

U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report No. 50-243/85-01
Docket No. 50-243 License No. R-106
Licensee: Oregon State University
Corvallis, Oregon 97331
Facility Name: TRIGA Mark II
Inspection at: Corvallis, Oregon
Inspection conducted: March 25-26, 1985

Inspectors:

M. Cillis

M. Cillis, Radiation Specialist

5/2/85

Date Signed

Approved By:

GP Yunas

G. P. Yunas, Chief
Facilities Radiological Protection Section

5/3/85

Date Signed

Summary:

Inspection on March 25-26, 1985 (Report No. 50-243/85-01)

Areas Inspected: Routine unannounced inspection by a regionally based inspector of the reactor operations program, radiation protection program, environmental monitoring program, emergency preparedness program, transportation activities; including personnel monitoring, surveys, instrument calibrations, reactor operator requalification program, standard operating procedures, surveillances, ALARA, reactor maintenance activities, experiments, organization, licensee evaluations of Information Notices, and a tour of the facility. The inspection involved 18 hours of onsite time by one inspector.

Results: Of the seventeen areas inspected, no violations or deviations were identified.

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DETAILS

1. Persons Contacted

*A. G. Johnson, Assistant Director, Radiation Protection and Regulatory Affairs

*Dr. B. Dodds, Assistant Reactor Administrator

*T. V. Anderson, Reactor Supervisor

Dr. S. E. Binney, Chairman, Reactor Operations Committee

H. Busby, Electronics Technician

*Denotes those individuals attending the exit interview on March 26, 1985.

2. Reactor Operations

a. General

The inspection disclosed that the facility continues to provide support for reactor related research and teaching programs.

A review of reactor operating records disclosed that a total of 198.7 kilowatt hours were generated from January 1 through March 26, 1985. The inspector witnessed one reactor operation involving reactor startup. The startup was performed consistent with the licensee's standard operating procedures and the Technical Specifications.

No violations or deviations were identified.

b. Organization, Logs, Records

The organizational structure for the operation and administration of the TRIGA reactor facility remains unchanged from that previously reported.

Through discussions with licensee representatives and an examination of selected facility records, the inspector found the staffing and qualification of personnel, including members of the Reactor Operations Committee, to be consistent with the Technical Specification, Section 6.1 "Organization."

Representative samples of facility records and maintenance logs for the period of June 1983 through January 1985 were examined to verify the performance of reactor operation activities.

Specific records examined were as follows:

- Control Room Log Sheets
- Startup and Shutdown Checklists
- Maintenance Log
- Rod Calibration
- Instrument Calibration Records
- Power Calibration

Operational Procedures
 Console Logs
 Daily Power Logs
 Reactor Supervisors Log
 Scram Log
 Survey (radiation, contamination, and air) records
 Emergency Procedures
 Training Records
 Environmental Monitoring Records
 10 CFR 50.59 Evaluations

No violations or deviations were identified.

c. Review and Audit

The licensee's review and audit program prescribed in Technical Specification, Section 6.2, "Review and Audit" was examined. The examination included a review of the Reactor Operation Committee (ROC) written charter, ROC committee meeting minutes, ROC surveillance and audit reports for the period of 1983 through March 1985, and a discussion with the ROC Chairman.

The inspector concluded that the Review and Audit program implemented by the ROC met or exceeded the requirements specified in the Technical Specification, Section 6.2.

No violations or deviations were identified.

d. Reactor Operational Procedures

The inspection included an examination of the licensee's operating procedures prescribed in Technical Specification, Section 6.5, "Operating Procedures." Procedures examined were those associated with reactor startup, shutdown, steady state operations, and conduct of experiments.

The inspector noted that the procedures are periodically reviewed for technical adequacy by the licensee's staff.

A walk through of a selected procedure checklist (e.g., OST Rep 2.0, "Reactor Startup Checklist Procedure") was made for the purpose of verifying the procedure was technically adequate for accomplishing its intended purpose.

No violations or deviations were identified.

e. Changes to the Facility, to Facility Procedures and Reactor Experiments

Changes made to the facility, facility procedures, and experiments since the previous inspection were examined for compliance with 10 CFR Part 50.59, "Changes, Tests and Experiments."

The examination disclosed that there were five changes which were reviewed pursuant to 10 CFR 50.59. A summary of each change is as follows:

- ° Addition of a "Ventilation Dampers Closed" annunciator to the reactor console day/night switch.
- ° Installation of new flow rate regulating valves in three argon vent lines entering the argon ventilation system manifold.
- ° Installation of a reactor control room smoke detector.
- ° Installation of amphenol plugs into the control rod electrical cables.
- ° Minor changes to the Oregon State Triga Reactor and Radiation Center emergency response plan.

The licensee's evaluation of the above items is described in the licensee's annual report dated September 15, 1984. The inspector verified, through the review of reactor operation maintenance records and discussions, that no recent changes were made which may be considered as an unreviewed safety question pursuant to 10 CFR 50.59.

