May 30, 2002

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

SUBJECT: NRC INSPECTION REPORT NO. 50-027/2002-201

Dear Dr. Hedge:

This refers to the inspection conducted on April 29 through May 2, 2002, at your Washington State University TRIGA research reactor in 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 available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at (the Public Electronic Reading Room) http://www.nrc.gov/NRC/ADAMS/index.html.

Should you have any questions concerning this inspection, please contact Craig Bassett at (404) 562-4712.

Sincerely,

/RA/

Patrick M. Madden, Section Chief
Research and Test Reactors Section
Operating Reactor Improvements Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

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

Enclosure: NRC Inspection Report No. 50-027/2002-201
cc w/enclosure: Please see next page

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:	50-027/2002-201
Licensee:	Washington State University
Facility:	Nuclear Radiation Center
Location:	Pullman, WA
Dates:	April 29 through May 2, 2002
Inspector:	Craig Bassett
Approved by:	Patrick M. Madden, Section Chief Research and Test Reactors Section Operating Reactor Improvements Program Division of Regulatory Improvement Programs Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY

This routine, announced inspection involved onsite review of selected programs and activities since the last NRC inspection including: Organizational Structure and Staffing, Experiments, Review and Audit Functions, Operations, Fuel Handling, Operator Requalification, Surveillance, Maintenance, Design Control, Procedures, Radiation Protection, Effluent and Environmental Monitoring, Emergency Preparedness, Transportation of Radioactive Materials, Material Control and Accountability, and Security.

Organizational Structure and Staffing

- The operations organizational structure and responsibilities were consistent with Technical Specification requirements but currently two reactor operator positions are vacant.

- Shift staffing met the minimum requirements for current operations.

Experiments

- Conduct and control of experiments and irradiations met the requirements specified in the Technical Specifications and the applicable experiment authorizations and procedures.

Review and Audit

- The review and audit program was being conducted acceptably by the Reactor Safeguards Committee.

Operations

- Operational activities were consistent with applicable Technical Specification and procedural requirements.

Fuel Handling

- Fuel handling activities and documentation were as required by Technical Specification and facility procedures.

Operator Requalification

- The Operator Requalification Program was being acceptably implemented; Technical Specification and requalification program requirements were met.

Surveillance

- The program for tracking and completing surveillance checks and Limiting Conditions for Operation verifications satisfied Technical Specification requirements and licensee administrative controls.

Maintenance

- Maintenance logs, records, performance, and reviews satisfied Technical Specification and procedure requirements.

Design Control

- The latest change completed by the licensee was reviewed using the criteria specified in 10 CFR 50.59, determined to be acceptable, and approved as required.

Procedures

- Facility procedural review, revision, control, and implementation 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 10 CFR Parts 19 and 20.

- Personnel dosimetry was being worn as required and doses were well within the licensee's procedural action levels and 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 and Environmental Monitoring

- Effluent monitoring satisfied license and regulatory requirements and releases were within the specified regulatory and Technical Specification limits.

Emergency Preparedness

- The emergency response program was conducted in accordance with the requirements stipulated in the Emergency Preparedness Plan.

Transportation of Radioactive Materials

- Radioactive material was shipped in accordance with the applicable regulations.

Security

- Security facilities, equipment, and procedures satisfied the Physical Security Plan requirements.

Material Control and Accounting

- Special nuclear material was acceptably controlled and tracked as required by 10 CFR Part 70.

REPORT DETAILS

Summary of Plant Status

The licensee's one megawatt Research and Test Reactor continues to be operated in support of education, operator training, surveillance, and experiments involving Boron Neutron Capture Therapy (BNCT) work. During the inspection, the reactor was started up, operated, and shut down as required and in accordance with applicable procedures to support these ongoing activities.

