

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-192/88-02
50-602/88-02

Operating License: R-92
Construction Permit: CPPR-123

Dockets: 50-192
50-602

Expiration Date: December 31, 1988

Licensee: University of Texas (UT)
College of Engineering
Austin, Texas 78712

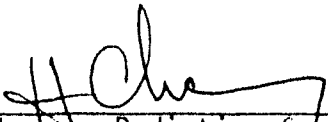
Facility Name: Docket: 50-192 Nuclear Engineering Teaching Laboratory (NETL) ^{L1}
TRIGA Mark I Reactor (250 kilowatts)

Docket: 50-602 Balcones Research Center
TRIGA Mark II Reactor (1000 kilowatts)

Inspection At: UT Taylor Hall and the Balcones Research Center, Austin, Texas

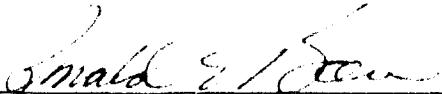
Inspection Conducted: March 9-11, 1988

Inspector:


H. D. Chaney, Radiation Specialist, Facilities
Radiological Protection Section

4/26/88
Date

Approved:


R. Baer, Acting Chief, Facilities Radiological
Protection Section

4/26/88
Date

Inspection Summary

Inspection Conducted March 9-11, 1988 (Report 50-192/88-02; 50-602/88-02)

Areas Inspected: Routine, unannounced inspection of the licensee's radiation protection, emergency planning, nuclear material safeguards, and the physical security programs. The inspection also included a review of proposed radiation protection program and facilities associated with the TRIGA Mark II reactor being constructed at the Balcones Research Center.

Results: Within the areas inspected, no violations or deviations were identified. Six open items were identified (see paragraph 2).

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DETAILS

1. Persons Contacted

UT

- *T. Bower, Assistant Facility Director/Reactor Supervisor
- *H. Bryant, Radiation Safety Officer
- *R. Miksad, Associate Dean of Research
- *L. Rabenberg, Nuclear Reactor Committee Member
- M. Krause, Senior Reactor Operator

*Indicates those present at the exit interview.

2. Open Items Identified During This Inspection

Open items are matters discussed during the course of the inspection that will be reviewed during future inspections to determine if further NRC action is appropriate. During the course of this inspection, six open items were identified.

Open Items:

<u>Number</u>	<u>Title</u>	<u>Paragraph</u>
192/8802-01	Calibration of Neutron Survey Meter	3. c
602/8802-01	Evaluation of Personnel Neutron Dosimetry	3. e
192/8802-02	Response Check of Pocket Dosimeters	3. e
192/8802-03	Surveys	3. g
192/8802-04	Calibration of Emergency Kit Radiation Monitoring Instruments	4
602/8802-02	TRIGA Mark II Reactor Facility Radiation Shield Survey	8

3. Radiation Protection (40750)

The licensee's radiation protection program was inspected to determine compliance with the requirements of the Facility Operating License, Amendment No. 10, and Technical Specifications (TS) 3.5, 4.2.3, 5.4, 5.7, 6.1, 6.2, 6.4, 6.5, 6.6, and 6.7; 10 CFR Parts 19 and 20; the UT Emergency Plan (E-Plan); and the recommendations of NRC Regulatory Guide (RG) 2.1, 2.5, 8.4, 8.7, 8.8, 8.10, 8.13, and 8.26.

The NRC inspector reviewed selected records, interviewed personnel, made observations, and performed independent radiological surveys.

a. Radiation Protection (RP) Organization and Controls

The NRC inspector reviewed the licensee's organization for compliance with TS requirements. The licensee's management of the Nuclear Engineering Teaching Laboratory (NETL) and of the new Balcones Research Center (BRC) is comprised of a laboratory Director, one senior reactor operator (SRO) licensed supervisor, and one SRO. All are full-time employees of the university and some have collateral teaching duties. The university Radiation Safety Officer (RSO) provides personnel as needed for assistance to the NETL. Most RP activities associated with the facility are performed by the NETL staff.

The NRC inspector expressed concern at the exit meeting regarding the need to establish and implement the necessary procedures for fuel transfer, preoperational testing and start of the Mark-II reactor, and decommissioning of the Mark-I reactor. The NRC inspector noted that the responsibility for the fuel transfer, decommissioning of the NETL, and preoperational testing and startup of the BRC facility rests with the Reactor Supervisor (RS) with little, if any, outside help.

The NRC inspector reviewed the licensee's Reactor Committee Meeting minutes for 1986 and 1987 and reviews/audits conducted during that time period.

