

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No: 50-264
License No: R-108
Report No: 50-264/97001(DNMS)
Licensee: DOW Chemical Company
Facility Name: DOW Nuclear Research Reactor
Location: Midland, Michigan
Dates: April 7-11, 1997
Inspector: T. M. Burdick
Approved by: T. D. Reidinger, Acting Chief
Fuel Cycle Branch

Executive Summary

DOW TRIGA Research Reactor Report No. 50-264/97001(DNMS)

This routine, announced inspection included aspects of organization, periodic and special reports, and operations and maintenance; operations and maintenance procedures; requalification training; surveillance; experiments; radiation controls; environmental protection; design change, audit, and review; emergency preparedness; fuel handling activities (40750); transportation activities (86740); and review of licensee reports (90713).

Organization (40750)

- The DOW TRIGA Research Reactor organization has been relatively stable over the past two years. A new RSO was appointed around the time of the last inspection. The licensee submitted revision 7 to their technical specifications in 1995 and has been clarifying the organization and reporting structure in response to NRC questions in that regard. (Section 1.0)

Operations and Maintenance (40750)

- Reactor operation and maintenance were good and in accordance with the reactor's license conditions and Technical Specifications (T.S.) requirements. Logs and records were adequate. (Section 2.0)

Procedures

- The licensee committed to review their procedures to ensure consistency with current practices and expectations. (Section 3.0)

Requalification Program, Surveillance, Experiments, Fuel Handling (40750), Periodic and Special Reports (90713), and Transportation (86740)

- No concerns were identified. (Sections 4.0, 5.0, 6.0, 11.0, 12.0, and 13.0)

Radiation Control (40750)

- The radiation protection program was effective in protecting the staff and public. Exposures were reviewed for As Low As Reasonably Achievable (ALARA) at extremely low thresholds. The licensee's routine surveillance did not detect activated material in one of the laboratory sink drains which were not used for disposal of radioactive waste. (Section 7.0)

Environmental Protection (40750)

- Airborne releases were within the regulatory limits. Radioactive waste accumulations were adequately stored. (Section 8.0)

Audits and Reviews (40750)

- Reactor Operations Committee (ROC) meetings were conducted within the specified time period.
- Radiation safety audits were particularly thorough as they addressed a variety of areas and processes and identified good issues. (Section 9.0)

Emergency Preparedness (40750)

- Emergency Plan exercises and training were conducted satisfactorily. (Section 10.0)

DETAILS

1.0 Organization

a. Inspection Scope (40750)

The inspector reviewed T.S. and the Safety Analysis Report (SAR) related to organization and staffing and compared the requirements with current conditions.

b. Observations and Findings

The inspector determined that the organizational structure and assignment of responsibilities were as specified in T.S. 6.0. A proposed revision 7 to the T.S. is currently under going regulatory review.

The membership of the Reactor Operations Committee (ROC) was in accordance with T.S. and the SAR.

The inspector verified minimum staffing requirements were met during reactor operations.

c. Facility Walk Down

The control room, labs, and pool floor areas were well illuminated and unusually clean. Potentially contaminated tools and equipment were neatly stored. Roof top access controls and postings were established.

d. Conclusions

Compliance with T.S. requirements and observed reactor facility material conditions were good.

2.0 Operations and Maintenance Activities

a. Inspection Scope (40750)

The inspector reviewed the reactor operations and maintenance logs and observed ongoing reactor operations to determine compliance with Operating License Condition 2.C.(1) and the requirements in T.S. 2.0 and T.S. 3.0.

b. Observations and Findings

The licensee had operated the reactor intermittently at various thermal power levels in accordance with Operating License Condition 2.C.(1). The inspector verified that they were in compliance with T.S. 2.2.

Selected reactor operator logs from March 1995 through March 1997 were reviewed. The operator logs were adequate.

The operators appeared proficient, demonstrated good procedural compliance, and made appropriate log entries for the observed period.

The inspector accompanied operators conducting sample insertion and removal from the reactor and observed a safety conscious and professional attitude.

c. Conclusions

The reactor was operated and maintained in accordance with the reactor's license conditions, safety limits and limiting conditions for operation. The licensee's logs and records adequately documented reactor operations and maintenance activities. Operators were observant and systematic in both operations and experiment activities.