1. Organizational Structure and Staffing

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

The inspector reviewed the following regarding the licensee's organization and staffing to ensure that the requirements of Sections 6.1-6.3 of Technical Specifications (TS), Amendment No. 17, dated February 20, 1998, were being met:

- Washington State University (WSU) Nuclear Radiation Center organizational structure and staffing
- staff qualifications
- management responsibilities
- staffing requirements for the safe operation of the facility
- selected portions of the operations log for the past year through the present
- WSU Nuclear Radiation Center Administrative Procedure Number (No.) 1, "Responsibilities and Authority of Reactor Operating Staff," (not dated)

b. Observations and Findings

The Nuclear Radiation Center organizational structure and the responsibilities of the reactor staff had not changed since the last inspection. However staffing levels had changed and licensed staff consisted of the Director, Nuclear Radiation Center and the Reactor Supervisor, both of whom are Senior Reactor Operators (SROs). One SRO, who previously worked at the facility, had been called to active duty in the Naval Reserves and the other SRO, who had worked there, was hired to help with the BNCT experiments. Although the latter person still works at the facility, he now falls under a different funding source and his primary duties are not reactor operation. Thus, two operator positions are currently open. It was noted that one individual working part-time at the facility recently took the NRC examination to become a Reactor Operator (RO) but that is still pending NRC notification.

The reactor operations staff satisfied the training and experience requirements stipulated in the TS. The operations log and associated records confirmed that shift staffing met the minimum requirements for duty and on-call personnel.

c. Conclusions

The operations organizational structure and responsibilities were consistent with TS requirements but currently two reactor operator positions are vacant. Shift staffing met the minimum requirements for current operations.

2. Experiments

a. Inspection Scope (IP 69001)

To verify compliance with the licensee's program for conducting experiments and irradiations as outlined in TS Sections 3.10 and 6.5.4 and in various procedures, the inspector reviewed selected aspects of:

- WSU Nuclear Radiation Center Standard Operating Procedure (SOP) No. 1, "Standard Procedure for Use of the Reactor," dated November 29, 1995
- irradiation program requirements outlined in WSU Nuclear Radiation Center SOP No. 2, "Standard Procedure for Performing Irradiations Using the Reactor," dated April 24, 2001
- experimental program requirements outlined in WSU Nuclear Radiation Center SOP No. 3, "Standard Procedure for Performing Experiments Using the Reactor," dated February 2, 1995
- Operations logs and irradiation records
- reactor experiment records
- annual reviews documented in Reactor Safeguards Committee (RSC) meeting minutes
- experiment approvals documented on Irradiation Request Form, Nuclear Radiation Center Form No. 1, form dated October 1992

b. Observations and Findings

In addition to the documents mentioned above, the inspector reviewed in detail two irradiation request forms and one experiment request form as follows: 1) Irradiation Request Form, Nuclear Radiation Center Form No. 1 for Commercial Users, C-4, approved June 4, 1999, which involved fission track analysis of geological minerals; 2) Irradiation Request Form, Nuclear Radiation Center Form No. 1 for WSU Users, U-10, dated May 10, 2001, and amended August 14, 2001, which involved developing a new radiochemical detection method using Cr-51 tracer; and, 3) Experiment Request Form, Nuclear Radiation Center Form No. 2, for WSU Users, U-9, request dated October 23, 2000, which dealt with installation of a BNCT box (approximately two inches of aluminum plate) between the reactor core and the Thermal Column. Also, reviewed was the associated form, Experiment Authorization Form, Nuclear Radiation Center Form No. 4, approval dated October 24, 2000. The request forms contained the appropriate information, hazards analyses as applicable, and had been reviewed and approved as required by TS and procedure.

Through review of the experiment procedure and the operations log, interviews with staff, and direct observation, the inspector verified that the experiment was

constrained as required by the TS and experiment authorization. The experiment and irradiations had also been installed, conducted, and removed as outlined in the experiment authorization and procedures. The radioactive material produced was handled and controlled as required.

c. Conclusions

Conduct and control of experiments met the requirements specified in the TS and the applicable experiment authorizations and procedures.

3. Review and Audit 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 6.5, the inspector reviewed selected aspects of:

- Reactor Safeguards Committee (RSC) meeting minutes for 2001 to date
- safety review and audit records for the past two years
- responses to the safety reviews and audits
- WSU Nuclear Radiation Center Administrative Procedure No. 3, “Approval and Review of Facility Modifications and Special Tests or Experiments,” (not dated)

b. Observations and Findings

The RSC membership satisfied TS requirements and the Committee's procedural rules. The RSC had quarterly meetings as required and a quorum was present. Review of the committee meeting minutes indicated the RSC provided appropriate guidance and direction for reactor operations, and ensured suitable use and oversight of the reactor.

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 completed and documented. Additionally, the biennial reviews of the emergency and security plans had been conducted and acceptably documented.

c. Conclusions

The review and audit program was being conducted acceptably by the Reactor Safeguards Committee.

