UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W., SUITE 2900
ATLANTA, GEORGIA 30323-0199

Report No.: 50-83/94-02

Licensee: University of Florida
202 Nuclear Sciences Center
Gainesville, FL 32601

Docket No.: 50-83 License No.: R-56

Facility Name: University of Florida Training Reactor

Inspection Conducted: September 6-8, 1994

Inspector: C Bassett 9/20/94
Craig H. Bassett, Senior Radiation Specialist Date Signed

Approved by: Douglas M. Collins 9/20/94
for Edward J. McAlpine, Chief Date Signed
Radiation Safety Projects Section
Nuclear Materials Safety and Safeguards Branch
Division of Radiation Safety and Safeguards

SUMMARY

Scope:

This routine, unannounced inspection involved the biennial review of the University of Florida's Class II Operations. The onsite inspection included review of the operational aspects of the licensee's program including organization and staffing, safety committee function, procedures, requalification training, logs and records, reactor operation, surveillances, and experiments.

Results:

The licensee's staffing and current organizational structure met Technical Specification (TS) requirements and were adequate to implement the licensee's operational programs. The safety committee was functioning as required. Procedures appeared to be adequate and the requalification program was on schedule. No new experiments were being conducted.

Strengths in the operational area included thorough and complete documentation of activities in operations and maintenance log books, and in test, experiment, and surveillance records. Analysis and evaluation of the measurements and results of required surveillance tests met or exceeded regulatory requirements.

No program weaknesses were noted.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*D. Munroe, Radiation Control Officer, Environmental Health and Safety (EHS) Division
D. Simpkins, Reactor Manager, University of Florida Training Reactor (UFTR)
*J. Tulenko, Chairman, Nuclear Engineering Sciences Department
*W. Vernetson, Facility Director, UFTR

Other licensee employees contacted included operators and office personnel.

*Attended exit interview on September 8, 1994.

2. Organization and Staffing (40750)

Technical Specifications (TS) 6.2 details organizational structure and management responsibility for safe operation of the UFTR facility.

The inspector reviewed and discussed with cognizant licensee personnel the current staffing associated with operating the UFTR on a daily basis. There have been no changes in the organization as outlined in the TS since the last inspection. However, the position of Reactor Manager, which was being filled on a part-time basis, had been filled on a full-time basis since the previous inspection.

The licensee currently has two part-time senior reactor operators (SROs) and one full-time SRO, who is the Reactor Manager, and the Director of Nuclear Facilities who is an SRO. These individuals operate the reactor as required, perform the required surveillances and most of the maintenance, and complete the associated records. Currently, this provides sufficient coverage and support during operation of the reactor for experiments, training, and reactor sharing projects. During the inspection and tours of the facility, the inspector noted that the staffing level appeared adequate to safely conduct the operational activities at the facility.

No violations or deviations were identified.

3. Reactor Safety Review Subcommittee (40750)

a. Minutes

TS 6.2.5 requires that the Reactor Safety Review Subcommittee (RSRS) conduct quarterly meetings at intervals not to exceed four months.

The inspector reviewed the minutes of the RSRS meetings conducted from April 1992 through June 1994. During that time period, the RSRS and Executive RSRS met approximately 20 times, thus exceeding the TS requirement. Items discussed and reviewed by the subcommittee during the meetings included unscheduled shutdowns of the reactor, 10 CFR 50.59 safety reviews, monthly facility status and operating reports, possible TS violations, revisions to Standard Operating Procedures (SOPs), the high enriched uranium (HEU) to low enriched uranium (LEU) fuel conversion program and progress, experiment proposals, security plan changes, emergency plan changes, the facility annual report, and the results of NRC inspections.

b. Audits

TS 6.2.5 also requires an independent review and audit of safety aspects of reactor facility operations to advise management of adverse trends. The TS requires that the review and audit functions be performed by the RSRS.