No violations or deviations were identified.

b. Qualifications and Staff Training

The NRC inspector reviewed the licensee's RP staff qualifications, indoctrination program for experimenters, and radiation worker training.

No violations or deviations were identified.

c. RP/Measurement Instrumentation

The NRC inspector reviewed the licensee's inventory of RP instruments (portable dose rate measuring, laboratory counters, air samplers, etc.) including functional checks and calibration records (1986 and 1987). The NRC inspector noted that the neutron radiation measurement instrument was calibrated using a Plutonium-Beryllium (Pu-Be) source. Industry standards recommend that the calibration of remeters with a hard neutron spectrum such as that produced by a Pu-Be calibration source would cause an over response to a thermalized neutron spectrum. ANSI N323-1978, "Radiation Protection Instrument Test and Calibration," recommends that a calibration source or sources preferably should be

of a radiation energy similar to that with which the instrument will be used. The Pu-Be neutron calibration source used by the licensee produces neutrons in the 3-5 MeV range whereas the expected neutron energies associated with the research reactor beam port work and general area neutron exposures would be in the KeV-eV range. This is considered an open item pending licensee evaluation of the suitability of their neutron dose rate measuring instrumentation, especially in the area of calibration. (192/8802-01)

No violations or deviations were identified.

d. Area Radiation Monitors (ARM)

The 1986 and 1987 calibration and operational response check program for the two ARM were reviewed.

No violations or deviations were identified.

e. Personnel Monitoring and Exposure Control

The licensee's program for personnel radiation exposure monitoring and exposure control was inspected to determine compliance with 10 CFR Parts 20.101, 20.102, 20.103, 20.104, 20.105, 20.201, and 20.203.

The NRC inspector reviewed the personnel dosimetry records for NETL personnel (monitoring by film badge) kept by the university RSO for 1986 and 1987. The licensee's dosimetry processor was noted to have successfully participated in the National Voluntary Laboratory Accreditation Program. Records of extremity and whole body radiation exposures were properly documented and maintained on forms equivalent to those referenced in 10 CFR Parts 20.201 and 20.401. The licensee was noted to use Neutron Type A (NTA) film for measuring personnel exposure to neutron radiation. The NRC inspector noted that current industry standards do not recommend the use of NTA film for neutron personnel monitoring due to its inability to measure the low energy neutrons. This concern is important with the BRC facility in that BRC work will involve beam ports along with the potential for neutron exposures that currently do not exist at the NETL. This is considered an open item pending the licensee's evaluation of the neutron dosimetry to be used at the BRC. (602/8802-01)

The NRC inspector noted that the licensee's pocket dosimeters (PD), which are used in conjunction with the official dosimetry (film) were not periodically response checked in accordance with the guidance provided in NRC RG 8.4. The licensee response checks the PD approximately annually where RG 8.4 recommends a 6-month interval. This is considered an open item pending licensee evaluation of the pocket dosimeter response check program. (192/8802-02)

No violations or deviations were identified.

f. Environmental and Radioactive Effluents Releases

The NRC inspector reviewed the licensee's environmental monitoring program for 1985-87. The gaseous releases are calculated from experimental data and the number of full power hours of reactor operation for the NETL facility. Gaseous releases have been negligible. No liquid releases have been made at the facility. Solid radioactive wastes (less than 10 cubic feet) are transferred to the university RSO for disposal. The licensee does not have environmental dosimetry placed around the facility, but does have area dosimeters placed within the facility.

The NRC inspector reviewed the preoperational radiological environmental monitoring program for the BRC facility. The licensee stated that there were no requirements for the performance of a preoperational environmental monitoring program. The licensee had obtained soil samples from core drillings below the facility and the state of Texas Department of Health has in-place environmental dosimeters on university land adjacent to the BRC. These are not specifically for the BRC. The NRC inspector contacted the NRC Project Manager and discussed the lack of requirements for a preoperational radiological environmental monitoring program for this facility. The Project Manager stated that an environmental monitoring program is not required for research reactors.

No violations or deviations were identified.

g. Radiological Surveys

The NRC inspector reviewed radiation and contamination survey records regarding radiological surveys performed by the NETL staff (logged in operations logs) and the university RSO's office staff to determine compliance with the requirements of 10 CFR Part 20.201 and the recommendations of industry standard ANSI 15.11-1977. The licensee's program for beta, beta/gamma, and alpha counting of contamination smears was reviewed. The use of survey procedures, facility diagrams, survey frequency, and the results of completed surveys for 1985-87 were reviewed. The NRC inspector also conducted confirmatory radiation and contamination surveys of the NETL facility.