4. Operations

a. Inspection Scope (IP 69001)

The inspector reviewed selected aspects of the following to verify compliance with TS Section 6.2 and the applicable procedures:

- operational logs and records
- staffing for operations
- observation of startup, operations, and shutdown activities on April 30, 2002
- WSU Nuclear Radiation Center SOP No. 1, "Standard Procedure for Use of the Reactor," dated November 29, 1995
- WSU Nuclear Radiation Center SOP No. 4, "Standard Procedure for Startup, Operation, and Shutdown of the Reactor," dated November 29, 1995

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 on checklists as required by procedures and TS. Use of maintenance and repair logs satisfied procedural requirements. Significant problems and events noted in the operations log were reported, reviewed, and resolved as required by TS and administrative procedures. Scrams were identified in the logs and records, reported as required, and their cause(s) resolved before the resumption of operations under the authorization of an 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.

As noted previously, operations 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 TS and procedural requirements.

5. Fuel Handling

a. Inspection Scope (IP 69001)

The inspector reviewed selected aspects of the following to ensure that the licensee was complying with TS Sections 4.4, 5.1, 5.2, and 6.9:

- fuel handling procedures including WSU Nuclear Radiation Center SOP No. 7, "Standard Procedure for Core Changes and Fuel Movement," dated February 17, 1995
- WSU Nuclear Radiation Center SOP No. 8, "Standard Procedure for Control Element Maintenance, Removal, and Replacement," dated February 17, 1995
- fuel handling equipment and instrumentation
- fuel handling and examination records

b. Observations and Findings

Procedures for refueling, fuel movement, and TS required inspections/surveillances ensured controlled operations for Core 33X. Fuel movement, inspection, log keeping, and data recording generally followed facility procedural guidance. A detailed plan for performing fuel movement was developed prior to the operations as required. The inspector noted that the data recorded for fuel movement was acceptable and was required to be cross referenced in the operations logs. Log entries indicated fuel movements were completed under the direct supervision of an SRO as required.

During the review of the fuel movement data, the inspector noted that, during a rod drive removal (which also involved a fuel movement) in November 2001, a procedure was developed and entries were made in the operations log showing the locations of the fuel during the entire process as required. However, during a fuel move in January of this year, the required operations log entry was not completed. When this issue was discussed with the licensee, it was acknowledged that an entry should have been made in the operations log but was simply overlooked at the time. The licensee stated that greater care would be exercised in the future to ensure that such items are documented in the operations log as required.

Because the fuel move was documented in the procedure that had been developed, the failure to enter the data in the operations log was viewed as a record keeping problem. The licensee was informed that failure to document a fuel movement in the operations log was an apparent violation of TS Section 6.9. However, this failure was a violation of minor significance and is being treated as a Non-Cited Violation (NCV), consistent with Section IV of the NRC Enforcement Policy (NCV 50-027/2002-201-01)

c. Conclusions

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

6. Operator Requalification

a. Inspection Scope (IP 69001)

To verify that the licensee was complying with the requirements of the operator requalification program, the inspector reviewed selected aspects of:

- WSU Nuclear Radiation Center Research Reactor Operator Requalification Plan dated January 4, 1994
- the effective dates of current operator licenses
- operator training records maintained in individual folders for each operator and in the Director's Requalification Schedule
- physical examination records
- operator competence evaluation and written examination records
- operator active duty status noted in the Quarterly Operator Supervisor Activity Reports

b. Observations and Findings

All currently licensed SROs were successfully completing the training, reactivity manipulations, and supervisory responsibilities as required by the NRC-approved requalification plan. Folders containing individual training records, the Requalification Schedule maintained by the facility Director, and the Quarterly Operator Supervisor Activity Reports contained the documentation required by the program. Review of records indicated that operator performance and competence evaluations had been given as required. Biennial medical examinations had been completed as required.

c. Conclusions

The Operator Requalification Plan was being acceptably implemented; TS and plan requirements were met.

