

U.S. NUCLEAR REGULATORY COMMISSION  
OFFICE OF INSPECTION AND ENFORCEMENT  
REGION IV

IE Inspection Report No. 50-407/81-01

Docket No. 50-407

License No. R-126

Licensee: University of Utah  
College of Engineering  
Salt Lake City, Utah 84112

Facility Name: University of Utah Triga, Mark 1

Inspection at: University of Utah, Salt Lake City, Utah

Inspection Conducted: April 6-9, 1981

Inspector: T. F. Westerman 6-5-81  
M. W. Dickerson, Reactor Inspector Date

Approved By: T. F. Westerman 6-5-81  
T. F. Westerman, Chief, Reactor Projects Section No. 1 Date

Inspection Summary

Inspection on April 6-9, 1981 (Report No. 50-407/81-01)

Areas Inspected: Routine, unannounced inspection of: Organization, Logs and Records; Review and Audits; Requalification Training; Surveillance; Experiments; Radiation Control; Follow-up on previously identified open items; and Follow-up on previous items of noncompliance. The inspection involved 16 inspector-hours on-site by one NRC inspector.

Results: Of the eight areas inspected no items of noncompliance were identified.

## DETAILS

### 1. Persons Contacted

#### University of Utah

\*Dr. R. E. Turley, Reactor Administrator  
Dr. G. M. Sandquist, Reactor Supervisor  
Dr. R. C. Pendleton, Radiation Safety Officer  
C. Jensen, Senior Reactor Engineer

\*Denotes those attending exit interview.

### 2. Licensee Action on Previous Inspection Findings

(Closed) Item on Noncompliance (50-407/8002): Control rods not visually inspected and channel calibration of power level monitors not performed. The licensee performed an inspection of the control rods on April 15 and 17, 1980, and resulted in finding no problems with the rods. The licensee also completed a channel calibration of the power level monitors on March 11, 1980.

(Closed) Unresolved Item (50-407/7802): Formal and detailed surveillance procedures. Detailed surveillance procedures and data sheets have been written and were approved for use by the Reactor Safety Committee on February 20, 1981.

### 3. Reactor Organization, Logs and Records

Within the area of Organization the inspector observed that the facility organization is consistent with the Technical Specifications.

The following logs and records for the period February 12, 1980 thru April 9, 1981, were reviewed:

- (a) Reactor Operations Log, Volumes 7 and 8
- (b) Reactor Startup and Termination Checklists B1, B2, and B3
- (c) Preliminary Procedures Log
- (d) Maintenance Log
- (e) Monthly Inspection Sheets B4 and B5
- (f) Fuel Inventory Sheets

The NRC inspector also reviewed core changes to core configuration 8, 9, and 10. The change to core configuration 8 was made on April 17, 1980. The change basically consisted of the addition of four aluminum clad elements to "G" ring. Changes to configuration 9 were made July 9, 1980, and consisted basically of the removal of eleven aluminum clad fuel elements from "C" ring and their replacement with six heavy water moderator cans and five stainless steel clad elements. Seventeen heavy water moderator cans were also removed from "G" ring and replaced by aluminum clad elements. The final configuration change to that of configuration 10, was made August 22, 1980, and consisted basically of the removal from "C" ring of six heavy water moderator cans and their replacement with three control rods from "E" ring, leaving three spaces in "C" ring containing natural water. Three stainless steel clad elements were placed in "E" ring and three heavy water moderator cans were removed from "G" ring and replaced with aluminum clad elements. The resulting control rod worths, excess reactivity and shutdown margin for each configuration are as follows:

	#10	#9	#8
Shutdown Margin	\$1.04	\$0.72	\$0.73
Safety Rod	1.08	1.17	0.96
Shim Rod	1.61	1.30	1.31
Regulatory Rod	0.37	0.18	0.17
Excess Reactivity	0.94	0.40	0.40

No violations or deviations were identified.

#### 4. Surveillance

By review of the logs and records noted previously the NRC inspector determined that all of the Technical Specification Section 4.0 requirements for surveillance activities had been completed satisfactorily.

#### 5. Requalification Training

At the present time there are five licensed operators at the facility, one of whom was the reactor supervisor and as such is exempt from the requalification program. The written examination and reactor manipulation records for the four operators who remained under the requalification program were examined and found acceptable.

No items of noncompliance or deviations were identified.

#### 6. Review and Audit

The minutes of the licensee's Reactor Safety Committee (RSC) Meetings were reviewed. The responsibilities of the RSC are outlined in Technical Specification 6.1.b and 6.2, Sections 1 and 3.4 of the Operations Manual and are further amplified by "Reactor Safety Committee - Rules and Procedures" dated September 29, 1977.

Records indicated that the RSC met quarterly on the following dates: February 25, 1980; June 25, 1980; September 4, 1980; December 22, 1980; and February 20, 1981.

In addition to review of the reactor logs and records the RSC also approved the following procedures:

- . Experimental Procedure for Approach to Critical.  
This procedure included the core configuration changes.
- . Semiannual Control Rod Worth Determination
- . Semiannual Thermal Power Calibration
- . Semiannual Neutronic Power Calibration
- . Procedure for Determination of the Flux Correction Factor CF
- . Procedure for Adjustment of Power Monitoring Channels
- . Semiannual Thermocouple Calibration
- . Biennial Fuel Rod Inspection
- . Biennial Control Rod Check
- . Control Rod Movement or Replacement Procedure
- . Procedure for Adding Water to Reactor Tank
- . Procedure for Changing Filters in Water Demineralizer Circuit
- . Instrument Element Calibration

It was noted that changes to the Nuclear Engineering Laboratory Manual are in progress as a result of the procedures noted above and the need for compatibility of the procedures.

No violations or deviations were identified.

#### 7. Experiments

The experiments performed during the period February 12, 1980 to March 9, 1981, involved only irradiations that had been approved as Class 1 experiments.

The experiments had been completed, reviewed, and approved in accordance with Technical Specifications and Section 2 of the Nuclear Engineering Laboratory Operations Manual.

No violations or deviations were identified.

8. Annual Operating Report

The inspector reviewed the annual operating report for the University of Utah Triga Reactor for the period July 1, 1979 through June 30, 1980.

No violations or deviations were identified.

9. Radiation Control

The inspector reviewed the facility's procedures, posting requirements, radiation area markings, personnel monitoring devices, and reviewed the following records:

- a. Air sampling data, February 1980 - February 1981,
- b. Water sampling data, February 1980 - February 1981,
- c. Calibration Records (Instruments), November 1980 - March 1981,
- d. Radiation Survey Log, March 1, 1980 - March 9, 1981,
- e. Records of external radiation exposure, February 1980 - March 1981.

No violations or deviations were identified.

10. IE Bulletins/Circulars

The inspector verified by record review, observation, and discussion with representatives of the licensee, the actions taken in response to IE Bulletins/Circulars.

IE Circular 80-14 dealing with the radioactive contamination of plant demineralized water system and resultant internal contamination of personnel has been reviewed by the licensee and was determined to be not applicable since the demineralized system is a closed loop system and no means of tapping into the system would be available without system modification.

11. Exit Interview

An exit interview was held with representatives of the licensee on April 9, 1981, following completion of the inspection. At the interview, the inspector discussed the findings indicated in the previous paragraphs. The licensee acknowledged these findings.