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

Docket No:	50-602
License No:	R-129
Report No:	50-602/98-201
Licensee:	University of Texas
Facility:	University of Texas TRIGA Mark-II Reactor
Location:	Pickle Research Campus, Bldg. 159 10100 Burnet Road Austin, TX 78758
Dates:	December 7-11, 1998
Inspector:	Stephen W. Holmes, Radiation Specialist
Approved by:	Seymour H. Weiss, Director Non-Power Reactors and Decommissioning Project Directorate Division of Regulatory Improvement Programs

EXECUTIVE SUMMARY

This routine, announced inspection consisted of the review of selected conditions and records since the last inspection, verification of corrective actions previously committed to by the licensee, and related discussions with licensee personnel. The inspection was conducted in accordance with the guidance of the NRC Inspection Manual.

The reactor was being maintained and operated as required by the license and applicable regulations. All reactor staff positions were acceptably filled in accordance with TS requirements. A new Nuclear Safety Committee Chairman had been appointed by the university. Licensee's response, reporting and actions involving a leaking instrumented fuel element was found to be acceptable.

Report Details

Summary of Plant Status

The reactor was being operated a few days per week in support of research and training programs.

I. Operations

O1 Conduct of Operations

01.1 Reactor Staffing

a. Inspection Scope (Inspection Procedure 69001)

The inspector reviewed senior reactor licenses, operations logs and records and selected events.

b. Observations and Findings

Licensed staff consisted of the Assistant Director (AD), the Reactor Manager, (RM) and two trainees. The reactor staff satisfied the training and experience required by the Technical Specifications (TS). Operation logs and records confirmed that shift staffing met the minimum requirements for duty and on-call personnel.

The inspector discussed with the Director of the Nuclear Engineering Teaching Laboratory (NETL) and the new Chairman of the Nuclear Reactor Safety Committee (NRSC) that, although the reactor staff meet TS requirements and is acceptable for the present operations workload, the staffing might need to be augmented if operations increase. The Director, NETL and the Chairman NRSC stated that they were in the process of hiring two new persons, one to fill a vacant position and the other a new position. They also stated that staffing would continue to be evaluated as the operations workload changes.

c. Conclusions

The reactor operating staff satisfied TS requirements.

01.2 Control and Performance of Experiments

a. Inspection Scope (Inspection Procedure 69001)

The inspector reviewed approved experiment records, reactor log experimental data, NRSC minutes and observed an in core K excess experiment from insertion to retrieval.

b. Observations and Findings

New experiments or classes of experiments, or substantive changes to approved experiments must be approved by the NRSC while minor changes to approved experiments may be approved by the AD or RM. Record reviews and interviews substantiated that experiment approvals had been done in this manner.

Review of the experiment data in the reactor log and observation by the inspector of an experimental run verified that experiments were installed, performed, and removed as required by the experiment authorization, licensee's procedures and TS.

c. Conclusions

Licensee control and performance of experiments met TS and regulatory requirements.

01.3 Reactor Operations

a. Inspection Scope (Inspection Procedure 69001)

The inspector interviewed staff, reviewed reactor operations and fuel logs, and periodic checkout, start-up and shutdown checklists. The inspector observed a start-up, shutdown, steady state power operations and an in-core experiment from insertion to retrieval.

b. Observations and Findings

Reactor operations were implemented in accordance with written procedures and TS. Observations by the inspector confirmed that information on operational status was recorded in log books and checklists as required by procedures and TS. Use of maintenance and repair logs complied with procedures and satisfied pertinent requirements. Significant problems and events noted in the operations log were reported and quickly resolved as required by TS and administrative procedures.

c. Conclusions

Reactor operations conformed to TS and licensee procedural requirements. No safety concerns were identified.

01.4 Fuel Handling

a. Scope (Inspection Procedure 69001)

Reactor operation and fuel logs, and periodic checkout, start-up and shutdown checklists were reviewed. Fuel movement for the three element holder was observed.

b. Observations and Findings

Procedures for refueling, fuel shuffling, and TS required inspections and surveillances were acceptable to control operations. Fuel movement, inspection, log keeping, and data recording followed the facility's procedures. Data recorded for fuel movement was clear and cross referenced in fuel and operations logs. Radiological controls and procedures conformed to health physics (HP) ALARA principles.

Communications between control room, reactor deck, and HP staff was well conducted.

c. Conclusions

Fuel handling activities and documentation were as required by TS and facility procedures. No safety concerns were identified.