7. Surveillance

a. Inspection Scope (IP 69001)

To verify compliance with TS Sections 3 and 4, the inspector reviewed selected aspects of:

- WSU Nuclear Radiation Center Administrative Procedure No. 5, "Surveillance Documentation Review," (not dated)
- WSU Nuclear Radiation Center SOP No. 13, "Standard Procedure for Performing Power Calibrations," dated May 3, 1994
- surveillance, calibration, and test data sheets and records
- reactor operations log for 2001 through the date of the inspection

b. Observations and Findings

Daily, weekly, monthly, semiannual, and other periodic checks, tests, and verifications for TS required Limiting Conditions for Operations (LCOs) were being completed as required. All surveillance and LCO verifications reviewed were completed on schedule as required by TS and in accordance with licensee procedures. Extensive checklists were used to track completion of the various required surveillances and LCO verifications. The checklists included the date the activity was completed and by whom. These checklists provided acceptable documentation of the results and proper control of reactor operational tests and surveillances. Some of the daily and periodic checks of equipment operability included recording system parameters such as temperature, pressure, and flow. All recorded results observed by the inspector were within prescribed TS and procedure parameters and in close agreement with the previous surveillance results.

The inspector reviewed a report sent to the NRC on August 7, 2000. The report detailed a licensee-identified monitoring failure that occurred during the month of June 2000. The radionuclide content of the reactor pool water is required to be

monitored monthly at an interval not to exceed six weeks in order to detect a significant leak in the sources stored in the reactor pool. Due to personnel error, this monitoring was not performed in June. The oversight was detected July 31, 2000, at which time a pool water sample was obtained and analyzed. The water sample showed no abnormal radionuclide levels. One of the corrective items was to add an item to the Reactor Startup Checkout to ensure that all operations, i.e., all required surveillances, are completed before reactor operation. During this inspection it was noted that an item had been added to the Checkout sheet but it was unclear as to what it directed the operators to do. The inspector informed the licensee that this would be noted by the NRC as an Inspector Follow-up Item (IFI) and the clarification of this step in the Reactor Startup Checkout would be reviewed during a subsequent inspection (IFI 50-027/2002-201-02).

c. Conclusions

The program for tracking and completing surveillance checks and LCO verifications satisfied TS requirements and licensee administrative controls.

8. Maintenance

a. Inspection Scope (IP 69001)

The inspector reviewed selected aspects of:

- WSU Nuclear Radiation Center SOP No. 5, "Standard Procedure for Performing Preventive Maintenance on the Reactor and Associated Equipment," dated April 24, 2001
- WSU Nuclear Radiation Center Administrative Procedure No. 6, "Performance of Maintenance Activities," (not dated)
- equipment maintenance as documented in the Maintenance Log and in the Monthly Console and Auxiliary Equipment Checklists
- reactor operations logs
- RSC meeting minutes

b. Observations and Findings

Routine and preventive maintenance was controlled and documented in the maintenance or reactor operations logs and in 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 facility tours the inspector noted that control and pool room equipment was operational. No missing or malfunctioning equipment was noted.

c. Conclusions

Maintenance logs, records, performance, and reviews satisfied TS and procedure requirements.

9. Design Control

a. Inspection Scope (IP 69001)

The inspector reviewed selected aspects of the following to verify compliance with 10 CFR 50.59 and TS Section 6.5.4:

- WSU Nuclear Radiation Center Administrative Procedure No. 3, "Approval and Review of Facility Modifications and Special Tests or Experiments," (not dated)
- the most recent facility design change concerning upgrade of reactor power monitoring channels
- facility configuration
- RSC meeting minutes and files

b. Observations and Findings

One design change had been completed since the last inspection. This change involved removing the "old" Linear Power channel and Safety Channel #2 and replacing them with new General Atomics Linear Power channel and Pulse Power channel respectively. Design change procedure was followed and Nuclear Radiation Center Form No. 7 was completed as required. The licensee considered the criteria included in the revised 10 CFR 50.59 and concluded that the change was an acceptable change under the regulations. Although not required by procedure, a review by the RSC was requested and conducted, and the RSC approved the change. The change, review, and approval appeared to be acceptable.

c. Conclusions

The latest change completed by the licensee was reviewed using the criteria specified in 10 CFR 50.59, determined to be acceptable, and approved as required.

