APPENDIX B

U. S. NUCLEAR REGULATORY COMMISSION

REGION IV

Inspection Report: 50-128/94-01

Operating License: R-83

Licensee: Texas Engineering Experiment Station
Texas A&M University
College Station, Texas 77843-3575

Facility Name: TRIGA Reactor (1 Megawatt)

Inspection At: Nuclear Science Center

Inspection Conducted: May 23-27, 1994

Inspector: L. R. Norderhaug
Senior Material Control Analyst
Reactor Inspection Branch

Approved: Blaine Murray
Blaine Murray, Chief
Reactor Inspection Branch

6/17/94
Date

Inspection Summary

Areas Inspected: Routine, announced, inspection of organization and staffing, operations logs and records, procedures, licensed operator requalification training, surveillance and limiting conditions for operation, experiments, radiation protection, design changes, committee activities, audits and reviews, emergency planning, maintenance logs and records, and fuel handling logs and records.

Also reviewed were programs for radioactive materials transportation, special nuclear material accountability and physical security, including plans, procedures and reviews, reports of safeguards events, receipt of new fuel at reactor facilities, fixed site physical protection of special nuclear material of low strategic significance, and the protection of Safeguards Information.

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Results:

- The licensee's organization satisfied technical specification requirements (Section 1.1).
- Reactor operations logs and records were maintained as required (Section 1.2).
- Operating procedures were followed consistent with regulatory requirements (Section 1.3).
- The operator requalification program was properly implemented (Section 1.4).
- The surveillance requirements and limiting conditions of operation were maintained in accordance with technical specifications (Section 1.5).
- Reactor experiments had been reviewed and authorized in accordance with technical specification requirements (Section 1.6).
- A good radiation protection program was effectively implemented. The licensee had completed a significant upgrade of the sample handling and packaging area to incorporate air flow barriers, a separate entrance and exit to the handling area, and a whole-body frisking booth to improve contamination control (Section 1.7).
- Reactor design changes, the performance of any modified equipment, and procedures related to the modified system had been reviewed and approved in accordance with 10 CFR 50.59, the technical specifications, and administrative procedures (Section 1.8).
- A violation was identified involving the failure of the Reactor Safety Board to complete the required program audits (Section 1.9).
- The licensee's emergency equipment, instrumentation, and supplies were maintained in a state of operational readiness. Licensee's staff and support organization personnel had been trained and demonstrated a knowledge of the emergency plan and emergency procedures (Section 1.10).
- Equipment maintenance logs and records were maintained as required by the technical specifications and administrative procedures (Section 1.11).
- Reactor fuel material had been handled and recorded in a manner consistent with the requirements of the technical specifications and procedures (Section 1.12).

- The security program properly minimizes the potential for unauthorized removal special nuclear material and would facilitate the location and recovery of any missing material (Section 5).

- A noncited violation was identified concerning the storage of Safeguards Information (Section 6).

- Special nuclear material inventory control was consistent with regulatory requirements (Section 7).

- The licensee had received, reviewed, and evaluated their operations in accordance with Information Notices and Generic Letters issued by NRC since the last inspection (Section 9).

Summary of Inspection Findings:

- Violation 128/9401-01 was opened (Section 1.9).

- Noncited Violation was identified (Section 6).

Attachments:

- Attachment 1 - Persons Contacted and Exit Meeting

- Attachment 2 - **PROPRIETARY INFORMATION**
  Sensitive Security Inspection Information

DETAILS

1 CLASS II RESEARCH AND TEST REACTOR OPERATIONS (40750)

The inspector reviewed the operations, health physics, emergency preparedness, and requalification training for the Nuclear Science Center TRIGA reactor. The items reviewed are discussed in the following subsections. A violation identified in this area is discussed in Section 1.9.

1.1 Organization and Staffing

The inspector determined that the licensee's organization and minimum shift staffing composition for operation, including on-call personnel, were as described in their technical specifications.

1.2 Operations Logs and Records

The inspector determined that the licensee's operation logs and records were maintained as required by the licensee's administrative procedures. No significant problems or events had been identified. The recorders required by the technical specifications were properly maintained.

