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Nuclear Engineering Teaching Laboratory

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Non-Power Production and Utilization Facility Licensing Branch (UNPL)
Division of Advanced Reactors and Non-Power Production and Utilization Facilities (DANU)
Office of Nuclear Reactor Regulation

SUBJECT: Docket Number 50-602, License R-126, 2021 ANNUAL REPORT FOR THE UNIVERSITY
OF TEXAS TRIGA II NUCLEAR RESEARCH REACTOR

Sir:

Attached is the 2021 Annual Report for the University of Texas TRIGA II Nuclear Reactor
(previously communicated via email). If there are any questions, please feel free to contact P. M.
Whaley at 512-232-5373 or whaley@mail.utexas.com.

Sincerely

A handwritten signature in dark ink, appearing to read "P. M. Whaley".

P. M. Whaley

A020
NRR

**2021 ANNUAL REPORT FOR THE UNIVERSITY OF TEXAS
TRIGA II NUCLEAR RESEARCH REACTOR (DOCKET 50-602)**

INTRODUCTION

The University of Texas System (UTS) was established by the Texas Constitution in 1876, with the University of Texas at Austin the flagship institution. The Nuclear Engineering Teaching Laboratory was established at the J. J. Pickle Research Campus with a TRIGA II Nuclear Research Reactor, critical in 1992. The reactor is licensed to the University of Texas under USNRC License R-129, a class 104 research reactor. Other activities at the NETL using radioisotopes fall under a broad scope, State of Texas license (L00485).

The NETL TRIGA II Reactor Technical Specifications (section 6.6.1) requires an annual report to the Nuclear Regulatory Commission. This Annual Report covers the period from January through December 2021. The report is organized to summarize the status of current organization during the reporting period (line management organization, oversight committees, and independent oversight activities) followed by the information as detailed in Technical Specifications.

ANNUAL REPORT

Personnel status for the organization during the 2020-2021 reporting year for management, oversight, and operating staff is provided. The Technical Specifications requires "Routine annual reports covering the activities of the reactor facility during the previous calendar year" three months following the end of each prescribed year. The information required in the annual report is addressed as indicated in Table 1.

Table 1: Required Annual Report Information		
Information		Addressed as
a.	A narrative summary of reactor operating experience including the energy produced by the reactor or the hours the reactor was critical, or both.	Narrative Summary
		Energy produced: 14MWD
		Hours critical: 588 h
b.	The unscheduled shutdowns including, where applicable, corrective action taken to preclude recurrence.	Tabulation of Unscheduled Shutdowns
		Analysis and Corrective Action
c.	Tabulation of major preventive and corrective maintenance operations having safety significance.	Statement of Surveillance Activities
		Description of Significant Corrective Maintenance
d.	Tabulation of major changes in the reactor facility and procedures, and tabulation of new tests or experiments, or both, that are significantly different from those performed previously, including conclusions that no new or unanalyzed safety questions were identified.	Description of Facility Modifications
		Description of Procedure Changes
		Description of New Tests/Experiments
		50.59 Summary

e.	A summary of the nature and amount of radioactive effluents released or discharged to the environs beyond the effective control of the owner-operator as determined at or before the point of such release or discharge. The summary shall include, to the extent practicable, an estimate of individual radionuclides in the effluent. If the estimated average release after dilution or diffusion is less than 25% of the concentration allowed or recommended, a statement to this effect is sufficient.	There were no liquid effluents in 2021 Argon 41 Effluent
f.	A summarized result of environmental surveys performed outside the facility.	Environmental Surveys
g.	A summary of exposures received by facility personnel and visitors where such exposures are greater than 25% of that allowed or recommended.	Exposures

ORGANIZATION

Line Management

Figure 1 presents the four levels of management identified in Technical Specifications.

