May 8, 2001

Dr. Richard Powell
Vice President for Research
University of Arizona
Tucson, AZ 85721-0066

SUBJECT: NRC INSPECTION REPORT NO. 50-113/2001-201

Dear Dr. Powell:

This letter refers to the inspection conducted on March 20-23, 2001, at your University of Arizona's Nuclear Reactor Laboratory TRIGA Reactor. The enclosed report presents the results of that inspection.

Various aspects of your reactor operations and security 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 Nuclear Regulatory Commission (NRC) requirements was identified. No response to this letter is required.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be 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. 50-113
License No. R-52

Enclosure: NRC Inspection Report No. 50-113/2001-201

cc w/enclosure: Please see next page

cc:

Office of the Mayor
P.O. Box 27210
Tucson, AZ 85726-7210

Arizona Radiation Regulatory Agency
4814 S. 40th Street
Phoenix, AZ 85040

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

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

Docket No:	50-113
License No:	R-52
Report No:	50-113/2001-201
Licensee:	University of Arizona
Facility:	University of Arizona Research Reactor
Location:	Engineering Building (202) Tucson, Arizona
Dates:	March 20-23, 2001
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 and activities since the last NRC inspection of the following: Organizational Structure and Functions, Experiments, Review and Audit, Operations, Fuel Handling, Operator Requalification, Surveillance, Maintenance, Design Control, Procedures, Security and Health Physics Surveys.

ORGANIZATIONAL STRUCTURE AND FUNCTIONS

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

EXPERIMENTS

Licensee control and performance of experiments met TS and regulatory requirements.

REVIEW AND AUDIT

The review and audit program satisfied TS requirements.

OPERATIONS

Operational activities were consistent with applicable requirements.

FUEL HANDLING

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

OPERATOR REQUALIFICATION

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

SURVEILLANCE

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

MAINTENANCE

Maintenance logs, records, performance, and reviews satisfied TS and procedure requirements. Facility condition was well maintained for its intended function and use.

DESIGN CONTROL

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

PROCEDURES

Facility procedures and use satisfied TS requirements. The procedural control and implementation program satisfied TS requirements.

SECURITY

Security facilities, equipment, and procedures satisfied the Physical Protection Plan (PPP) requirements.

HEALTH PHYSIC SURVEYS

Licensee actions were acceptable and satisfied their TS and procedural requirements and NRC regulations in regards to this event.

REPORT DETAILS

Summary of Plant Status

During the inspection the reactor was operated several days a week to support education, operator training, surveillance, and experiments.

1. ORGANIZATIONAL STRUCTURE AND FUNCTION

a. Inspection Scope (Inspection Procedure 69001)

The inspector reviewed selected aspects of:

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

b. Observations and Findings

The operations organizational structure had not functionally changed since the last inspection. Licensed staff consisted of the Reactor Director (RD), the Reactor Supervisor (RS) position, two other Senior Reactor Operators (SRO), and a Reactor Operator. The reactor staff satisfied the training and experience required by the TS. Operation logs and records confirmed that shift staffing met the minimum requirements for duty and on-call personnel. Review of records verified that management responsibilities were administered as required by TS and applicable procedures.

At the time of the inspection the RD was on sabbatical leave and the RS was to retire at the end of the following week. One of the other SROs had been trained to become and was qualified to hold the position as the new RS.

c. Conclusions

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

2. EXPERIMENTS

a. Inspection Scope (Inspection Procedure 69001)

The inspector reviewed selected aspects of:

- experimental program requirements
- logs and records
- approved reactor experiments
- Reactor Committee (RC) minutes
- experimental administrative controls and precautions
- annual reviews

b. Observations and Findings

The inspector verified that each routine, or not significantly different, experiment had been reviewed and approved by the RD or his designee and that new or significantly different experiments were referred to the RC as required.

Review of the experiment procedures and reactor log books, interviews with staff, and observation verified that experiments were constrained as required by the TS and experiment authorization. Experiments were also installed, performed, and removed as outlined in the experiment authorization and procedures.

