

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

Report No. 50-128/78-02

License No. R-83

Licensee: Texas A&M University (TAMU)  
College Station, Texas

Docket No. 50-128

Facility Name: Texas A&M TRIGA (1mw)

Location: College Station, Texas

Inspection Conducted: September 11-15, 1978

Inspector: *G. S. Murray* 10/4/78  
Blaine Murray, Radiation Specialist Date

Supervisor: *G. L. Madsen* 10/4/78  
G. L. Madsen, Chief, Reactor Operations Date  
and Nuclear Support Branch

Inspection Summary

Inspection on September 11-15, 1978 (Report No. 50-128/78-02)

Areas Inspected: Routine, unannounced inspection of the licensee's organization; reactor logs & records; licensee audits; requalification training; procedures; surveillance tests; experiments; reports; environmental surveillance; emergency planning; and radiation control. The inspection involved 39 on-site hours by one NRC inspector.

Results: Two apparent items of noncompliance: (1) Infraction - failure to post High Radiation Area, see paragraph 14.b; (2) Deficiency - failure to post notice to workers, see paragraph 14.a; and two unresolved items (see paragraphs 10.a & 14.c), were identified.

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DETAILS

1. Persons Contacted

- \*Dr. J. D. Randall, Director of Nuclear Science Center (NSC)
- \*D. E. Feltz, Assistant Director of Nuclear Science Center
- \*E. E. Bates, Nuclear Science Center Health Physicist
- B. J. Browning, Reactor Supervisor
- G. S. Stasny, Reactor Operator
- A. L. Restivo, Facility Maintenance Foreman
- \*Dr. R. D. Neff, University Radiological Safety Office

\*Denotes those attending the exit interview.

2. Licensee Action on Previous Inspection Findings

- a. (Closed) Item of Noncompliance 50-128/77-03: Failure to include gaseous effluent data in annual reports. The licensee's corrective action was reviewed and considered adequate to close this item.
- b. (Closed) Unresolved Item 50-128/7601-3: This item was discussed in IE Inspection Report 50-128/76-01 and involved a program for updating and control of design change drawings. The inspector noted that considerable improvement had been made in this area. This item is considered closed.

3. Scope of Inspection

The purpose of this inspection was to review the operating history of the reactor for the period May 1, 1977 through September 11, 1978.

4. Organization

The inspector reviewed the reactor facility and Reactor Safety Board (RSB) organization to determine compliance with Technical Specifications 6.1 and 6.2.

No items of noncompliance or deviations were identified.

5. Logs, Records, and Reports

The inspector examined the licensee's logs and records to determine compliance with Technical Specifications 6.6 and 6.7. The following logs, records, and reports were examined:

Surveillance Tests Results, May 1, 1977 - September 10, 1978

RSB Meetings, May 1, 1977 - September 10, 1978  
Reactor Supervisor's Log, May 1, 1977 - September 10, 1978  
RSB Audits, January 1, 1977 - September 10, 1978  
Experiment Authorizations, January 1, 1977 - September 10, 1978  
Reactor Maintenance, May 1, 1977 - September 10, 1978  
Instrumentation Log, May 1, 1977 - September 10, 1978  
Standard Operating Procedures (SOPs)  
Scram Log, January 1, 1977 - September 10, 1978  
Fuel Log, May 1, 1977 - September 10, 1978  
Radiation Surveys, July 1, 1977 - September 10, 1978  
Operator Requalification Records, January 1, 1977 - September 10, 1978  
Reactor Operations Logs Nos. 58,59,60,61, April 1, 1977 - September 10, 1978  
Radioactive Shipment Records, May 1, 1977 - September 10, 1978  
Health Physic Monthly Reports, 1977 & 1978  
Annual Reports, 1976 & 1977  
Health Physic Calibration Records, May 1, 1977 - September 10, 1978  
Personnel Exposure Records, 1977 & 1978  
Radiation Protection Training Records, 1977 & 1978  
Reactor Modification Authorizations, January 1, 1977 - September 10, 1978  
Fuel Inventory Records, 1977 & 1978  
Reactor Start-up & Shut-down Checklists, 1977 & 1978  
Licensee Event Reports, 1977 & 1978

No items of noncompliance or deviations were identified.

6. Audits

The inspector reviewed audits performed by the licensee to determine compliance with Technical Specification 6.2. The licensee's records indicated that the following audits were conducted:

September 1, 1977 - Reactor Logs  
December 14, 1977 - Personnel Exposure Records  
March 13, 1978 - Reactor Start-up  
June 21, 1978 - Intrusion Alarm

The licensee's records indicated that audits have been performed at the frequency specified in the Technical Specifications. However, the RSB has not developed a schedule to ensure that all activities associated with the NSC are identified for periodic audits. To date, it appears that a random selection method has been used to select audit areas. As a result, the possibility exists that important areas may be audited infrequently or missed altogether. A licensee representative stated that the matter of audit schedules will be discussed during the next RSB meeting.

