

February 24, 2000

Dr. William G. Vernetson  
Director of Nuclear Facilities  
Department of Nuclear and Radiological  
Engineering  
P. O. Box 11830  
University of Florida  
Gainesville, Florida 32611

SUBJECT: NRC INSPECTION REPORT NO. 50-83/99-201

Dear Dr. Vernetson:

On November 30 thru December 3, 1999, the United States Nuclear Regulatory Commission (NRC) conducted an announced inspection of University of Florida Test Reactor facility. The enclosed report presents the results of that inspection.

Various aspects of your reactor operation, safeguards, 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 were 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 placed in the NRC Public Document Room on the ADAMS System. 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. 50-83  
License No. R-56  
Enclosure: NRC Inspection Report No. 50-83/99-201

cc w/enclosure: Please see next page

cc:

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## 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, Operator Requalification, Maintenance, Surveillance, Fuel Handling, Experiments, Procedures, Emergency Preparedness, Safeguards, Transportation, and Surveillance Procedure Deficiency.

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 (TS) requirements.

### OPERATIONS

The operations program satisfied TS requirements.

### DESIGN CONTROL

The design change program satisfied NRC requirements.

### REVIEW AND AUDIT

The Reactor Safety Review Subcommittee (RSRS) performed its duties as required by license, TS, and administrative criteria. The review and audit program satisfied TS 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 and return to normal operations satisfied TS requirements.

### FUEL HANDLING

The reactor core reload was safely performed in compliance with licensee procedures, TS, and regulatory requirements. The fuel handling program satisfied licensee TS and procedural requirements.

### EXPERIMENTS

The program for experiments satisfied TS and procedural requirements.

### PROCEDURES

The procedural control and implementation program satisfied TS requirements.

### EMERGENCY PREPAREDNESS

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

### SAFEGUARDS

Special Nuclear Materials (SNM) were acceptably controlled and inventoried.

### TRANSPORTATION

The program for transportation of radioactive materials satisfied NRC and Department of Transportation (DOT) requirements.

### SURVEILLANCE PROCEDURE DEFICIENCY

The licensee's actions in regards to the surveillance procedure deficiency were acceptable and satisfied TS reporting requirements.

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

Docket No: 50-83  
License No: R-56  
Report No: 50-83/99-201  
Licensee: University of Florida  
Facility: University of Florida Test Reactor  
Location: University of Florida, Gainesville, FL  
Dates: November 30 thru December 3, 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

## **REPORT DETAILS**

### **Summary of Plant Status**

During the inspection the reactor was operated several days a week to support experiments, education, operator training, and surveillances. 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 organizational structure and staffing had not changed since the last inspection. 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

Reactor operations were carried out following written procedures and TS. The operating logs and records were clear and provided an indication of operational activities. This included use of maintenance and repair logs, 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. Observation by the inspector of operational activities including a start-up, steady state power operation, a shutdown, and several facility checks and tests further confirmed that these conditions and requirements were satisfied.

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

Since the last inspection several design changes had been made to the facility and others were in progress.

Records and observations showed that changes at the facility were 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:

- Reactor Safety Review Subcommittee minutes
- safety review records
- audit records
- responses to safety reviews and audits
- review and audit personnel qualifications

b. Observations and Findings

The RSRS meeting schedule and membership satisfied TS requirements and the Committee's procedural rules. Review of the minutes indicated the RSRS provided appropriate guidance, direction and oversight, and ensured suitable use of the reactor. The minutes were clear and provided a record of the safety oversight of reactor operations.

The audit records showed that audits had been completed in those areas outlined in the TS and at the 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 inspector noted that the safety reviews and audits and the associated findings were acceptably detailed and that the licensee took corrective actions as needed.

The safety review and audit personnel qualifications satisfied TS requirements and licensee administrative controls. Further, the number of personnel involved in the safety reviews and audits also satisfied TS and licensee procedural requirements.

c. Conclusions

The RSRS performed its duties as required by license, TS, and administrative criteria. The review and audit program satisfied TS requirements.

