

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

Docket No: 50-059

License No: R-23

Report No: 50-059/99-201

Licensee: Texas A&M University

Facility: AGN-201M Reactor

Location: Zachry Engineering Center, Texas A&M University
College Station, Texas

Dates: September 27, 1999

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 following programs since the last NRC inspection in these areas: Organizational Structure and Functions, Operations, Design Control, Review and Audit, Radiation Protection, Effluent Monitoring and Release, Operator Requalification, Maintenance, Surveillance, Fuel Handling, Experiments, Procedures Program, Emergency Preparedness, Safeguards, Security, and Transportation.

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

ORGANIZATIONAL STRUCTURE AND FUNCTIONS

The organizational structure and functions were consistent with Technical Specification requirements.

OPERATIONS

The operations program satisfied Technical Specification requirements.

DESIGN CONTROL

The design change program satisfied NRC requirements.

REVIEW AND AUDIT

The review and audit program satisfied Technical Specification requirements.

RADIATION PROTECTION

The radiation protection program satisfied the requirements of 10 CFR 20.1101.

RADIATION PROTECTION POSTINGS

Radiological postings satisfied regulatory requirements.

RADIATION PROTECTION SURVEYS

Surveys were performed and documented as required by 10 CFR 20, Technical Specification and licensee administrative controls.

PERSONNEL DOSIMETRY

The personnel dosimetry program was acceptably implemented and doses were in conformance with licensee and 10 CFR Part 20 limits.

CALIBRATION OF RADIATION MONITORING AND EQUIPMENT

Portable survey meters, radiation monitoring, and counting lab instruments were being maintained according to industry and equipment manufacturer standards. Calibrations satisfied Technical Specification requirements.

EFFLUENT MONITORING AND RELEASE PROGRAM

The effluent monitoring and release program satisfied NRC requirements.

OPERATOR REQUALIFICATION

Operator requalification training was conducted as required by the Requalification Program.

MAINTENANCE

The maintenance program satisfied NRC requirements.

SURVEILLANCE

The surveillance program satisfied Technical Specification requirements.

FUEL HANDLING

The fuel handling program satisfied licensee Technical Specification and procedural requirements.

EXPERIMENTS

The program for experiments satisfied Technical Specification and procedural requirements.

PROCEDURES

The procedural control and implementation program satisfied Technical Specification requirements.

EMERGENCY PREPAREDNESS

The emergency preparedness program was conducted in accordance with the Emergency Plan.

SAFEGUARDS

Special Nuclear Materials were acceptably controlled and inventoried.

SECURITY

Security activities and systems satisfied Physical Protection Plan requirements.

TRANSPORTATION

The program for transportation of radioactive materials satisfied NRC and DOT requirements.

Report Details

Summary of Plant Status

With the license in timely renewal, operations were continuing to support the requirements of several nuclear engineering courses and reactor operator training as well as performing preventive maintenance and operational surveillances required by the Technical Specifications (TS). At the time of this inspection the reactor was shutdown while undergoing repairs to instrument and electrical systems. Repairs were being conducted as outlined in facility procedures. No safety concerns were noted.

1. ORGANIZATIONAL STRUCTURE AND FUNCTIONS

a. Scope (69001)

The inspector reviewed selected aspects of:

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

b. Observations and Findings

The functional organizational structure and staffing had not changed since the last inspection. Licensed staff consisted of the Reactor Supervisor, and one other Senior Reactor Operator (SRO). Operation logs and records confirmed that shift staffing met the minimum requirements for duty and on-call personnel. Staffing has been constant for the past decade. The organizational structure and staffing at the facility and as reported in the Annual Report was as required by TS. Qualifications of the staff met TS requirements. Review of records verified that management responsibilities were administered as required by TS and applicable procedures.

c. Conclusions

The organizational structure and functions were consistent with TS requirements.

2. OPERATIONS (69001)

a. Scope

The inspector reviewed selected aspects of:

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

b. Observations and Findings

The operating logs and records were clear and provided an indication of operational activities. This included documentation of events, and resolution or tracking of events. The logs and records indicated that shift staffing, including on-call personnel, was as required by TS. Logs and records also showed that operational conditions and parameters were consistent with license and TS requirements. Reactor operations were carried out following written procedures and TS. The reactor control system instrument channels, safety circuits, and safety interlocks required by TS were tested and operable prior to each startup of the reactor.

c. Conclusions

The operations program satisfied TS requirements.