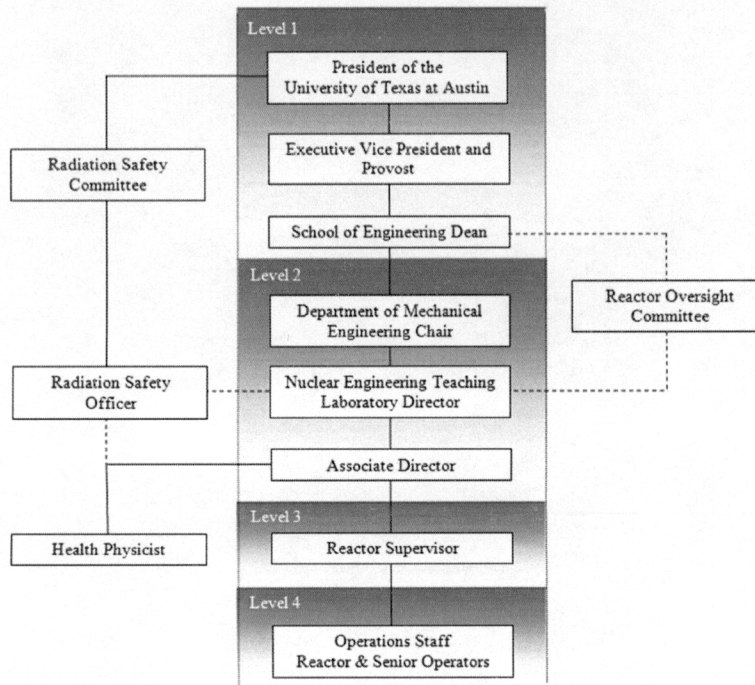


Figure 1: Line Management Organization

Table 2: Level 1

The University of Texas at Austin Administration

J. Hartzell, PhD, President
Sharon L. Wood, PhD, Executive Vice President and Provost
Roger T. Bonnecaze, Dean, Cockrell School of Engineering

DR. Wood was appointed Executive Vice President and Provost with Dr. Bonnecaze interim Dean in July 2021

Table 3: Level 2

Mechanical Engineering and NETL Administration

Dr. Donald Siegel, Chair, Walker Department of Mechanical Engineering
Dr. W. Charlton, Director
P. M. Whaley, Associate Director

Dr. Siegel assumed the role of Department Chair in September 2021

Table 4: Level 3

NETL Reactor Supervisor

Larry Hall, Reactor Manger

There was no change in the reactor manager during 2021.

Table 5: Level 4

NETL Reactor Operators/Senior Reactor Operators

P. M. Whaley: Senior Operator
Larry Hall: Senior Operator
Jim Terry (Electronic Technician) Senior Operator
Tracy Tipping (Health Physicist) Reactor Operator
Walker Payne (Research Assistant) Reactor Operator
Kevin McKay -- *Reactor Operator*
Mark Andrews (Research Associate) -- *Reactor Operator*

There was no change of licensed operators in 2021

Oversight Committees

Table 6: 2020-2021 University Radiation Safety Committee

Kevin N. Dalby, Ph.D., Chair, Professor, College of Pharmacy
Dan Jaffe, Ph.D., Vice-Chair, Office of the Vice President for Research
R. DeWayne Holcomb, ex-officio, Radiation Safety Officer, Environmental Health and Safety
Kristi Powell, ex-officio, Radiation Safety Officer, Dell Medical School
Jack L. Ritchie, Ph.D., Department Chair, Professor, Department of Physics
Rick Russel, Ph.D., Professor, Department of Molecular Biosciences
John Salsman, Director, Environmental Health and Safety (& acting Radiation Safety Officer)
Christopher S. Sullivan, Ph.D., Associate Professor, Department of Molecular Biosciences
J. Steven Swinnea, Ph.D., Texas Materials Institute X-Ray Facility Manager
Tracy N. Tipping, NETL Health Physicist and Laboratory Manager
Karen M. Vasquez, Ph.D., Professor, College of Pharmacy

Table 7: 2020-2021 Reactor Oversight Committee

Derek Haas (ME), Chair
 Kevin Clarno (ME), Chair
 Dale Klein (ME)
 Rick Neptune, ex-officio (ME)
 John G. Ekerdt, ex-officio
 Lawrence R. Jacobi (External Representative)
 Scott Pennington (External Representative)
 Larry Hall, ex-officio (NETL)
 Tracy Tipping, ex-officio (NETL)
 Mike Whaley, ex-officio (NETL)
 DeWayne Holcomb (Radiation Safety Officer)

