

January 24, 2012

Dr. K. Jordan  
Director of University of Florida Training Reactor  
Nuclear and Radiological Engineering Department  
P. O. Box 11830  
University of Florida  
Gainesville, FL 32611

SUBJECT: UNIVERSITY OF FLORIDA - NRC ROUTINE INSPECTION REPORT NO.  
50-083/2012-201

Dear Dr. Jordan:

The U.S. Nuclear Regulatory Commission (NRC) conducted a routine inspection on January 30 to February 2, 2012 at your University of Florida Test Reactor Facility (Inspection Report No. 50-083/2012-201). During the inspection, the NRC staff examined activities conducted under your license as they relate to public health and safety and with the conditions of your license. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations of activities in progress.

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

In accordance with Title 10 of the *Code of Federal Regulations* Part 2.390, "Public inspections, exemptions, and requests for withholding" 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 (Agencywide Document Access and Management System (ADAMS)). ADAMS is accessible from the NRC Web site at (the Public Electronic Reading Room) <http://www.nrc.gov/reading-rm/adams.html>.

Should you have any questions concerning this inspection, please contact Jack Donohue at 301-452-1950 or electronic mail at [Jack.Donohue@nrc.gov](mailto:Jack.Donohue@nrc.gov).

Sincerely,  
**/RA/**

Johnny H. Eads, Jr., Chief  
Research and Test Reactors Oversight Branch  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

Docket No. 50-083  
License No. R-56

Enclosure: NRC Inspection Report No. 50-083/2012-201  
cc w/encl: See next page

University of Florida

Docket No. 50-083

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January 14, 2012

Dr. K. Jordan  
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Gainesville, FL 32611

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**/RA/**

Johnny H. Eads, Jr., Chief  
Research and Test Reactors Oversight Branch  
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cc w/encl: See next page

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**ACCESSION NO.: ML120540013 \*concurrence by e-mail TEMPLATE #: NRC-002**

OFFICE	PROB:RI*	PRPB:LA	PROB:BC
NAME	JDonohue	GLappert	JEads
DATE	02/22/2012	02/23/2012	2/24/2012

**OFFICIAL RECORD COPY**

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

Docket No: 50-083

Report No: 50-083/2012-201

Licensee: University of Florida

Facility: University of Florida Training Reactor

Location: Gainesville, Florida

Dates: January 30 - February 2, 2012

Inspectors: Jack Donohue  
Taylor Lichatz (Inspector-in-Training)

Approved by: Johnny H. Eads, Jr., Chief  
Research and Test Reactors Oversight Branch  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

## EXECUTIVE SUMMARY

University of Florida  
University of Florida Training Reactor  
Inspection Report No. 50-083/2012-201

The primary focus of this routine, announced inspection was the onsite review of selected aspects of the University of Florida's (the licensee's) Class II research reactor safety program including: organization and staffing, requalification training, maintenance and surveillance, radiation protection program, review and audit and design change functions, and transportation since the last U.S. Nuclear Regulatory Commission (NRC) inspection of these areas. The licensee's programs were acceptably directed toward the protection of public health and safety, and in compliance with NRC requirements.

### Organizational Structure and Staffing

- The operations organizational structure and functions were consistent with Technical Specifications Section 6.2.

### Requalification Training

- The requirements of the Operator Requalification Plan were being met and the plan was being acceptably implemented.
- Medical examinations were being completed as required.

### Maintenance and Surveillance

- Maintenance logs, records, performance, and reviews satisfied Technical Specification and procedure requirements.
- The program for tracking and completing surveillance checks and verifications satisfied Technical Specification requirements.

### Radiation Protection Program

- Surveys were being completed and documented acceptably to permit evaluation of the radiation hazards present.
- Postings met the regulatory requirements specified in Title 10 of the *Code of Federal Regulations*, Parts 19 and 20.
- Dosimeters were being worn by staff members as required and doses were within the NRC's regulatory limits.
- Radiation monitoring equipment was being maintained and calibrated as required.