O3 Operations Procedures and Documentation

a. Inspection Scope (Inspection Procedure 69001)

The inspector reviewed operating procedures and updates, reactor operating records and logs, NRSC minutes and observed use of procedures during operations.

b. Observations and Findings

Written procedures required by the TS were available and used by the staff. These procedures were being kept up-to-date. Implementation of and adherence to the procedures was acceptable. Both temporary and permanent procedure changes had been reviewed and approved by the reactor staff, AD, and/or the NRSC as required by TS and licensee procedures.

Records of power level, operating periods, unusual events, calibration and maintenance procedures, installed experiments, and start-up and shutdown checks were being kept up-to-date. Also, records of Senior Reactor Operator (SRO) evaluations of unanticipated/unscheduled scrams were being kept as required.

c. Conclusions

Facility procedures satisfied TS requirements. Reactor operating records and logs were being maintained as required by TS.

05 Operator Training and Qualification Program

a. Inspection Scope (Inspection Procedure 69001)

The inspector reviewed requalification program records, NRC licenses, training records and interviewed staff.

b. Observations and Findings

Both currently licensed SROs were successfully completing reactivity manipulations, and participating in the ongoing training as required by the NRC-approved requalification plan. Review of records indicated that performance and competence evaluations of the operators had been given as required. Required quarterly operation hours, as SROs, were being tracked. Biennial medical exams had been performed as required.

The current requalification program exempts individuals who prepare and give sections of the exam from taking those portions. Records show that the AD had normally prepared and given the exams in the past and thus had not taken an exam in a number of years. In discussion with the AD about this he stated that, as they will have two additional reactor operators in the near future, he would evaluate having the RM and AD alternate writing and administering the required written and operational exams to the staff.

c. Conclusions

The requalification program was being acceptably implemented. TS and NRC-approved requalification plan requirements were met.

06 Organization and Administration

a. Inspection Scope (Inspection Procedure 69001)

The inspector reviewed organization, staffing and administrative controls and interviewed management and staff.

b. Observations and Findings

Since the last inspection no functional changes in the management organization or administrative controls have been made. The newly appointed Chairman of the NRSC is a previous member of the committee and present Chairman of the University Radiation Safety Committee.

c. Conclusions

Organizational and administrative controls remain consistent with TS and license requirements and commitments.

O7 Quality Assurance in Operations

a. Inspection Scope (Inspection Procedure 69001)

The inspector reviewed NRSC minutes, annual reviews, audits, and interviewed the NRSC Chairman.

b. Observations and Findings

The NRSC was reorganized to include two new members, one the new Chairman, the other, from outside the University of Texas, the reactor administrator at Oregon State University (OSU).

The meeting schedule and membership satisfied TS requirements and the Committee's procedural rules. Review of the minutes indicated the committee provided guidance, direction and oversight, and ensured suitable use of the reactor. The minutes provided a record of the safety oversight of reactor operations.

Audit instructions had been written for most of the required areas. The new outside member from OSU was performing a complete review and audit of the reactor. With a few minor exceptions, written reports were being made at each meeting for the previous audited items. The new Chairman stated that after this ongoing comprehensive review and audit is done, future audits would be performed by multiple members of the committee and submitted on time. Inspector Follow-up Item (IFI 602-97-201-01) concerning submission of audit reports to the NRSC remains open.

c. Conclusions

The NRSC performed its duties as required by license, TS, and administrative criteria.

O8 Miscellaneous Operations Issues

08.1 Instrumented Fuel Element Leak

a. Scope (Inspection Procedure 69001)

The inspector reviewed reactor logs, NRSC minutes, facility procedures, maintenance logs and records, the FSAR, as built drawings, and interviewed staff.

b. Observations and Findings

On Thursday, May 21, 1998, the University of Texas TRIGA reactor experienced a fuel element failure event involving an newly installed instrumented element. The facility shut down, identified and isolated the leaking element, performed recovery operations, installed a new instrumented element and resumed normal operations June 24, 1998. This unusual event, classified as a "minor leak" as per their TS, required no mandatory reporting. The licensee, however, provided a report dated August 14, 1998, "Fuel element leak (May 1998)," as a courtesy.

On May 4, 1998, the fuel temperature thermocouple in element 5283 failed. On May 7, 1998, a new instrumented element was placed in service and measurements and surveillance tests were performed. During at power tests on May 7 and 8, 1998, short duration alarms were observed of the gaseous effluent monitor, the argon CAM. These transient alarms were investigated following licensee procedures. The cause of the alarms could not be identified and evaluation of the reactor room particulate CAM readings and filter found no direct indication of the presence of fission products.

