

U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report No. 50-224/87-01

Docket No. 50-224

License No. R-101

Licensee: University of California  
Berkeley, California 94720

Facility Name: TRIGA, Mark III

Inspection at: Etcheverry Hall, Berkeley, California

Inspection Conducted: July 13-16, 1987

Inspectors: *M. Cillis*  
M. Cillis, Senior Radiation Specialist

7/28/87  
Date Signed

Approved by: *G. P. Yuhas*  
G. P. Yuhas, Chief, Facilities Radiological  
Protection Section

7/28/87  
Date Signed

Summary:

Inspection on July 13-16, 1987 (Report No. 50-224/87-01)

Areas Inspected: Routine unannounced inspection by a regionally based inspector of reactor operations program; including organization, audits and reviews, experiments, health physics program, environmental monitoring program, emergency preparedness program, procedures, reactor operator requalification program, transfer and shipment of radioactive material, a tour of the facility and open items consisting of Information Notice evaluations, Generic Letters and followup items, and a review of the annual report. Inspection Procedures 30703, 39745, 40745, 40750, 41745, 42745, 61745, 69745, 82745, 83743, 86740, 90713, and 92701 were addressed.

Results: Of the fourteen areas inspected, two apparent violations were identified in one area: failure of the Reactor Hazards Committee (RHC) to perform quarterly audits (see Paragraph 2(c) and failure to submit a 30-day written report as prescribed in Technical Specifications, Section 6.7(c)(4) (see Paragraph 2(c)).

## DETAILS

### 1. Persons Contacted

\*Professor T. H. Pigford, Reactor Administrator  
\*Dr. T. Lim, Reactor Supervisor  
\*Professor V. E. Schrock, Assistant Reactor Administrator  
\*A. Peterson, Radiation Safety Officer (RSO)  
Professor M. Christensen, Reactor Hazards Committee (RHC), Chairman  
\*P. Vernig, Reactor Health Physicist  
M. Denton, Chief Reactor Operator  
J. Harrell, Senior Reactor Operator

\*Denotes those individuals attending the exit interview.

### 2. Reactor Operations

#### a. General

The inspection disclosed that reactor operations were consistent with the information provided in the licensee's annual reports of 1985 and 1986.

The licensee's facility continues to provide support for irradiation and teaching programs.

#### b. Organization

The organizational structure for operation and administration of the TRIGA reactor facility remains unchanged from that previously reported. The organization was found to be consistent with Section 6.1 of the Technical Specifications (TSs).

No violations or deviations were identified.

#### c. Review and Audit

The licensee's review and audit activities assigned to the Reactor Hazards Committee (RHC) pursuant to Sections 6.1 and 6.5 of the TSs were examined during the inspection.

It should be noted that TSs, Section 6.2(c) states: "The RHC or a Subcommittee thereof shall audit reactor operations at least quarterly but at intervals not to exceed four months." Additionally, TSs, Section 6.7(c)(4) requires a 30-day written report for any observed inadequacies in the implementation of administrative or procedural controls prescribed under TSs, Section 6.0, "Administrative Controls."

The examination included discussions with the RHC Chairman, RHC Secretary and Reactor Supervisor. The RHC meeting minutes, RHC Bylaws and audit report files were examined.

The Reactor Supervisor informed the inspector at the onset of this portion of the inspection that audits for two successive quarters were not conducted at their scheduled time. He added that the required audits were subsequently performed at a later date.

The record review disclosed that RHC audits were not conducted for the period of November 1985 through September 1986, a period of slightly over ten months. The reasons provided are as follows:

- ° One individual went out of the country and failed to conduct the audit before leaving.
- ° Another individual had too many conflicting duties and failed to conduct the audit. This individual has been deleted from the RHC.

The two audits that were originally scheduled for the first and second quarters of 1986 were subsequently performed in December 1986 and February 1987.

The RHC meeting minutes did not discuss the missed audits in any great detail and no thirty (30) day written report was submitted to the NRC pursuant to TSs, Section 6.7(c)(4) as of July 13, 1987. The licensee's staff was unaware of the 30-day reporting requirement until it was brought to their attention by the NRC inspector.

Remaining RHC functions were found to be consistent with TS requirements.

The inspector brought these observations to the licensee's staff attending the exit interview.

The inspector informed the licensee that failure to perform the 1986 first and second quarter audits was an apparent violation of TS, Section 6.2(c) (87-01-01).

The inspector also informed the licensee that failure to make a 30-day written report to identify the missed audits was an apparent violation of TSs, Section 6.7(c)(4) (87-01-02).