3.0 **Procedures**

a. Inspection Scope (40750)

The inspector reviewed the licensee's written procedures for operating and maintaining the reactor, performing surveillance activities, conducting experiments, and shipping radioactive materials to determine compliance with the requirements in T.S. 6.3. requirements.

b. Observations and Findings

The inspector noted that the procedure guidance for maintaining the operating log book included detailed entries for both malfunctions and maintenance whereas the licensee limited these entries to the maintenance log book. The licensee committed to modify the procedure to reflect the actual practice.

c. Conclusions

The licensee had approved procedures to sufficiently conduct reactor operations, maintenance, experiments, surveillance testing, instrument calibrations, and shipping in compliance with T.S. requirements.

4.0 **Requalification Training**

a. Inspection Scope (40750)

The inspector reviewed the reactor operators' requalification training program to determine compliance with the requirements in 10 CFR 19.12 and 10 CFR 55.59.

b. Observations and Findings

The licensee's biennial written exam was comprehensive. Each licensed operator had a current license and physical examination.

c. Conclusions

An adequate training program was being conducted. Adequate training records were being maintained.

5.0. **Surveillance**

a. Inspection Scope (40750)

The inspector reviewed selected surveillance test documentation and observed activities to determine compliance with the requirements in T.S. 4.0.

b. Observations and Findings

Surveys and prestartup surveillances observed were routine.

The licensee had identified what they initially thought to be a missed reactor coolant activity surveillance and contacted NRR immediately upon the discovery. They then determined that the requirement had been met through continuous monitoring. The inspector found the licensee's conclusion acceptable.

c. Conclusions

All reactor surveillance tests had been completed and documented at the required frequencies, and the surveillance test results met T.S. requirements.

6.0 **Experiments**

a. Inspection Scope (40750)

The inspector reviewed the licensee's program to control and conduct experiments performed in the reactor to determine compliance with the requirements in T.S. 3.6. and 6.2.

b. Observations and Findings

No new types of experiments were conducted since the last inspection.

c. Conclusions

All reactor experiments were conducted in accordance with properly reviewed and approved procedures and satisfactorily documented in the reactor operations log.

7.0 **Radiation Control**

a. Inspection Scope (40750)

The inspector reviewed the radiation protection program to determine compliance with the requirements in 10 CFR Part 20 and T.S. 3.4, 3.5, 3.6, 4.4, and 4.6.

b. Observations and Findings

The inspector reviewed the licensee's ALARA evaluation in response to an operator's reported finger ring dose which was very low but would normally indicate less than detectable. The results of their review identified that the operator's finger ring was receiving the dose from an illuminated wrist watch sweep hand in his desk drawer where he stored the ring. The operator had been assigned the desk without knowledge of the watch hand left by a predecessor.

The inspector, accompanied by the Radiation Safety Officer (RSO), identified radioactivity in one reactor lab sink drain trap. The licensee identified the six microcurie source as a very small stainless steel washer they believed was part of the sample handling tool. Negative survey results of other lab drain traps and the basement drain piping led the inspector to conclude this was an isolated case.

All of the sample materials activated in the reactor were encapsulated and eventually disposed of as dry solid waste.

The drains for all the facility's sewers are collected and treated in an onsite facility but are not monitored for radioactivity. The licensee is considering conducting routine surveillance on sink drains as a precaution to preclude recurrence of a similar incident.

c. Conclusions

All badged reactor personnel exposures were significantly below 10 CFR 20.1201 limits.

The licensee was very sensitive to dose even in low exposures that assured a careful review.

The presence of the activated washer in the lab sink drain was an isolated case which did not reflect potential unmonitored release of insoluble activity.

8.0. Environmental Protection

a. Inspection Scope (47050)

The inspector reviewed the licensee's program for the discharge or removal of radioactive liquid, gases, and solids from the reactor laboratory.

b. Observations and Findings

The licensee does not discharge liquid.

Airborne effluent monitoring records for 1995-1996 showed that the releases were within the regulatory limits.

The inspector determined that they properly stored and posted the solid radioactive waste as required for decay in storage or prior to shipment to Barnwell.

c. Conclusions

Airborne releases and solid waste disposal were within the regulatory limits.