No violations or deviations were identified.

f. Experiments

A review of the experiments that were accomplished since the last inspection was conducted. The review disclosed that no new experiments have been conducted. Those performed were consistent with the Technical Specification, Sections 6.2.d, "Review and Audit," and 6.5, "Operating Procedures."

No violations or deviations were identified.

g. Surveillances

Records of surveillance checks conducted daily, monthly, quarterly, semi-annually and annually were selectively examined and found to be consistent with the appropriate requirements prescribed in the Technical Specifications, standard operating procedures, and licensee's commitments.

No violations or deviations were identified.

3. Training

The licensee's general employee training (GET), emergency preparedness training, reactor operator, and senior reactor operators training and requalification programs were examined.

Training lesson plans, study guides, attendance records, and examinations were reviewed.

The inspector concluded all of that the licensee's training programs met or exceeded their commitments described in their emergency plan, in 10 CFR Part 19.12, "Instructions to Workers," and in their NRC approved reactor and senior reactor operators requalification program.

No violations or deviations were identified.

4. Emergency Preparedness

The licensee's capabilities for responding to emergencies as described in their Emergency Plan of July 24, 1984, and for demonstrating compliance with 10 CFR Part 50.54(q) and 10 CFR 50, Appendix E were examined.

The inspector verified through discussions, review of emergency procedures, training records, memorandums of understanding with offsite organizations, and an inspection of emergency equipment, that the licensee has fully implemented their commitments described in their emergency plan.

The examination revealed that a full scale drill involving offsite agencies was conducted on July 20, 1984. Additionally, the examination disclosed that an evacuation drill, involving the reactor staff, was held on November 6, 1984.

The inspector also verified that emergency equipment located at various locations on campus, were routinely inventoried. The inspector noted that radiation detection instruments and pocket ionization chambers stored in emergency cabinets were routinely calibrated.

The inspector concluded that the licensee's emergency response capabilities had been maintained at a level that met or exceeded 10 CFR Part 50, Appendix E requirements.

No violations or deviations were identified.

5. IE Information Notices (INs)

The inspector verified that the licensee was receiving and evaluating INs for applicability to the Oregon State Triga Reactor facility. Discussions with the Assistant Director of Radiation Protection and Regulatory Affairs revealed that records of the receipt and review are maintained.

The inspector confirmed that licensee evaluations of all applicable INs issued since 1982 were accomplished.

No violations or deviations were identified.

6. Environmental Monitoring Program

Records associated with the licensee's environmental monitoring program which is described in Part 5, Section F of the licensee's annual report of September 15, 1984 were examined.

The environmental program consist of the following:

- ° Onsite environmental sampling
- ° Offsite environmental sampling

The onsite environmental monitoring program includes:

- ° Direct area monitoring with thermoluminescent dosimeters (TLDs).
- ° Routine (daily, weekly, and monthly) radiation and contamination surveys.
- ° Monitoring of airborne particulates and gaseous activity being discharged from the stack.
- ° Routine sampling of the liquid effluent release pathways.

The offsite environmental monitoring program includes:

- ° Routine sampling of soil, water, vegetation and for airborne activity.
- ° Direct area monitoring with TLDs.

Environmental sample analytical results for 1983 and 1984 were reviewed and were found to be consistent with the values reported in the licensee's annual report of September 15, 1984.

The radioactivity levels observed from the offsite environmental monitoring program gave no evidence of change in the environs due to reactor operations.

The inspector noted that the licensee's environmental monitoring program exceeded the program specified in the Technical Specifications.

No violations or deviations were identified.

7. Radiation Protection Program

a. Surveys and Effluent Releases

The inspector verified that direct radiation surveys, contamination surveys, and surveys of airborne particulates, liquids and gaseous effluents are performed on a routine schedule by the licensee's radiation protection staff.

The monitoring program appears to be consistent with 10 CFR Part 20.201, "Surveys". The examination also revealed that records of surveys are recorded and maintained in accordance with 10 CFR Part 20.401, "Records of surveys, radiation monitoring, and disposal." The reactor pool water is routinely checked for conductivity, pH, and radioactive levels as prescribed in the Technical Specifications.

Survey records for the period of July 1983 through March 1985 were reviewed during the inspection.

Argon-41 releases for 1983 and 1984 ranged from 12.66 to 14.65 curies. The diluted concentration of Argon-41 at the point of release averaged between 7.6×10^{-8} uCi/cc to 9.5×10^{-8} uCi/cc. These values are less than three percent of the Maximum Permissible Concentrations (MPC) provided in Section 3.6.2 of the Technical Specifications.

The annual average concentration for liquids, excluding tritium, associated with reactor operations for 1984 was 1.96×10^{-8} uCi/cc. This value is much less than one percent of the MPC allowed by 10 CFR 20, Appendix B.

The licensee's survey program includes daily (work days) radiation and contamination surveys, and special surveys for non-routine work. The inspector noted that survey results are reviewed by the reactor staff for abnormal trends and for ALARA considerations.

