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ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.:	50-113
License No.:	R-52
Report No.:	50-113/97-01
Licensee:	University of Arizona
Facility:	Nuclear Reactor Laboratory
Location:	Tucson, Arizona
Dates:	May 19-22, 1997
Inspector:	L. T. Ricketson, P.E., Senior Radiation Specialist Plant Support Branch
Approved By:	Blaine Murray, Chief, Plant Support Branch Division of Reactor Safety

ATTACHMENT: Supplemental Information

EXECUTIVE SUMMARY

Nuclear Reactor Laboratory
NRC Inspection Report 50-113/97-01

Summary of Site Status

This routine, announced inspection reviewed reactor operations and maintenance, reactor operator requalification, reactor committee activities, reactor and facility modifications, radiation protection activities, emergency plan activities, and physical security plan implementation.

Operations

- The reactor was operated safely and in accordance with technical specification requirements (Section O1).
- The reactor requalification program was conducted appropriately (Section O5).
- The reactor committee provided good oversight of reactor operations and support activities (Section O7).
- A noncited violation was identified by the licensee involving the operation of the reactor by a reactor operator who was not under the supervision of a senior reactor operator (Section O8).

Engineering

- Maintenance and modifications to the reactor and facilities were performed in accordance with regulatory requirements (Section E1).

Plant Support

- The radiation protection, emergency preparedness, and physical security programs were implemented properly (Sections R1, P1, and S1).
- Documentation of lessons-learned from emergency drills could be improved (Section P1).
- A noncited violation was identified by the licensee involving the failure to notify radiation workers of their annual radiation exposure (Section R8).
- The licensee demonstrated a good ability to identify and correct violations (Sections O1 and R1).

Report Details

I. Operations

O1 Conduct of Operations

a. Inspection Scope (40750)

The inspector interviewed the reactor supervisor, observed a reactor startup, and reviewed the following:

- Surveillance records
- Operations logs
- Annual reports (July 1994 - June 1995; July 1995 - June 1996)
- Experiment approval records

b. Observations and Findings

According to information in the annual reports and interviews with the reactor supervisor, no emergency shutdowns and only two inadvertent reactor scrams occurred from July 1, 1994, to May 21, 1997. The inadvertent reactor scrams were attributed to faulty replacement bulbs in the regulating rod magnet circuit. No problems were observed by the inspector during reactor startup.

The inspector determined from selected reviews of operations logs that the operating limits of the Technical Specification, Section 3, were not exceeded and the reactor was maintained appropriately. Surveillances required by Technical Specification, Section 4, were performed as required. An excellent tracking system was used to ensure that surveillances were performed at the required frequencies.

New or modified experiments were reviewed and approved by the reactor committee in accordance with Technical Specification 6.2 and 10 CFR 50.59 to ensure compliance with limiting conditions for operations required by Technical Specification 3.7 and to ensure there were no unreviewed safety questions. No additional experiments had been proposed or reviewed since those reported in the annual report for the period July 1, 1995, through June 30, 1996.

c. Conclusions

The reactor was operated safely and in accordance with technical specification requirements.

03 Operations Procedures and Documentation

The inspector reviewed selected operating procedures and confirmed that procedures required by Technical Specification 6.3.a were established and maintained. The procedures provided appropriate guidance.

05 Operator Training and Qualification

a. Inspection Scope (40750)

The inspector reviewed the following records:

- Lecture attendance
- Operator evaluations
- Console manipulations
- Medical examinations

b. Observations and Findings

The licensee had three senior reactor operators and two operators. All operator licenses were current. The first operator license to expire will do so on August 17, 1998.

10 CFR 50.54(i-1) requires that the licensee have, in effect, an operator requalification program which must, as a minimum, meet the requirements of 10 CFR 55.59(c). The inspector reviewed the licensee's operator requalification program and concluded that it met the requirements of 10 CFR 55.59(c).

10 CFR 55.59(a)(1) requires that each licensee (operator) successfully complete a requalification program developed by the facility licensee that has been approved by the Commission. 10 CFR 55.59(c)(2) requires that the requalification program include preplanned lectures on a regular and continuing basis. According to lecture attendance records, some individuals did not attend all lectures that were a part of the requalification program. However, Section 2.4 of the licensee's operator requalification provided for this contingency by allowing the operator to pursue a program, approved by the reactor supervisor, of study, reading, or exercise before taking an examination. Based on an interview with the reactor supervisor and a review of examination scores, the inspector concluded that the individuals missing the lectures complied with instructions of the operator requalification program.

Section 1.4 of the operator requalification program requires that each reactor operator and senior reactor operator pass an annual operating test that includes a sample of items specified in 10 CFR 55.45(a), (1) through (6) and (9) through (13). Section 3.1 of the operator requalification program requires that each licensed reactor operator and senior reactor operator perform at least five reactivity manipulations in any combination of reactor startups, shutdowns, or significant

reactivity changes, and five preliminary checklists during each year of the biennial requalification program. Each licensed reactor operator and senior reactor operator is required to perform licensed functions for a minimum of 4 hours per calendar quarter. The inspector confirmed through a review of evaluation records and operational logs that all operators and senior operators complied with these requirements of the operator requalification program.

