

April 24, 2014

Dr. Yassin Hassan  
Head of Nuclear Engineering  
Texas A&M University  
Zachry Bldg. Room 337  
College Station, TX 77843-3133

SUBJECT: TEXAS A&M UNIVERSITY - NRC INSPECTION REPORT NO. 50-059/2014-201

Dear Dr. Hassan:

From March 24–27, 2014, the U.S. Nuclear Regulatory Commission (NRC or the Commission) completed an inspection at your Texas A&M University AGN-201M Research Reactor facility (Inspection Report No. 50-059/2010-201). The enclosed inspection report documents the inspection results, which were discussed on March 27, 2014, with C. Crouch, the 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, observed activities at the facility, 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, 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).

Y. Hassan

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Should you have any questions concerning this inspection, please contact Mike Morlang at (301) 415-4092 or by electronic mail at [gary.morlang@nrc.gov](mailto:gary.morlang@nrc.gov).

Sincerely,

**/RA/**

Gregory T. Bowman, Chief  
Research and Test Reactors Oversight Branch  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

Docket No. 50-059  
License No. R-023

Enclosure:  
NRC Inspection Report No. 50-059/2014-201

cc w/encl: Please see next page

Texas A&M University

Docket No. 50-59

cc:

Mayor of the City of College Station  
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Y. Hassan

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Should you have any questions concerning this inspection, please contact Mike Morlang at (301) 415-4092 or by electronic mail at [gary.morlang@nrc.gov](mailto:gary.morlang@nrc.gov).

Sincerely,

**/RA/**

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**NRC-002**

OFFICE	PROB:RI	PROB:BC
NAME	GMorlang (GBowman for)	GBowman
DATE	4/23/2014	4/24/2014

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

Docket No.: 50-059

License No.: R-23

Report No.: 50-059/2014-201

Licensee: Texas A&M University

Facility: AGN-201M Research Reactor

Location: College Station, TX

Dates: March 24–27, 2014

Inspector: Mike Morlang

Approved by: Gregory T. Bowman, Chief  
Research and Test Reactors Oversight Branch  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

## EXECUTIVE SUMMARY

Texas A&M University  
AGN-201M Research Reactor  
Report No: 50-059/2014-201

The primary focus of this routine, announced inspection was on-site review of selected aspects of Texas A&M's (the licensee's) Class II research reactor safety program, including: (1) operations logs and records; (2) operator licenses, requalification, and medical activities; (3) experiments; (4) radiation protection; (5) effluents and environmental monitoring; (6) maintenance logs and records; and (7) fuel handling logs and records since the last U.S. Nuclear Regulatory Commission (NRC) inspection of these areas. The licensee's program was acceptably directed toward the protection of public health and safety. No deviations or violations of significance were identified.

### Operations Logs and Records

- The reactor had been shut down since June 21, 2013, because of discrepancies noted during the NRC's license renewal review of the reactor console wiring.

### Operator Licenses, Requalification, and Medical Activities

- There were five licensed senior reactor operators and one licensed reactor operator at the facility. Operator requalification was generally being conducted as described in the Requalification Plan.
- One inspector follow-up item was identified associated with timely administration of the written requalification exam to licensed operators at the facility.

### Experiments

- The program for conducting and controlling experiments was in place, but no new experiments had been conducted.

### Radiation Protection Program

- Surveys were being completed and documented acceptably.
- Postings met the regulatory requirements specified in Title 10 of the *Code of Federal Regulations* Parts 19 and 20.
- Personnel dosimetry was being worn as required and doses were well within the licensee's procedural action levels and NRC's regulatory limits.
- Radiation monitoring equipment was being maintained and calibrated as required.
- The Radiation Protection Program satisfied regulatory requirements.

Effluents and Environmental Monitoring

- Effluent monitoring satisfied license and regulatory requirements and there had been no releases of radioactive effluents.

Maintenance Logs and Records

- Maintenance was being conducted in accordance with approved procedures and Technical Specification requirements.

Fuel Movement

- Fuel movements were conducted to facilitate control rod inspections in accordance with approved procedures.

## **REPORT DETAILS**

### **Summary of Plant Status**

Texas A&M University's (TAMU's or the licensee's) 5 watt Aerojet General Nucleonics-201 Modified (AGN-201M) training reactor had been shutdown since June 21, 2013, because of a reactor control console wiring discrepancy noted during the U.S. Nuclear Regulatory Commission's (NRC's) license renewal review. The reactor was not operated during this inspection.

