

December 5, 2016

Dr. Steven Biegalski  
Director, Nuclear Engineering  
Teaching Laboratory  
The University of Texas at Austin  
Pickle Research Campus, Building 159  
Mail Code R9000  
Austin, TX 78712-1024

SUBJECT: UNIVERSITY OF TEXAS AT AUSTIN – NUCLEAR REGULATORY COMMISSION  
ROUTINE INSPECTION REPORT NO. 50-602/2016-201

Dear Dr. Biegalski:

From October 31 - November 3, 2016, the U.S. Nuclear Regulatory Commission (NRC or the Commission) completed an inspection at the University of Texas at Austin Nuclear Engineering Teaching Laboratory facility. The enclosed report documents the inspection results, which were discussed on November 3, 2016, with you and Paul Whaley, Associate Director, The University of Texas Nuclear Engineering Teaching Laboratory; and members of your staff.

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.

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 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).

S. Biegalski

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

Sincerely,

***/RA/***

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

Docket No. 50-602  
License No. R-129

Enclosure:  
As stated

cc: See next page

University of Texas at Austin

Docket No. 50-602

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S. Biegalski

- 2 -

Should you have any questions concerning this inspection, please contact Gary 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**

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<b>DATE</b>	11/22/2016	11/23/2016	12/5/2016

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

Docket No. 50-602

License No. R-129

Report No. 50-602/2016-201

Licensee: The University of Texas at Austin

Facility: Nuclear Engineering Teaching Laboratory

Location: Pickle Research Campus, Building 159  
10100 Burnet Road  
Austin, TX 78758

Dates: October 31 – November 3, 2016

Inspector: Gary Morlang

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

## **EXECUTIVE SUMMARY**

The University of Texas at Austin  
Nuclear Engineering Teaching Laboratory  
Report No. 50-602/2016-201

The primary focus of this routine, announced inspection included onsite review of selected aspects of the University of Texas at Austin (the licensee's) Nuclear Engineering Teaching Laboratory TRIGA Mark II research reactor safety program including: (1) organizational structure and staffing, (2) operations logs and records, (3) operator requalification, (4) surveillance testing and limiting conditions for operation, (5) emergency preparedness, (6) maintenance, and (7) fuel handling, since the last Nuclear Regulatory Commission (NRC) inspection in these areas. The licensee's program was acceptably directed toward the protection of public health and safety and was in compliance with NRC requirements.

### Organizational Structure and Staffing

- The organizational structure, functions, and staffing were consistent with Technical Specification (TS) requirements. Staff qualifications satisfied TS requirements.

### Operations Logs and Records

- Reactor operations and logs were being maintained acceptably and operations were carried out in accordance with procedural and TS requirements.

### Operator Requalification

- The operator requalification program was up-to-date and being acceptably maintained.
- Medical examinations were being completed biennially as required.

### Surveillance Testing and Limiting Conditions for Operation

- The program for surveillance testing, including checks, tests, and calibration of equipment, was being implemented in accordance with requirements specified in Sections 3 and 4 of the TS.

### Emergency Preparedness

- The emergency plan and implementing procedures were being audited and reviewed biennially as required.
- Letters of agreements documenting emergency support to be provided by offsite agencies needed to be updated as required. Inspector Follow-Up Item 05-602/2016-201-01.
- Annual drills were being held and documentation was maintained concerning the follow-up critiques and subsequent corrective actions taken as needed.

- Emergency preparedness training for staff personnel was being conducted as stipulated in the emergency plan.

#### Maintenance

- The facility maintenance program was being implemented as required by facility procedures.

#### Fuel Handling

- Reactor fuel movements and fuel inspections were made and documented in accordance with procedure.
- Fuel elements were being inspected on a biennial basis as required by the TS.

## REPORT DETAILS

### Summary of Facility Status

The University of Texas at Austin (UT or the licensee's) 1.1 megawatt TRIGA Mark II research reactor continued routine operations. The reactor is operated in support of laboratory experiments, maintenance and surveillance testing, and operator training. During the inspection, the reactor was operated to support sample irradiations and facility tours.