- The Radiation Protection Program being implemented by the licensee satisfied regulatory requirements
- Effluent monitoring satisfied procedural and regulatory requirements and releases were within the specified regulatory and Technical Specification limits.

#### Review and Audit and Design Change Functions

- The review and audit program was being conducted acceptably by the Reactor Safety Review Subcommittee as stipulated in Technical Specifications Section 6.2.5.
- Based on the records reviewed, the licensee's design change program was being implemented as required.

#### Transportation of Radioactive Materials

- Transfer of radioactive material from the University of Florida Training Reactor to the State of Florida (Agreement State) License was completed and documented in accordance with licensee procedural requirements.

## REPORT DETAILS

### Summary of Plant Status

The University of Florida's (the licensee's, UF) 100 kilowatt modified Argonaut-UTR type research and test reactor (RTR) continued to be shutdown following reactor piping repair.

#### 1. **Organizational Structure and Staffing**

##### a. Inspection Scope (Inspection Procedure [IP] 69001)

The inspectors reviewed selected aspects of the following regarding the licensee's organization and staffing to ensure that the requirements of Sections 6.2.1 - 6.2.4 of the facility Technical Specifications (TS), Amendment No. 26, dated September 1, 2006, were being met:

- Current staff qualifications
- Management responsibilities as outlined in the TS
- Organizational structure for the University of Florida Training Reactor (UFTR)
- Selected portions of the operations log for the past year through the present
- The University of Florida Annual Report for the period from September 1, 2009 – August 31, 2010, dated March 2011

##### b. Observations and Findings

The organizational structure has not functionally changed since the last routine inspection (refer to the U. S. Nuclear Regulatory Commission (NRC) Inspection Report No. 50-083/2011-201). Dr. David Hintenlang continues to maintain the Level 1 position as Interim Chair of the Nuclear & Radiological Engineering Department at the University of Florida. Dr. Kelly Jordan has been appointed Director of Nuclear Facilities. Brian Shea was reinstated as Reactor Manager of the UFTR. The operations staff is comprised of two Senior Reactor Operator (SRO) and four Reactor Operators (RO's) in training.

##### c. Conclusion

The inspectors determined that shift staffing met minimum requirements for current operations as required by TS. The facility organizational structure and functions were consistent with TS Section 6.2.

## 2. **Requalification Training**

### a. Inspection Scope (IP 69001)

To verify that the licensee was complying with the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 55 to implement and maintain an operator requalification program, the inspectors reviewed selected aspects of:

- Medical examination records
- Effective dates of current operator licenses
- Operator training records and operator active duty status
- Operator competence evaluation and written examination records
- Certification Letters from the Facility Director written to qualified operators
- "UFTR Operator Requalification Plan and Recertification Training Program Plan," for the period from July 2009 through June 2011, dated May 26, 2009
- "UFTR Operator Requalification Plan and Recertification Plan," for the training cycle July 2013 and again two years thereafter. Dated August 4, 2011
- UFTR SOP-0.8, "Control and Documentation of Operator Licensing Requalification Training and Examination," Rev. 2, dated September 2003
- UFTR Semiannual #12 (S-12 Surveillance), "Review of Requalification Training Program Binders," Rev. 3, dated February 2003 (controlled by UFTR SOP-0.5)
- UFTR Biannual #5 (B-5 Surveillance), "Evaluation and Certification of Licensed Operators," Rev. 3, dated February 2003 (controlled by UFTR SOP-0.5)

### b. Observations and Findings

The inspectors noted there was one SRO licensed to operate the research reactor at the facility and one that is scheduled to complete requalification in February. The training notebooks, the Requalification Plan and Schedule, and the various operators' active duty status records contained the documentation required by the program. The inspectors determined that the SRO was completing the hours of operation, as conditions permit, and supervisory responsibilities as required by the NRC-approved requalification plan and that the required biennial medical examinations within the required time frame.

### c. Conclusion

The requirements of the Operator Requalification Plan were being met and the plan was being acceptably implemented.



