

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

IE Inspection Report No. 50-192/79-02

Docket No. 50-192

License No. R-92

Licensee: The University of Texas

Facility: Triga Mark I - 250 Kwt

Inspection at: Austin, Texas

Dates of Inspection: April 9-11, 1979

Inspectors: *G. S. Madson* 4/25/79
E. H. Johnson, Reactor Inspector Date

G. S. Madson 4/25/79
E. A. Cupp, Reactor Inspector Date

Approved by: *G. S. Madson* 4/25/79
G. L. Madsen, Chief, Reactor Operation and Nuclear Support Branch Date

Inspection Summary

Inspection on April 9-11, 1979 (Report No. 50-192/79-02).

Areas Inspected: Routine, announced inspection of plant status, facility organization, logs and records, review and audit functions, requalification training, procedures, surveillance testing, experiments, environmental protection, emergency plan, radiation control and follow-up on previously identified matters. The inspection involved thirty-six (36) inspector-hours on-site by two (2) NRC inspectors.

Results: Of the thirteen (13) areas inspected, no items of noncompliance or deviations were identified.

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DETAILS

1. Persons Contacted

- *J. A. Burack, Reactor Supervisor
- *Dr. D. E. Klein, Director, Nuclear Reactor Laboratory
- T. L. Bauer, Reactor Operator
- *R. D. Smith, Senior Reactor Operator
- B. B. Tomlin, Laboratory Technician
- H. W. Bryant, Radiation Safety Officer

*Attended exit interview.

2. Plant Status

During this inspection the reactor was started up several times and one pulse was performed. Observations of the operators during these evolutions revealed no discrepancies.

The inspectors toured the facility in the company of the Reactor Supervisor. During the tour the inspectors observed: (a) condition and cleanliness of the reactor and laboratory; (b) radiation controls; (c) access controls to the laboratory; and (d) posting of notices to employees in accordance with 10 CFR 19. During this inspection it was noted that seven (7) gas cylinders, some with no caps, and numerous fire extinguishers located in the facility were not rigidly supported. The Radiation Safety Officer committed to notifying the proper personnel to correct the problem.

3. Follow-up on Previously Reported Items

Closed. Infraction 1 of report 50-192/78-01. The licensee is observing a maximum licensed power level of 250kw (steady state). The power indicating channels have been calibrated.

Closed. Infraction 2 of report 50-192/78-01. The licensee records the pool water conductivity on the start-up checklist at the beginning of each day's operation. When the reactor is not operated during the week, the pool water conductivity is measured and recorded in the weekly calibration log.

Closed. Infraction 3 of report 50-192/78-01. The licensee performed a review of the two design changes in question and documented the evaluation that these items did not constitute an unreviewed safety question.

Closed. Infraction 4 of report 50-192/78-01. The Reactor Committee now reviews the activities of each operator at its quarterly meeting to ensure that operators are actively performing the functions of an operator or senior operator.

Closed. Deviation 7601-1 (Report No. 50-192/76-01). The licensee's revised Hazards Summary Analysis indicates that the two fuel temperature meters will be the primary indications of fuel temperature during a pulse. These temperatures are read and recorded during each pulse.

Closed. Deviation 7602-1 (Report No. 50-192/76-02). The revised Hazards Summary Analysis specifies the revised meeting frequency of the radiation safety committee.

Closed. Unresolved Item 7601-2 (Report No. 50-192/76-01). Written annual evaluations of each operator are being performed and documented in the "Requal Documentation" book.

Closed. Unresolved Item 7801-1 (Report No. 50-192/78-01). NRC management has indicated that simulation of emergency or abnormal conditions is not required for research reactors.

Closed. Reference IE Report No. 50-192/76-02, Details paragraph 1. The reactor pool floor has been cleaned up.

Closed. Reference Report No. 50-192/78-01, Details paragraph 6. The licensee has specified the use of the fuel unloading and loading procedures for the approach to critical experiment.

Closed. Reference IE Report No. 50-192/78-01, Details paragraph 9c. The master drawings have been revised to reflect removal of the auto controller.

Closed. Reference IE Report No. 50-192/78-01, Details paragraph 9a. The revised Hazards Summary Report contains a charter for the Reactor Committee which includes quorum requirements.

Closed. Reference IE Report No. 50-192/78-01, Details paragraph 9c. Design changes are reviewed by the nuclear laboratory staff and then submitted to the Reactor Committee. All approvals are formally documented.

4. Organization

The inspector reviewed the operational organization associated with the reactor to determine compliance with technical specification requirements.

No items of noncompliance or deviations were noted.

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5. Operations and Maintenance Logs

The inspector examined the operation and maintenance logs for the period June 8, 1978 through April 9, 1979. The following logs and records were reviewed:

- Reactor Operations log
- Startup Checklists
- Semiannual checks
- Pulse log
- Radio isotope log
- Weekly calibration log
- Calibration and maintenance log.