#### **1. Operations Logs and Records**

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

The inspector reviewed selected portions and/or aspects of:

- Console logbooks 53, 54, and 55, from April 4, 2012, to present
- Reactor Safety Board meeting minutes for May 15, 2012, to the present
- Annual Operating Report of the Texas A&M University AGN-201M Training Reactor, for the period June 1, 2011, to May 31, 2012, dated June 2, 2012
- Annual Operating Report of the Texas A&M University AGN-201M Training Reactor, for the period June 1, 2012, to May 31, 2013, dated August 30, 2013
- Startup checklists from May 2012 to present

##### **b. Observations and Findings**

As noted previously, the last date of operation of the reactor was June 21, 2013. During the NRC's license renewal review, wiring discrepancies were noted on the upgraded reactor control console. At the time of the inspection, the licensee was in the process of reinstalling hard-wired reactor scrams that had been modified during a previous console upgrade.

During this inspection, it was noted that because the reactor could not be operated, the licensee was unable to complete some required periodic surveillance tests. These surveillance tests will need to be completed once control console repairs have been completed and the reactor is operable.

##### **c. Conclusions**

Records and operating logs were in compliance with procedures and Technical Specifications prior to the reactor shutdown. There have been no reactor operations conducted since June 21, 2013.



## **2. Operator Licenses, Requalification, and Medical Activities**

### **a. Inspection Scope (IP 69001)**

The inspector reviewed the following in order to determine whether operator training and requalification activities were conducted as required and to confirm that medical requirements were met as required by the licensee's Requalification Program for Licensed Reactor Operators and Senior Reactor Operators - Texas A&M University, dated May 20, 1988:

- Records of reactivity manipulations
- Operator active license status
- Operator physical examination status
- Training and written examination results records

### **b. Observations and Findings**

The reactor supervisor and four student operators were qualified senior reactor operators. One student operator was qualified as a reactor operator. All licensed operators will need to complete a written exam and manipulate the reactor controls under direct supervision following NRC approval to restart the reactor. The inspector noted that the required written requalification exam had not been completed on time, based on the reactor supervisor's decision to make it part of the reactor restart training. The inspector identified this issue as a minor non-compliance with the requalification program. In response to the inspector's observation, the licensee indicated that the written exam would be administered as soon as possible to meet the requirements of the requalification plan, and that another exam would be given prior to restart of the reactor, if necessary. This issue will be tracked as an inspector follow-up item (IFI-05/059-2014-201-1) and reviewed during a future inspection.

Licensed operator medical records were complete and up to date.

### **c. Conclusions**

The licensee was generally conducting training in accordance with the requalification plan. One inspector follow-up item was identified associated with timely administration of the written requalification exam to licensed operators at the facility.

## **3. Experiments**

### **a. Inspection Scope (IP 69001)**

The inspector reviewed the following to verify that experiments would be conducted within approved guidelines specified in Technical Specification Sections 3 and 4:

- Documentation of experiment review and approval by the Reactor Safety Board
- Listing of Texas A&M approved experiments contained in the program document entitled, "Reactor Experiments for the Texas A&M University AGN-201M Reactor Facility," including:
  - "Startup and Operation of the AGN-201M Reactor" (REXP-1), approval dated February 16, 1976
  - "Irradiation of Compounds Composed of Elements One Through Eighty-Three in the Glory Hole or Access Port" (REXP-2), approval dated February 16, 1976
  - "Control Rod Calibration by the Rod Drop Method" (REXP-3), approval dated February 16, 1976
  - "Control Rod Calibration by Positive Period Measurement" (REXP-4), approval dated February 16, 1976
  - "Reactivity Perturbations" (REXP-5), approval dated February 16, 1976
  - "Delayed Neutron Half-Life Measurements" (REXP-6), approval dated February 16, 1976
  - "Transfer Function Measurement" (REXP-7), approval dated February 16, 1976
  - "Irradiation of Natural or Enriched Uranium in the AGN-201M Glory Hole" (REXP-8), approval dated February 16, 1976
  - "Irradiation Experiments in the Thermal Column" (REXP-9), approval dated February 16, 1976
  - "A Critical Experiment for the AGN-201M Reactor" (REXP-10), approval dated February 16, 1976
- Reactor Safety Board meeting minutes for May 15, 2012, to the present
- Annual Operating Report of the Texas A&M University AGN-201M Training Reactor, for the period June 1, 2011, to May 31, 2012, dated June 2, 2012
- Annual Operating Report of the Texas A&M University AGN-201M Training Reactor, for the period June 1, 2012, to May 31, 2013, dated August 30, 2013

b. Observations and Findings

Various types of experiments had been proposed to be conducted on a routine basis at the facility. The inspector verified that experiments had been reviewed and approved by the Reactor Safety Board as required. The inspector ensured that the licensee was aware of the requirements associated with the completion of a evaluation required by Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.59, and the review and approval of the Reactor Safety Board, before conducting new experiments.