The licensee acknowledged the inspector's observations by stating that appropriate corrective action will be implemented to prevent their recurrence.

d. Experiments

The inspection disclosed that ten new experiments were performed since the previous inspection.

The experiments were reviewed and approved by the Reactor Supervisor, Health Physicist and Reactor Hazards Committee in accordance with the TSs and reactor operating procedures.

No violations or deviations were identified.



e. Changes

Discussions with the licensee's staff disclosed that no changes were made to the facility or in procedures that would require a safety evaluation be made pursuant to 10 CFR Part 50.59.

No violations or deviations were identified.

f. Procedures

The inspection disclosed that the licensee's reactor operating procedures in TSs, Section 6.5 remain in effect.

The inspector reviewed the licensee's operating procedures. The procedures appeared to provide thorough instructions. The inspector noted that the procedures are reviewed on a routine schedule or whenever changes occur that may require revisions.

No violations or deviations were identified.

g. Reactor Operator Regualification Program

The licensee's NRC approved Reactor Operators (RO) and Senior Reactor Operators (SRO) regualification program dated November 13, 1974 was examined. The program is designed to meet the conditions as set forth in 10 CFR Part 50.54(i) and 10 CFR Part 55, Appendix A.

Selected training records, RO and SRO reactor operations logs and annual RO/SRO examinations for the period of 1985 through March 1987 were examined.

No violations or deviations were identified.

h. Surveillances

The inspector examined selected records associated with the performance of surveillance activities prescribed in Section 4 of the TSs.

The parameters selected included: Rod drop times, excess reactivity, reactor pool water conductivity checks, temperature measuring calibration checks, fuel element temperature channel checks, radiation monitoring instrumentation calibration checks and power calibration checks.

The inspector concluded that the licensee had complied with the applicable requirements.

No violations or deviations were identified.

### 3. Radiation Protection

#### a. General Employee Training

The licensee's General Employee's Training (GET) program, for assuring compliance with 10 CFR Part 19.12, "Instructions to Workers," was examined.

The examination included the review of the training lesson plans, hand-out material and attendance records.

The inspector observed that significant improvements in the licensee's GET were implemented since the previous inspections. The RSO stated that the GET is being revised. The revision will include a provision for providing GET retraining every three years.

The examination disclosed that the licensee's GET program met or exceeded 10 CFR 19.12 requirements.

No violations or deviations were identified.

#### b. Posting

The inspector verified that the licensee's posting practices are consistent with 10 CFR Part 19.11, "Posting of Notices to Workers."

No violations or deviations were identified.

#### c. Personnel Monitoring

The licensee's program for assuring compliance with 10 CFR Part 20.202 was examined and was found to be acceptable. Personnel monitoring records for the period of January 1985 through 1987 were reviewed. No abnormal exposures were identified.

No violations or deviations were identified.

#### d. Solid Wastes and Liquid Releases

Licensee solid wastes and liquid release records for the period of January 1985 through June 1987 were reviewed.

Approximately ten cubic feet of solid waste (e.g., spent resins) were transferred to the licensee's Radiation Safety Office for disposal. Disposal is made through the licensee's State of California license.

All liquids are sampled prior to each release. Two liquid releases, totalling 5551 gallons, were discharged to sewer system during the period. The sample results were well within 10 CFR Part 20, Appendix B limits.

No violations or deviations were identified.

e. Surveys

The inspector verified that direct radiation surveys, contamination surveys, special surveys and surveys for airborne particulates, gaseous, and liquid effluents are performed on a routine schedule.

Survey records for the period January 1985 through March 1987 were reviewed. The results were consistent with the levels reported in the 1985 and 1986 annual reports. No abnormal results were identified.

The RSO stated a program for sampling the reactor pool water on a routine basis was going to be implemented. The RSO also stated that an RHC audit had made the recommendation to resume the sampling program which had been stopped several years ago because the analysis never showed any activity. The inspector commended the licensee's staff for making this decision.

The inspector concluded that the licensee's radiological monitoring program was consistent with 10 CFR Parts 20.201 and 20.401.

No violations or deviations were identified.

f. Particulate and Gaseous Effluent Releases

The principal airborne radionuclide released from the facility is Argon (Ar)-41.

Region V Inspection Report 50-224/83-01 describes the licensee's program for monitoring airborne releases. The program has not changed significantly from what was described in the inspection report.