The inspector reviewed the last two audits conducted by the RSRS for the calendar years 1992 and 1993. The audits covered the facility emergency plan, fire protection system records, the security plan, special nuclear material records, the requalification training program, health physics records, TS surveillance requirements, documentation of experiments, correspondence/commitments made to the NRC, the Quality Assurance program, and a review of operation and maintenance logs. The audits did not identify any serious deficiencies but some problems were noted. The licensee addressed these problems by initiating corrective actions as applicable. The inspector also reviewed the actions taken by the licensee to correct the problem areas noted by the RSRS. From this review, the inspector determined that the RSRS was providing adequate oversight of the UFTR operations and that management was committed to and involved in proper operation of the facility and maintaining an adequate safety program.

c. Safety Evaluations

TS 6.2.5(3)(a) requires that the RSRS review proposed changes in equipment, systems, tests, experiments, or procedures and determine that the changes do not involve an unreviewed safety question.

The inspector reviewed selected 10 CFR 50.59 safety evaluations that had been performed during 1992 through 1994 and that had been reviewed by the RSRS. The inspector determined that the evaluations had been performed in accordance with the UFTR Procedure 0.4, "10 CFR 50.59 Evaluation and Determination", Rev. 1, dated May 1986 and were implemented, as applicable, in accordance with UFTR Procedure 0.3, "Control and Documentation of UFTR Modifications", Rev. 0, dated October 1985. The evaluations

appeared to be adequate and were performed when required. No unresolved safety questions were identified.

No violations or deviations were identified.

4. Procedures (40750)

TS 6.3 requires that the facility be operated and maintained in accordance with approved written procedures.

The inspector reviewed the procedures for the facility and the changes that had been made since the last inspection. It was noted that the changes were minor in nature and were implemented by means of UFTR Procedure 0.1, "Operating Document Controls", Rev. 2, dated July 1991. The procedure allowed implementation of minor changes by means of a Temporary Change Notice (TCN) if the meaning or intent of the procedure was not changed. The TCNs remained effective until the licensee completed a major revision of the procedure. At that time the TCNs would be incorporated into the procedure and a new revision number would be issued.

The inspector noted that some operator responsibilities were not specifically addressed or outlined in the licensee's procedures. The responsibilities not specifically included in procedures were the operators' responsibility to use written procedures, to adhere to the TS, to believe instrument indications until the indications were proved to be incorrect, and to shut down the reactor if the control system did not automatically shut down the reactor when operating parameters exceeded the reactor protection set points. The inspector discussed this issue with licensee representatives. It was noted that the training manual did contain some of these responsibilities and the licensee indicated that they were all discussed and practiced. The inspector did not observe any operations or actions that would indicate otherwise. Because these responsibilities were not explicitly outlined in a procedure, the licensee indicated that they would review their procedures and possibly include a list of operators' responsibilities in a procedure so there would be no question.

No violations or deviations were identified.

5. Requalification Training Program (40750)

10 CFR 55.59 requires the licensee to have a requalification program for licensed operators. The program is to be conducted for a continuous period not to exceed 24 months in duration. 10 CFR 55.59 also requires that the operators pass a comprehensive requalification written examination and an annual operating test.

The inspector noted that the licensee's Training Program had been completely reviewed and rewritten in November 1991 and submitted to the NRC for approval in December 1991. The NRC had approved the Training Program in February 1992 and the inspector noted that the program was

being followed as outlined. Through a review of the operator requalification training records for 1991 through 1994, the inspector determined that the records were being maintained as required and that requalification exams and annual operating tests were given. The records reflected the training the operators received, the tests they took covering the material presented, and the scores they received.

Through discussions with licensee representatives, the inspector determined that the program is offered on a biennial schedule. The lectures presented to the operators are given approximately every other month. The lecture topics included: nuclear theory and principles of operation; design and operating characteristics; instrumentation and control systems; reactor protection systems; normal, abnormal, and emergency operating procedures; radiological control and safety; Technical Specification and applicable 10 CFR subjects; emergency plan and security plan subjects; and training on fuel handling. The inspector noted that the current lecture series is on schedule. No problems were noted with the general timeliness of the lectures.

The training records also indicated that, through lectures or discussions, abnormal situations and emergency procedures are reviewed by the operators and proper responses to the problems discussed. The licensee also maintains a listing of the duty schedule for all operators on the operations logs and thus ensures that all operators maintain their active duty status as required by the regulations.

No violations or deviations were identified.