No items of noncompliance or deviations were noted.

7. Operator Requalification Training

The inspector reviewed the requalification training to determine compliance with the program as accepted on October 7, 1976. The following is a list of licensed operators:

<u>Operator</u>	<u>License Expiration Date</u>	<u>Requalification Requirements Completed</u>
B. J. Browning (SRO)	11/26/79	Yes
R. G. Cochran (SRO)	6/28/79	No
D. E. Feltz (SRO)	6/28/79	Yes
C. E. Harris (SRO)	3/28/80	Yes
J. D. Randall (SRO)	6/28/79	Yes
G. S. Stasny (RO)	7/29/79	Yes
J. P. Taft (SRO)	3/30/80	Yes
J. W. Thesis (SRO)	6/13/80	Yes

The licensee's records indicated that Dr. R. G. Cochran had not participated in the requalification program during 1977-78. A licensee representative stated that it would be necessary for Dr. Cochran to satisfy the requalification program requirements before being allowed to operate the reactor.

No items of noncompliance or deviations were identified.

8. Procedures

The inspector reviewed the licensee's procedures to determine compliance with item 6.5 of the Technical Specifications. The required procedures are found in the Standard Operating Procedure (SOP) Manual. The licensee has reviewed and up-dated most of the SOPs during the past two years. It was noted that SOP's regarding experiments and facility modifications have not been completely updated. The licensee is presently in the process of updating these SOPs and procedures. A licensee representative stated that updating of experiment and modification SOPs will be completed within six months. This item will be reviewed during future inspections.

No items of noncompliance or deviations were noted.

9. Surveillance

The inspector reviewed the licensee's surveillance test results to determine compliance with Technical Specification requirements.

No items of noncompliance or deviations were noted.

10. Experiments

The inspector examined the licensee's experiment program to determine compliance with item 3.6 of the Technical Specifications. The following experiment authorizations (EAs) have been approved since the previous inspection:

EA No. 56, "In-pool Radiography Facility"

EA No. 57, "Neutron Radiography of Explosive Materials"

EA No. 57-1, "Neutron Radiography Scram Circuit"

During the review of experiments, the following items were noted:

a. Explosive Limits

Technical Specification 3.6 (c) states: "Explosive materials, such as gunpowder, TNT, nitroglycerin, or PETN, in quantities greater than 25 milligrams shall not be irradiated in the reactor or experimental facilities. Explosive materials in quantities less than 25 milligrams may be irradiated provided the pressure produced upon detonation of the explosive has been calculated and/or experimentally demonstrated to be less than the design pressure of the container."

The licensee has performed approximately 12 neutron radiography procedures of plastic explosives. Each of these devices contained about 32,500 milligrams of explosive material. During radiography procedures, the explosive device is located outside of the reactor pool attached to a film cassette which is positioned about 20 feet from the biological shield wall. The licensee stated that they interpret the 25 milligram limit as applying to material placed in or adjacent to the reactor core. The inspector stated that "experimental facilities" could include locations other than in or near the core. The licensee's internal procedures limit the total amount of explosive material at any one time in the NSC to less than five pounds. The inspector stated that both items involving experimental limits and total material at the NSC will be forwarded to NRC Licensing for resolution.

This item is considered unresolved pending resolution by NRC Licensing. See paragraph 16.

b. Approval of EA No. 57

An RSB approval signature did not appear on EA No. 57. However, the inspector noted that the minutes of RSB meeting No. 82 held on January 27, 1978 mentioned that approval was given to EA No. 57. The licensee stated that failure to have the RSB sign the

EA form was an apparent oversight. The licensee stated that the necessary signature will be obtained during the next RSB meeting.

No items of noncompliance or deviation were noted.

11. Reactor Operation

The inspector observed a reactor start-up, operation at 1 Mw, and shut-down on September 12, 1978.

No items of noncompliance or deviations were noted.

12. Facility Tour

The inspector toured the reactor facility several times during September 11-15, 1978. The following items were examined:

Housekeeping  
Availability of Procedures  
Posting Per 10 CFR 19 and 20  
Access Control  
Personnel Monitoring  
Handling of Irradiated Samples  
Availability of Radiation Survey Instruments

See paragraph 14 for items noted during the tours.