On May 12 and 13, 1998, after installing a supplemental air particulate monitor at the pool water to air interface, the licensee operated the reactor up to 950 kilowatts for up to thirty minutes. Argon CAM readings were not indicative of unusual conditions and the particulate CAM did not indicate levels of any significance relative to reactor power. A three hour run on May 20, 1998, proceeded without any unusual results.

On May 21, 1998, at 171 minutes into a 500 kilowatt run the argon CAM rate increased in 30 seconds from 5000 cpm to nearly 3,000,000 cpm and decreased to 100,000 cpm less than one minute after the transient began. The SRO contacted the RM for assistance. The RM noted that the room particulate CAM readings had remained unchanged and inspected the supplemental air particulate monitor for indication of radioactivity at the pool water to air interface. The detection circuit in the supplemental air particulate monitor had failed as the readings exceeded the alarm point. The CAM filter from the supplemental air particulate monitor was monitored using a thin window frisker for the presence of radioactivity on the filter. The reactor was shut down immediately when this confirmed that radionuclides were accumulating on the filter.

Subsequent inspection of the instrumented element confirmed that it was the leaking element and that the source of the fission product gases was at the approximate location of a pit in the weld zone of the fuel element where the upper cast fitting joins the fuel cladding can. This had been found by the licensee prior to installation and reported to the fuel manufacturer. The manufacturer had reviewed their test records and photographs of the element and regarded the pit as an artifact of the weld process, not a quality problem. This is being resolved between the DOE and the manufacturer.

The SAR design basis accident evaluation of a fuel leak in air indicate that regulatory dose limits of 10 CFR Part 20 would not be exceeded. A number of upperlimit/bounding calculation were performed for the effluent release and building internal and external doses. The calculations were conservative and followed SAR and standard HP methodology. The release was conservatively estimated to be 0.2 Ci with a maximum occupation dose of 3 mrem for a one-hour exposure and an unrestricted area total dose of 0.16 mrem. These were well below licensee and regulatory limits.

The inspector confirmed that the responses by the operators and staff were acceptable, procedures and TS were followed, and that the reactor was safely shut down as required. Notifications to licensee staff and the NRC were made on time and followed procedures, TS, and applicable regulatory requirements. The inspector verified that subsequent repair, recovery, and restart operations were acceptable.

c. Conclusions

Licensee actions regarding the event were acceptable.

08.2 Year 2000 Computer Problem

a. Scope (Inspection Procedure 69001)

The records pertaining to the year 2000 (Y2K) concerns were reviewed.

b. Observations and Findings

The University of Texas at Austin has a campus wide program addressing the Y2K computer problem. This includes the NETL and thus the reactor and its systems. During October 1998 an independent firm audited three university groups to evaluate the University's Y2K program. One of these was the NETL. The firm's report stated that based on the three areas audited the University's program was effective and specifically stated that the NETL had adequately addressed the Y2K problem. The inspector confirmed that the facility was cognizant and aware of the Year 2000 Computer Problem, had programs to address digital components that may affect safety, and would continue to deal with the Y2K problem as needed.

c. Conclusions

Y2K concerns were being acceptably addressed.

II. Maintenance

M1 Conduct of Maintenance

M1.1 Limiting Conditions for Operation and Surveillance

a. Inspection Scope (Inspection Procedure 69001)

The inspector reviewed selected surveillance records, data sheets and records of tests, licensee procedures, reactor logs, checklists, periodic reports and interviewed staff.

b. Observations and Findings

Daily and other periodic checks, tests, and verifications for TS required limiting conditions for operations (LCO) were completed as required. All surveillance and LCO verifications were completed on schedule as required by TS and in accordance with licensee procedures. All were within prescribed TS and procedure parameters.

c. Conclusions

The licensee's program for surveillance and LCO confirmations satisfied TS requirements.

M2 Maintenance and Material Condition of Facilities and Equipment

a. Inspection Scope (Inspection Procedure 69001)

The inspector reviewed maintenance and reactor logs, repair records, and observed facility and equipment during an accompanied tour.

b. Observations and Findings

Reactor maintenance was noted in a maintenance log and the reactor logbook as required by procedures. Maintenance was performed and documented consistently with the TS and licensee procedures.

Control room equipment was operational. No missing or malfunctioning equipment was noted.

c. Conclusions

Maintenance logs, records, performance, and reviews satisfied TS and procedure requirements.