The checklist for RC review of experiments ensured experiments conformed to TS and license requirements, had safety constraints for the hazards identified, and experimenter oversight.

c. Conclusions

Control and performance of experiments met TS and applicable requirements.

3. **REVIEW AND AUDIT**

a. Inspection Scope (Inspection Procedure 69001)

The inspector reviewed selected aspects of:

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

b. Observations and Findings

The RC membership satisfied TS requirements and the Committee's procedural rules. The RC had quarterly meetings as required. Appointment letters were current. Review of the minutes indicated the committees provided guidance, direction and oversight, and ensured suitable use of the reactor. The minutes provided a record of the RC safety oversight of reactor operations.

Since the last inspection all required audits of reactor facility activities and reviews of procedures, equipment changes, proposed tests or experiments, had been performed and documented. Additionally the reviews of the emergency and security plans had been conducted and acceptably documented. Audits were performed throughout the year meeting the annual frequency requirements. The use of audit and program checklists was noteworthy.

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

The RC reviewed University of Arizona Research Reactor (UARR) procedure 127 and decided to keep it with minor modifications. This closes IFI 50-113/99-201-02.

c. Conclusions

The review and audit program satisfied TS requirements.

4. OPERATIONS PROGRAM

a. Inspection Scope (Inspection Procedure 69001)

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. Information on operational status of the facility was recorded in log books and checklists as required by procedures and TS. Use of maintenance and repair logs satisfied pertinent requirements. Problems and events noted in the operations log were reported and quickly resolved as required by TS and administrative procedures.

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

The inspector verified that TS and procedure required items were logged and cross referenced with other logs and checklists as required, and that TS operational limits had not been exceeded.

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

c. Conclusions

Operational activities were consistent with applicable requirements.

5. FUEL HANDLING

a. Inspection Scope (Inspection Procedure 69001)

The inspector reviewed selected aspects of:

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

b. Observations and Findings

Records showed that procedures for refueling, fuel shuffling, and TS required inspections/surveillances were used to ensure controlled operations. Fuel movement, inspection, log keeping, and data recording followed the facility's procedures. Data recorded for fuel movement was clear and cross referenced in fuel and operations logs. Radiological controls and procedures conformed to health physics ALARA principles. Log entries clearly identified, as required by procedure, the minimum two persons present when moving fuel.

c. Conclusions

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

6. OPERATOR REQUALIFICATION

a. Inspection Scope (Inspection Procedure 69001)

The inspector reviewed selected aspects of:

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

b. Observations and Findings

All currently licensed SROs were successfully completing the emergency procedure and abnormal events training, reactivity manipulations, and participating in the ongoing training as required by the NRC-approved Requalification Plan. Lectures were conducted as required. The lecture outline for the reactor operator requalification program included acceptable subject material. Training records contained the documentation required by the program. Review of records indicated that operator performance and competence evaluations had been given as required. Past test questions covered the material prescribed by the program and demonstrated technical depth. Required quarterly

operation hours, as SROs, were being tracked. Biennial medical exams had been performed as required. Checklists used for tracking requalification requirements were commendable and ensured that the plan elements were accomplished

c. Conclusions

The Requalification Program was being acceptably implemented. TS and NRC-approved Requalification Plan requirements were met.

7. **SURVEILLANCE**

a. Inspection Scope (Inspection Procedure 69001)

The inspector reviewed selected aspects of:

- surveillance and calibration procedures
- surveillance, calibration, and test data sheets and records
- reactor operations log

b. Observations and Findings

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

Extensive checklists were used to track daily, monthly, and “annual” (including semiannual through biennial to five year/500 pulse items) surveillances, checks, audits, drills, training, and inspections. The checklists included date last performed, date presently completed, and information on where documented, and by whom. These checklists provided clear and concise documentation and control of reactor operational tests and surveillances. Use by the licensee was comprehensive and timely.