6. Reactor Operations (40750)

a. Operations and Maintenance Records Review

The operations log sheets for the period from June 1992 to August 1994 were reviewed. Log entries were complete and descriptive of the events that occurred and the actions taken by the operators. Entries dealt with items such as maintenance activities, surveillance completion, problems noted, experiments conducted, and tours by various groups. During the review, specific attention was given to power level entries for the nuclear instruments and primary coolant temperature rise. No instances of overpower operation were identified.

The maintenance logs were reviewed for the period from 1992 through 1994 to date. The maintenance load appeared to be generally the same as in past years. During 1992, a total of 46 maintenance activities were logged; during 1993, a total of 50 activities were logged; and during 1994 to date, a total of 29 maintenance activities were logged. No one item had caused the majority of maintenance activity and reactor down time. It was noted, however, that the "high-maintenance" systems, or at least high activity items, appeared to be those that have continually required such attention. These included the stack monitor and

dilution fan, area radiation monitors, the shield tank, and most recently the safety blade position indicators. The licensee was handling these problems as they arose and no specific problem areas were noted.

b. Operation of the Reactor

The inspector observed SROs perform a daily check of the reactor and then start up and operate the reactor. The check out, start up, and operation were performed in accordance with the appropriate Standard Operating Procedures (SOPs). These included:

- UFTR SOP-A.1, Pre-operational Checks, Rev. 14, dated December 1988.

- UFTR SOP-A.2, Reactor Startup, Rev. 12, dated May 1987.

- UFTR SOP-A.3, Reactor Operation At Power, Rev. 11, dated May 1987.

The inspector noted that the SROs used the appropriate procedures during these operations and followed them as written. No problems were noted during this observation period.

7. Surveillances (40750)

Surveillance requirements for the UFTR are stipulated in Section 4 of the facility TS. Unless otherwise specified, quarterly surveillances (Q) are to be performed at an interval not to exceed 4 months, semiannual surveillances (S) are not to exceed 8 months, annual surveillances (A) are not to exceed 14 months, and biennial surveillances (B) are not to exceed 30 months between surveillances.

The inspector reviewed the following surveillances for timeliness and completion:

- Q-1, Quarterly Check of Scram Function. During 1992, this check was performed on January 1, March 26, July 2, September 15, and December 23. During 1993, the surveillance was performed on April 16, June 9, and October 6. During 1994 to date, the surveillance was performed on January 27, March 28, and June 29. The checks appeared to be adequate and no operational problems or significant drifts were identified during these checks. It was noted that, during 1993, only three surveillances were conducted. Although the interval between each surveillance did not exceed four months, performing the check only three times a year did not appear to meet the intent of the requirement. This issue was discussed in detail with the licensee. The licensee indicated that performing a quarterly check only three times a year was not the standard practice and that, if this did occur, the surveillance check was typically completed five times during the following year. The licensee also indicated that during 1993 this

surveillance had not been completed every quarter due to an oversight. The licensee indicated that greater attention would be given to completing the surveillances within the time frame specified so that this problem did not continue in the future.

- Q-2, Calibration Check of Area and Stack Radiation Monitors. During 1992, this surveillance was performed on January 23, April 21, April 27, June 3, August 7, September 10, and November 16. During 1993, the check was performed on February 11, May 14, August 16, and November 9. During 1994 to date, the surveillance checks were on February 15, May 23, and August 26. The calibration checks of these monitors had to be performed more frequently than required by TS due to some minor maintenance problems with the monitors. Following maintenance on the various monitors, calibration checks were performed as required. No problems were noted.

- Q-3, Quarterly Radiological Emergency Evacuation Drills. Drills were conducted in April, July, October, and December during 1992 and 1993, and in April and July of 1994. The drills appeared to be adequate to meet the intent of the requirement. No problems were noted.

- Q-4, Quarterly Radiation Survey Unrestricted Areas. In 1992, this surveillance was performed on February 18, May 27, September 25, and December 1 and 16. In 1993, this check was performed on March 11, May 21, September 15, and November 19. In 1994 to date, this surveillance was performed on March 3, May 25, and August 19. The results of the surveys were comparable from quarter to quarter and no problems or abnormal radiation readings were noted during any of the surveys.