10. Procedures

a. Inspection Scope (IP 69001)

The inspector reviewed selected aspects of the following to verify that the licensee was complying with the requirements of TS Sections 6.5.4 and 6.8:

- administrative controls as outlined in WSU Nuclear Radiation Center Administrative Procedure No. 2, "Approval, Revision, and Review of Standard Operating Procedures," (not dated)
- selected administrative and standard operating procedures
- records for procedure changes and temporary changes
- observation of procedure implementation
- related logs and records documenting procedure implementation

b. Observations and Findings

Operations procedures were available for those tasks and items required by the TS and facility directives. Written changes were reviewed and approved by the RSC as required. The SOPs were reviewed biennially as required by TS Section 6.5.4 with the last review being completed November 8, 2001.

Training of personnel on procedures and changes was acceptable. Through observation of reactor operations and experiment handling, the inspector verified that personnel conducted TS activities in accordance with applicable procedures. Records showed that procedures for potential malfunctions (e.g., radioactive releases, contaminations, and reactor equipment problems) had been developed and were implemented as required.

c. Conclusions

Procedural review, revision, control, and implementation satisfied TS requirements.

11. Radiation Protection Program

a. Inspection Scope (IP 69001)

The inspector reviewed the following to verify compliance with 10 CFR Parts 19 and 20, TS Sections 3.7 and 5.4, and procedural requirements:

- radiation and contamination survey records documented on the forms in accordance with the guidance contained in WSU Nuclear Radiation Center SOP No. 10, “Standard Procedure for Health Physics Surveys,” dated August 18, 1999
- Nuclear Radiation Center dosimetry records for 2000 through the first month of 2002
- calibration and periodic check records for radiation monitoring instruments documented on the applicable forms
- WSU Nuclear Radiation Center SOP No. 17, “Standard Procedure for Checkout and Calibration of the Area Radiation Monitors,” dated November 29, 1995
- WSU Nuclear Radiation Center SOP No. 23, “Standard Procedure for Portable Survey Instrumentation Check and Calibration,” dated March 1, 1992
- WSU Nuclear Radiation Center SOP No. 27, “Standard Procedure for RM-14 Check and Calibration,” dated February 20, 1995
- WSU Nuclear Radiation Center Administrative Procedure, “Radiation Protection Program” last reviewed August 2001
- ALARA Policy as outlined the “Radiation Protection Program”

The inspector also toured the facility to note any changes that may have been made and observed the use of dosimetry and radiation monitoring equipment. Licensee personnel were interviewed and radiological signs and postings were observed as well.

b. Observations and Findings

(1) Surveys

The inspector reviewed monthly radiation and contamination surveys of licensee controlled areas conducted by campus Radiation Safety Office personnel. The inspector also reviewed weekly general area radiation and contamination surveys and semiannual neutron surveys of the Pool Room and the Beam Room from 2000 to date. These latter surveys had been completed by the licensee personnel as required by WSU Nuclear Radiation Center SOP No. 10. The results were documented on the appropriate forms, were evaluated as required, and corrective actions taken when readings or results exceeded set action levels. During the inspection, the inspector conducted a radiation survey of the Pool Room and compared the readings detected with those found by the licensee. The results were comparable and no anomalies were noted.

(2) Postings and Notices

The inspector reviewed the postings at the entrances to various controlled areas including the Control Room, the Pool Room, the Beam Room, and various laboratories in the Nuclear Radiation Center. 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's radioactive material storage areas were noted to be properly posted. No unmarked radioactive material was detected in the facility. Copies of current notices to workers required by 10 CFR Part 19 were posted on various bulletin boards throughout the facility including one in the stairway leading to the Control Room and one in the Conference Room as well.

(3) Dosimetry

The licensee used a National Voluntary Laboratory Accreditation Program accredited vendor (Landauer) to process personnel dosimetry. Through direct observation, the inspector determined that dosimetry was acceptably used by facility personnel.

An examination of the records for the past two years through January of 2002, showed that all exposures were well within NRC limits and within licensee action levels. Extremity monitoring, accomplished through the use of finger rings, also showed relatively low doses to the hands of staff members. The highest annual whole body exposure received by a single individual for the past two years was less than 110 millirem. The highest annual extremity exposure for the past two years was less than 375 millirem.

(4) Radiation Monitoring Equipment

The calibration of portable survey meters, friskers, fixed radiation detectors, and air monitoring instruments were typically completed by licensee personnel.

The calibration records of selected portable survey meters, friskers, fixed radiation detectors, and air monitoring equipment in use at the facility were reviewed. Calibration frequency met the requirements established in the applicable Standard Operating Procedures (SOPs) and records were being maintained as required.