### 3. Maintenance and Surveillance

#### a. Inspection Scope (IP 69001)

The inspectors reviewed selected aspects of:

- Selected UFTR Operating Log pages for 2010 - present
- Selected Maintenance Log pages for 2010 - present
- Surveillance, calibration, and test data sheets and records
- Reactor operations, periodic checks, tests, and verification logs and forms
- UFTR SOP-0.2, "Control of Maintenance," Rev. 5, dated September 2003, and TCN dated November 2005
- UFTR SOP-0.5, "UFTR Quality Assurance Program," Rev. 3, dated February 2003, and the latest TCN dated November 2006

#### b. Observations and Findings

##### i. Maintenance

The inspectors reviewed various maintenance records related to 2010 thru present scheduled and unscheduled preventive, corrective, and modification maintenance activities. This review indicated that selected maintenance activities were controlled and documented in the maintenance and/or operations log consistent with the procedural requirements. Due the shutdown condition many operational maintenance activities continue to be incomplete.

##### (2) Surveillance

The inspectors determined that selected daily, weekly, semiannual, annual, other periodic checks, tests, verifications, and calibrations for TS-required surveillances and Limiting Conditions for Operations (LCOs) were generally completed as plant conditions allowed.

Calibration reviews indicated radiation monitoring equipment was operable and completed on schedule and performed in accordance with licensee procedures.

All the recorded results were within the TS and procedurally prescribed parameters and in close agreement with the previous surveillance results.

#### c. Conclusion

The maintenance program was being implemented as required. The surveillance program, including the associated calibrations and verifications, satisfied TS requirements.

#### 4. Radiation Protection Program

##### a. Inspection Scope (IP 69001)

The inspectors reviewed the following to verify compliance with 10 CFR Parts 19 and 20 and TS Sections 3.4.1 and 4.2.4:

- UFTR facility quarterly dosimetry records for 2010 to present
- Radiation and contamination survey records for 2010 to present
- Calibration and periodic check records for selected radiation monitoring instruments documented on the applicable forms for 2011 and to date in 2012
- As low as reasonably achievable (ALARA) Policy as outlined the "University of Florida Training Reactor Facility As Low As Reasonably Achievable (ALARA) Program," Rev. 1, dated August 2002
- UFTR SOP-D.1, "UFTR Radiation Protection and Control," Rev. 5, dated December 1993 and the latest TCN dated October 2001
- UFTR SOP-D.2, "Radiation Work Permit," Rev. 11, dated October 2003
- UFTR SOP-D.3, "Primary Equipment Pit Entry," Rev. 4, dated October 2001
- UFTR SOP-D.1, Appendix I, Table 1, "Quarterly Exposure Limits for the UFTR Facility," Rev. 5, dated December 1993 and the latest TCN dated April 1994
- UFTR Form SOP-D.1A, "UFTR Radiation Weekly Survey," Rev. 5, dated December 1993
- UFTR Form SOP-D.1B, "UFTR Swipe Survey Results," Rev. 5, dated December 1993
- UFTR Form SOP-D.2A, "Radiation Work Permit, University of Florida Training Reactor," Rev. 11, dated October 2003
- UFTR Quarterly #2 (Q-2 Surveillance), "Calibration Check of Area and Stack Radiation Monitors," Rev. 3, dated February 2003 and the latest TCN dated September 2005 (controlled by UFTR SOP-0.5)
- UFTR Quarterly #4 (Q-4 Surveillance), "Unrestricted Area Indoor/Outdoor Radiation Survey," Rev. 3, dated February 2003 (controlled by UFTR SOP-0.5)
- UFTR Quarterly #5 (Q-5 Surveillance), "Restricted Area Radiation Survey," Rev. 3, dated February 2003 and the latest TCN dated October 2003 (controlled by UFTR SOP-0.5)
- UFTR Quarterly #9 (Q-9 Surveillance), "Quarterly Calibration of Air Particulate Detector," Rev. 3, dated February 2003 (controlled by UFTR SOP-0.5)

The inspector also toured the facility and observed the various radiological signs and other postings as well.

