September 14, 2000

Dr. B. Don Russell, Deputy Director
Texas Engineering Experiment Station
Texas A&M University System
F. E. Box 89, M/S 3575
College Station, Texas 77843

SUBJECT: NRC INSPECTION REPORT NO. 50-128/2000-201

Dear Dr. Russell:

This refers to the routine inspection conducted August 1-3, 2000, at your Nuclear Science Center (NSC) Reactor. The enclosed report presents the results of that inspection.

Various aspects of your reactor operation and emergency preparedness programs were inspected, including selective examinations of procedures and representative records, interviews with personnel, and observations of the facility.

Based on the results of this inspection, no safety concern or noncompliance with NRC requirements was identified. No response to this letter is required.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at (the Public Electronic Reading Room) http://www.nrc.gov/NRC/ADAMS/index.html. Your cooperation is appreciated. Should you have any questions concerning this inspection, please contact Mr. Stephen Holmes at 301-415-8583.

Sincerely,

/RA/
Ledyard B. Marsh, Chief
Events Assessment, Generic Communications
and Non-Power Reactors Branch
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket No. 50-128
License No. R-83

Enclosure: NRC Inspection Report No. 50-128/2000-201

cc w/enclosure:
See next page

cc w/enclosures:

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College Station, Texas 77843

Texas State Department of Health
Radiation Control Program Director
Bureau of Radiation Control
Dept. of Health
1100 West 49th Street
Austin, Texas 78756-3189

Test, Research and Training
Reactor Newsletter
202 Nuclear Sciences Center
University of Florida
Gainesville, FL 32611

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U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION

Docket No:	50-128
License No:	R-83
Report No:	50-128/2000-201
Licensee:	Texas A&M University
Facility:	Texas Engineering Experiment Station Nuclear Science Center
Location:	College Station, Texas
Dates:	August 1-3, 2000
Inspector:	Stephen W. Holmes, Reactor Inspector
Approved by:	Ledyard B. Marsh, Chief Events Assessment, Generic Communications and Non-Power Reactors Branch Division of Regulatory Improvement Programs Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY

This routine, announced inspection included onsite review of selected aspects of the organizational structure and functions program, operations program, review and audit program, experimental program, fuel handling program, operator requalification program, surveillance program, maintenance program, design control program, procedural control program, emergency preparedness program, liquid effluent monitoring and release, and calibration of laboratory radiation counting instrumentation.

The licensee's programs were acceptably directed toward the protection of public health and safety, and in compliance with NRC requirements since the last NRC inspection of this program.

ORGANIZATIONAL STRUCTURE AND FUNCTIONS

The operations organizational structure and functions were consistent with technical specification (TS) requirements for current shift operations.

OPERATIONS

The operations program satisfied TS requirements.

REVIEW AND AUDIT

The reactor safety board (RSB) performed its review, audit, and approval duties as required by license, TS, and administrative criteria.

EXPERIMENTS

The program for experiments satisfied TS and procedural requirements.

FUEL HANDLING

Fuel handling activities and documentation were as required by TS and facility procedures.

OPERATOR REQUALIFICATION

The requalification program was being acceptably implemented. TS and NRC-approved requalification plan requirements were met.

SURVEILLANCE

The licensee's program for surveillance and limiting conditions for operations (LCO) confirmations satisfied TS requirements.

MAINTENANCE

Maintenance logs, records, performance, and reviews satisfied TS and procedure requirements.

DESIGN CHANGES

The licensee's design change procedures were in place and were implemented as required.

PROCEDURES

The procedural control and implementation program satisfied TS requirements.

EMERGENCY PREPAREDNESS

The emergency preparedness program was conducted and implemented in accordance with the emergency plan (E-Plan).

LIQUID EFFLUENT MONITORING AND RELEASE

Liquid effluent monitoring and releases satisfied regulatory requirements. IFI 50-128/99-201-01 is closed.

CALIBRATION OF LABORATORY RADIATION COUNTING INSTRUMENTATION

Counting equipment was being maintained according to industry and equipment manufacturer standards. Calibrations satisfied TS requirements. IFI 50-128/99-201-02 is closed.

Report Details

1. **ORGANIZATIONAL STRUCTURE AND FUNCTION**

a. Inspection Scope (Inspection Procedure 69001)

The inspector reviewed selected aspects of:

- operations organization and staffing
- qualifications
- management responsibilities
- administrative controls

b. Observations and Findings

TS section 6.0 prescribes the line management organization structure for the NSC reactor. The Deputy Director Texas Engineering Experiment Station (TEES), the NSC Director, the SRO on duty, and the operating staff comprise level 1 to 4 management. A radiation safety officer (RSO) and the RSB make up the rest of the organization. All positions were filled with qualified personnel. No changes have been made in the TS required structure. The reactor staff satisfied the training and experience required by the TS. Operation logs and records confirmed that shift staffing met the duty and on-call personnel requirements. Review of records verified that management responsibilities were administered as required by TS and applicable procedures.

c. Conclusions

The operations organizational structure and functions were consistent with TS requirements for current shift operations.