3. DESIGN CONTROL (69001)

a. Scope

The inspector reviewed selected aspects of:

- facility design changes and records
- facility configuration

b. Observations and Findings

There were no design changes since the last inspection. Records and observations showed that previous changes at the facility had been acceptably reviewed in accordance with 10 CFR 50.59 and applicable licensee administrative controls.

c. Conclusions

The design change program satisfied NRC requirements.

4. REVIEW AND AUDIT

a. Scope (69001)

The inspector reviewed selected aspects of:

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

b. Observations and Findings

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 acceptable use of the reactor.

The audit records showed that audits 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 the associated findings were acceptably detailed and that the licensee responded and took corrective actions as needed.

The safety review and audit personnel qualifications satisfied TS requirements and licensee administrative controls.

c. Conclusions

The review and audit program satisfied TS requirements.

5. RADIATION PROTECTION PROGRAM

a. Scope (69001)

The inspector reviewed selected aspects of:

- the Radiation Protection Program (RPP)
- ALARA reviews

b. Observations and Findings

The campus RPP, which encompasses the AGN, had not changed since the last inspection. The licensee reviewed the RPP at least annually in accordance with 10 CFR 20.1101(c). This review and oversight were provided by the university environmental health and safety staff as required by TS and licensee procedures. No weaknesses were reported.

c. Conclusions

The RPP satisfied the requirements of 10 CFR 20.1101.

6. RADIATION PROTECTION POSTINGS

a. Scope (69001)

The inspector reviewed selected aspects of:

- radiological signs and posting
- facility and equipment during tours

b. Observations and Findings

Caution signs, postings, and controls to radiation areas at Nuclear Radiation Center reactor were acceptable for the hazards involved and were as required in 10 CFR Part 20, Subpart J. Licensee personnel observed the indicated precautions for access to the radiation areas. NRC Forms-3 were posted in appropriate areas in the facility as were current notices to workers required by 10 CFR Part 19.

c. Conclusions

Radiological postings satisfied regulatory requirements.

7. RADIATION PROTECTION SURVEYS

a. Scope (Inspection Procedure 69001)

The inspector reviewed selected aspects of:

- routine surveys and monitoring
- survey and monitoring procedures

b. Observations and Findings

Weekly, quarterly, and other periodic contamination and radiation surveys were performed as required by TS and Environmental Health and Safety procedures. These were conducted by reactor and university staffs. Results were evaluated and corrective actions taken and documented when readings/results exceeded set action levels.

c. Conclusions

Surveys were performed and documented as required by 10 CFR Part 20, TS, and licensee administrative controls.

8. PERSONNEL DOSIMETRY

a. Scope (69001)

The inspector reviewed selected aspects of:

- licensee procedures
- dosimetry records

b. Observations and Findings

Use of dosimeters were in accordance with radiation protection requirements. The licensee used a National Voluntary Laboratory Accreditation Program - accredited vendor to process personnel thermoluminescent dosimetry. The licensee's dosimetry program for declared pregnant women satisfied 10 CFR 20.1208 requirements. Radiological exposure records showed that occupational doses were essentially zero, thus well within 10 CFR Part 20 limitations.

c. Conclusions

The personnel dosimetry program was acceptably implemented and doses were in conformance with licensee and 10 CFR Part 20 limits.

9. CALIBRATION OF RADIATION MONITORING AND EQUIPMENT

a. Scope (69001)

The inspector reviewed selected aspects of:

- maintenance and calibration of radiation monitoring equipment
- periodic checks, quality control, and test source certification records

b. Observations and Findings

The calibration and periodic checks of the portable survey meters, radiation monitoring, and counting lab instruments were performed in-house by the campus staff and offsite by certified contractors. Calibration procedures were consistent with American National Standards Institute or the manufacturers' recommendations. Calibration and check sources were traceable to the National Institutes of Standards and Technology. The sources' geometry matched those used in actual analyses

All instruments checked were in calibration. Calibration records were in order.

c. Conclusions

Portable survey meters, radiation monitoring, and counting lab instruments were being maintained according to industry and equipment manufacturer standards. Calibrations satisfied TS requirements.

