

June 24, 2011

Dr. Joseph Cecchi, Dean
School of Engineering
University of New Mexico
Albuquerque, NM 87131-1341

SUBJECT: UNIVERSITY OF NEW MEXICO - NRC ROUTINE INSPECTION REPORT NO.
50-252/2011-201

Dear Dr. Cecchi:

On May 23-26, 2011, the U.S. Nuclear Regulatory Commission (NRC, the Commission) conducted an inspection at the University of New Mexico AGN-201M Research Reactor facility (Inspection Report No. 50-252/2011-201). The enclosed report documents the inspection results, which were discussed on May 25, 2011, with Dr. Robert Busch, Chief Reactor Supervisor, and Mr. Kenneth Carpenter, Reactor Supervisor.

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, observation of activities, and interviews with 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, and 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 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).

Should you have any questions concerning this inspection, please contact Greg Schoenebeck at (301) 415-6345 or by electronic mail at Greg.Schoenebeck@nrc.gov.

Sincerely,

/RA/

Johnny H. Eads, Jr., Chief
Research and Test Reactors Oversight Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

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

Enclosure: NRC Inspection Report No. 50-252/2011-201
cc w/encl: See next page

University of New Mexico

Docket No. 50-252

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Test, Research, and Training
Reactor Newsletter
University of Florida
202 Nuclear Sciences Center
Gainesville, FL 32611

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

Docket No: 50-252

License No: R-102

Report No: 50-252/2011-201

Licensee: University of New Mexico

Facility: AGN-201M Reactor Facility

Location: Albuquerque, New Mexico

Dates: May 23-26, 2011

Inspector: Gregory M. Schoenebeck

Approved by: Johnny H. Eads Jr., Chief
Research and Test Reactors Oversight Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY

University of New Mexico
AGN-201M Research Reactor Facility
NRC Inspection Report No.: 50-252/2011-201

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) Requalification Training, 4) Surveillance and Limiting Conditions for Operations (LCOs); 5) Emergency Planning, 6) Maintenance Logs and Records; 7) Fuel Handling Logs and Records since the last U.S. Nuclear Regulatory Commission (NRC) inspection. The licensee's program was acceptably directed toward the protection of public health and safety, and in compliance with NRC requirements. No deviations or violations were identified.

Organization and Staffing

- Organization and staffing satisfied Technical Specification (TS) requirements.

Operations Logs and Records

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

Requalification Training

- The licensee's requalification program was up-to-date, and requirements were met as specified in the NRC-approved requalification plan.

Surveillance and LCOs

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

Emergency Planning

- The facilities' emergency preparedness program is consistent with the approved Emergency Plan.

Maintenance Logs and Records

- No maintenance activity has occurred since the last NRC inspection. 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.

REPORT DETAILS

Summary of Plant Status

The University of New Mexico (UNM, the licensee) Aerojet General Nucleonics-201 Modified (AGN-201M) research reactor was licensed to operate at a maximum steady-state thermal power of 5 Watt (W). The licensee continued to operate the reactor in support of operator training, surveillances, and teaching and classroom experiments/demonstrations. During the inspection, the reactor was operated for the performance and completion of the monthly surveillance tests.

1. Organizational Staffing

a. Inspection Scope (IP 69001)

The inspector reviewed the following to ensure that the requirements of Technical Specifications (TS) Section 6.0 (revised November 2010) were being met:

- Organization and Staff Qualifications
- Reactor Safety Advisory Committee (RSAC) meeting minutes for September 2, 2010 and March 11, 2011
- Selected portions of the Reactor Operations Logs

b. Observations and Findings

Since the last U. S. Nuclear Regulatory Commission (NRC) inspection in August 2010, there has been an increase in the operating staff at the UNM research reactor. In February 2011, the NRC administered a license examination to 5 prospective candidates, of which 4 passed both the written and operating exam; 1 failed Section B of the written exam. In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) Section 55.59, part of the license application process requires a medical examination which uses an approved standard (e.g., American National Standards Institute/American Nuclear Society (ANSI/ANS) 15.4-1988 (Non-Power)) for guidance. When filling out the required medical application form (i.e., NRC Form 396) the prospective candidates' medical evaluator did not delineate the NRC-approved standard which he/she used for guidance. At this time, the candidates are being re-examined by a clinician who will use NRC-approved guidance document; results are pending. The facility intends to mail the NRC Form 396 for all candidates to the NRC for review and approval.

The facilities' desire to increase the number of reactor operators is to aid with the large number of laboratories that the nuclear engineering undergraduates take throughout the fall and spring semesters during their senior year. Currently, the UNM research reactor operates with one Chief Reactor Supervisor (CRS) and

two Reactor Supervisors all of whom hold a valid Senior Reactor Operator (SRO) license issued by the NRC. One SRO's license is approaching expiration in December 2011, but intends to renew.