No violations or deviations were identified.

b. Personnel Radiation Dosimetry

The licensee utilizes a film badge/TLD program that is contracted from Radiation Detection Company for assuring compliance with 10 CFR Parts 20.101, "Radiation Dose Standards for Individuals in Restricted Areas, 20.102, "Determination of Prior Dose," 20.104, "Exposure of Minors," and 20.202, "Personnel Monitoring." The licensee's personnel monitoring program has not changed from what is described in Region V Inspection Reports 50-243/82-02 and 50-243/83-01.

The inspector reviewed personnel dosimetry records for the period of January 1983 through March 1985. The exposures recorded for the whole body, extremities, and skin of the whole body were well below the regulatory limits as specified in 10 CFR 20.101(a). The exposure records for visitors were also examined and found to be consistent with the values reported in the licensee's annual report (Table 5-4) of September 15, 1984.

No violations or deviations were identified.

c. Posting and Labeling

The inspector verified that the licensee's posting and labeling practices were consistent with 10 CFR Part 19.11, "Posting of

Notices to Workers" and 10 CFR Part 20.203, "Caution signs, labels, signals, and controls.

No violations or deviations were identified.

d. Instrument Calibration

The licensee's program related to the calibration of portable radiation detection monitoring equipment was examined.

A review of calibration records confirmed that the licensee's calibration program is consistent with ANSI N-323-1978, "Radiation Protection Instrumentation Test and Calibration".

Technical Specification, Section 4.3.3 requires that area, continuous air, exhaust gas, and exhaust particulate monitors be calibrated at intervals not to exceed 14 months, a review of records disclosed that the calibrations were performed at the required intervals.

No violations or deviations were identified.

e. As Low As Is Reasonably Achievable (ALARA)

The inspector noted from direct observations that the ALARA principals prescribed in 10 CFR 20.1 were constantly practiced by the staff during the inspection. The Oregon State Test Reactor staff continuously evaluate methods for maintaining personnel exposures and reactor operations consistent with the ALARA concept.

No violations or deviations were identified.

8. Radioactive Waste

The inspector examined the licensee's records and procedures associated with the handling and disposal of solid radioactive wastes that are generated from reactor operations.

The examination disclosed that the licensee has established procedures for the handling and shipment of radioactive waste that appear to be consistent with the appropriate regulatory requirements prescribed in:

- ° 10 CFR Part 20.311, "Transfer for Disposal and Manifests."
- ° 10 CFR Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste".
- ° 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."
- ° Department of Transportation 49 CFR Parts 0-199.

The waste generated by the reactor is routinely shipped to an approved burial (e.g., U. S. Ecology) site under the University's State of Oregon radioactive materials license.

The inspector noted that reactor operations normally generates approximately 7 to 9 cubic feet of waste on an annual bases.

No violations or deviations were identified.

9. Facility Tour

The inspector toured the licensee's facility to check the general state of housekeeping and to verify that radiation monitoring instrumentation were in current calibration and operating properly.

Independent surveys were performed using an Eberline Model RO-2 ion chamber radiation detection instrument, NRC No. 008985, S/N 837, calibrated on February 25, 1985.

The inspector noted the facility cleanliness was excellent. No fluid leaks or piping vibrations were observed. All fixed and portable instrumentation observed were in current calibration.

The independent radiation measurements confirmed that the licensee's posting and labeling practices were consistent with 10 CFR 20.203 requirements.

No violations or deviations were identified.

10. Special Licensee Report

A licensee notification made on January 23, 1985, informed the Region V staff that low level air concentrations of radioactive noble gas above background was detected at the TRIGA facility. The licensee suspected a leaking fuel element. A special report, pursuant to Technical Specification, Section 6.7.b.2, was submitted to Region V on February 5, 1985.

The report explained that gamma spectroscopy analysis of the Constant Air Monitor (CAM) particulate channel filter gave an indication of what was suspected to be short-lived fission products (e.g., ⁸⁹Rb, ⁹⁰Rb, ¹³⁸Cs, and ¹³⁹Ba).

The report further explains the corrective actions that were taken to ascertain the cause for the airborne concentrations that were observed. The tests failed to provide any positive indication of a fuel cladding defect and therefore the licensee concluded they could return to normal reactor operations. The licensee implemented the following surveillance program prior to resuming normal reactor operations:

- ° Increased surveillance of the CAM during and after operations.

- ° For a period of one month after returning the reactor to normal operation, the reactor top CAM's particulate filter paper will be analyzed by gamma spectroscopy.
- ° At the conclusion of the one month period, the licensee's routine air surveillance program will be changed to include a weekly gamma spectroscopy analysis of a daily CAM filter paper.

Through discussions held with licensee representatives and a review of the analysis records between the period of February 5, 1985, and March 25, 1985, the inspector concluded that the additional corrective actions have failed to provide a positive indication of a possible fuel defect.

The licensee informed the inspector that they plan to continue with the corrective actions described in their February 5, 1985 letter.

No violations or deviations were identified.

11. Exit Interview

The inspector met with the individuals (denoted in paragraph 1) at the conclusion of the inspection on March 26, 1985. The scope and findings of the inspection were summarized. The inspector commented that the licensee's performance in the areas inspected were exemplary. The licensee was informed that no violations or deviations were identified.