1.3 Procedures

The inspector determined that:

- The licensee's administrative control procedures were consistent with technical specifications, license requirements, and licensee commitments.
- The procedures used by the licensed operator had been reviewed and approved in accordance with the requirements of the licensee administrative control procedures. The latest revisions were available and used.
- The procedures required by the technical specifications contained sufficient information for the user to perform the required function.
- Reactor personnel adhered to the facility procedures requirements.

1.4 Operator Requalification Training

The inspector determined that:

- The requalification records for licensed operators were maintained as required by the requalification plan.

- Although no operators had been disqualified, the licensee understood the required actions for any disqualified individual not meeting the requirements of 10 CFR 55.53(e) or the requalification plan.

- The licensee had implemented the following items, consistent with the Requalification Plan approved by the Office of Nuclear Reactor Regulation:

  - Discussion and review of changes in the facility, procedures, and license.

  - Review and simulation of abnormal and emergency procedures.

  - Assurance that the operators maintain an active duty status in accordance with 10 CFR Part 55.53(e).

  - The conduct of formal training.

1.5 Surveillance and Limiting Conditions for Operation

The inspector determined that:

- The surveillance requirements of the technical specifications were being conducted as required.

- The limiting conditions of operation were maintained in accordance with the licensee's procedural requirements.

1.6 Experiments

The inspector determined that:

- New and modified experiments had been reviewed and approved in accordance with the requirements in the technical specifications and procedures.

- None of the experiments represented an unreviewed safety question or require a technical specifications change as delineated in 10 CFR 50.59.

- Hazards that could be associated with experiments had been identified and remedial actions implemented as appropriate.

- Irradiated items had been accounted for and controlled as required by the regulations and licensee procedures.

- The experiments were controlled as required by the technical specifications and the licensee's procedures.

- The experiments were installed and removed from the reac accordance with experiment authorizations and procedures.

- The reactivity worth of experiments had been evaluated and ·ified by measurements in accordance with the technical specification: and the licensee's procedures.

- Engineering controls had been established to limit radiation exposures as required by the applicable experiment protocol and authorization, operating procedures, and technical specifications.

1.7 Health Physics

The inspector determined that:

- The exposure limits in 10 CFR Part 20 were not exceeded.

- The required radiation survey, sampling, and monitoring had been performed in accordance with the regulatory requirements and the licensee's procedures.

- The required calibration of radiological survey, sampling, or monitoring instruments had been performed in accordance with the technical specifications and the licensee's procedures. While the inspector found no instances where instruments with expired calibrations had been used, the licensee is, nonetheless, in the process of modifying their data sheets to require an entry noting the type, identification number, and calibration due date of all survey instruments used.

- The required personnel dosimetry program was conducted in accordance with licensee procedures and 10 CFR 20.1501 and 20.1502.

- Radiological effluent releases requirements in 10 CFR 20.1302; 10 CFR Part 20, Appendix B, Table 2; and the technical specifications were not exceeded.

- The use and calibration for instruments to monitor gaseous or liquid effluent releases were commensurate with the requirements in 10 CFR 20.1501, the technical specifications, and the licensee's procedures.

- Notices to workers were posted in accordance with 10 CFR 19.11 and the licensee's procedural requirements.

- Restricted areas, as defined in 10 CFR 20.1003, were posted in accordance with the requirements in 10 CFR 20.1902 and 20.1903 and the licensee's procedures.

- Appropriate contamination control protective clothing was being used in accordance with the licensee's procedural requirements.

- Personnel working around radioactive material had been instructed in radiation safety as required by the licensee's procedures and by 10 CFR 19.12.

- The principles of As-Low-As-Reasonably-Achievable (ALARA) had been implemented to include a significant upgrade of the sample handling and packaging area to incorporate air flow barriers, a separate entrance, and exit to the handling area and a whole-body frisking booth.

- The facility health physics supervisor had reviewed and approved radiation protection program changes, experiments, and radiation protection related events and conditions in accordance with licensee procedures and the technical specifications.

- Although no planned special exposures had been conducted, the licensee understood requirements related to such activities.

- Although no radiation had been received by declared pregnant women, the licensee understood the requirements related to potential doses to the embryo/fetus.

- The licensee had developed, documented, and implemented a radiation protection program in accordance with new 10 CFR Part 20.