b. Observations and Findings

i. Surveys

The inspectors reviewed weekly radiation and contamination surveys conducted by reactor staff personnel. These were surveys of facility controlled areas including the Radiochemistry Laboratory (Lab) and classroom, the Neutron Activation Analysis (NAA) Lab, the Control Room, and the Reactor Cell from 2010 through the date of the inspection. The inspector also reviewed quarterly general area radiation surveys of restricted and unrestricted areas completed by the licensee. The results were documented on the appropriate forms and were evaluated and reviewed as required. No readings or results were noted that exceeded set action levels and the licensee indicated that corrective action would be taken if results were detected that were above these levels.

ii. Postings and Notices

The inspectors reviewed the postings at the entrances to various controlled areas including the Control Room, the Reactor Cell, and the Radiochemistry Lab in the UFTR facility. The postings were acceptable and indicated the radiation and contamination hazards present. Other postings also showed the industrial hygiene hazards present in the areas. The facility radioactive material storage areas were noted to be properly posted. No unmarked radioactive material was detected in the facility. Copies of notices to workers were posted in various locations throughout the facility, including on a bulletin board in the Control Room. The inspectors noted that the copies of NRC Form-3, "Notice to Employees," posted at the facility, as required by 10 CFR Section 19.11, were the current version.

iii. Dosimetry

The licensee provided reactor staff personnel with dosimetry from a National Voluntary Laboratory Accreditation Program-accredited vendor (Landauer). Pocket Ion Chambers (PICs) were routinely given to visitors for use during tours of the facility. Through direct observation, the inspector determined that dosimetry was acceptably used by facility personnel and visitors as well.

The inspectors noted that the licensee used Optically Stimulated Luminescent (OSL) dosimeters for staff whole body monitoring of beta and gamma radiation exposure with an additional component to measure fast/thermal neutron radiation. The licensee used thermoluminescent dosimeter (TLD) finger rings for extremity monitoring as needed. These were periodically sent to the vendor for processing.

An examination of the OSL dosimeter and TLD results for the past two years showed that the highest occupational doses, as well as doses to the public, were within 10 CFR Part 20 limitations. The records showed that the highest annual whole body exposure received by a single individual for 2009 through December 2011 was 1093 millirem (mr) total effective dose equivalent (TEDE). These doses were well within limits specified in 10 CFR Part 20. The majority of exposure has been due to reactor maintenance work and reassembly of portions of the reactor.

iv. Radiation Monitoring Equipment

The calibration records of selected portable survey meters, friskers, fixed radiation detectors, and air monitoring instruments in use at the facility were reviewed. The records showed that the portable instrument calibrations were completed by UF campus Environmental Health and Safety (EH&S) Division personnel and fixed radiation detectors and air monitors were typically calibrated by reactor staff personnel.

The inspectors confirmed that the frequencies of the calibrations completed quarterly or semiannually, satisfied the requirements established in the TS Section 4.2.4 and 10 CFR 20.1501(b).

v. Radiation Protection Program

The licensee's Radiation Protection Program was established through the UF "Radiation Control Guide", last revised February 1997, and the UFTR SOPs. The program required that all personnel, who had unescorted access to radiation areas or to work with radioactive material, receive training in radiation protection, policies, procedures, requirements, and facilities.

The ALARA Policy was outlined and established in the UF "Program for Maintaining Occupational Radiation Exposure for Non-Medical Licensed Activities at the University of Florida, As Low As Reasonably Achievable (ALARA)," dated January 18, 2005 and in the "University of Florida Training Reactor Facility As Low As Reasonably Achievable (ALARA) Program," Rev. 1, dated August 2002. The ALARA Policy provided guidance for keeping doses as low as reasonably achievable and was consistent with the guidance in 10 CFR Part 20.

vi. Effluent and Environmental Monitoring

Liquid releases were approved by the Facility Director or Reactor Supervisor and the Radiation Control Officer after analyses indicated that the releases met regulatory requirements for discharge into the sanitary sewer. It was noted that there were 921.7 gallons released in 2009 with activity of  $6.44 \times 10^{-10}$   $\mu\text{Ci/ml}$ .