Through the review of selected records, during operations when the reactor was not secured the facility met the minimum operating staff requirements specified in Technical Specification (TS) Section 6.1.12.

A current listing (i.e., November 2010) of reactor facility personnel by name and phone number was conspicuously posted in the reactor control room.

c. Conclusion

Organization 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 2010 and 2011
- Reactor Operation and Training Manual (ROTM), Revised February 2009
- Surveillance and LCO Records, various 2010 and 2011
- Maintenance Records, various 2010 and 2011
- Facility Radiation Surveys, various 2010 and 2011

b. Observations and Findings

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

Overall, the inspector noted few revisions to the existing procedures. However, in some instances there were a few "pen and ink" changes to the ROTM and Monthly Maintenance procedures which update facility description and correlates to the newly revised TS from the completed relicensing effort. Once the procedures are updated, they will undergo the review process.

c. Conclusion

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

3. Operator Requalification

a. Inspection Scope (IP 69001)

The inspector reviewed the following to verify compliance with the requirements in 10 CFR Part 55 and the requalification program:

- Operator active license status
- Written Requalification Examinations records
- Operator physical examination records
- Reactivity manipulation records for the last requalification cycle
- Selected "Request For Use" forms dated from March 2010 to present
- Selected AGN-201M Reactor Operations Log sheets dated from January 2010 to the present
- "Operator and Senior Operator Requalification Program for the University of New Mexico AGN-201M Reactor Facility," revised as of March 11, 2009
- Requalification Training Records for the 2008-2009 Requalification Cycle

b. Observations and Findings

At the time of the inspection, there were three qualified Senior SROs working at the facility. The inspector verified that all the operators' licenses were current.

A review of the logs and records showed that lectures and on-the-job training (OJT) were required parts of the licensee's requalification program. With only three active operators, the licensee continues to use the Annual Maintenance period and semester classes/laboratories performing reactor operations to substitute for the lectures and the OJT in accordance with the NRC-approved Requalification Plan. This maintains a level of appropriateness for this facility since the last NRC inspection. Pending the review of the medical applications, the facility intends to enroll the newly licensed reactor operators into an active requalification plan in accordance with the NRC-approved Requalification Plan.

Through the record review of current operators, it was also noted that annual operating examinations (exams) and biennial written exams had been completed by each operator as required. In addition, the inspector verified that each operator had completed the required number of hours of reactor operations or supervision each calendar quarter as required. Records of these reactor manipulations, other operational activities such as maintenance, and supervisory activities were being maintained, as were records of the annual operating exams and biennial written exams. The program was up-to-date and training was current.

Through records review the inspector verified that medical examinations were being completed biennially for each operator as required.

c. Conclusion

The licensee's requalification program was up-to-date, and requirements were met as specified in the NRC-approved requalification plan.

4. Surveillance and Limiting Condition for Operation

a. Inspection Scope (IP 69001)

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

- Selected Request For Use (RFU) forms from 2010 and 2011
- AGN-201 Annual Maintenance form, dated August 12, 2010
- Monthly Reactor Inspection AGN-201 M, SN-112 Reactor forms, various for 2010 and 2011

b. Observations and Findings

The inspector verified that the 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. During the review of the monthly and annual maintenance records, the inspector noted the Chief Reactor Supervisor reviewed and approved the records as required. There were no issues with out of specification LCOs nor were any surveillance items noted to be outside of the required periodicity for completion.

During the inspection, the inspector observed the completion of their monthly maintenance by an SRO; there were no issues noted.

c. Conclusion

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

5. Emergency Preparedness

a. Inspection Scope (IP 69001)

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

- E-plan for the UNM AGN-201M Reactor Facility, dated August 10, 2010
- Emergency Drill Critique, dated May 6, 2011
- 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 (other than formatting) and did not appear to change its effectiveness. The inspector reviewed the latest facility drill critique and noted a finding from the annual drill (i.e., fire in the reactor building, May 6, 2011) which will modify a step of a procedure. Currently, the E-Plan procedure for a fire in the facility indicates in step IV to turn on the exhaust fans. The fire department indicated it would be best to leave the fans off in case of fire so the oxygen levels in the building may be reduced. The proposed change in procedure is a recommendation from the Fire Department which, appears to enhance the effectiveness of emergency response. The facility was aware that they must inform the NRC regarding the change to the E-Plan within 30 days of implementation in order to satisfy 10 CFR 50.54q.

c. Conclusion

The facilities' emergency preparedness program is consistent with the approved E- Plan.

6. 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:

- Reactor Safety Advisory Committee (RSAC) Meeting Minutes
- Maintenance Log

b. Observations and Findings

Since the last NRC inspection, no maintenance activities have occurred at the reactor facility; the last occurred in 2009. All maintenance activities were

maintained within the facility Maintenance Log. The historical records were maintained by the facility and were retained by the TS required periodicity (i.e., at least 5 years).

c. Conclusion

No maintenance activity has occurred since the last NRC inspection. Maintenance records were retained in accordance with TS required periodicity.