10. EFFLUENT MONITORING AND RELEASE

a. Scope (69001)

The inspector reviewed selected aspects of:

- annual reports
- release records
- counting and analysis program

b. Observations and Findings

The program for the monitoring and storage of radioactive liquid, gases, and solids was consistent with applicable regulatory requirements. Radioactive material was monitored and released when below acceptable limits was acceptably transferred to the broad-scope license for disposition. The principles of As Low As Reasonably Achievable were acceptably implemented to minimize radioactive releases. Monitoring equipment was acceptably maintained and calibrated. Records were current and acceptably maintained.

c. Conclusions

The effluent monitoring and release program satisfied NRC requirements.

11. OPERATOR REQUALIFICATION

a. Scope (69001 & 92701)

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

The Requalification Program was maintained up to date. Operator licenses were also current. Records showed that operator training was consistent with the Requalification Program requirements. Physical examinations of the operators were conducted as required. Records showed that written and operating examinations of the operators were acceptably implemented. Logs showed that operators maintained active duty status as required. SRO operational hours for the two operators were individually tracked and SRO maintenance hours were in the process of being tracked also. IFI 50-059-98-201-01, the licensee annotated SRO hours separately on their present tracking documents, is closed.

c. Conclusions

Operator requalification training was conducted as required by the Requalification Program.

12. MAINTENANCE

a. Scope (69001)

The inspector reviewed selected aspects of:

- maintenance procedures
- equipment maintenance records

b. Observations and Findings

Logs indicated that corrective maintenance activities and problems were addressed as required by procedure. Records showed that routine maintenance activities were conducted at the required frequency and in accordance with the TS, applicable procedure, or equipment manual. Maintenance activities ensured that equipment remained consistent with the Safety Analysis Report and TS requirements. The licensee was reviewing the new change to 50.59 requirements to determine the need for formal written guidance to ensure that any facility change would be done under 50.59 or license amendment as required by TS. IFI 50-059-98-201-02 is still open.

c. Conclusions

The maintenance program satisfied NRC requirements.

13. SURVEILLANCE

a. Scope (69001)

The inspector reviewed selected aspects of:

- surveillance and calibration procedures
- surveillance, calibration and test data sheets, and records

b. Observations and Findings

Surveillance, test and limiting conditions for operations verifications, and calibrations were completed on schedule and in accordance with licensee procedures. All the recorded results were within the TS and procedurally prescribed parameters. The records and logs reviewed were complete and were being maintained as required. Checks, tests, and calibrations were completed as required by TS.

c. Conclusions

The surveillance program satisfied TS requirements.

14. FUEL HANDLING

a. Scope (69001)

The inspector reviewed selected aspects of:

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

b. Observations and Findings

Due to the design of the AGN fuel (uranium dioxide embedded in radiation stabilized polyethylene), movement and handling were extremely infrequent, as confirmed by fuel handling logs. Records also show that fuel handling and monitoring equipment and instrumentation had been verified operable prior to use. Personnel were knowledgeable of the procedural and equipment requirements for criticality control and assurance of fuel integrity. Radiological requirements had also been met in accordance with applicable procedures.

c. Conclusions

The fuel handling program satisfied licensee TS and procedural requirements.

15. EXPERIMENTS

a. Scope (69001)

The inspector reviewed selected aspects of:

- experimental program requirements
- approved reactor experiment procedures
- logs, records, and Reactor Safety Board (RSB) minutes
- experimental administrative controls

b. Observations and Findings

The experiments at the facility were routine procedures that had been in place for many years. No new or unknown-type experiments had been initiated, reviewed, or approved since the last inspection. The experiments were completed with the cognizance of the Reactor Supervisor and a Senior Reactor Operator and in accordance with TS requirements (e.g., reactivity limitations). The results of the experiments were documented in appropriate experimental logs, data sheets, or records. Engineering and radiation protection controls were implemented as required to limit exposure to radiation.

c. Conclusions

The program for experiments satisfied TS and procedural requirements.