The inspectors also reviewed the cumulative environmental monitoring OSL dosimeter results for 2010 and 2011. The effective dose equivalent to the public was well within the regulatory limits. In addition, the inspector reviewed the calibration records of the area and stack monitoring systems. These systems had been calibrated quarterly as required by TS Section 4.2.4.

c. Conclusion

The inspectors determined that the Radiation Protection Program being implemented by the licensee satisfied regulatory and TS requirements because: 1) surveys were being completed and documented acceptably; 2) postings met regulatory requirements; 3) personnel dosimetry was being worn as required and doses were within the NRC's regulatory limits; 4) radiation monitoring equipment was being maintained and calibrated as required; 5) the radiation protection training program was acceptable; and, 6) the effluent monitoring satisfied procedural and regulatory requirements.

**5. Review and Audit and Design Change Functions**

a. Inspection Scope (IP 69001)

In order to verify that the licensee had established and conducted reviews and audits as required in TS Section 6.2.5 and that design changes were reviewed as required by 10 CFR 50.59, the inspectors reviewed selected aspects of:

- Facility configuration and associated records
- Selected UFTR Operating Log pages for 2010-present
- Selected Maintenance Log pages for 2010-present
- Facility design changes and records for the past three years
- Reactor Safety Review Subcommittee (RSRS) meeting minutes from 2010 to present
- UFTR Standard Operating Procedure (SOP)-0.1, "Operating Document Controls," Revision (Rev.) 5, dated July 12, 2011
- UFTR SOP-0.2, "Control of Maintenance," Rev. 5, dated September 2003, and TCN dated November 2005
- UFTR SOP-0.3, "Control of Documentation of UFTR Modifications," Rev. 1, dated October 1999, and TCN dated September 2003
- UFTR SOP-0.4, "10 CFR 50.59 Evaluation and Determination," Rev. 3, dated October 21, 2011
- UFTR SOP-0.5, "UFTR Quality Assurance Program," Rev. 3, dated February 2003, and the latest TCN dated June 2011

b. Observations and Findings

i. Review and Audit Functions

The inspectors noted that, during the last two years, the Reactor Safety Review Subcommittee (RSRS) held at least one meeting each quarter at intervals not to exceed four months as required by TS Section 6.2.5(2). The membership also satisfied the charter requirements also stipulated in the TS. Review of the minutes indicated that the committee provided guidance and direction to ensure suitable oversight of reactor operations and that the minutes provided a record of this safety oversight. The RSRS meeting minutes and audit records also showed that safety reviews and individual audits had been completed and a report of the findings submitted to the Dean of the College of Engineering within three months of completion for the functional areas as required by the TS. The audits appeared to be comprehensive and well documented. The inspectors noted that there were no significant issues discovered and that the licensee took appropriate corrective actions in response to the audit findings. Committee records documented that procedure changes were reviewed as required as well.

ii. Design Change Functions

Facility design changes were controlled by UFTR SOP-0.3 and SOP-0.4. The inspectors reviewed the 10 CFR 50.59 evaluations/determinations and corresponding design change packages pertaining to various changes implemented at the facility. From these reviews, the inspectors determined that the facility design change evaluations had adequate supporting documentation and information. Additionally, the inspectors found that the 10 CFR 50.59 reviews and approvals conducted by the RSRS were focused on safety and met TS and UFTR procedure requirements. Post installation verification testing of the systems, when required, was adequately documented when completed. Procedure and drawing changes were included in the change packages and were consistent with TS and UFTR requirements for facility changes.

c. Conclusion

The review and audit program was being conducted acceptably by the RSRS as stipulated in TS 6.2.5. The design change program was being implemented as required.