### 1. Organizational Structure and Staffing

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

The inspector reviewed the following regarding the licensee's organizational structure and functions to ensure that the requirements of Section 6.0 of licensee's Technical Specification (TS) were being met:

- Management responsibilities and administrative controls
- The UT Nuclear Engineering Teaching Laboratory (NETL) organizational structure and staffing
- Administrative controls outlined in NETL Procedure No. ADMN-3, "Personnel and Operator Qualifications," Revision (Rev. 0), approval dated January 31, 1992
- UT, NETL, 2015 Annual Report, submitted March 31, 2016
- American National Standards Institute/American Nuclear Society (ANSI/ANS) Standard-15.4-1988, "Selection and Training of Personnel for Research Reactors," dated June 9, 1988, and reaffirmed July 12, 1999

#### b. Observations and Findings

Organization, structure, responsibilities, and staffing were as required by TS Section 6.1. Through review of various records and discussions with personnel, the inspector determined that the NETL staff satisfied the TS requirements and conformed to those outlined in ANSI/ANS-15.4-1998.

Four changes to senior management level personnel had occurred between March and August of 2016. As required by TS these changes were reported to the NRC.

#### c. Conclusion

The organizational structure, functions, and staffing were consistent with TS requirements. Staff qualifications satisfied TS requirements.

Enclosure



## 2. Operations Logs and Records

### a. Inspection Scope (IP 69001)

The inspector reviewed selected aspects of the following to verify operation of the reactor in accordance with TS Sections 3 through 5 and TS Section 6.1.3:

- TS through Amendment 4, dated May 10, 2001
- Maintenance log for 2015 through the present
- Selected monthly checklists for 2015 through the present
- Selected prestart check sheets for 2015 through the present
- Selected UT-TRIGA instrumentation and control system (ICS) console operation log sheets for 2015 and 2016
- Selected startup-shutdown check sheets and the associated experiment startup-shutdown check sheets and heat exchanger startup-shutdown check sheets for 2015 through the present
- Scram log sheets and startup reactivity calculation records from January 2015 to the present
- NETL Operation Procedure, OPER-1, "Startup - Shutdown Checks," Version (Ver.) 1.00, approved April 3, 2002
- NETL Operation Procedure, OPER-2, "Reactor Startup and Shutdown," Ver. 1.01, approved April 11, 2012,
- NETL Operation Procedure, OPER-3, "Reactor Operation Modes," Ver. 1.01, approved April 12, 2012
- NETL Operation Procedure, OPER-4, "Operation of Reactor Water Systems," Ver. 1.00, approved April 3, 2002
- NETL Operation Procedure, OPER-5, "Operation of Air Confinement System," Ver. 1.00, approved April 3, 2002
- NETL Operation Procedure, OPER-6, "Reactor Bay Systems," Ver. 1.00, approved April 3, 2002
- UT, NETL, 2015 Annual Report, submitted March 31, 2016

### b. Observations and Findings

The inspector reviewed selected operations records from January 2015 through the present. These records included daily startup-shutdown checklists, log sheets, experiment startup and shutdown checklists, weekly checklists, monthly checklists, and other associated forms. Information on the operational status of the facility was recorded accurately on the log sheets and/or the checklists as required by procedure

The inspector observed the performance of the daily console startup checklist and a reactor startup to power.

Through interviews with operators and review of logs and records, the inspector confirmed that shift staffing met the minimum requirements for duty and on-call personnel as required by TS Section 6.1.3. This was noted on the log sheets by

listing the names of the individuals designated as the reactor operator and the senior reactor operator.

c. Conclusion

Reactor operations and logs were being maintained acceptably and operations were conducted in accordance with procedural and TS requirements.

**3. Operator Requalification**

a. Inspection Scope (IP 69001)

To determine that operator requalification activities and training were conducted as required by the UT-TRIGA requalification plan and that medical requirements were met, the inspector reviewed:

- Active license status of all current reactor operators (ROs) and senior reactor operators (SROs)
- Medical examination records for selected operators
- Training lectures and records for the training cycle (2016–2017)
- UT-TRIGA Requalification Plan, Rev. 1, dated November 1990
- Logs and records of reactivity manipulations for the requalification cycle (2016–2017)
- NETL Administrative Procedure, ADMN-3, “Procedures for Personnel and Operator Qualifications,” Rev. 0, approved January 31, 1992

b. Observations and Findings

There were three qualified SROs and one qualified RO at the facility. A review of all of the operators’ licenses showed that they were current. The inspector also noted that there were two students who were in training.