1.8 Design Changes

The inspector determined that design changes, the performance of modified equipment, and procedures related to the modified system had been reviewed and approved in accordance with 10 CFR 50.59, the technical specifications, and the licensee's administrative procedures. The licensee further understood that the as-built drawings must reflect the actual modified design required by the licensee's procedures and the design change package.

1.9 Committees, Audits, and Reviews

The inspector determined that the last audit of record for facility operations was dated April 23, 1991, and for the emergency plan July 19, 1991.

Technical Specification 6.2.4 which requires, in part, that the Reactor Safety Board, or a subcommittee thereof, conduct audits to include:

> "(a) Facility operations for conformance to the technical specifications and applicable license conditions at least once per calendar year (interval between audits not to exceed 15 months). . . .

"(d) The reactor facility emergency plan and implementing procedures at least once per calendar year (interval between audits not to exceed 15 months)."

The failure to perform required audits was identified as a violation of Technical Specification 6.2.4 (VIO 128/9401-01).

1.10 Emergency Planning

The inspector determined that:

- Procedures required by the emergency plan were current and readily available to users as required by the plan.
- The licensee had conducted exercises and drills as required by the emergency plan.
- The licensee had conducted training for emergency response personnel in accordance with the emergency plan.
- Key emergency response personnel can acceptably respond to emergency conditions in accordance with the emergency plan and implementing procedures.

1.11 Maintenance Logs and Records

The inspector determined that:

- Maintenance logs and records were maintained as required by the licensee's administrative procedures.
- Although no significant problems and events had been identified, the licensee understood that, if identified, they must be reported and resolved in accordance with the requirements in the technical specifications and the licensee's administrative procedures.
- Maintenance had been performed consistent with the technical specifications and the licensee's procedures that govern maintenance activities.

1.12 Fuel Handling Logs and Records

The inspector determined that fuel handling operations had been recorded to satisfy the requirements in the technical specifications and the licensee's procedures.

2 SECURITY PLANS, PROCEDURES, AND REVIEWS (81401)

The licensee maintained good performance in this area.

2.1 Plan Revisions

The inspector determined that the licensee had made no changes to their approved Physical Security Plan since the last inspection.

2.2 Procedures

The inspector determined that the licensee's security plan implementing procedures contained sufficient detail to adequately accomplish their intended purpose.

2.3 Security Program Review

The inspector verified that, notwithstanding the violation identified in Section 1.9, the Reactor Safety Board had reviewed the security program as required.

3 REPORTS OF SAFEGUARDS EVENTS (81402)

Although no events reportable under 10 CFR 73.71 had occurred, the licensee demonstrated a knowledge of the reporting requirements.

4 RECEIPT OF NEW FUEL AT REACTOR FACILITIES (81403)

Although no new fuel had been received since the last inspection, the licensee demonstrated an understanding of the need to check the integrity of the container and tamper-indicating seal and to immediately notify the shipper and initiate an investigation if any discrepancy is noted.

5 FIXED SITE PHYSICAL PROTECTION OF LOW STRATEGIC QUANTITY OF NUCLEAR MATERIAL (81431)

The licensee maintained good performance in this area.

5.1 Use and Storage

The inspector verified that the licensee stores and uses special nuclear material only within a controlled access area as required and that proper placement and transfer of custody of material is maintained.

5.2 Detection and Surveillance

The inspector determined that the licensee's safeguards system:

- Provides early detection and assessment of unauthorized access or activities with the controlled access area.

- Provides early detection of removal of special nuclear material from the controlled access area.

The inspector also verified that:

- The detection and assessment of unauthorized access and/or activities and of the unauthorized removal of special nuclear material were sufficiently prompt that a response could facilitate the location and recovery of missing special nuclear material.

- The licensee monitors the controlled access area with an intrusion alarm system or other devices and procedures to detect unauthorized penetrations or activities.

- All individuals whose duties include the use of these procedures are knowledgeable in their execution.

Upon identification of a potential weakness with the intrusion detection alarm system, he licensee immediately acted to correct the vulnerability. Prior to the completion of the inspection, the licensee had initiated actions to correct the weakness as described in Attachment 2 to this inspection report. Attachment 2 is exempt from public disclosure and will receive limited distribution.

5.3 Access Control

The inspector verified that:

- All controlled access areas were clearly demarcated.

- Access to the room containing the reactor was controlled, and the room was designated a controlled access area.