- Q-6, Quarterly Check of Postings. In 1992, this surveillance was performed on April 8, July 7, August 23, and September 26; in 1993, it was performed on January 11 and 31, May 22, July 31, October 29, and December 12. In 1994 to date, this surveillance was performed on February 15, May 15, and August 20. The postings were checked and new postings added in various areas as the result of the new 10 CFR Part 20. Also a new form was developed for use during this surveillance. No problems were noted.

- S-1, Measurement of Control Blade Drop Times. This surveillance was performed on May 4, and November 24, 1992; on June 15 and December 22, 1993; and on May 4, 1994. Satisfactory results were reported in all cases and no trends of increasing or decreasing drop times were apparent.

- S-2, Annual Reactivity Measurements. The annual surveillance of reactivity measurements was performed in August of 1992, 1993 and 1994. There appeared to be good consistency between blade worth distributions from measurement to measurement.

- S-5, Blade Controlled Insertion Time Measurement. This surveillance was performed on May 4 and November 24, 1992; on June 15 and December 22, 1993; and on May 5, 1994. The results for these measurements were satisfactory and demonstrated good correlation with previous time measurements.

- A-2, UFTR Nuclear Instrumentation Calibration Check and Calorimetric Heat Balance. The NI calibration check and the heat balance was performed in March 1992, 1993, and 1994. There was no significant change in instrument readings between surveillances and the results were satisfactory.

- A-3, Annual Measurement of UFTR Temperature Coefficient of Reactivity. This measurement was performed on November 26, 1992, and on September 29, 1993. The data were comparable from year to year and the results appeared to be satisfactory. No problems were noted.

- B-1, Biennial Check to Assure Negative UFTR Void Coefficient of Reactivity. The satisfactory check was performed on March 15, 1991, and again on October 6, 1992. The results were satisfactory and no problems were noted.

- B-2, Biennial Inspection of Incore Reactor Fuel Elements. This inspection was completed on June 8, 1990, on August, 12, 1992, and again on August 10, 1994.

  During the 1990 inspection, small "blisters" were noted on one of fuel elements. Through extensive evaluation of this problem and after consulting with various people, including Argonne National Laboratory personnel, the licensee concluded that the phenomenon was not routinely representative of the potential for thermal hydraulic problem or failed fuel. A 10 CFR 50.59 safety evaluation was also performed. The conclusion was that this phenomenon was not a safety issue and did not represent the potential for an unreviewed safety question. Even though this conclusion was reached, the licensee subsequently removed the fuel element from the reactor and another element was put is its place.

  During the most recent inspection, no further problems were noted in this area.

No violations or deviations were identified.

8. Experiments (40750)

TS 6.4 requires that experiments be reviewed and approved as outlined in TS 3.5 to ensure compliance with the requirements of the license, the TS, and applicable regulations. TS 3.5 requires that the reactor manager and the radiation control officer review and approve all proposed experiments prior to their performance. The reactor manager is to refer new experiments and those that have the possibility to pose

potential hazards to the facility to the RSPS for review and approval. This section also outlines the manner in which experiments are to be classified into four different classes. Class I experiments are routine, Class II are relatively routine experiments that only need to be documented for new experimenters or whenever the experiment has not been performed for over a year, Class III experiments are those that pose significant questions regarding the safety of the reactor, the personnel, or the public, and Class IV are those that have a significant potential for hazard to the reactor, the personnel, or the public.

The inspector reviewed selected experiments conducted in 1993 and to date in 1994. A total of 70 experiments were conducted in 1993 and 50 to date in 1994. All the experiments were either Class I or Class II experiments. No new experiments or Class III or Class IV experiments were proposed. All the experiments had been approved as required and no problems were noted.

No violations or deviations were identified.

9. Exit Interview (30703)

The inspection scope and findings were summarized on September 8, 1994, with those persons indicated in Paragraph 1. The inspector discussed and detailed the findings for each area reviewed. Dissenting comments were not received from the licensee.

The licensee's staffing and current organizational structure met Technical Specification (TS) requirements and were adequate to implement the licensee's operational programs. The safety committee was functioning as required. Procedures appeared to be adequate and the requalification program was on schedule. No new experiments were being conducted.

Strengths in the operational area included thorough and complete documentation of activities in operations and maintenance log books, and in test, experiment, and surveillance records. Analysis and evaluation of the measurements and results of required surveillance tests met or exceeded regulatory requirements.

No program weaknesses were noted.