

August 10, 2001

Dr. George Hedge
Vice Provost for Research
Washington State University
Pullman, WA 99164-1030

SUBJECT: NRC INSPECTION REPORT NO. 50-027/2001-201

Dear Dr. Hedge:

This refers to the inspection conducted on April 30 through May 3, 2001, at your Washington State University TRIGA research reactor at the Nuclear Radiation Center. 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 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 by Patrick M. Madden Acting for/

John R. Tappert, Acting Chief
Operational Experience and Non-Power Reactors Branch
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket No. 50-027
License No. R-76

Enclosure: NRC Inspection Report No. 50-027/2001-201

cc w/enclosure: See next page

Washington State University

Docket No. 50-27

cc:

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

Docket No: 50-027

License No: R-76

Report No: 50-027/2001-201

Licensee: Washington State University

Facility: TRIGA research reactor

Location: Nuclear Radiation Center

Dates: April 30 through May 3, 2001

Inspector: Stephen W. Holmes, Reactor Inspector

Approved by: John R. Tappert, Acting Chief
Operational Experience 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, and Security.

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 (RP) was being acceptably implemented. TS and NRC-approved RP 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.

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

Although some upper management staff had changed, the operations organizational structure had not functionally changed since the last inspection. Licensed staff consisted of the Director, Nuclear Radiation Center (DIR), the Reactor Supervisor (RS), three other Senior Reactor Operators (SRO), and a Reactor Operator (RO). 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.

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 Safeguards Committee (RSC) minutes
- irradiation request forms
- annual reviews

b. Observations and Findings

The inspector verified that each experiment and changes to approved experiments had been reviewed and approved as required by TS.

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

Review of two experiment approval packages, U8 and U9, confirmed that ALARA was being implemented as required in approved experiments.

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:

- RSC minutes
- safety review records
- audit records
- responses to safety reviews and audits
- experiment and change reviews

b. Observations and Findings

The RSC membership satisfied TS requirements and the Committee's procedural rules. The RSC 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 safety oversight of reactor operations.

Since the last inspection all required audits of reactor facility activities and reviews of programs, procedures, equipment changes, and proposed tests or experiments, had been performed and documented. Additionally the reviews of the emergency and security plans had been conducted and acceptably documented.

The inspector noted the RSC reviews of the November 5, 1999, Beam Room Flooding, the BNCT 2" aluminum PLATE UPGRADE. Their staffing evaluation confirmed that the

committee was performing its oversight duties as required.

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. Significant 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

Procedures for refueling, fuel shuffling, and TS required inspections/surveillances ensured 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 RP
- 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 RP. Quarterly qualifications were completed as required by the RP. 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 were being tracked. Biennial medical exams had been performed as required. Checklists used for tracking requalification requirements were ensured that the plan elements were accomplished.

c. Conclusions

The RP was being acceptably implemented. TS and NRC-approved RP 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, 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" surveillances, checks, audits, drills, training, and inspections. The checklists included date last performed, date presently completed, 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 observed by the inspector satisfied the limits/parameters listed in the procedure or checklist.

TS Section 4.3.4 Surveillance requirements, Ventilation System, require that the ventilation system be checked monthly, the pressure drop across the absolute filter measured at least twice a year, and the absolute filter replaced when the pressure differential increases by 1" of water or at least every two years.

Since the ventilation is only used in the "isolation" mode during emergencies and for the above testing once a month, no measurable pressure drop has been seen over the last number of years. When asked by the inspector when the filter was changed last, the staff was unsure as the former RS, who had retired, had done them himself. Subsequently, the licensee staff and the inspector could not determine if the filter had been changed since June 17, 1994, the last date noted on a chart attached to the filter housing.

The licensee stated they would attempt to determine when the actual last filter change was accomplished. Additionally they would contact the manufacture to obtain its data on storage and usage life, and recommendations on change out /replacement intervals and indicators. (Unless incurring water, chemical, mechanical damage etc. the useful life of a filter is normally limited by particulate buildup, indicated by an increase in differential pressure.) This is an Unresolved Item (URI) 50-027/2001-201-01 and will be addressed in a future inspection.

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
- RSC minutes

b. Observations and Findings

Routine/preventive maintenance was controlled and documented in the maintenance or reactor log and the monthly console and auxiliary equipment checklists 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.

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
- RSC minutes and files

b. Observations and Findings

No design changes had been performed since the last inspection. Design change procedures were in place and met TS, RSC, and licensee requirements. Previous licensee design changes were reviewed, approved, implemented, tested, and controlled as required by TS, licensee procedures, and pertinent regulations.

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 RSC 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.

c. Conclusions

Procedural control and implementation programs satisfied TS requirements.

11. **SECURITY**

a. Scope (Inspection Procedures 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. University police provided security as required by the plan. 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. Periodic training was provided to both the

Nuclear Research Center staff and the university police. Acceptable security response and training, in accordance with procedures, were demonstrated through observed alarm and drill responses, and discussions with enforcement officers. 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.

The licensee identified twice in the last two years that a weekly security check was performed one and two days late. Based on the specific circumstances of these events, the inspector determined there was no safety significance and that licensee actions were appropriate.

c. Conclusions

Security facilities, equipment, training, and procedures satisfied PPP requirements.

12. **EXIT MEETING SUMMARY**

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

License

*G. Hedge	Vice Provost Research
*B. Bunce	Senior Reactor Operator
*K. Fox	Reactor Operator
*S. Sharp	Reactor Supervisor
*G. Tripard	Director, Nuclear Radiation Center

* 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

URI-50-027/2001-201-01	Replacement interval for absolute filter to be verified.
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Closed

NONE

PARTIAL LIST OF ACRONYMS USED

DIR	Director, Nuclear Radiation Center
LCO	Limiting Conditions for Operations
NRC	Nuclear Regulatory Commission
PPP	Physical Protection Program
RP	Requalification Program
RS	Reactor Supervisor
RSC	Reactor Safeguards Committee
SRO	Senior Reactor Operator
RO	Reactor Operator
TS	Technical Specifications