7. Fuel Handling Logs and Records

a. Inspection Scope (IP 86740)

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

- Nuclear Engineering Radioisotope Production Log, various 2010 and 2011
- Reactor Facility Utilization Logs, various 2010 and 2011
- Reactor Operations Log, various 2010 and 2011
- Fuel Addition Data AGN-201 Critical Experiment, dated January 27, 2011

b. Observations and Findings

Through discussion with reactor facility staff and record reviews it was determined that the majority of fuel handling is performed during laboratory experiments (e.g., 1/M plots for criticality determination) or annual surveillances (e.g., rod drop tests). For the laboratory experiments, after rigging off the graphite shield plug and removal of the tank access hatch, five of the polyethylene fuel discs are removed for baseline measurements. The polyethylene discs have associated serial numbers and when they are removed, they are set down on a covered working surface above the shielded tank. In this storage condition outside of the reactor, the fuel is in a secured location (i.e., the locked Nuclear Engineering Laboratory) and does not leave the confines of the reactor room. Criticality concerns for the five discs is well below the TS limit of $K_{\text{eff}} < 0.9$.

During the rod drop measurements, the fueled control rods are uncoupled from the bottom of the core shroud and taken to a rig for general inspection and tested using infrared sensors and computer software. A single fueled control rod is removed, measured, and coupled back into the core shroud prior to removing another rod. Additionally, inherit design measures prevent the inadvertent replacement of an incorrect fueled control rod element in the improper core position. The two safety rods and coarse control rod contain approximately the same amount of uranium-235 (U-235) and are identical in size. The fine control rod is approximately one-half the diameter of the other rods and has less U-235. Because of the diameter restrictions in the control rod guide tube for the fine

control rod, it would be evident if the fueled section of one of the other three rods (e.g., Safety #1) would be erroneously installed onto that particular rod or if an operator accidentally attempted to install one of the other three rods (e.g., Safety #1) into the fine control rod position.

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.

8. Follow-up

a. Inspection Scope (IP 92701)

IFI 50-252/2008-201-01

The inspector followed-up on IFI 50-252/2008-201-01 to determine the licensee's efforts for investigating the cause of the much higher than expected doses for reactor staff members and students who had worked in the NE Lab during the second and third quarters of 2007.

IFI 50-252/2010-201-01

The inspector followed-up on delineating the reactor condition of shutdown in procedures and TS. This included identifying if the cadmium rod installed into the glory hole is a requirement for either a shutdown or secured condition.

b. Observations and Findings

IFI 50-252/2008-201-01

Upon discussion with the facility staff it was determined that the Radiation Safety Officer had not provided any additional information or investigated further with the cause of abnormal, increased dose levels. During discussion with the facility staff, they indicated that they have not seen any unusual dose levels noted on recent quarterly reports since 2007. During this inspection, Radiation Protection was not one of the modules due for completion. The inspector will follow-up with the Radiation Safety Officer and the facility during the next inspection.

IFI 50-252/2010-201-01

During the relicensing effort, the new TS clearly define the shutdown and secured position with regards to the cadmium rod being installed into the glory hole. Therefore, this IFI is considered closed.

c. Conclusion

The inspector is keeping IFI 50-252/2008-201-01 open for future inspection; IFI 50-252/2010-01 is considered closed.

9. Exit Meeting

The inspector presented the inspection results to licensee management at the conclusion of the inspection on May 26, 2011. The inspector discussed the findings for each area reviewed. The licensee acknowledged the findings 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

Other Personnel

None

INSPECTION PROCEDURES USED

IP 69001 Class II Research and Test Reactors

ITEMS OPENED, CLOSED, AND DISCUSSED

OPENED:

None

CLOSED:

50-252/2010-201-01 IFI Follow-up on delineating the reactor condition of shutdown in procedures and TS. This includes identifying if the cadmium rod installed into the glory hole is a requirement for either a shutdown or secured condition.

DISCUSSED:

50-252/2008-201-01 IFI Follow-up on the licensee's efforts to determine the cause of the much higher than expected doses for reactor staff members and students who had worked in the NE Lab during the second and third quarters of 2007. This item remains open.

LIST OF ACRONYMS USED

10 CFR	Title 10 of the <i>Code of Federal Regulations</i>
ANSI/ANS	American National Standards Institute/American Nuclear Society
CRS	Chief Reactor Supervisor
E-Plan	Emergency Plan
IFI	Inspector Follow-up Item
IP	Inspection Procedure
K_{eff}	Effective Multiplication Factor
NRC	U. S. Nuclear Regulatory Commission

OJT	On-the-job training
ROTM	Reactor Operation and Training Manual
RS	Reactor Supervisor
RSO	Radiation Safety Officer
RSAC	Reactor Safety Advisory Committee
SRO	Senior Reactor Operator
TS	Technical Specifications
UNM	University of New Mexico
U-235	Uranium 235