2. **OPERATIONS PROGRAM**

a. Inspection Scope (Inspection Procedure 69001)

The inspector reviewed selected aspects of:

- operational logs and records
- staffing for operations
- selected operational, startup, and shutdown activities
- weekly checklist

b. Observations and Findings

Reactor operations were carried out following written procedures and TS. Observations by the inspector confirmed information on operational status of the facility was recorded in log books and checklists as required by procedures and TS. Use of maintenance and repair logs satisfied pertinent requirements. Significant problems and events noted in the This refers to the routine operations log were reported and quickly resolved as required by TS and administrative procedures.

Unanticipated shutdowns were identified in the logs and records, and reported and resolved as required before the resumption of operations under the authorization of a SRO.

The inspector verified that TS and procedure required items were logged and cross referenced with other logs and checklists as required, and that TS operational limits had not been exceeded. Start-up, steady state power operation, a shutdown, and several facility checks and tests were observed by the inspector with no problems noted.

Operation logs and records confirmed that shift staffing met the minimum requirements for duty and on-call personnel.

c. Conclusions

Operational activities were consistent with applicable requirements.

3. **REVIEW AND AUDIT**

a. Inspection Scope (Inspection Procedure 69001)

The inspector reviewed selected aspects of:

- RSB minutes
- safety review records
- audit records
- responses to safety reviews and audits
- review and audit personnel qualifications

b. Observations and Findings

The RSB meeting schedule and membership satisfied TS requirements and the Committee's procedural rules. Review of the minutes indicated that RSB provided guidance, direction, and operations oversight of the reactor.

Records showed that the safety reviews were conducted at the TS required frequency. Topics of these reviews were also consistent with TS requirements to provide guidance, direction, and oversight and to ensure satisfactory use of the reactor.

The audit records showed that reviews had been completed in those areas outlined in the TS and at the required frequency.

The inspector noted that the safety reviews and audits and associated findings were acceptably detailed and that the licensee responded and took corrective actions as needed. The safety review and audit personnel qualifications were consistent with licensee administrative controls.

c. Conclusions

The RSB performed its review, audit, and approval duties as required by license, TS, and administrative criteria.

4. EXPERIMENTS

a. Inspection Scope (Inspection Procedure 69001)

The inspector reviewed selected aspects of:

- experimental program requirements
- procedures
- logs and records
- approved reactor experiments
- RSB minutes
- experimental administrative controls and precautions
- an experimental neutron radiographic run

b. Observations and Findings

Each experiment had been reviewed and approved by the reactor staff or was referred to the RSB as required. Review of the experiment procedures and reactor log books, interviews with staff, and observation verified that experiments were constrained as required by the TS and experiment authorization. The experiments were also installed, performed, and removed as outlined in the experiment authorization and procedures. The RSB review of experiments ensured evaluation for unreviewed safety questions or TS changes.

Observation of the set-up and reinstallation of an Argon/Iodine irradiation experiment confirmed that experiments conformed to TS, pertinent requirements, and that there were safety constraints for the identified hazards.

c. Conclusions

Control and performance of experiments met TS and procedural requirements.

5. FUEL HANDLING

a. Inspection Scope (Inspection Procedure 69001)

The inspector reviewed selected aspects of:

- fuel handling procedures
- fuel handling equipment and instrumentation
- fuel handling and examination records

b. Observations and Findings

Procedures for refueling, fuel shuffling, and TS required inspections and surveillances were extensive and detailed, ensuring controlled operations. Fuel movement, inspection, log keeping, and recording followed the facility's procedures. Data recorded for fuel movement was clear and cross referenced in fuel and operations logs. Radiological controls and procedures conformed to health physics (HP) as low as reasonably achievable principles. Log entries clearly identified, as required by procedure, the minimum two persons present when moving fuel. and operations, and fuel log recording was performed as required.

c. Conclusions

Fuel handling activities and documentation were as required by TS and facility procedures.