(5) Radiation Protection Program

The licensee's Radiation Protection Program was established in the WSU Nuclear Radiation Center Administrative Procedure of the same name dated August 2001. The program was further explained in the campus document entitled, "WSU Radiation Protection Program Manual," dated March 15, 1994. The program required that all personnel who had unescorted access to work in a radiation area or with radioactive material receive training in radiation protection, policies, procedures, requirements, and facilities prior to entry. The program was being reviewed annually as required.

(6) ALARA Policy

The ALARA Policy was also outlined and established in the WSU Nuclear Radiation Center Administrative Procedure, "Radiation Protection Program." The ALARA program provided guidance for keeping doses as low as reasonably achievable and was consistent with the guidance in 10 CFR Part 20.

(7) Facility Tours

The inspector toured the Control Room, Pool Room, Beam Room, and selected support laboratories and offices. Control of radioactive material and control of access to radiation and high radiation areas were acceptable. As noted earlier, the postings and signs for these areas were appropriate.

c. Conclusions

The inspector determined that, 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 well within the NRC's regulatory limits; and, 4) radiation monitoring equipment was being maintained and calibrated as required, the Radiation Protection Program being implemented by the licensee satisfied regulatory requirements.

12. Effluent and Environmental Monitoring

a. Inspection Scope (IP 69001)

The inspector reviewed the following to verify compliance with the requirements of 10 CFR Part 20 and TS Sections 3.7-3.9, 3.12, 5.6, and 6.10:

- WSU Nuclear Radiation Center SOP No. 11, "Standard Procedure for Analysis of Liquid Waste Samples," dated November 18, 1997
- WSU Nuclear Radiation Center SOP No. 18, "Standard Procedure for Ar-41 Monitor Checkout and Calibration," dated December 4, 1995
- WSU Nuclear Radiation Center SOP No. 21, "Standard Procedure for Environmental Monitoring," dated February 20, 1995
- WSU Nuclear Radiation Center SOP No. 22, "Standard Procedure for TLD Environmental Monitoring Program," dated December 28, 1982
- WSU Nuclear Radiation Center SOP No. 26, "Standard Procedure for Continuous Air Monitor Check and Calibration," dated October 15, 1997
- WSU Nuclear Radiation Center SOP No. 29, "Standard Procedure for Continuous Air Monitor Filter Analysis," dated November 30, 1995
- licensee Annual Reports for reporting periods: July 1998 - June 1999, July 1999 - June 2000, and July 2000 - June 2001

- airborne release records documented in the Average Monthly Concentration of Ar-41 Released section of the Reactor Operations Summary Log for the period from 2000 to date in 2002
- liquid release records also documented in the Average Monthly Concentration of Ar-41 Released and contained in the Reactor Operations Summary Log for the period from 2000 to date in 2002

b. Observation and Findings

The inspector reviewed the calibration records of the area and stack monitoring systems. These systems had been calibrated annually according to procedure. The weekly setpoint verification records for the monitoring equipment were also reviewed. Corrective actions, including recalibration, were required if the setpoint values were exceeded.

The inspector also reviewed the records documenting liquid and airborne releases to the environment for the past two years. The inspector determined that gaseous releases continued to be calculated as required by procedure and were adequately documented. The releases were determined to be within the annual dose constraints of 10 CFR 20.1101 (d), 10 CFR Part 20 Appendix B concentrations, and TS limits. Liquid releases were approved by the Reactor Supervisor after analyses indicated that the releases would meet regulatory requirements for discharge into the sanitary sewer.

c. Conclusions

Effluent monitoring satisfied license and regulatory requirements and releases were within the specified regulatory and TS limits.

13. Emergency Preparedness

a. Inspection Scope (IP 69001)

The inspector reviewed selected aspects of:

- Emergency Preparedness Plan and implementing procedures
- emergency response facilities, supplies, equipment and instrumentation
- training records for licensee staff and support personnel
- offsite support as documented in Letters of Agreement
- emergency drills and exercises for the past two years
- WSU Nuclear Radiation Center SOP No. 6, "Standard Procedure in the Event of an Emergency Situation," dated February 17, 1995
- WSU Nuclear Radiation Center SOP No. 6, "Standard Procedure for Security and Emergency Plan Training for Nuclear Radiation Center, Radiation Safety Office, and Campus Police Personnel," dated November 18, 1997

b. Observations and Findings

The Emergency Plan (E-Plan) in use at the Nuclear Radiation Center was the same as the version most recently approved by the NRC dated June 19, 1994. The E-Plan was audited and reviewed biennially as required. Implementing procedures were reviewed and revised as needed to effectively implement the E-Plan. Emergency facilities, instrumentation, and equipment were being maintained and controlled, and supplies were being inventoried quarterly as required in the E-Plan.