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

By letter dated June 22, 1999, the licensee made a TS required report per section 6.7.c.4.a of an observed inadequacy in the implementation of administrative or procedural control. During a review of TS and procedures the first part of June 1999, the licensee discovered that a monthly TS requirement for verifying bulk coolant water conductivity was being enforced by use of the preliminary checklist, which is completed on each day the reactor is operated, rather then the monthly checklist.

Normally the reactor is operated at least once a month ensuring compliance. However during the summer when use of the reactor is light and staff may be taking vacations it was possible for six weeks to elapse between runs. This would result in this TS

surveillance being missed. The RS reviewed TS Surveillances since 1990 and identified only one period, July 12 to September 14, 1998, when this occurred. Pool water conductivity values were 1.0 and 1.2 µmho/cm, respectively, well under the 5.0 µmho/cm limit.

A revised monthly checklist was implemented on Jun 7, 1999, which includes this month conductivity verification. Additionally the RS verified that all other surveillance, LCOs, and maintenance items were acceptably included in facility checklist and audit procedures. The inspector reviewed the licensees actions and concluded that their reporting, response and corrective actions in this situation were comprehensive, acceptable, and satisfied regulatory requirements.

c. Conclusions

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

8. MAINTENANCE

a. Inspection Scope (Inspection Procedure 69001)

The inspector reviewed selected aspects of:

- maintenance procedures
- equipment maintenance records
- reactor logs
- RC minutes

b. Observations and Findings

Routine/preventive maintenance was controlled and documented in the maintenance or reactor log consistent with the TS and licensee procedures. Unscheduled maintenance or repairs were reviewed to determine if they required a 50.59 evaluation. Verifications and operational systems checks were performed to ensure system operability before return to service. This included a statement signed by the RS indicating that the system had been tested for operation and that the reactor was approved for operation.

During a facility tour the inspector noted that control and reactor room equipment was operational. No missing or malfunctioning equipment was noted.

c. Conclusions

Maintenance logs, records, performance, and reviews satisfied TS and procedure requirements. Facility condition was well maintained for its intended function and use.

9. DESIGN CONTROL

a. Inspection Scope (Inspection Procedure 69001)

The inspector reviewed selected aspects of:

- facility design changes and records
- facility configuration
- RC minutes and files

b. Observations and Findings

The packages for design changes were kept with the RC minutes. Changes were rigorously controlled requiring a staff review, a committee review, and were recorded in the facility logbook or the Reactor Upgrade and Instrument Log. Questions from the committee and replies from the reactor and HP staffs were documented and incorporated into the modification packages.

The inspector reviewed the package for the console power supply replacement. The evaluations were far-reaching with supporting documentation and information. RC involvement was also comprehensive. Post installation verification testing of the systems was thorough. Procedure and drawing changes were included and were consistent with the observations of the inspector.

c. Conclusions

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

10. **PROCEDURES**

a. Inspection Scope (Inspection Procedure 69001)

The inspector reviewed selected aspects of:

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

b. Observations and Findings

Operations procedures were available for those tasks and items required by the TS, license, and facility directives. Written changes were reviewed and approved by the RC or RS as required. Oversight and review were provided by the reactor and university staffs as required by TS and licensee procedures.

Training of personnel on procedures and changes was acceptable. Personnel conducted TS 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.

The licensee reviewed their procedures, checklists, logs, etc. to identify and correct inconsistencies in terms, references, directives, and instruction. This closes Follow-up Item (IFI) 50-113/98-201-01.

c. Conclusions

Procedural control and implementation programs satisfied TS requirements.

11. SECURITY

a. Inspection Scope (Inspection Procedure 81401 and 81431)

The inspector reviewed selected aspects of:

- the PPP
- security systems, equipment and instrumentations
- implementation of the PPP
- audits

b. Observations and Findings

The PPP 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 PPP. Security checks, tests, verifications, and periodic audits were performed and tracked as required by the PPP. Corrective actions were taken when required. Access control was implemented as required by the PPP and licensee procedures. Acceptable security response and training, in accordance with procedures, were demonstrated through alarm and drill responses and by enforcement officers' answers to the inspector's interview questions. Response rosters were current and posted as required. Communication between the reactor staff and the University Police was ongoing and kept each informed of current activities.

c. Conclusions

Security facilities, equipment, and procedures satisfied PPP requirements.