5. **OPERATOR REQUALIFICATION**

a. Scope (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

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. The inspector verified that the examination content satisfied regulatory requirements. Logs showed that operators maintained active duty status as required.

c. Conclusions

Operator requalification was conducted as required by the Requalification Program.

6. **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 the manufacturer's equipment manual. Maintenance activities ensured that equipment remained consistent with the Safety Analysis Report and TS requirements. Further, maintenance activities were consistent with the requirements of 10 CFR 50.59.

c. Conclusions

The maintenance program satisfied NRC requirements.

7. **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

During most of last year the reactor had been in an extended outage which entailed a major disassembly and subsequent reassembly of the reactor core. During this time surveillance, test, and Limiting Conditions for Operation (LCO) verifications and calibrations, which need to be done with the reactor in operation, were deferred, as allowed by TS.

These verification and calibrations were completed prior to returning to normal operations. A detailed Surveillance/Activity Schedule, approved by the RSRS, was followed in bringing the reactor back on line. Additionally, the committee directed that they were to be performed in a conservative manner with the committee consulted and updated prior to normal operations.

Surveillance, test, and LCO verifications and calibrations were completed 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 and return to normal operations satisfied TS requirements.

8. **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

As noted in Section 7 SURVEILLANCE, the reactor had been in an extended outage which entailed a major disassembly and subsequent reassembly of the reactor core to include a complete fuel unload and reload. A detailed core loading plan, approved by the RSRS, was used to enhance and clarify the fuel handling/loading procedures.

The fuel handling procedures, along with the core loading plan, provided a detailed method to move and handle fuel during the core reload consistent with the provision of the TS and the licensee safety analyses. Fuel movement and fuel examination records showed that the fuel was moved and examined as required. Records also show that fuel handling, monitoring equipment, and instrumentation was verified operable, prior to use. Personnel were knowledgeable of the procedural and equipment requirements for criticality control and assurance of fuel integrity. Radiological and security precautions were also met in accordance with applicable procedures.

c. Conclusions

The reactor core reload was safely performed in compliance with licensee procedures, TS, and regulatory requirements. The fuel handling program satisfied licensee TS and procedural requirements.

9. **EXPERIMENTS**

a. Scope (69001)

The inspector reviewed selected aspects of:

- experimental program requirements
- procedures
- logs and records
- experimental administrative controls and precautions
- an observed activation experiment

b. Observations and Findings

The experiments at the facility were routine procedures that had been in place for several years. The results of the experiments were documented in appropriate experimental logs, data sheets, or records. Experiments were constrained as required by the TS and experiment authorizations were installed, performed, and removed as outlined in the experiment authorization and licensee's procedures.

Engineering and radiation protection controls were implemented as required to limit exposure to radiation. Reviews of experiment requests required by TS had been performed by the RSRS as needed.

c. Conclusions

The program for experiments satisfied TS and procedural requirements.

10. **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, associated review, and approval processes, were as required. Training of personnel on procedures and changes was acceptable. Written procedures required by the TS were available and used by the staff. The inspector observed procedure use during operations. Personnel acceptably implemented and 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 executed as required.

c. Conclusions

The procedural control and implementation program satisfied TS requirements.

11. **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

- interview with a University Police Department Officer
- offsite support
- emergency drills and exercises

b. Observations and Findings

The 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. Communication 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. 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.

c. Conclusions

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

12. **SAFEGUARDS**

a. Inspection Scope (85102)

The inspector reviewed selected aspects of:

- nuclear material accountability program
- nuclear material inventory and locations
- accountability records and reports

b. Observations and Findings

The semiannual inventory of material was reviewed and verified. The material control and accountability program tracked locations and content of fuel and other

SNM under the research reactor license. Fuel burn-up and related measurements/calculations were acceptably performed and documented on the total core. The possession and use of SNM were 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. Fuel inventory and movement records were cross referenced and matched.

c. Conclusions

SNM were acceptably controlled and inventoried.