Through records review and through interviews with licensee personnel, emergency responders were determined to be knowledgeable of the proper actions to take in case of an emergency. Agreements with outside response organizations, i.e., the Pullman Memorial Hospital, had been updated and maintained as necessary. Communications capabilities were acceptable with these support groups and had been tested weekly and monthly as stipulated in the E-Plan. Off-site support for the facility was verified to be in accordance with the E-Plan.

Emergency drills had been conducted as required by the E-Plan. In one instance, credit was taken for an actual event which required the response of the emergency organization. Critiques were written following the drills and the event to document the strengths and weaknesses identified during the exercises and to develop possible solutions to any problems noted.

Emergency preparedness and response training for reactor staff was being completed and documented. However, the inspector noted that the training was not being conducted annually for all groups specified in the E-Plan. The licensee stated that the emergency response training had always been given to the Campus Police, WSU Fire Department and Ambulance Service personnel, and Memorial Hospital on a rotating basis so that all groups received training about every three years. Because the E-Plan seemed to indicate annual training was to be given to all groups, the licensee committed to change the E-Plan language to conform to the actual practice. The licensee was informed that this will be followed as an IFI and the issue of revising the E-Plan to reflect actual training practices will be reviewed during a subsequent inspection (IFI 50-027/2002-201-03).

c. Conclusions

The emergency response program was conducted in accordance with the requirements stipulated in the Emergency Preparedness Plan.

14. Transportation

a. Inspection Scope (IP 86740)

The inspector reviewed the following to verify compliance with procedural requirements for transferring licensed material:

- WSU Nuclear Radiation Center SOP No. 35, "Standard Procedure for Receiving and Opening Packages Containing Licensed Materials," dated October 6, 1993
- records of radioactive material shipments for 2002 and to date

The inspector also interviewed licensee personnel.

b. Observations and Findings

Through records review and discussions with licensee personnel, the inspector determined that the licensee had shipped various types of radioactive material since the previous inspection in this area. The records indicated that the radioisotope types and quantities were calculated and dose rates measured as required. All radioactive material shipment records reviewed by the inspector had been completed in accordance with Department of Transportation and NRC requirements.

c. Conclusions

Radioactive material was shipped in accordance with the applicable regulations.

15. Security

a. Scope (IPs 81402 and 81431)

To verify compliance with the licensee's NRC-approved Physical Security Plan (PSP) and to assure that changes, if any, to the plan had not reduced its overall effectiveness, the inspector reviewed:

- security systems, equipment and instruments
- logs, records, and reports concerning security
- audits of security
- access and key control
- WSU Nuclear Radiation Center SOP No. 30, "Standard Procedure for Security System Check," dated October 15, 1991

b. Observations and Findings

The PSP was the same as the latest revision approved by the NRC dated September 12, 1984, with the latest revision dated September 15, 1998. Campus police personnel provided security as required by the plan. Physical protection systems (barriers and alarms), equipment, and instrumentation were as required by the PSP. Security checks, tests, verifications, and periodic audits were performed and tracked as required. Corrective actions were taken when problems with security or the equipment were noted. Access control was implemented as required by the PSP and licensee procedures. Periodic training was provided to both the Nuclear Research Center staff and the university campus police. Response rosters were current and posted as required. Communication between the reactor staff and the university police was acceptable and checked periodically.

c. Conclusions

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

16. Material Control and Accounting

a. Inspection Scope (IP 85102)

To verify compliance with 10 CFR Part 70, the inspector reviewed:

- control of Special Nuclear Material (SNM) storage areas
- WSU Nuclear Radiation Center SOP No. 20, "Standard Procedure for Fuel Burn-up Calculations," dated December 5, 1995
- annual fuel inventory results
- Nuclear Material Transaction Reports for the time period from October 2000 through March 2002

b. Observations and Findings

The records reviewed by the inspector showed that the licensee was maintaining control of SNM storage areas as required. Records also showed that physical inventories were conducted at least annually as required by 10 CFR 70.51(d). Nuclear Material Transaction Reports (DOE/NRC Form 741) and Material Status Reports (DOE/NRC Form 742) had been completed semiannually and submitted by the licensee to the appropriate regulatory agencies in a timely manner and as required by 10 CFR 74.13(1).

c. Conclusions

The licensee was acceptably controlling and tracking SNM as required by 10 CFR Part 70.