A review of the logs and records showed that training was being conducted in accordance with the licensee’s requalification and training program. Records of quarterly reactor operations, reactivity manipulations, and operator activities indicating operator proficiency were being maintained. Documentation indicating the completion of semiannual change and procedure reviews by the operators and annual supervisory evaluations of the operators were also maintained. Annual written examinations were being completed as required or credit was taken by the licensee for the licensed operator exams administered by the NRC to satisfy the requalification cycle exam requirements when applicable.

The inspector verified that operators were receiving the required biennial medical examinations as well.

c. Conclusion

The requalification program was up-to-date and being acceptably maintained. Medical examinations were being completed biennially as required.

**4. Surveillance Testing and Limiting Conditions for Operation**

a. Inspection Scope (IP 69001)

To determine that maintenance and surveillance activities and calibrations were being completed as required by TS Sections 3 and 4, the inspector reviewed:

- TS through Amendment 4, dated May 10, 2001
- System maintenance log for 2015 through the present
- Weekly-monthly surveillance log for 2015 through the present
- Semiannual and annual surveillance log for 2015 through the present
- Selected UT-TRIGA ICS console operation log sheets from January 2015 through the present
- NETL Maintenance Procedure, MAIN-1, "Interlock and SCRAM Features," Ver. 3.00, approved July 26, 2000
- NETL Maintenance Procedure, MAIN-2, "Instrument System Features," Ver. 3.00, approved July 26, 2000
- NETL Maintenance Procedure, MAIN-3, "Support System Features," Ver. 3.00, approved July 26, 2000
- NETL Maintenance Procedure, MAIN-6, "Rod and Drive Maintenance, Inspection," Ver. 3.00, approved July 26, 2000
- NETL Operation Procedure, OPER-6, "Reactor Bay Systems," Ver. 1.00, approved April 4, 2002
- NETL Surveillance Procedure, SURV-1, "Fuel Temperature Calibration," Rev. 0, approved January 24, 1992
- NETL Surveillance Procedure, SURV-2, "Reactor Pool Power Calibration," Rev. 1, approved March 2, 2009
- NETL Surveillance Procedure, SURV-3, "Excess Reactivity and Shutdown Margin," Ver. 2.00, approved April 4, 2002
- NETL Surveillance Procedure, SURV-4, "Reactor Water Systems Surveillance," Rev. 1, approved January 22, 1991
- NETL Surveillance Procedure, SURV-5, "Air Confinement System Surveillance," Rev. 2, approved April 4, 2002
- NETL Surveillance Procedure, SURV-6, "Control Rod Calibration," Rev. 1, approved March 2, 2009
- NETL Surveillance Procedure, SURV-7 "Pulse Characteristic Comparison," Rev. 0, approved January 24, 1992
- UT, NETL, 2015 Annual Report, submitted March 31, 2016

b. Observations and Findings

The inspector reviewed selected surveillance procedures and records including the weekly-monthly and semiannual-annual surveillance logs. The inspector determined that selected weekly, monthly, semiannual, and annual checks, tests, and/or calibrations for TS required surveillances were completed as stipulated. The tests and calibrations reviewed were completed on schedule and in accordance with licensee procedures. The appropriate records and logs reviewed were being maintained as required.

c. Conclusion

The program for surveillance testing, including checks, tests, and calibration of equipment was being carried out in accordance with TS Section 3 and 4 requirements.