13. Environmental Protection

The inspector reviewed the licensee's environmental protection program to determine compliance with item 6.7.2 of the Technical Specification and 10 CFR 20.106 limits. The licensee maintains an off-site environmental survey program which consists of quarterly analysis of water, vegetation, and milk samples. In addition, facility gaseous effluents are continuously monitored and liquid hold-up tanks are sampled and analyzed prior to each release.

Table 2, Section III-4, in the 1977 Annual Report listed several monthly Ar-41 releases that were slightly above 10 CFR 20 limits for releases to the unrestricted area. A licensee representative stated that the values appearing in the annual report are concentrations measured at the stack. These values do not take into account dilution that occurs between the stack and the restricted area fence. Information contained in the SAR indicates that, even under the most restrictive atmospheric conditions, an additional dilution factor of 200 would apply for concentration at the restricted area fence.

A licensee stated that future annual reports will list concentrations at the restricted area fence.

No items of noncompliance or deviations were noted.

14. Radiation Control

The inspector reviewed the licensee's program to determine compliance with 10 CFR 19 and 10 CFR 20 requirements. The following areas were examined:

Exposure Control  
Radiological Training  
Radiological Protection Procedures  
Instruments and Equipment  
Posting, Labeling, and Control  
Surveys  
Notifications and Reports

During a tour of the facility on September 12, 1978 the following items were noted:

a. Posting of notices to Workers

10 CFR 19.11 requires that copies of 10 CFR 19, 10 CFR 20, license information and operating procedures be posted or describe the documents and state where they may be examined.

Contrary to the above, copies of 10 CFR 19&20 were not posted on September 12, 1978. A licensee representative stated that the documents had been inadvertently removed from the facility bulletin board. The inspector verified that the required material was posted prior to leaving the facility on September 15, 1978.

b. Caution Signs

10 CFR 20.203 (c)(1) states: "Each high radiation area shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words:

CAUTION  
HIGH RADIATION AREA

Contrary to the above, the cave door to the beam port No. 4 neutron radiography facility was not posted while the beam port was in use on September 12, 1978. Evaluation of radiation levels in the beam port facility indicated that whole body radiation levels of approximately 40 Rem/hr neutron and 10 Rem/hr gamma are present in the primary beam area. It should be noted that the beam port facility was locked and fitted with an interlock

device so as to satisfy the requirements of 10 CFR 20.203 (c)(2).

The inspector verified that the beam port area was properly posted prior to leaving the facility on September 15, 1978.

c. Neutron Personnel Monitoring

The licensee's neutron personnel monitoring program was examined to determine compliance with Regulation Guide 8.14. The inspector was particularly concerned with personnel monitoring associated with neutron radiography activities. The licensee's survey data indicates that radiation levels of about 250 mRem/hr are present near the sample loading area and 100 mRem/hr at selected locations within the sample preparation room. Survey data indicated that neutrons contribute more than 90 percent of the total radiation levels at the above locations.

The licensee presently uses NTA film as the means of establishing personnel neutron doses. A licensee representative states that the neutron spectrum associated with the beam port No. 4 radiography activities has not been evaluated to determine if their neutron monitoring program satisfies Regulatory Guide 8.14. According to a licensee representative, a neutron spectrum evaluation will be performed. Depending on the evaluation results, it may be necessary to modify their present program. This item is considered unresolved pending the results of the neutron spectrum evaluation. See paragraph 15.

15. Emergency Planning

The inspector reviewed the licensee's emergency planning program regarding coordination with emergency support agencies, facilities and equipment, and drills.

The licensee has established written agreements with support agencies such as medical, police and fire departments. The licensee maintains emergency supplies and equipment and has conducted emergency drills since the previous inspection.

The licensee's records did not indicate that critiques are held following drill activities. A licensee representative stated that post drill critiques are held, but the items discussed have not been formally documented. A licensee representative stated that problems identified during drills and the proposed corrective action will be documented for future drills.

No items of noncompliance or deviations were noted.



16. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, items of noncompliance, or deviations. Unresolved items disclosed in this inspection are discussed in paragraphs 10.a & 14.c.

17. Exit Interview

The inspector met with the licensee representatives denoted in paragraph No. 1 at the conclusion of the inspection on September 15, 1978. The inspector summarized the purpose and the scope of the inspection and the findings. With regard to the items of noncompliance, the inspector stated that appropriate corrective action had been completed; therefore, the licensee would not be required to submit a written response. Dr. Randall stated that a neutron spectrum evaluation will be performed to evaluate the unresolved item associated with Regulatory Guide 8.14. The inspector stated that the unresolved item regarding the explosive limits in Technical Specification 3.6 will be discussed with the NRC Licensing Staff.