The inspector also determined that the licensee's access control procedures and mechanisms are capable of detecting the unauthorized entry of individuals or materials.

5.4 Response

The inspector verified that:

- A watch person or offsite response force was available to respond to all unauthorized penetrations or activities.
- The licensee had established and maintained response procedures for dealing with threats of theft and theft of special nuclear material.
- All individuals with duties for responding to security emergencies were trained, equipped, and qualified to perform the response procedures as appropriate.

5.5 Testing and Maintenance

The inspector determined that the licensee periodically tests security related devices and equipment to assure continued operability.

6 PROTECTION OF SAFEGUARDS INFORMATION (85810)

The inspector determined that Safeguards Information, as defined in 10 CFR 73.21, is protected against unauthorized disclosure or compromise. However, the inspector observed that the licensee was storing Safeguards Information in a cabinet which does not meet the definition of 10 CFR 73.2 as a security storage container required by 10 CFR 73.21(d)(2). The licensee noted that they were aware of the discrepancy and had ordered, but not yet received, a replacement lock conforming to the requirements of the regulation.

Considering other security measures in place, the licensee's temporary measures and planned corrective actions, this finding, discussed further in Attachment 2 to this report, was found to satisfy the criteria in paragraph VII.B.1, Appendix C, to 10 CFR Part 2 as a noncited violation. Attachment 2 is exempt from public disclosure and will receive limited distribution.

7 MATERIAL CONTROL AND ACCOUNTING, REACTORS (85102)

The licensee maintained a proper level of performance in this area.

7.1 Possession and Use of Special Nuclear Material

The inspector determined that Texas Engineering Experiment Station of Texas A&M University is authorized by NRC License R-83 to receive, possess, and use up to 17.0 kilograms of contained uranium-235 in connection with operation of the reactor. As of the reporting period ending March 31, 1994, the licensee possessed 10.20 kilograms of U-235 contained in 15.79 kilograms of uranium in

the core and pool storage racks. The licensee also possessed 231 grams of plutonium produced by the operation of the reactor.

The reactor core configuration varies with experimental setup. The accuracy of inventory records for a random sample of elements both in the core and storage racks was verified to fuel history records and the reactor fuel handling log.

7.2 Control and Accounting of Special Nuclear Material

The inspector determined that the licensee had prepared, maintained, and implemented an adequate and effective program to control and account for the special nuclear material in his possession.

8 TRANSPORTATION ACTIVITIES (86740)

The inspector verified through discussions with facility personnel that no shipments of radioactive materials were conducted under authority of the NRC reactor license. All radioactive waste shipments were performed under the authority of the State of Texas license.

9 LICENSEE ACTIONS

9.1 Information Notice (IN-93-57): Software Problems Involving Digital Control Console Systems at Non-power Reactors

This information notice dated July 23, 1993, was issued to alert licensees to software problems involving digital control console systems at two non-power reactors.

The inspector determined that the information notice had been received and reviewed by the licensee's staff.

9.2 Information Notice (IN-93-86): Identification of Isotopes in the Production and Shipment of Byproduct Material at Non-power Reactors

This information notice dated October 29, 1993, was issued to alert licensees to a problem with the identification of isotopes in byproduct material produced and shipped at a non-power reactor.

The inspector determined that the information notice had been received and reviewed by the licensee's staff.

ATTACHMENT 1

1 PERSONS CONTACTED

1.1 Licensee Personnel

W. Asher, Reactor Operations Manager
*G. Hogg, Chairman, Reactor Safety Board
L. Krisanitis, Coordinator-Health Physics Support, Nuclear Science Center
C. Meyer, Campus Radiation Safety Officer
*S. O'Kelly, Assistant Director, Nuclear Science Center
L. Strata, Texas A & M Lock Shop
*W. Reese, Director, Nuclear Science Center
E. Schneider, Jr., University Police Chief

1.2 Brazos Valley Medical Center

T. Oeth, Nurse Manager, Emergency Department

*Denotes those in attendance at the exit meeting.

The inspector also contacted members of the licensee's security, administrative and technical staff during the course of this inspection.

2 EXIT MEETING

An exit meeting was conducted on May 27, 1994. During this meeting, the inspector reviewed the scope and findings of the report. The licensee identified the physical security plan as proprietary information.

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