Section 1.5 of the reactor operator requalification program requires that each licensed reactor operator and senior reactor operator pass a biennial, comprehensive written examination. The inspector confirmed through a review of examinations that each reactor operator and senior reactor operator met this requirement.

10 CFR 55.21 requires that a licensee (operator) have a physical examination every 2 years. Through a records review, the inspector determined that all but one operator had physical examinations within 2-year intervals. One individual exceeded the 2-year requirement by approximately 2 weeks. A review of operational logs confirmed that the individual did not operate the reactor during the 2 weeks in question. The inspector determined that this portion of the reactor operator requalification program was conducted appropriately.

c. Conclusions

The reactor requalification program was conducted appropriately.

O6 Operations Organization and Administration

The inspector interviewed the reactor director and reactor supervisor. An organization chart was reviewed. The organization met technical specification requirements.

O7 Quality Assurance in Operations

a. Inspection Scope (40750)

The inspector reviewed reactor safety board meeting minutes and audits performed since the previous NRC inspection.

b. Observations and Findings

Oversight was provided by the reactor committee. The inspector determined through a records review that the reactor committee established a charter and conducted meetings in accordance with Technical Specification 6.2. The reactor committee conducted ongoing reviews of reactor operations by assigning committee members on a rotating basis to review reactor logs and records. The reactor

committee conducted reviews of the emergency preparedness and the physical security plans on a biennial basis, as required Technical Specification 6.2.b.8 and Part II.B.4(c) of the physical security plan, respectively. Checklists used by the committee members to review the reactor program were reviewed by the inspector and found to provide suitable guidance.

c. Conclusions

The reactor committee provided good oversight of reactor operations and support activities.

O8 Miscellaneous Operations Issues

The licensee identified, by telephone on September 19, 1996, and by letter dated October 16, 1996, that the reactor was started and operated at a power of 1 Watt for approximately 6 minutes by a licensed reactor operator without supervision of a senior reactor operator. This was in violation of Technical Specification 6.1(b).

As immediate corrective action, the reactor operator was relieved of duty and counselled. As part of the corrective action to prevent recurrence of the item, the operator was required to present an operator requalification lecture that reviewed statements in all the facility procedures, technical specifications, and the emergency plan that indicate who may authorize actions. Subsequently, a document summarizing the details of the lecture was placed in the reactor control room for future reference. Additionally, Procedure UARR 163 was revised to specifically state the need for a senior reactor operator to be present under circumstances similar to this event. There have been no similar occurrences.

The violation was licensee identified, nonrepetitive, corrected within a reasonable time, and nonwillfull. Accordingly, the violation is being treated as a noncited violation consistent with Section VII.B.1 of the NRC Enforcement Policy (50-113/9701-01).

III. Engineering

E1 Conduct of Engineering

a. Inspection Scope (40750)

The inspector interviewed the reactor supervisor and reviewed the annual reports and operational logs.

b. Observations and Findings

No major maintenance has been performed on the reactor since the previous inspection. The most significant maintenance involved the replacement and calibration of the detector in the continuous air monitor. Modifications were reviewed in accordance with 10 CFR 50.59 and reported in the annual reports. No unreviewed safety questions were identified.

c. Conclusions

Maintenance and modifications to the reactor and facilities were performed in accordance with regulatory requirements.

IV. Plant Support

R1 Radiological Protection and Chemistry Controls

a. Inspection Scope (40750)

The inspector interviewed the university medical and reactor health physicist and reviewed records of the following:

- 1995 and 1996 personnel exposure
- Instrument calibrations
- Selected radiation and contamination surveys
- Annual reports

b. Observations and Findings

Personnel exposures were within regulatory limits. Exposures were minimum. Personnel and extremity monitoring devices were provided and processed by a vendor.

During tours of the facility, the inspector confirmed that entrances and areas were posted properly.

Calibration of portable radiation detection instrumentation was performed by members of the university health physics staff, under the agreement state license. A review of calibration records confirmed that portable radiation detection instrumentation was calibrated at the required frequency.

Area radiation and contamination surveys were performed and documented as required. Members of the university health physics group performed monthly surveys of contamination levels and periodic surveys during reactor operation to document maximum radiation levels. Thermoluminescent dosimeters were used to monitor radiation doses on the perimeter of the restricted area. Using the occupancy factors assumed by the licensee, radiation levels in unrestricted areas did not exceed regulatory limits. The inspector concluded that the occupancy factors were conservative. No problems were identified by the inspector as a result of the review of area surveys.

Two plutonium-beryllium sources were stored in the reactor facility. These sources were possessed in accordance with the university's agreement state license. The sources were tested appropriately for leakage at 6-month intervals by university health physics personnel.

No liquid or solid waste had been generated by the licensee since July 1, 1994. Gaseous effluents were below regulatory limits. Although not required, the university health physics group conducted an environmental monitoring program that included the placement of thermoluminescent dosimeters on various campus buildings and the periodic radiological analysis of environmental samples. The inspector reviewed the results of the environmental monitoring program and identified no problems.