16. **PROCEDURES (69001)**

a. Scope

The inspector reviewed selected aspects of:

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

b. Observations and Findings

Administrative controls of changes and temporary changes to procedures, and associated review and approval processes were as required. Training of personnel on procedures and changes was acceptable. Personnel conducted activities in accordance with applicable procedures. Records showed that procedures for potential malfunctions (e.g., radioactive releases and contaminations, and reactor equipment problems) were implemented as required.

In conjunction with the license renewal, the procedures were being updated as needed and reviewed and approved by the RSB as required

c. Conclusions

The procedural control and implementation program satisfied TS requirements.

17. **EMERGENCY PREPAREDNESS (69001)**

a. Scope

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 in 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. Communications capabilities were acceptable with these support groups and had been tested as stipulated in the E-Plan. Emergency drills had been conducted as required by the E-Plan. Offsite 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. Training for offsite and reactor staff personnel was conducted and documented as stipulated by the E-Plan.

c. Conclusions

The emergency preparedness program was conducted in accordance with the Emergency Plan.

18. SAFEGUARDS (85102)

a. Scope

The inspector reviewed selected aspects of:

- nuclear material inventory and locations
- accountability records

b. Observations and Findings

The inventory of material was verified. The material control and accountability program tracked locations and content of fuel and fission detectors under the research reactor license. The possession and use of special nuclear material (SNM) was limited to the locations and purposes authorized under the license. The material control and accountability forms (DOE/NRC Forms 741 and 742) were prepared and transmitted as required.

c. Conclusions

SNM were acceptably controlled and inventoried.

19. SECURITY (81401)

a. Scope

The inspector reviewed selected aspects of:

- the Physical Protection Plan
- security systems, equipment and instrumentations
- implementation of the Physical Protection Plan

b. Observations and Findings

The Physical Protection Plan was the same as the latest revision approved by the NRC. Physical protection systems (barriers and alarms), equipment and instrumentation were as required by the Physical Protection Plan. Access control was as required. Implementing procedures were consistent with the Physical Protection Plan. Acceptable security response and training was demonstrated through alarm response and drill response in accordance with procedures.

c. Conclusions

Security activities and systems satisfied Physical Protection Plan requirements.

20. TRANSPORTATION (86740)

a. Scope

The inspector reviewed selected aspects of:

- radioactive materials shipping procedures
- radioactive materials transportation and transfer records

b. Observations and Findings

Records showed that the radioactive material for disposal was transferred to the broad scope license in accordance with licensee requirements. This program for radioactive material transport is consistent with license requirements.

Offsite transport of radiological samples from the reactor was not performed.

c. Conclusions

The program for transportation of radioactive materials satisfied NRC and DOT requirements.

21. **EXIT MEETING SUMMARY (30703)**

The inspector presented the inspection results to members of licensee management at the conclusion of the inspection on September 27, 1999. 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

*R. Berry Reactor Supervisor
C. Meyer Radiation Safety Officer, Environmental Health and Safety
*J. Poston Reactor Administrator, Head, Nuclear Engineering Department
D. Russell, Jr. Dean, College of Engineering, Chairman Reactor Safety Board

*Attended Out Briefing

INSPECTION PROCEDURE (IP) USED

IP 30703 ENTRANCE, EXIT INTERVIEWS
IP 69001 CLASS II NON-POWER REACTORS
IP 81401 PLANS, PROCEDURES, AND REVIEWS
IP 85102 MATERIAL CONTROL AND ACCOUNTING
IP 86740 TRANSPORTATION ACTIVITIES
IP 92701 FOLLOWUP ON INSPECTOR IDENTIFIED PROBLEMS

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

IFI 50-059-98-201-01 The licensee would annotate SRO hours separately on their present tracking documents.

PARTIAL LIST OF ACRONYMS USED

ALARA As Low As Reasonably Achievable
NRC Nuclear Regulatory Commission
RPP Radiation Protection Program
RSB Reactor Safety Board
SNM Special Nuclear Material
SRO Senior Reactor Operator
TS Technical Specifications
E-Plan Emergency Plan

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