The NRC inspector determined that the licensee's documentation of facility surveys was poor and that the results were confusing. Results for area radiation surveys conducted by the RSO's office were routinely reported in units of counts per minute and then were converted to millirem per hour by the NETL staff. The NRC inspector also noted that the licensee does not routinely perform beta, alpha, and tritium analysis of the reactor pool water. The NRC inspector obtained a sample of the NETL reactor's coolant for laboratory analysis at the NRC Region IV office. The NRC inspector discussed

with the RSO the need to conform with the 10 CFR Part 20.5 format when documenting survey results. This is considered an open item pending licensee evaluation and action. (192/8802-03)

No violations or deviations were identified.

h. Posting of Regulatory Matter

The licensee was found to have conspicuously posted information notices on availability of regulatory matter (licenses, 10 CFRs, operating procedures, etc.) and Form NRC 3 in several areas of the NETL.

No violations or deviations were identified.

i. Radioactive Material Control

The NRC inspector reviewed the licensee's control over radioactive materials produced in the reactor and used to directly support reactor operation to determine compliance with License Condition 2.B.3.

No violations or deviations were identified in this area.

4. Emergency Planning and Preparedness (40750)

The NRC inspector reviewed the implementation of the NETL E-Plan dated July 1983.

The NRC inspector reviewed assignment of responsibilities, development of implementing procedures, emergency facilities, emergency support letters of agreement with local emergency services, inventoried emergency kits and first aid facilities, reviewed communications and recall lists, and critiques of drills. The licensee's letters of agreement with the city of Austin, local hospitals, and university support services were reviewed and found current.

The NRC inspector noted that the supplementary radiation dose rate measuring instruments (civil defense issue) assigned to the emergency kits had never been calibrated. The NRC inspector discussed with the licensee the need to have these instruments periodically calibrated especially the high range instruments. This is considered an open item pending licensee evaluation and action. (192/8802-04)

No violations or deviations were identified.

5. Materials Control and Accounting (85102)

The NRC inspector reviewed the nuclear materials inventory program to determine compliance with License Condition 2.B.

The NRC inspector reviewed accountability procedures and practices, and records and materials status reports for the period January through September 1987. The Reactor Safety Board (RSB) audit of fuel accountability was reviewed. The material accountability controls were found to be well implemented. A visual verification of the current fuel inventory indicated that 150 used TRIGA fuel elements and one new instrumented element were located at the NETL.

No violations or deviations were identified.

6. Physical Security (81421)

The NRC inspector reviewed the licensee's compliance with License Condition II.C(3) and the requirements of the NRC approved Physical Security Plan, revised June 1983.

No violations or deviations were identified.

7. Decommissioning of the NETL TRIGA Reactor

The NRC inspector discussed the plans and schedule for removal of fuel from the NETL reactor and transfer to the BRC reactor, and the decommissioning of the NETL facility. The licensee has been in communications with the NRC Project Manager regarding the decommissioning. The NRC inspector determined that the licensee had not developed procedures for the receipt inspection of the fuel transfer cask, defueling of the NETL reactor, fuel transfer, training of personnel responsible for performing the fuel transfer, radiological surveys during fuel movement, and eventual decommissioning of the NETL facility. The licensee currently has only one person working on accomplishing the above activities. The licensee intends on shutting down the NETL reactor on or about April 30, 1988. The defueling of the NETL reactor is tentatively scheduled to begin August 15, 1988. Decommissioning of the NETL facility is tentatively scheduled to begin in November 1988. The NRC's concerns regarding the need to establish adequate procedures is addressed in the transmittal letter for this inspection report.

No violations or deviations were identified.

8. Construction, Preoperational Testing, and Startup of the BRC Reactor Facility

The NRC inspector inspected the BRC TRIGA reactor facility. The NRC inspector determined that the licensee had not developed procedures for startup surveys of reactor to verify design requirements will be met during reactor operations. The NRC inspector also discussed the importance of verifying design requirements of the ventilation filtration system, area radiation, and airborne radioactivity monitoring systems prior to initial reactor startup. The licensee was not sure whether or not the facility would be provided with a personnel paging system, especially in the basement of the reactor containment. The above noted concerns were discussed with the licensee and will be considered an open item pending licensee evaluation and action. (602/8802-02)

9. Exit Interview

The NRC inspector met with the licensee representatives identified in paragraph 1 of this report at the conclusion of the inspection on March 11, 1988. The NRC inspector summarized the inspection findings.