**6. Transportation**

a. Inspection Scope (IP 86740)

The inspectors reviewed the following to verify compliance with TS Section 3.4.6 and procedural requirements for transferring licensed material:

- Records of radioactive material transfers from the reactor license to the State of Florida materials license for 2009 and to date documented on various forms
- UFTR SOP-D.4, "Removing Irradiated Samples from UFTR Experimental Ports," Rev. 7, dated October 2001
- UFTR SOP-D.5, "UFTR Reactor Waste Transfer," Rev. 3, dated December 16, 2011
- UFTR SOP-D.6, "Control of UFTR Radioactive Material Transfers," Rev. 1, dated April 2000 and the latest TCN dated October 2003
- UFTR Form SOP-D.4A, "Record of Sample Irradiation and Disposition," Rev. 7, dated October 2001
- UFTR Form SOP-D.5A, "Radioactive Reactor Waste Transfer Checklist," Rev. 3, dated December 2011
- UFTR Form SOP-D.5B, "Radioactive Reactor Waste Container Inventory," Rev. 3, dated December 2011
- UFTR Form SOP-D.5C, "Swipe Samples Analysis Report," Rev. 3, dated December 2011
- UFTR Form SOP-D.5D, "Radioactive Waste Container Radiation Survey," Rev. 3, dated December 2011
- UFTR Form SOP-D.6A, "University of Florida Training Reactor/University of Florida Radioactive Material Transfer Record," Rev. 1, dated April 2000
- UFTR Form SOP-D.6B, "University of Florida/University of Florida Training Reactor Radioactive Material Transfer Record," Rev. 1, dated April 2000
- UFTR Form SOP-D.6C, "University of Florida Training Reactor/University of Florida Activated Foil Transfer Record," Rev. 1, dated April 2000
- UFTR Form SOP-D.6D, "University of Florida Training Reactor/University of Florida Neutron Radiography Film Cassette Transfer Record," Rev. 1, dated April 2000
- UFTR Form SOP-D.6E, "University of Florida Training Reactor/University of Florida Rabbit System Sample Package Transfer Record," Rev. 1, dated April 2000

b. Observations and Findings

Through records review and discussions with licensee personnel, the inspector determined that the licensee had transferred radioactive material and solid waste produced by reactor operations to the university's "State of Florida Radioactive Materials License" (Agreement State License), License No. 356-1, expiration date March 31, 2015, for possession, shipment, or disposal. All transfers were recorded on the appropriate and applicable forms and transfer documentation was kept on file as required.

It was noted that the most recent shipment was on January 15, 2012. The shipment contained 18 packages and all of which were shipped as Low Specific Activity (LSA) II Type A packages. The total weight was 5145 pounds of low level waste that had been accumulated over the past ten years. The inspectors

also made note that the facility had been significantly cleaned up since the last inspection.

c. Conclusion

Transfer of radioactive material from the UFTR to the State of Florida (Agreement State) License was completed and documented in accordance with facility procedural requirements.

**7. Exit Meeting Summary**

The inspectors reviewed the inspection results with members of licensee management at the conclusion of the inspection on and February 2, 2012. 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**

C. Abernathy	Dean, College of Engineering, Professor of Material Science
K. Jordan	Director of Nuclear Facilities
D. Munroe	University of Florida Radiation Control Officer
B. Shea	Reactor Manager

**INSPECTION PROCEDURE (IP) USED**

IP 69001	Class II Research and Test Reactors
HP 86740	Transportation of Nuclear Materials

**ITEMS OPENED, CLOSED, AND DISCUSSED**

Open

None

Closed

None

**LIST OF ACRONYMS USED**

10 CFR	Title 10 of the <i>Code of Federal Regulations</i>
ADAMS	NRC's Agencywide Documents Access and Management System
ANSI	American National Standards Institute
EH&S	Environmental Health and Safety
IP	Inspection Procedure
LCO	Limiting Condition for Operations
NAA	neutron activation analysis
NRC	U. S. Nuclear Regulatory Commission
Rev.	Revision/Revised
TEDE	Total Effective Dose Equivalent
RSRS	Reactor Safety Review Subcommittee
RTR	Research and Test Reactor
SDE	Shallow dose equivalent
SOP	Standard Operating Procedure
SRO	Senior Reactor Operator
TCN	Temporary Change Notice
TS	Technical Specifications
UFTR	University of Florida Training Reactor