III. Engineering

E1 Conduct of Engineering, Design Changes

a. Inspection Scope (Inspection Procedure 69001)

The inspector reviewed selected design change packages, associated procedures and drawings, logs, records, and NRSC files. The inspector interviewed staff.

b. Observations and Findings

Review of the recent pneumatic transfer system change package, the fume/sort hood installation, and the on-going console upgrade package confirmed that design changes were reviewed and approved by the appropriate reactor staff and the NRSC or forwarded to the NRC for approvals as required. After the changes were made, testing was performed to verify operation was consistent with the safety analysis assumptions. Procedure and drawing changes were included when needed and were consistent with the observations of the facility by the inspector.

Additionally, a package for the Neutron Imaging Facility was rejected by the NRSC and sent back to the NETL staff for additional information. This also provided verification that design changes were being handled as required.

c. Conclusions

The licensee's design changes were reviewed, approved, implemented, tested, and controlled as required by TS, licensee procedures, and pertinent regulations.

S1 Conduct of Security and Safeguards Activities

a. Inspection Scope (Inspection Procedure 81401)

The inspector reviewed the NRC-approved security plan, toured the facility, reviewed security logs, reports, and security related documents, and interviewed reactor staff.

b. Observations and Findings

Access was controlled as outlined in the NRC approved security plan. Reactor tests/verifications of the security systems were performed as required. Related key control activities also satisfied plan requirements. University police provided security as required by the plan. The inspector verified that university police security checks were performed, tracked, and corrective actions taken when required. Communication between the reactor staff and the university police was acceptable.

c. Conclusions

Conduct of security activities satisfied the NRC approved plan.

S2 Status of Security Facilities and Equipment.

a. Inspection Scope (Inspection Procedure 81401)

The inspector reviewed the NRC approved security plan, toured the facility, reviewed security logs, reports, and security related documents, and interviewed reactor staff.

b. Observations and Findings

The inspector verified that the security system was as described in the NRC approved plan. The system provided detection and assessment of unauthorized access or removal of special nuclear material from the facility. The inspector verified that the alarms and devices were as required to allow the university police to detect and respond to unauthorized activities. Response rosters and emergency phone lists were current and posted.

c. Conclusions

Security facilities and equipment satisfied plan requirements.

S3 Security and Safeguards Procedures and Documentation

a. Inspection Scope (Inspection Procedure 81401)

The inspector reviewed the NRC approved security plan, toured the facility, reviewed security logs, reports, and security related documents, and interviewed reactor staff.

b. Observations and Findings

The plan was secured as required against release to unauthorized individuals. The plan had been reviewed and updated as required. Changes to the plan had been forwarded to the NRC within the required time frame. The periodic audit of the plan had been completed as required.

The inspector verified that the records required by the security plan to be retained on file were being maintained.

c. Conclusions

Security procedure documentation satisfied plan requirements.

S5 Security and Safeguards Staff Training and Qualification

a. Inspection Scope (Inspection Procedure 81401)

The inspector reviewed the NRC approved security plan, toured the facility, reviewed security logs, reports, training records and security related documents, and interviewed reactor staff.

b. Observations and Findings

Security training was provided to the reactor staff as part of the requalification program. Periodic training was provided to the university police as required by the plan.

c. Conclusions

Security training satisfied plan requirements.

V. Management Meetings

X1 Exit Meeting Summary

The inspector presented the inspection results to members of licensee management at the conclusion of the inspection on December 11, 1998. The licensee acknowledged the findings presented.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

T. Bauer	Assistant Director, Nuclear Engineering Teaching Laboratory
D. Kein	Chairman, Nuclear Reactor Safety Committee
M. Krause	Reactor Manager, Operations and Maintenance
P. Lamb	Chairman, Mechanical Engineering Department
A. Teachout	Reactor Health Physicist
B. Wehring	Director, Nuclear Engineering Teaching Laboratory
J. White	Radiation Safety Officer, University of Texas at Austin

INSPECTION PROCEDURE (IP) USED

IP 69001: CLASS II NON-POWER REACTORS
IP 81401: PLANS, PROCEDURES, AND REVIEWS

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

NONE

Closed

NONE

PARTIAL LIST OF ACRONYMS USED

AD	Assistant Director
LCO	Limiting Conditions for Operations
HP	Health Physics
NETL	Nuclear Engineering Teaching Laboratory
NRC	Nuclear Regulatory Commission
NRSC	Nuclear Reactor Safety Committee
OSU	Oregon State University
RM	Reactor Manager, Operations and Maintenance
SRO	Senior Reactor Operator
TS	Technical Specifications