No items of noncompliance or deviations were noted.

6. Review and Audit Functions

The objective of this inspection effort was to verify that review and audit functions are conducted consistent with the requirements of the TS and the commitments of the Hazard Summary Report and that changes to the facility are made in accordance with the requirements of 10 CFR 50.59.

a. Reactor Committee Activities

The inspector reviewed the activities of the Reactor Committee. The composition of the committee and the meeting frequency has been in conformance with the TS requirements. The inspector reviewed the minutes of the four meetings which were held in 1978 and verified that the subject matter reviewed by the committee is consistent with the requirements of the TS.

b. Radiation Safety Committee

The Radiation Safety Committee met twice during 1978 as required by the Hazard Summary Report as revised in December 1978 (See closed item in paragraph 3).

c. Facility Design Changes

There were no changes to the facility since the last inspection.

No items of noncompliance or deviations were noted.

7. Requalification Training

The objective of this inspection effort was to verify that the Requalification Training program is being conducted as approved by the Commission.

The inspector reviewed the "Requal Documentation" book maintained by the Reactor Supervisor for the following items: (a) annual exams and answers for each individual; (b) documentation of required manipulations; (c) records of operator evaluations; (d) attendance at any required lectures; (e) records of review of changes in facility, procedures and license and (f) records of review of emergency procedures.

No items of noncompliance or deviations were noted.

8. Procedures

The inspector reviewed the content, scope and control of facility procedures to determine if they are adequate to control safety-related operations.

The inspector reviewed the Startup Operating Procedures for Pulse Operation and Pulse Interlock Checks for technical adequacy and to verify that they meet Technical Specification requirements. The inspector then observed the Reactor Supervisor's performance of these two procedures to verify that they accomplish their intended functions.

The inspector reviewed the administrative controls for procedures.

During the past year a new Bomb Threat procedure was implemented by the University. This procedure was incorporated into the reactor facility procedures.

No items of noncompliance or deviations were noted.

9. Experiments

From records reviewed and discussions with the licensee personnel, the inspector determined that the experiments conducted since the last inspection were "Routine Experiments" as defined by Technical Specification I.1. Review of the Radioisotope Log indicated that the Reactor

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Supervisor is now calculating or estimating the reactivity worth of movable experiments. No items of noncompliance or deviations were identified.

10. Surveillance

Sections C through F of the licensee's TS has requirements for functionally testing, calibrating and inspecting specified instrumentation, controls and systems of the facility. These requirements, which are herein referred to as "Surveillance Requirements," establish the operability of the systems/components. The objective of this inspection effort was to verify that the licensee is complying with these surveillance requirements.

The licensee has established a "Yearly Checklist" which lists all of the surveillance requirements of the TS and additional requirements established by his internal procedures. The checklist is prepared in the form of a bar chart which also serves as a mechanism for scheduling the tests/checks. When a scheduled test/check is satisfactorily completed, the licensee writes the date of the test/check on the chart and initials the entry. The date and initial thereby serve as a record of completion of the test or check.

The inspector reviewed the checklist for the period June, 1978 through April, 1979, and verified that all of the required surveillance requirements had been scheduled and completed. All of the tests/checks had been completed at the frequency required by the TS or the licensee's procedures, except for two tests which were scheduled for performance during the current month.

The inspector also reviewed licensee records to verify the results of the tests and checks recorded on the yearly checklist. The results of the tests/checks were documented in one or more of the following records:

- a. Reactor Operations Log Book.
- b. Reactor Calibration Log Book.
- c. Instrument Log Book.
- d. Reactor Maintenance Log Book.

During this review the inspector noted the licensee performs the annual power level calibration using a rate of pool temperature increase method. It has been noted at other TRIGA facilities that the results for calculated core power when using this method can be affected by as much as ± 10 percent depending on the initial difference

in temperature between the pool and the surrounding ambient (i.e. pool concrete). The inspector was informed by the reactor supervisor that this effect had been noted and that the power calibration was conducted after a 72 hour stabilization period to allow pool temperature to equalize with the concrete temperature. The inspector's expressed the concern that this initial condition should be specified in the procedure for this calibration to ensure that the procedure is performed uniformly each time. The reactor supervisor committed to adding this initial condition to the procedure.

The inspector reviewed the procedure for check of reactor interlocks which must be tested semiannually. The low source count interlock is tested by rotating the alarm hand on the meter up to the indicator hand to energize the interlock. The inspector indicated that removing the source and causing the indicator to downscale would be a more realistic test. The reactor supervisor indicated that he would change the procedure to reflect this method of testing the interlock.

The inspector had no further questions in this area. The above items will however receive follow-up during the next inspection.