c. Conclusions

The program for conducting and controlling experiments was in place, but no new experiments had been conducted.

**4. Radiation Protection**

a. Inspection Scope (IP 69001)

The inspector reviewed the following to verify compliance with 10 CFR Parts 19 and 20, as well as Section 4.4.c of the Technical Specifications:

- Area dosimetry results for 2012 and 2013
- Personnel dosimetry results for 2012 and 2013
- Computer-based training records for the AGN-201M reactor staff
- Radiological signs and postings in various areas of the facility
- Maintenance and calibration of radiation monitoring equipment
- Monthly contamination and radiation survey forms for the AGN complex, dated 2012 to present
- Reactor Safety Board meeting minutes for May 15, 2012, to the present
- Annual Operating Report of the Texas A&M University AGN-201M Training Reactor, for the period June 1, 2011, to May 31, 2012, dated June 2, 2012
- Annual Operating Report of the Texas A&M University AGN-201M Training Reactor, for the period June 1, 2012, to May 31, 2013, dated August 30, 2013

b. Observations and Findings

(1) Surveys

The inspector reviewed annual radiation and contamination surveys of the AGN-201M reactor facility completed by Texas A&M Environmental Health and Safety Department (EHSD) Radiation Safety Staff personnel. The results were documented on the appropriate forms and evaluated as required. No elevated contamination levels or radiation levels were noted during the inspection period.

(2) Postings and Notices

The inspector reviewed the postings at the entrances to the facility controlled areas. The postings indicated the radiation hazards present. Other postings also showed the industrial hygiene hazards present in the areas. The facility's radioactive material storage areas were noted to be properly posted. No unmarked radioactive material was detected in the facility. Copies of the notice to workers required by 10 CFR Part 19 were posted on the door outside the hallway leading to the reactor area.

(3) Dosimetry

The licensee used a National Voluntary Laboratory Accreditation Program-accredited vendor to process personnel and area dosimetry quarterly. Through direct observation, the inspector determined that dosimetry was acceptably used by facility personnel. Visitors to the facility were not routinely issued dosimetry due to low background readings and no direct exposures to sources.

An examination of the records for the inspection period showed that all exposures were well within NRC limits and within licensee action levels. To date in 2014, there were seven individuals being monitored. Monitoring was accomplished by using optically-stimulated luminescent dosimeters. The highest lifetime dose to any individual being monitored was 65 millirem.

(4) Radiation Monitoring Equipment

The calibration of portable survey meters and friskers was typically completed by an outside contractor. There were no fixed radiation detectors installed at the facility. The calibration stickers of portable survey meters and friskers in use at the facility were reviewed. Calibration frequency met the requirements established in the applicable procedures and records were being maintained as required.

(5) Radiation Protection Program

The licensee's Radiation Protection Program was established in the Texas A&M EHSD's document entitled, "Radiological Safety Program Manual," latest revision dated July 2004. The program required that all personnel who had unescorted access to work in a radiation area or with radioactive material receive training in radiation protection, policies, procedures, requirements, and facilities prior to entry. The inspector verified that licensee staff had received the required radiation protection training given by EHSD. In addition, staff members with unescorted access to the facility supervised all new employees or visitors. Refresher training was required every 2 years and was available on-line for ease of completing the training.

(6) Facility Tours

The inspector toured the reactor room, as well as the adjoining ante chamber (room adjacent to the reactor room) and the graduate study office. Control of access to these areas, control of access to radiation and high radiation areas, and control of radioactive material were acceptable.

c. Conclusions

The radiation protection program was adequate in that: (1) surveys were being completed and documented acceptably, (2) postings met the regulatory requirements specified in 10 CFR Parts 19 and 20, (3) personnel dosimetry was being worn as required and doses were well within the licensee's procedural action levels and NRC's regulatory limits, (4) radiation monitoring equipment was being maintained and calibrated as required, (5) the Radiation Protection Program being implemented by the licensee satisfied regulatory requirements.