A review of airborne monitoring records for the period of 1985 through March 1987 disclosed the following:

- ° Argon (Ar)-41 releases for the period of July 1985 through June 1986 were 5.8 Curies and for the period of July 1986 through June 1987 Ar-41 releases totalled 3.84 Curies.
- ° No radioactivity in particulate form with half lives greater than eight days had been released.

The percent of the Maximum Permissible Concentration of Ar-41 is a small fraction of the limits prescribed in 10 CFR Part 20, Appendix B.

The inspector concluded that the licensee's program to maintain releases as low as possible is consistent with the ALARA concept prescribed in 10 CFR Part 20.1.

No violations or deviations were identified.



g. Environmental Monitoring Program

The licensee has continued to maintain the radiation environmental monitoring program described in Inspection Report 50-224/83-01.

Selected environmental monitoring reports for the period of January 1985 through June 1987 were reviewed.

The inspector concurred with the licensee's observations which essentially concludes that there has been no detectable or meaningful increases of radioactivity in the environs as a result of reactor operations.

No violations or deviations were identified.

4. Radioactive Material Shipments and Receipt

A review of radioactive material shipping and receipt records revealed that activities associated with the transportation and receipt of radioactive material were consistent with 10 CFR Part 20, 10 CFR Part 61, 10 CFR Part 71 and Department of Transportation (DOT) 49 CFR Parts 173-178.

Shipments of radioactive materials are made through the licensee's State of California radioactive material license. The licensee's radioactive material transportation activities were well documented.

No violations or deviations were identified.

5. IE Information Notices (INs)

Licensee's evaluations of INs received between June 1985 and March 1987 were reviewed and discussed with the licensee's staff.

The review disclosed that the licensee was not receiving all of the INs. Those that were received had been appropriately evaluated by the licensee's staff. A copy of IN 87-22 was provided to the licensee's staff during the inspection.

The Reactor Supervisor informed the inspector that he would call the appropriate NRC office to determine why the INs were not being received.

No violations or deviations were identified.

6. Generic Letter

The information provided in Generic Letter 86-11, "Distribution of Products Irradiated in Research Reactors," was discussed with the Reactor Supervisor.

The inspector was informed that the licensee does not have any current plans to irradiate any gem stones for commercial use. The Reactor Supervisor stated that the NRC would be informed of any future decisions to irradiate gem stones for commercial and/or private use.

No violations or deviations were identified.

7. Emergency Preparedness

The licensee's capabilities for responding to emergencies as described in their Emergency Plan of July 1984 and for demonstrating compliance with 10 CFR Part 50.54(q) were examined.

The inspector concluded through discussions, review of emergency procedures, training records, memorandums of understanding, and other related documents, that the licensee met the commitments provided in their emergency plan.

The Reactor Supervisor stated that he was revising the Emergency Plan Training Program to include a provision for retraining Laboratory Users and some support groups. The Supervisor added that the Emergency Plan Training Program includes provisions for retraining remaining activities. The retraining program for Laboratory Users will be given whenever major changes occur or at a three-year frequency. The inspector commended the supervisor for his decision.

The examination revealed that evacuation drills and other full scale drills involving offsite agencies were conducted at the frequencies prescribed in the emergency plan.

No violations or deviations were identified.

8. Open Items

(Closed) Followup Item 83-01-01 - This item identified that the licensee had agreed to calibrate instruments for non-penetrating radiation and to develop a program for evaluating non-penetrating radiation, to develop a program for evaluating non-penetrating radiation exposure, either by means of special surveys or by modification of routinely performed surveys.

An examination was conducted to determine the status of this item.

The inspector was informed that an instrument would be calibrated for measuring non-penetrating radiation. This matter is closed (83-01-01).

9. Facility Tour

The inspector toured the licensee's facility to check the general state of housekeeping and to verify that posting and labeling was consistent with 10 CFR Part 20.203 and that radiation monitoring instrumentation was in current calibration and were operating properly.

Independent radiation measurements were performed using an Eberline, Model R0-2 ion chamber survey instrument, S/N 2691, that was due for calibration on July 21, 1987.

All fixed and portable radiation monitoring instruments were in current calibration and plant cleanliness was excellent.



The independent measurements confirmed that the licensee's postings and labeling practices were consistent with 10 CFR Part 20.203.

No violations or deviations were identified.

10. Exit Interview

The inspector met with the licensee representatives (denoted in Paragraph 1) at the conclusion of the inspection on July 16, 1987. The inspector summarized the scope and findings of the inspection. The licensee was informed of the apparent violations in Paragraph 2.

The licensee acknowledged the violations, stating that immediate corrective actions would be implemented.