**5. Emergency Preparedness**

a. Inspection Scope (IP 69001)

The inspector reviewed selected aspects of the following to verify compliance with the NETL emergency response plan:

- Emergency Plan (E-Plan), Rev. 3, dated December 10, 2009
- Training records for the past 2 years
- Emergency response facilities, supplies, equipment, and instrumentation
- Documentation of emergency drills and exercises held during 2015
- Letters of Agreement with support organizations including the Austin - Travis County Emergency Medical Services, City of Austin Fire Department, and the Brackenridge Hospital
- NETL Administrative Procedure, ADMN-5, "Protection Programs," Rev. 0, approved January 24, 1992
- NETL Implementing Procedure, PLAN-0, "Call and Notification," Ver. 2.00, approved November 9, 2000, with local permanent change (Emergency Call List) dated February 22, 2016
- NETL Implementing Procedure, PLAN-E, "Emergency Response," Ver. 3.00, approved November 2, 2006, which specified the emergency equipment and supplies required to be available at the facility
- NETL Security Procedure, PLAN-S, "Physical Security," Ver. 5.00, approved November 2, 2006
- Emergency drill critique dated November 2015

b. Observations and Findings

The E-Plan in use at the reactor and emergency facilities was the same as the version most recently submitted to the NRC for approval. The inspector verified that the E-Plan and implementing procedures were being audited and reviewed biennially as required and revised as needed. The inspector verified that

emergency response facilities, supplies, instrumentation, and equipment were being maintained and controlled as required in the E-Plan.

Through records review and interviews with licensee personnel, the inspector determined that emergency responders were knowledgeable of the proper actions to take in case of an emergency. Letters of agreement with outside response organizations had not been updated biennially as required. The licensee was informed that this issue would be handled as an Inspector Follow-up Item (IFI) for the next inspection (IFI 05-602/2016-201-01).

Emergency drills had been conducted annually as required by the E-Plan. Records indicated that off-site support organizations had participated in the facility drills at least every 2 years as required. Critiques were held following the drills to discuss the strengths and weaknesses identified during the exercises and to develop possible solutions to any problems identified. The results of these critiques were documented. Emergency preparedness and response training for reactor staff personnel was being conducted and documented as stipulated in the E-Plan. The emergency call list was updated at least annually as stipulated in the E-Plan. The latest emergency call list was dated February 22, 2016.

c. Conclusion

The emergency preparedness program was being conducted in accordance with the E-Plan.

**6. Maintenance**

a. Inspection Scope (IP 69001)

To determine that maintenance activities were being completed as required by TS and procedures, the inspector reviewed:

- TS through Amendment 4, dated May 10, 2001
- System maintenance log for 2015 through the present
- Weekly-monthly surveillance log for 2015 through the present
- Semiannual and annual surveillance log for 2015 through the present
- Selected UT-TRIGA ICS console operation log sheets from January 2015 through the present
- NETL Maintenance Procedure, MAIN-1, "Interlock and SCRAM Features," Ver. 3.00, approved July 26, 2000
- NETL Maintenance Procedure, MAIN-2, "Instrument System Features," Ver. 3.00, approved July 26, 2000
- NETL Maintenance Procedure, MAIN-3, "Support System Features," Ver. 3.00, approved July 26, 2000
- NETL Maintenance Procedure, MAIN-4, "Area Radiation Monitors," Ver. 3.00, approved July 26, 2000

- NETL Maintenance Procedure, MAIN-5, "Fuel Inspection and Measurement," Ver. 3.00, approved July 26, 2000
- NETL Maintenance Procedure, MAIN-6, "Rod and Drive Maintenance Inspection," Ver. 3.00, approved July 26, 2000
- NETL Operation Procedure, OPER-6, "Reactor Bay Systems," Ver. 1.00, approved April 4, 2002
- NETL Surveillance Procedure, SURV-1, "Fuel Temperature Calibration," Rev. 0, approved January 24, 1992
- NETL Surveillance Procedure, SURV-2, "Reactor Pool Power Calibration," Rev. 1, approved March 2, 2009
- NETL Surveillance Procedure, SURV-3, "Excess Reactivity and Shutdown Margin," Ver. 2.00, approved April 4, 2002
- NETL Surveillance Procedure, SURV-4, "Reactor Water Systems Surveillance," Rev. 1, approved January 22, 1991
- NETL Surveillance Procedure, SURV-5, "Air Confinement System Surveillance," Rev. 2, approved April 1, 2002
- NETL Surveillance Procedure, SURV-6, "Control Rod Calibration," Rev. 1, approved March 2, 2009
- NETL Surveillance Procedure, SURV-7 "Pulse Characteristic Comparison," Rev. 0, approved January 24, 1992
- UT, NETL, 2015 Annual Report, submitted March 31, 2016