**5. Effluents and Environmental Monitoring**

a. Inspection Scope (IP 69001)

The inspector reviewed the following to verify compliance with 10 CFR Parts 19 and 20, as well as Section 4.4.c of the Technical Specifications:

- Annual Operating Report of the Texas A&M University AGN-201M Training Reactor, for the period June 1, 2011, to May 31, 2012, dated June 2, 2012
- Annual Operating Report of the Texas A&M University AGN-201M Training Reactor, for the period June 1, 2012, to May 31, 2013, dated August 30, 2013
- Monthly contamination and radiation survey forms for the AGN complex, dated 2010 to present

b. Observations and Findings

An optically-stimulated luminescent dosimeter was placed in the AGN reactor room, several feet from the reactor. A second dosimeter was also placed directly outside of the reactor room in the ante chamber room, which was also part of the controlled area at the facility. The inspector verified that there were no liquid or gaseous effluents discharged from the facility in 2012 and 2013.

c. Conclusions

Effluent monitoring satisfied license and regulatory requirements and no releases had occurred.

**6. Maintenance Logs and Records**

a. Inspection Scope (IP 69001)

To determine whether maintenance and surveillance activities were being completed, the inspector reviewed:

- Maintenance log, dated June 7, 2010, to present
- Certification log for 2012 and 2013
- CRIS-6, "Maintenance Procedure for Conducting a Detailed Control Rod Inspection and Functional Check," dated May 2010
- Annual Operating Report of the Texas A&M University AGN-201M Training Reactor, for the period June 1, 2011, to May 31, 2012, dated June 2, 2012
- Annual Operating Report of the Texas A&M University AGN-201M Training Reactor, for the period June 1, 2012, to May 31, 2013, dated August 30, 2013

b. Observations and Findings

The licensee maintained a maintenance log to document work on reactor equipment. A separate certification log was maintained to document required surveillance testing. As discussed above, because the reactor has been inoperable since June 2013, numerous surveillance requirements will need to be completed prior to restart of the reactor.

c. Conclusions

Maintenance items were being conducted and documented as required.

**7. Fuel Movement**

a. Inspection Scope (IP 69001)

The inspector reviewed the following to verify adherence to fuel handling, positioning, and inspection requirements specified in Technical Specification Sections 5.1 and 5.2:

- Fuel handling equipment and instructions
- CRIS-6, "Maintenance Procedure for Conducting a Detailed Control Rod Inspection and Functional Check," dated May 2010
- Console logbooks 53, 54, and 55, from April 4, 2012, to present

b. Observations and Findings

Through records review and interviews with licensee personnel, the inspector determined that the licensee had moved fuel on May 29, 2013, for control rod inspections. The Reactor Manager, a licensed senior reactor operator, was present during the fuel movement. The inspector verified through review of records that Technical Specification and procedural requirements were met during this activity.

c. Conclusions

Fuel movements were being conducted following Technical Specification requirements and applicable procedures.

**8. Exit Interview**

The inspection scope and results were summarized on March 27, 2014, with members of licensee management. The inspector described the areas inspected and discussed in detail the inspection findings. The licensee acknowledged the results of the inspection and did not identify any information to be withheld from public disclosure.

## **PARTIAL LIST OF PERSONS CONTACTED**

### **Licensee**

C. Crouch                      Reactor Supervisor

### **Other Personnel**

D. Menchaca                      Senior Health Physicist for Cyclotrons  
L. Vasudesan                      Manager and Radiological Safety Officer, Environmental Health and  
Safety Department, Texas A&M University

## **INSPECTION PROCEDURES USED**

IP 69001                      Class II Research and Test Reactors

## **ITEMS OPENED, CLOSED, AND DISCUSSED**

### **Opened**

50-059/2014-201-1      IFI      Review timely administration of the written requalification exam.

### **Closed**

None.

### **Discussed**

None.

## **LIST OF ACRONYMS USED**

10 CFR	Title 10 of the <i>Code of Federal Regulations</i>
ADAMS	Agencywide Documents Access and Management System
AGN-201M	Aerojet General Nucleonics-201 Modified
EHSD	Environmental Health and Safety Department
IFI	Inspector Follow-up Item
IP	Inspection Procedure
NRC	Nuclear Regulatory Commission
TAMU	Texas A&M University