9.0 Audit and Reviews

a. Inspection Scope (40750)

The inspector reviewed the meetings, audits and reviews conducted by the Reactor Operations Committee (ROC) to determine compliance with the requirements in T.S. 6.2.

b. Observations and Findings

The inspector found the last two radiation protection audits by the RSO to be particularly thorough. The reactor supervisor and the RSO appeared to work cooperatively to ensure an effective program was implemented.

The required T.S. operations safety audits were conducted by an outside evaluator with applicable experience which was beyond the requirements of the license.

c. Conclusions

ROC meetings were conducted as required by T.S. Internal radiation protection audits were very good. Annual operations audits exceeded requirements.

10.0 Emergency Preparedness

a. Inspection Scope (82745)

The inspector reviewed the emergency plan and the last two annual drills for the reactor laboratory, interviewed licensee employees, and inventoried storage lockers to determine compliance with the requirements in 10 CFR 50.54(q) and (r).

b. Observations and Findings

The inspector found that the emergency plan referred to respiratory equipment usage and that the licensee certified most of the staff as users of the equipment which was adequately maintained. The licensee was contemplating a standardized apparatus for respiratory use.

c. Conclusions

The licensee maintained the licensee's emergency program in a state of operational readiness.

11.0 Fuel Handling

a. Inspection Scope (60745)

The inspector reviewed the fuel handling procedures and records at the reactor laboratory, and interviewed employees to determine compliance with T.S. 4.5.

b. Observations and Findings

The licensee only handled fuel for annual inspection purposes. The last inspection was routine with no problems noted by the licensee.

c. Conclusions

The licensee's procedure and documentation for annual fuel inspections were adequate.

12.0 Review of Periodic and Special Reports

a. Inspection Scope (90713)

The inspector reviewed the licensee's submittal of reports and notifications to the NRC to determine compliance with the requirements in T.S. 6.6.

b. Observations and Findings

The inspector found the last two annual reports routine.

C. Conclusions

The licensee had submitted required reports to the NRC in accordance with T.S. requirements.

13.0 Transportation of Radioactive Materials

a. Inspection Scope (86740)

The inspector reviewed the licensee's radioactive materials shipping program, reviewed logs, and interviewed employees to determine compliance with the requirements in Department of Transportation (DOT) and NRC regulations, 49 CFR Parts 172 & 173 and 10 CFR Part 71, respectively.

b. Observations and Findings

The licensee had not transferred any materials out of the lab in the last two years.

c. Conclusions

Radioactive materials were retained in the lab for decay in storage or while awaiting shipment to an approved burial site.

14.0 Persons Contacted

DOW Chemical Company

*Susan Butts	Facility Director
*Ward Rigot	Reactor Supervisor
*Stan Dombrowski	Radiation Safety Committee Chair
*Janet Grappin	Radiation Safety Officer
*Mike Buckmann	Senior Reactor Operator

The inspector also contacted other supervisory, technical and administrative staff personnel as well.

* Denotes those attending the exit meeting on April 11, 1997.

15.0 Exit Interview (30703)

The inspector presented the inspection results to members of the licensee management at an exit meeting on April 11, 1997. The licensee acknowledged the findings presented. The inspector asked the licensee whether any material examined during the inspection should be considered proprietary. They identified no proprietary information.

Inspection Procedures Used

IP 40750	Class II Nonpower Reactors
IP 86740	Inspection of Transportation Activities
IP 90713	Review of Periodic and Special Reports

Items Opened and Closed

None

List of Documents Reviewed

Safety Analysis Report
Safety Evaluation Report
Reactor Operating License
Technical Specifications
Administrative Procedures
Operating Procedures
Maintenance Procedures
Surveillance Procedures
Shipping records and procedures
Maintenance and Surveillance Records
Emergency procedures
Training Program
Emergency Plan
Dosimetry Records
Training Records
Various Reports

List of Acronyms Used

ALARA	As Low as Reasonably Achievable
CFR	Code of Federal Regulations
DNMS	Division of Nuclear Materials and Safeguards
DOT	Department of Transportation
HP	Health Physics
NRC	Nuclear Regulatory Commission
PDR	Public Document Room
RSO	Radiation Safety Officer
ROC	Reactor Operations Committee
SAR	Safety Analysis Report
T.S.	Technical Specifications