b. Observations and Findings

The inspector reviewed selected maintenance procedures and maintenance records, including the system maintenance log. The log contained maintenance information on various systems, including the reactor coolant system, the radiation monitoring system, the ICS computer, the ICS data acquisition control system, the ICS neutron monitoring (power channel) system, and the ICS rod drive system. The logs and records showed that routine and preventive maintenance was controlled and documented in the maintenance and/or operations logs consistent with licensee procedures and within the time frame specified.

The leaking beam port bellows was replaced in November of 2015. The IFI for this major maintenance item will be closed. (IFI 05-602/2013-202-01).

c. Conclusion

The licensee's maintenance program was being implemented as required by NETL procedures.

**7. Fuel Handling and Movement**

a. Inspection Scope (IP 69001)

In order to verify adherence to fuel handling and inspection requirements specified in TS Sections 3.1.4, 4.1.4, 5.3, and 5.4, the inspector reviewed:

- Selected NETL pool configuration forms
- UT-TRIGA Logbook 1 Fuel Movement Log and selected log sheets
- Selected core arrangement forms and fuel pin inventory forms
- Selected UT-TRIGA ICS console operation log sheets from January 2015 through the present
- The NETL core configuration map on the control room wall, dated January 16, 2016
- NETL Fuel Procedure, FUEL-1, "Movement of Fuel," Ver. 1.00, approved February 17, 2005, with local permanent change Ver. 1.01, approved March 4, 2009, and associated forms
- NETL Fuel Procedure, FUEL-2, "Movement of Experiments," Rev. 0, approved July 30, 1991
- NETL Maintenance Procedure, MAIN-5, "Fuel Inspection and Measurement," Ver. 3.00, approved July 26, 2000

b. Observations and Findings

The inspector determined that the licensee was maintaining the required records of the various fuel movements that had been completed. The inspector also determined that the fuel was being moved in compliance with procedure and the moves were being tracked and documented on the appropriate forms.

Following replacement of the leaking beam port bellows, the core was completely reloaded. One instrumented fuel element was replaced because of thermocouple failure in the element previously in that position.

The inspector also verified that the reactor fuel was being inspected biennially as required by TS Section 4.1.4. The most recent fuel inspection had been completed in January 2016.

c. Conclusion

Reactor fuel movements and inspections were completed and documented in accordance with procedure and the fuel elements were being inspected biennially as specified by TS.

**8. Exit Meeting**

The inspector presented the inspection results to members of licensee management at the conclusion of the inspection on November 3, 2016. The licensee acknowledged the findings presented. The licensee did not identify as proprietary any material reviewed as part of this inspection.



## **PARTIAL LIST OF PERSONS CONTACTED**

### **Licensee**

S. Biegalski	Director, NETL
T. Tipping	Reactor Health Physicist and Laboratory Manager
P. Whaley	Associate Director, NETL
G. Kline	Senior Reactor Operator

## **INSPECTION PROCEDURE USED**

IP 69001	Class II Non-Power Reactors
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## **ITEMS OPENED, CLOSED, AND DISCUSSED**

### **Opened**

50-602/2016-201-01	IFI	Failure to update MOU's with outside support agencies
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### **Closed**

50-602/2013-202-01	IFI	Beam Port Leak Repair
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### **Discussed**

None.

## **PARTIAL LIST OF ACRONYMS USED**

ANS	American Nuclear Society
ANSI	American National Standards Institute
E-Plan	Emergency Plan
ICS	Instrumentation and Control System
IP	Inspection Procedure
IFI	Inspector Follow-up Item
NETL	Nuclear Engineering Teaching Laboratory
NRC	U.S. Nuclear Regulatory Commission
Rev.	Revision
RO	Reactor Operator
ROC	Reactor Oversight Committee
SRO	Senior Reactor Operator
UT	University of Texas
Ver.	Version