12. HEALTH PHYSIC SURVEYS

a. Inspection Scope (Inspection Procedure 69001)

The inspector reviewed selected aspects of:

- routine surveys and monitoring
- survey and monitoring procedures
- RC minutes
- Licensee reports

b. Observations and Findings

On July 27, 2000, the RD reported by facsimile, under TS Section 6.7.c.4, a possible I-131 contamination incident at their reactor on July 18, 2000. Later on July 27, 2000, this report was withdrawn when their investigation found no credible evidence of any I-131 contamination or other basis for an immediate report in accordance with their TS.

A follow-up letter dated August 2, 2000, from the Vice President for Research and Graduate Studies detailed the event and response. On the afternoon of July 18, 2000, a routine contamination survey of the NRL was performed by RCO staff. Subsequently on July 26, 2000, the RS was informed that a number of the samples showed contamination, some of which exceed action levels. Immediate surveys of the NRL and review of NRL records, including water, air, and area monitor results and the visitors' pocket dosimeter readings, showed no indications or confirmatory evidence of any contamination. Investigation by the RCO revealed the presence of a small amount of I-131 contamination on the surface of the gamma spectrum detector housing. Additionally, background subtraction of the unit had not been performed on the day the sample was analyzed. Based on these findings and noting that the observed I-131 peaks were not present after background subtraction, the RCO also determined that no contamination incident occurred.

The inspector verified the results of the licensee's investigation, confirmed the immediate and long term corrective actions, and determined that the licensee's actions were acceptable and satisfied their TS and procedural requirements and NRC regulations in regards to this event.

In discussion with the inspector, the licensee acknowledged that one of their long-term corrective actions which further restricted access to the reactor controlled area was not necessitated by their license, TS, or NRC regulations. The inspector noted that this additional access restriction was more prescriptive than those at other similar reactor facilities and could impede operations at the reactor in the future. The licensee stated that they would review if or to what extent this restriction should be imposed.

c. Conclusions

Licensee actions were acceptable and satisfied their TS and procedural requirements and NRC regulations in regards to this event.

13. EXIT MEETING SUMMARY

The inspector presented the inspection results to members of licensee management at the conclusion of the inspection on March 23, 2001. 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

*H. Doane	Reactor Supervisor
*M. Gavelek	SRO
*T. Hixon	Associate V.P. for Research
B. Mack	University Police Security Supervisor
*D. Silvain	Reactor Radiation Safety Officer
*C. Soundhaus	Director, Radiation Control Office

* Attended Out briefing

INSPECTION PROCEDURE (IP) USED

IP 69001:	CLASS II NON-POWER REACTORS
IP 81401:	PLANS, PROCEDURES, AND REVIEWS
IP 81431	FIXED SITE PHYSICAL PROTECTION OF SPECIAL NUCLEAR MATERIAL OF LOW STRATEGIC SIGNIFICANCE

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

NONE

Closed

IFI 50-113/98-201-01	The licensee to review the procedures, checklists, logs, etc. and update inconsistencies.
IFI 50-113/99-201-02	The Licensee would evaluate whether UARR procedure 127 is still needed.

PARTIAL LIST OF ACRONYMS USED

LCO	Limiting Conditions for Operations
NRL	Nuclear Radiation Laboratory
NRC	Nuclear Regulatory Commission
PPP	Physical Protection Program
RC	Reactor Committee
RCO	Radiation Control Office
RD	Reactor Director
RS	Reactor Supervisor
SRO	Senior Reactor Operator
TS	Technical Specifications

UARR	University of Arizona Research Reactor