According to the reactor supervisor and the university medical and reactor health physicist, the licensee had made no shipments of radioactive material since the previous inspection.

c. Conclusions

The radiation protection program was properly implemented.

R5 Staff Training and Qualification

The inspector reviewed selected personnel training records and confirmed that workers were provided proper instructions in radiation protection practices in accordance with 10 CFR 19.12.

R7 Quality Assurance in Radiological Protection and Chemistry Activities

In order to comply with 10 CFR 20.1101(c), radiation protection activities were reviewed annually by university health physics personnel. The results were reported to the reactor committee. The inspector reviewed the results of the 1994 and 1995 audits and concluded they were comprehensive reviews of the radiation protection program at the reactor laboratory and complied with the requirements of 10 CFR 1101(c). The results of the 1996 audit had not been finalized; however, university health physics personnel indicated that no adverse findings were identified.

university health physics personnel indicated that no adverse findings were identified.

R8 Miscellaneous Radiological Protection and Chemistry Issues

In a letter dated November 27, 1996, the licensee identified a failure to advise workers of their radiation doses, annually, in accordance with 10 CFR 19.13(b). Immediate corrective actions included notifying the individuals of their radiation doses. Corrective action to prevent recurrence included the purchase of new computer software that will produce the reports automatically. The violation was licensee identified, nonrepetitive, corrected within a reasonable time, and nonwillful. Accordingly, the violation is being treated as a noncited violation consistent with Section VII.B.1 of the NRC Enforcement Policy (50-113/9701-02).

P1 Conduct of Emergency Preparedness Activities

a. Inspection Scope (40750)

The inspector interviewed the reactor supervisor and reviewed:

- Emergency drill critiques
- Emergency plan training records
- Letters of agreement with offsite support agencies
- Emergency kit contents

b. Observations and Findings

Letters of agreement with offsite organizations were current. Police and fire department personnel had attended orientation to familiarize themselves with the reactor site, but there was no specific, required frequency for the orientation. An annual review program for radiation control office staff members with emergency response responsibilities was conducted as required.

Drills were conducted annually, as required. Section 10.3 of the emergency plan requires that observer and participant comments concerning areas needing improvement shall be evaluated and consideration given to possible changes in the plan and procedures. Records of critiques for the 1995 and 1996 drills documented comments from participating personnel, but they did not clearly state the conclusions reached by evaluation of the comments or list the lessons-learned by conducting the drills. Licensee personnel stated that this was done at reactor committee meetings. The inspector stated that it was not clear from a review of reactor committee meeting minutes and drill critiques that the evaluation of comments was performed. The reactor committee chairman acknowledged the inspector's comment and stated that the conclusions and results of evaluation would be more clearly reflected in the reactor committee meeting minutes.

c. Conclusions

The requirements of the emergency plan were implemented as required. Documentation of lessons-learned could be improved.

S1 Conduct of Security and Safeguards Activities

a. Inspection Scope (81431)

The inspector observed the licensee conduct tests of the security system and reviewed the following records:

- Security system tests documentation
- Security key issue

b. Observations and Findings

Licensee representatives tested the security system as required and, during observations by the inspector, the security system worked as designed. The licensee accounted for all security keys. Police surveillance was maintained, as required by the physical security plan.

c. Conclusions

The physical security plan was implemented as required and no problems were identified.

S8 Miscellaneous Security and Safeguards Issues

(Closed) Inspection Followup Item 50-113/9404-01: Student hiring practices.

During the previous inspection, the inspector identified a potential vulnerability related to the key shop. Student helpers were utilized in the key shop and the licensee agreed to consider special selection criteria (such as previous work experience on campus) and limited task assignments to preclude access to sensitive information related to the Nuclear Reactor Laboratory.

The licensee evaluated this matter and determined that special selection criteria and limited tasks assignments were not a viable option in this situation. There is no regulatory basis to warrant further licensee action.

V. Management Meetings

X1 Exit Meeting Summary

The inspector presented the results of the inspection to members of licensee management at the conclusion of the inspection on May 22, 1997. The licensee acknowledged the findings presented. No proprietary information was identified.

ATTACHMENT

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

M. Cusanovich, Vice President for Research and Graduate Studies
H. Doane, Reactor Supervisor
M. Gavelek, Reactor Operator
P. Secker, Jr. Reactor Committee Chairman
D. Silvain, Medical and Reactor Health Physicist
J. Williams, Director, Nuclear Reactor Laboratory

INSPECTION PROCEDURES USED

40750	Class II Non-Power Reactors
81431	Fixed Site Physical Protection of Special Nuclear Material of Low Strategic Significance

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-113/9701-01	NCV	Operation of the reactor by a reactor operator who was not under the supervision of a senior reactor operator (Section O8)
50-113/9701-02	NCV	Failure to notify radiation workers of their annual radiation exposure (Section R8)

Closed

50-113/9401-01	IFI	Student hiring practices
50-113/9701-01	NCV	Operation of the reactor by a reactor operator who was not under the supervision of a senior reactor operator (Section O8)
50-113/9701-02	NCV	Failure to notify radiation workers of their annual radiation exposure (Section R8)