Independent Oversight Activities

Table 8: Inspections and Reviews

USNRC License(s) Inspection	
R-129	16-19 November 2021
State of Texas License Inspection	
L00485 (89)	01 June 2021
Reactor Oversight Committee Review	
Semi Annual Review	13 May 2021
Semi Annual Review	24 Nov 2021
Other	
UT Fire Marshal Fire Safety	None
	02 March 2021
UT Fire Safety Systems	18 November 2021

FACILITY OPERATIONS SUMMARY REPORT

Narrative Summary

The UT-TRIGA reactor operated on 180 days in 2021, producing a total energy output of 321 MWh. There were routine maintenance outages in Jan and July, (Jan maintenance outage was completed in Jan 2021 post-Christmas break (The University is secured over Christmas break, typically from the Friday before Christmas through January 1) to support an experiment schedule. The COVID 19 pandemic affected the operating schedule, which resulted in limited staff and student ability to enter facility for an extended period of time. Even with the special event that limited reactor operations, the trend of operating hours and energy generation remained relatively high. Sandia National Laboratory performed experiments at the facility during 2021.

There were 10 days of operations for training and education, including preparation for NRC examination and reactor-based laboratory classes. There were 650 samples irradiated during 180 days of experiment operations (49 experiments run: 15 for research, 22 for service work and 12 for internal experiments).

Other Significant Operations and Events

Tabulation of Unscheduled Shutdowns

25 Jan 2021	NM%PWR	Playback indicated 97% prior to trip	Spurious NM
26 Feb 2021	NM%PWR	Playback indicated 97% prior to trip	Spurious NM
01 Mar 2021	NM%PWR	Playback indicated 99% prior to trip	Spurious NM
18 Aug 2021	NM%PWR	Operator error during NM adjustment	Operator error

Analysis and Corrective Actions

Temperature Trips

There were no temperature trips in 2021 a significant change from previous years.

Operator Error

There was a single reactor scram due to operator error. The scram occurred while adjusting constant in NM.

Spurious NM 1000 Power Level Trips

The NM was responsible for three spurious scrams. Playback allows the operator to witness the highest level of power reached. In all cases, the scram occurred well below the scram limit. This has been a recurring event throughout the history of UT NETL.

Statement of Surveillance Activities

The facility conducts two major maintenance outages each year, one in January (before the start of the spring semester) and one mid-summer. All surveillances and scheduled maintenance activities were completed during the reporting year at the required frequencies. All results met or exceeded the requirements of the Technical Specifications.

Description of Significant Corrective Maintenance

None

Description of Facility Modifications

New alarm and camera software were installed with greater capabilities available on both systems.

Description of Procedure Changes

None

New Tests or Experiments

None

50.59 Summary

None

The pneumatic facility in a 3-EL canister is in the design phase; a 10CFR50.59 review will be completed following review of final design and prior to installation (ongoing)