6. OPERATOR REQUALIFICATION

a. Inspection Scope (Inspection Procedure 69001)

The inspector reviewed selected aspects of:

- the Requalification Program
- operator licenses
- operator training records
- operator physical examination records
- operator examination records
- operator active duty status

b. Observations and Findings

All currently licensed operators and senior operators were successfully completing the emergency procedure and abnormal events training, reactivity manipulations, and participating in the ongoing training as required by the NRC-approved Requalification plan. Lectures conducted for the reactor operator Requalification program included appropriate subject material and a written examination. Annual operation exams were given and documented as required. Retraining and testing of persons who missed the lectures or failed the exams were performed and documented as required.

The tracking checklist for individual operators and the training program provided adequate control consistency for operator requalification. Required quarterly operation hours, as SROs, were being tracked. Biennial medical exams had been performed as required.

Training was provided to the reactor operators on maintenance operations and 10 CFR 50.59 design changes and evaluations.

c. Conclusions

The Requalification program was being acceptably implemented. TS and NRC-approved

Requalification plan requirements were met.

7. **SURVEILLANCE**

a. Inspection Scope (Inspection Procedure 69001)

The inspector reviewed selected aspects of:

- surveillance and calibration procedures
- surveillance, calibration, and test data sheets and records
- Reactor operations, checks, tests, verifications and surveillances were observed.

b. Observations and Findings

Daily and other periodic checks, tests, and verifications for TS required LCOs were completed as required. All surveillance and LCO verifications were completed on schedule as required by TS and in accordance with licensee procedures. All were within prescribed TS and procedure parameters and in close agreement with the previous surveillance results.

Microsoft Outlook was used to track and coordinate all surveillances This provided clear and concise control of the reactor operational tests and surveillances. Use at the facility was comprehensive and timely.

Some of the daily and periodic checks of equipment operability included recording system parameters such as temperature, pressure, and flow. All values checked by the inspector satisfied the limits/parameters listed in the procedure or checklist.

Observation by the inspector of calibration of one of the temperature recording channels verified that TS were being followed.

c. Conclusions

The licensee's program for surveillance and LCO confirmations satisfied TS requirements.

8. **MAINTENANCE**

a. Inspection Scope (Inspection Procedure 69001)

The inspector reviewed selected aspects of:

- maintenance procedures
- equipment maintenance records
- physical condition of facility

b. Observations and Findings

Routine/preventative maintenance was controlled and documented in the computer system and/or reactor maintenance and operations logs or files. Unscheduled maintenance or repairs were submitted on a facility work/modification request and were reviewed to decide if they were safety related and thus would need a change evaluation per 10 CFR 50.59. Verifications and operational systems checks were performed to ensure system operability before return to service. Trends were identified and problems resolved as required.

During a facility tour it was noted that control and reactor room equipment was operational. A malfunctioning vent valve in the demineralizer room, observed during a previous staff visit, had been replaced by the licensee. No missing or malfunctioning equipment was noted by the inspector during this inspection.

c. Conclusions

Maintenance logs, records, performance, and reviews satisfied TS and procedure requirements.

9. **DESIGN CHANGES**

a. Inspection Scope (Inspection Procedure 69001)

The inspector reviewed selected aspects of:

- facility design changes and records
- facility configuration
- staff meeting and RSB minutes
- facility configuration

b. Observations and Findings

Changes were controlled by requiring a facility staff review and a committee review, and were recorded and tracked individually. Facility work/modification requests were used for this process.

The packages MA # 51, 52, and 53 for Facility Air Monitor (FAM) # 3 modification and FAM recorder and fuel temperature recorder replacements were reviewed. The evaluations were acceptable with supporting documentation and information. RSB involvement was also comprehensive. Post installation verification testing of the systems was thorough. Procedure and drawing changes were included and were consistent with the observations by the inspector.

c. Conclusions

The licensee's design change procedures were in place and were implemented as required.

10. **PROCEDURES**

a. Inspection Scope (Inspection Procedure 69001)

The inspector reviewed selected aspects of:

- administrative controls
- records for changes and temporary changes
- procedural implementation
- logs and records

b. Observations and Findings

Written procedures required by the TS were available and used by the staff. The inspector observed procedure use during operations. Implementation of and adherence to the procedures was acceptable. Procedures were routinely updated as needed. Minor changes were authorized by the NSC Director or his designee while other changes were referred to the RSB as required. Review of procedures verified that changes had been evaluated and approved as required.

Training of personnel on procedures and changes was acceptable. Personnel conducted activities in accordance with applicable procedures.

Coordination between operation and HP staffs on procedures was acceptable.

c. Conclusions

The procedural control and implementation program satisfied TS requirements.