13. **TRANSPORTATION**

a. Inspection Scope (86740)

The inspector reviewed selected aspects of:

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

b. Observations and Findings

Production of solid radioactive waste at the facility was minimal. All transfers were recorded on the applicable forms. Transfer documentation was kept on file as required.

Materials transferred to other licensees were documented, and were in accordance with appropriate requirements.

c. Conclusions

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

14. **SURVEILLANCE PROCEDURE DEFICIENCY**

a. Inspection Scope (69001)

The inspector reviewed selected aspects of:

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

- Facility 14 Day Report dated June 29, 1999
- Reactor Manager's memo, Description of Possible Deficiencies in Scram Check Procedure (Q-1)

b. Observations and Findings

On June 8, 1999, the facility notified the NRC of a procedural deficiency that did not independently test the reactor trips for the loss of secondary water flow and pump power in the well water mode. Further contacts were made on June 10, 22, and facility report issued on June 29, 1999.

Secondary cooling water at the reactor can be provided by two separate systems, one from the city water system and the other from a well. During low flow and loss of pump power testing of these individual systems, the scram logic of the other was bypassed to test the response of the desired system. The inspector noted that the backup city water system had not been used for operations within the last decade.

After analyzing a perceived failure of the secondary flowmeter reed switches, the scram check procedure (Q-1 Surveillance) was thoroughly scrutinized and although all scram functions were determined to have been operating correctly, the current procedure used to verify it was flawed. The procedure predated the late 1993 replacement of a pressure switch in the city water line with a flowmeter to provide the signal for the scram. At this time the procedure was not changed and thus there was no ability to verify a loss of coolant flow independent of loss of pump power in the well water mode.

On June 8, 1999, the low flow scram system was fully tested independent of all other scrams. The well warning light activated at 140 gpm and the scram actuated as 60 gpm as required. Subsequently changes were made to the surveillance procedures and system hardware under 10 CFR 50.59. Evaluation and Determination Number 99-06 as approved by the RSRS on June 16, 1999. The inspector verified the changes were as approved and confirmed that the current procedure would test the low flow and loss of well pump power scrams independently.

The RSRS agreed with the staff's actions and their prompt reporting of this occurrence. The RSRS supported the staff's evaluation that the reactor never failed to trip for any condition reaching or exceeding the low flow scram setting on in the well pump mode. Reactor management and the RSRS agreed, and the inspector concurs, that this occurrence did not involve any reduction in reactor safety margins or had any significant effect on the health and safety of the public.

c. Conclusions

The licensee's actions in regards to the surveillance procedure deficiency were acceptable and satisfied TS reporting requirements.

15. **EXIT MEETING SUMMARY**

The inspector presented the inspection results to members of licensee management at the conclusion of the inspection on December 3, 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**

*G. Macdonald	Reactor Trainee
D. Munro	Radiation Safety Officer
*J. Tulenko	Chairman Nuclear and Radiological Engineering Department
*W. Vernetson	Director of Nuclear Facilities
A. Viebbicky	Reactor Trainee
J. Winn	Reactor Trainee
*J. Wolf	Reactor Manager

(\*Attended Exit Meeting)

**INSPECTION PROCEDURE (IP) USED**

69001	CLASS II NON-POWER REACTORS
85102	Material Control and Accounting - Reactors
86740	Transportation Activities

**ITEMS OPENED, CLOSED, AND DISCUSSED**

**Opened**

NONE

**Closed**

NONE

**PARTIAL LIST OF ACRONYMS USED**

DOT	Department of Transportation
NRC	Nuclear Regulatory Commission
E-Plan	Emergency Plan
LCO	Limiting Conditions for Operation
RSRS	Reactor Safety Review Subcommittee
TS	Technical Specifications
SNM	Special Nuclear Material