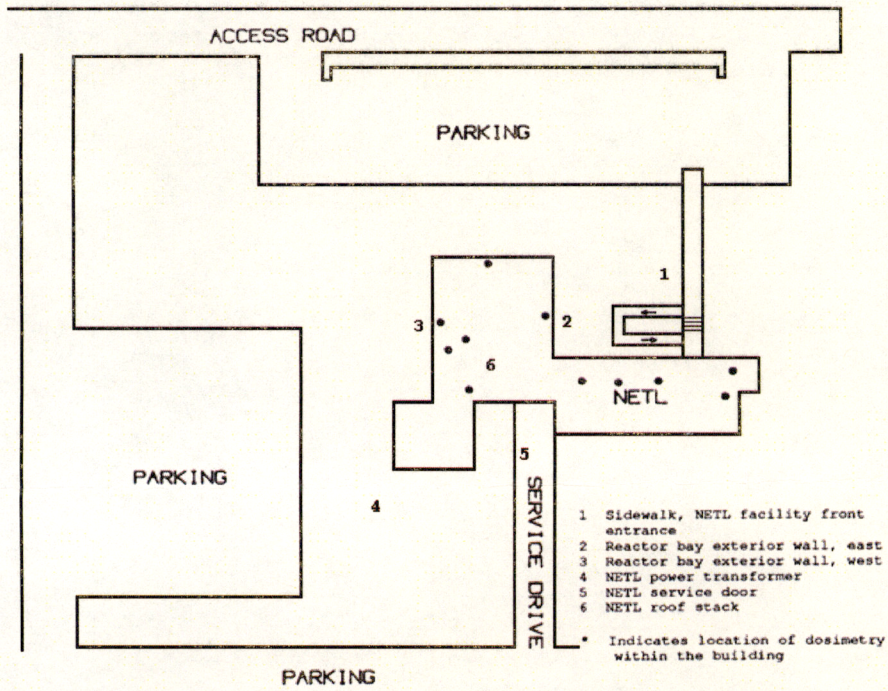
RADIOLOGICAL SUMMARY REPORT

Argon 41 Effluent

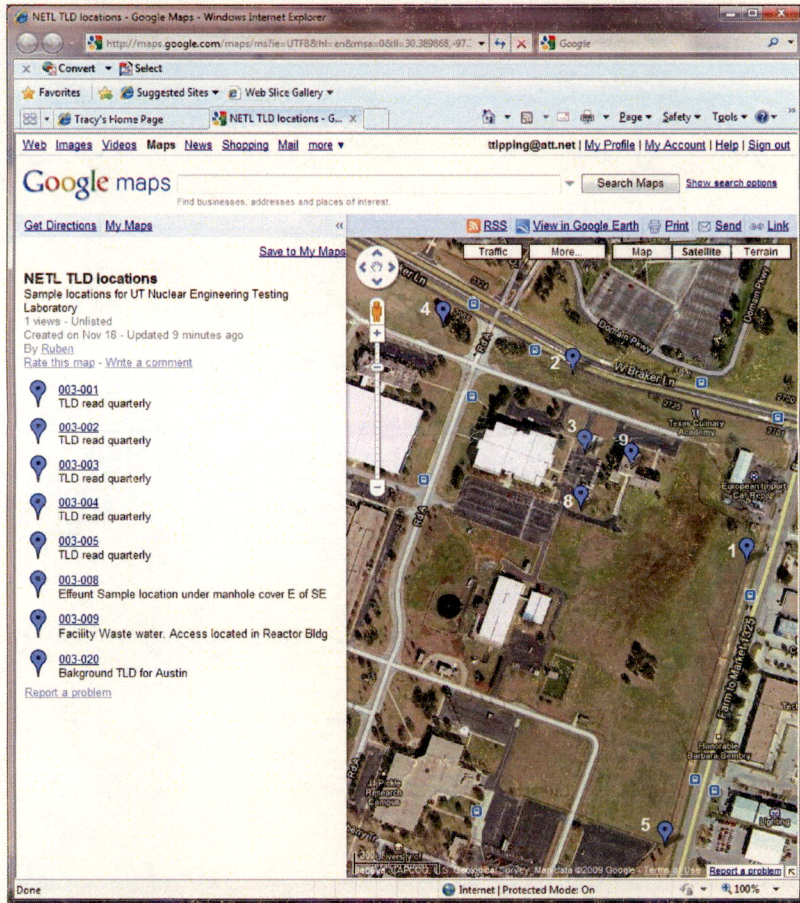
The principal radioactive effluent for the UT reactor is argon 41. There were 3.8×10^5 μCi of argon-41 discharged during calendar year 2021, approximately 0.3% of the value permitted by Technical Specifications.

Environmental Surveys

NETL monitors exterior locations indicated as positions 1 through 6 on the exterior dosimeter map. For 2021, "minimal" doses (< 1 mrem) were reported for positions 1, 3, 4, 5, and 6. A dose of one mrem was reported for position 1 for 2021. These doses are well below the 100 mrem annual limit for dose to the general public.



NETL Environmental Monitor Locations (External Dosimeter Map)



The Texas Department of State Health Services monitors exterior locations near NETL indicated as positions 1 through 5 on the TDSHS TLD map. For this period, a 2 mrem dose was reported for position 1, a 9 mrem dose was reported for position 2, a 3 mrem dose was reported for position 3, a 17 mrem dose was reported for position 4, and an 8 mrem dose was reported for position 5. These doses are well below the 100 mrem annual limit for dose to the general public.

Exposures

No workers or members of the general public received doses in excess of 25% of applicable exposure limits during 2020.