11. **EMERGENCY PREPAREDNESS**

a. Scope (69001)

The inspector reviewed selected aspects of:

- the Emergency Plan
- implementing procedures
- emergency response facilities, supplies, equipment and instrumentation
- training records
- offsite support
- emergency drills and exercises

b. Observations and Findings

The Emergency Plan (E-Plan) in use at the reactor and emergency facilities was the same as the version most recently approved by the NRC. The E-Plan was audited and reviewed as required. Implementing procedures were reviewed and revised as needed to employ the E-Plan effectively. Facilities, supplies, instrumentation and equipment were being maintained, controlled and inventoried as required by the E-Plan. Through records review and interviews with licensee personnel, emergency responders were determined to be

knowledgeable of the proper actions to take in case of an emergency. Agreements with outside response organizations had been updated and maintained as necessary. Emergency drills had been conducted as required by the E-Plan. Off-site support organization participation was also as required by the E-Plan. Critiques were held following the drills to discuss the strengths and weaknesses identified during the exercise and to develop possible solutions to any problems identified. The results of these critiques were documented and filed. Emergency preparedness and response training was being completed as required. Training for off-site and reactor staff personnel was conducted and documented as stipulated by the E-Plan.

The last drill, January 26, 2000, involved the Texas A&M Medical Center treating an injury with radiological contamination. This required interaction with campus police, ambulance and fire rescue services, and Environment Health and Safety staffs. The drill provided a practical, reasonable, and effective test of all the participants.

c. Conclusions

The emergency preparedness program was conducted and implemented in accordance with the E-Plan.

12. LIQUID EFFLUENT MONITORING AND RELEASE

a. Scope (Inspection Procedure 69001)

The inspector reviewed annual reports, release records, and counting and analysis results. The inspector interviewed operator and HP staff members.

b. Observations and Findings

Liquid waste from the Nuclear Science Center (NSC) is held in new above ground fiberglass waste tanks which have a recirculating water system to stir the liquid waste providing a homogeneous mixture prior to sampling. Liquid wastes are sampled, analyzed, and verified to meet 10 CFR 20, Appendix B, Table 2, Column 2, concentrations prior to release to the environment.

The inspector verified that the current procedures for sampling, analyzing, and releasing liquid wastes were clear, concise, and accurately reflected liquid effluent amounts, concentrations, and release fractions to the environment. IFI 50-128/99-201-01 is closed.

c. Conclusions

Liquid effluent monitoring and releases satisfied regulatory requirements.

13. CALIBRATION OF LABORATORY RADIATION COUNTING INSTRUMENTATION

a. Inspection Scope (Inspection Procedure 69001)

The inspector reviewed selected aspects of:

- maintenance and calibration of laboratory radiation counting instrumentation
- periodic checks, quality control, and test source certification records

b. Observations and Findings

The calibration of the laboratory instrumentation followed the manufacturers' recommendations and used calibration sources traceable or comparable to national standards. All instruments checked were in calibration. Calibration records were in order.

Daily energy checks were performed on the multichannel analyzer's high purity germanium crystal detector prior to use. The unit was not to be used until it passed the computerized energy test.

Previously, there were no formal written procedures for the daily energy check or instructions for what constituted acceptable results. Failure to the staff was indicated by none of the thirteen test peaks being identified as valid and no energy spectrum being printed out. They would diagnose the malfunction, correct the problem, and rerun the daily check before the unit would be used.

A formal written procedure was now used to perform such checks. It followed manufacturer's recommendations and a prescribed comparison of qualitative and quantitative results for standard source counts. IFI 50-128/99-201-02 is closed.

c. Conclusions

Laboratory counting equipment was being maintained according to industry and equipment manufacturer standards. Calibrations satisfied TS requirements.

14. EXIT MEETING SUMMARY

The inspector presented the inspection results to members of licensee management at the conclusion of the inspection on August 3, 2000. The licensee acknowledged the findings presented and did not identify as proprietary any of the material provided to or reviewed by the inspector during the inspection.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

B. Asher	Operations Manager, NSC
C. Kim	Assistant Director, NSC
D. Reece	Director, NSC
L. Vasudevan	Radiation Safety Officer, NSC

INSPECTION PROCEDURE (IP) USED

IP 69001: CLASS II NON-POWER REACTORS

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

none

Closed

IFI 50-128/99-201-01 Liquid effluent procedures and calculations would be modified to clarify sampling and better reflect release information

IFI 50-128/99-201-02 Written guidance would be prepared for evaluation of the daily energy checks.

PARTIAL LIST OF ACRONYMS USED

E-Plan	Emergency Plan
FAM	Facility Air Monitoring
HP	Health Physics
LCO	Limiting Condition for Operation
NRC	Nuclear Regulatory Commission
RSB	Reactor Safety Board
RSO	Radiation Safety Officer
SRO	Senior Reactor Operators
TS	Technical Specifications

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