17. Follow-up on Previously Identified Issues

a. Inspection Scope

The inspector reviewed the actions taken by the licensee following identification of an Unresolved Item during an inspection in May 2001, and documented in NRC Inspection Report No. 50-027/2001-201, dated August 10, 2001.

b. Observations and Findings

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

TS Section 4.3.4, Surveillance requirements, Ventilation System, requires 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 one inch of water or at least every two years.

During the inspection in May 2001, it could not be readily determined when the absolute filter was last changed. Since the ventilation is only used in the "isolation" mode during emergencies and for the above testing once a month, no measurable pressure drop had been seen over the last number of years and the filter had not been changed out for a number of years. Following the inspection, the licensee staff determined that the last time the filter had been changed was June 17, 1994.

As a result of this issue, the licensee contacted the filter manufacturer and obtained data on filter storage and usage life, and recommendations on change out or replacement intervals and indicators. The manufacturer stated that, unless incurring water, chemical, mechanical damage, etc., the useful life of a filter is normally limited only by particulate buildup, as indicated by an increase in differential pressure. In order to remedy the issue about filter change out interval, the licensee submitted a TS change to the RSC for review and approval. The TS change would remove the requirement to change out the absolute filter every two years and base the need to change the filter on an increase in the differential pressure. The RSC approved the TS change request and the licensee submitted the TS change request to the NRC for review and approval by letter dated April 26, 2002.

Although this was technically a violation for failure to comply with the requirements of the TS, the actual safety significance was low because the filter remained serviceable and the filtration of air was never compromised. This item will not be cited as a violation and is considered closed.

c. Conclusions

The licensee reviewed the issue concerning failure to change out an absolute filter at the required interval and proposed corrective actions following identification of the problem as an Unresolved Item during an inspection in May 2001.

18. Exit Interview

The inspection scope and results were summarized on May 2, 2002, with members of licensee management. The inspector described the areas inspected and discussed in detail the inspection findings. No dissenting comments were received from the licensee. The Physical Security Plan, and related subject matter, were identified as proprietary information.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

E. Corwin	Reactor Technician trainee
S. Sharp	Reactor Supervisor
G. Tripard	Director, Nuclear Radiation Center

Other Personnel

K. Fox	Project Associate
L. Porter	Director, WSU Radiation Safety Office

INSPECTION PROCEDURES USED

IP 69001	Class II Research and Test Reactors
IP 81402	Reports of Safeguards Events
IP 81431	Fixed Site Physical Protection of Special Nuclear Material of Low Strategic Significance
IP 85102	Material Control and Accounting - Reactors
IP 86740	Inspection of Transportation Activities

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-027/2002-201-01	NCV	Failure to completely document a fuel movement as required by TS Section 6.9
50-027/2002-201-02	IFI	Follow-up on the clarification of the last step in the Reactor Startup Checkout.
50-027/2002-201-03	IFI	Follow-up on the issue of revising the E-Plan to reflect actual training practices currently in use at the facility.

Closed

50-027/2001-201-01	URI	Replacement interval for absolute filter to be verified.
50-027/2002-201-01	NCV	Failure to completely document a fuel movement as required by TS Section 6.9

PARTIAL LIST OF ACRONYMS USED

ALARA	As Low As Reasonably Achievable
BNCT	Boron Neutron Capture Therapy
CFR	Code of Federal Regulations
IFI	Inspector Follow-up Item
IP	Inspection Procedure
LCO	Limiting Conditions for Operation
NRC	Nuclear Regulatory Commission
PSP	Physical Security Plan
RSC	Reactor Safeguards Committee
SNM	Special Nuclear Material
SOP	Standard Operating Procedure
SRO	Senior Reactor Operator
RO	Reactor Operator
TLD	Thermoluminescent dosimeter
TS	Technical Specifications
URI	Unresolved Item
WSU	Washington State University