11. Limiting Conditions for Operation

The purpose of this inspection effort was to review the licensee's adherence to technical specification conditions for which no specific surveillance test is specified.

The following technical specification conditions were selected:

-minimum shutdown margin, technical specification requirement is 26.6¢ shutdown. The licensee performs a calculation of this on a periodic basis to verify conformance. The inspector performed an independent calculation of the shutdown margin based on reactor data of April 2, 1979 and determined that the margin was \$1.10, well within specification.

-maximum excess reactivity (Kex) above clean critical, technical specification limit is \$3.08. The licensee calculates Kex once per month and the inspector noted that his independent calculation of \$2.25 Kex compared favorably with the licensee's calculations of January 5, 1979, February 21, 1979, March 22, 1979, (\$2.29-\$2.30).

-maximum reactivity insertion rate, technical specification limit is 26.6¢/sec. The licensee calculated this on January 31, 1979, at .041¢/sec for the most reactive rod. The inspector noted

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an error in the calculational method and performed an independent calculation of .06¢/sec still well within the specification limit.

-chiller unit to pool water delta pressure, technical specification limit is one psid. The licensee maintains the alarm on the unit d/p switch at 4 psid to ensure conformance to this specification. The inspector noted however that this switch was not scheduled for routine calibration. The reactor supervisor committed to scheduling this switch for routine calibration.

No items of noncompliance or deviations were noted in this area of the inspection. The routine calibration of the chiller/pool d/p switch will be followed up on the next inspection.

12. Core Configuration

In August, 1973 the licensee performed a major core configuration change in which numerous fuel elements were retired and other elements were moved to new core locations. The licensee performed rod worth measurements following this core change. The inspector noted however that since this major core configuration change several fuel elements have been retired however only the skim rod has been "recalibrated" (measurement of rod worth), and this was necessitated by maintenance on the skim rod. It was noted that the licensee periodically measures the total worth of the transient rod and the latest measurement was within 5 percent of the value determined in the August, 1973 calibration. The regulating rod worth is similarly periodically determined during student lab sessions. However the inspector expressed his concern that on any core configuration change the rod worths could be affected and a rod worth measurement must be conducted.

This item was discussed with the reactor supervisor who instituted the following changes: first, the current core configuration was assigned an alpha numeric designation and the rod worths are to be remeasured for this configuration. Any configuration changes will be assigned a new designator and the rod worth curves will be checked, if appropriate to this new configuration, the curves will be updated to show applicability to this new configuration.

The inspector had no further questions on this matter. This item will be followed up on during future inspections.

13. Environmental Protection

The inspector checked the facility for potential discharge paths that might permit unmonitored or unauthorized releases of radioactive

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materials. The Environmental Sample Data records for monthly sampling of surface water at three University locations were reviewed.

No items of noncompliance or deviations were noted.

14. Emergency Plan

The licensee's emergency plan was reviewed to verify that it is adequate to deal with emergencies and is in conformance with regulatory requirements.

The inspector noted that the emergency call list in the "Notices, Procedures and Start-up Check Sheets" book at the operator console and in the package of "Emergency Information" in the emergency locker did not reflect the fact that Dr. D. E. Klein assumed the position of Director, Nuclear Reactor Laboratory in September 1978. The licensee corrected this during the inspection and it is considered closed. No items of noncompliance or deviations were noted.

15. Radiation Control

The inspector reviewed the licensee's program for radiation protection and contamination control. The following items were reviewed: (a) posting and labeling; (b) marking of restricted areas; (c) protective clothing use; (d) personal monitoring devices; (e) exit monitoring; (f) instructions to personnel; (g) exposure records; and (h) radiation and contamination survey records. The inspector conducted a radiation survey while the reactor was at 100 percent power (250Kw) and compared it with a recently conducted survey by the licensee.

The inspector noted that no "Certification of Instructions to Workers" had been recorded since January 1977. The licensee committed to instructing all present and future non-licensed personnel working around radioactive material and to maintain the certifications on file. This item remains open.

The following records maintained by the Radiation Safety Officer were reviewed:

- Quarterly Pool Water Samples
- Laboratory Radiation Survey
- Radiation Background Data Sheet
- Radiation Exposure Records

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The inspector reviewed the operability of portable radiac instruments and noted one inoperable meter which the licensee promptly removed to the repair shop. It was also noted that the licensee currently stores all radiac meters in the reactor room. The inspector indicated that one instrument should be in the area of the emergency equipment area. The licensee committed to moving one of its meters to that area. This item remains open.

No items of noncompliance or deviations were noted.

16. Exit Interview

The inspectors met with licensee representatives (denoted in paragraph 1) at the conclusion of the inspection on April 11, 1979. The inspectors summarized the scope of the inspection and the findings as documented above.

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