

October 29, 2001

Mr. Ward L. Rigot  
Reactor Supervisor  
DOW Chemical Company  
1602 Building  
Midland, MI 48667

SUBJECT: NRC INSPECTION REPORT NO. 50-264/2001-201

Dear Mr. Rigot:

This letter refers to the inspection conducted on June 17 through 20, 2001, at the DOW Nuclear Research Reactor. 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/**

Patrick M. Madden, Section Chief  
Non-Power Reactors and Financial Section  
Operational Experience and  
Non-Power Reactors Branch  
Division of Regulatory Improvement Programs  
Office of Nuclear Reactor Regulation

Docket No. 50-264  
License No. R-108

Enclosure: NRC Inspection Report No. 50-264/2001-201

cc w/enclosure: Please see next page

Dow Chemical Company

Docket No. 50-264

cc:

Office of the Mayor  
333 West Ellsworth  
Midland, MI 48640

Office of the Governor  
Room 1 - Capitol Building  
Lansing, MI 48913

Stan Dombrowski  
Chair, Radiation Safety Committee  
Dow North America  
1803 Building  
Midland, MI 48667

Mr. Richard A. Wagner,  
Level 1 Manager  
The Dow Chemical Company  
TRIGA Nuclear Reactor  
1602 Building  
Midland, MI 48674

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ACCESSION NO.: ML012830431

TEMPLATE #: NRR-056

\*Please see previous concurrence

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

Docket No: 50-264

License No: R-108

Report No: 50-264/2001-201

Licensee: DOW Chemical Company

Facility: DOW Nuclear Research Reactor

Location: 1602 Building  
Midland, Michigan

Dates: June 17 to 20, 2001

Inspector: Stephen W. Holmes, Reactor Inspector

Approved by: Patrick M. Madden, Section Chief  
Non-Power Reactors and Financial Section  
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 was being acceptably implemented. TS and NRC-approved Requalification Plan 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 (IP) 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 Facility Director/Supervisor (DIR), an Assistant Reactor Supervisor (ARS), and two or three other Senior Reactor Operators (SRO). 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 (IP 69001)**

The inspector reviewed selected aspects of:

- experimental program requirements
- logs and records
- approved reactor experiments
- Reactor Operations Committee (ROC) minutes
- irradiation request forms
- annual reviews
- interviewed staff



b. Observations and Findings

The DOW reactor is primarily used to irradiate materials for activation analysis of their components. No new experiments or changes to experiments that required ROC review had been instituted in the past few years. The inspector verified that previous experiments 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.

ROC 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 (IP 69001)

The inspector reviewed selected aspects of:

- ROC minutes
- safety review records
- 1999 and 2000 audit records
- responses to safety reviews and audits
- experiment and change reviews

b. Observations and Findings

The ROC membership satisfied TS requirements and the Committee's procedural rules. The ROC had quarterly meetings as required. 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.

Follow up on audit findings were timely, documented, and reviewed in the following audit.

c. Conclusions

The review and audit program satisfied TS requirements.

4. **OPERATIONS PROGRAM**

a. Inspection Scope (IP 69001)

The inspector reviewed selected aspects of:

- operational logs and records
- staffing for operations
- selected operational, startup, power, and 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 (IP 69001)

The inspector reviewed selected aspects of:

- fuel handling procedures
- fuel handling equipment and instrumentation
- fuel handling and examination records



b. Observations and Findings

Fuel handling is infrequent at this facility as burn-up is low and only 20 percent of the fuel is inspected each year. Procedures for refueling, fuel shuffling, and TS required inspections/surveillances were on hand ensuring 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.

c. Conclusions

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

6. **OPERATOR REQUALIFICATION**

a. Inspection Scope (IP 69001)

The inspector reviewed selected aspects of:

- the Requalification Program (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 competed 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, as SROs, were being tracked. Biennial medical exams had been performed as required.

c. Conclusions

The Requalification Program was being acceptably implemented. TS and NRC-approved Requalification Plan requirements were met.

7. **SURVEILLANCE**

a. Inspection Scope (IP 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. 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.

Checklists were used to track daily, monthly, and annual surveillances, checks, audits, drills, training, and inspections. 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 checked by the inspector satisfied the limits/parameters listed in the procedure or checklist.

NUREG-1537, "Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors," Section 4, "Surveillance Requirements," states that if a surveillance is not required for safety while the reactor was shut down, it may be deferred, but must be performed before the next reactor startup/operation. Section 4, "SURVEILLANCE REQUIREMENTS" of the DOW reactor TS infers that "any surveillance task" may be so deferred. The DIR stated that they would not defer surveillances that could be performed while the reactor was shut down such as pool water and radiation monitoring system checks and that he would contact the facility project manager to determine if a TS change request would be necessary. This will be reviewed during a future inspection as an Inspection Follow-up Item (IFI 50-264/2001-201-01).

c. Conclusions

The licensee's program for surveillance and LCO confirmations satisfied TS and licensee administrative controls.

8. **MAINTENANCE**

a. Inspection Scope (IP 69001)

The inspector reviewed selected aspects of:

- maintenance procedures
- equipment maintenance records
- reactor logs

- ROC minutes

b. Observations and Findings

Routine/preventive maintenance was controlled and documented in the maintenance or reactor log and 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 (IP 69001)

The inspector reviewed selected aspects of:

- facility design changes and records
- facility configuration
- ROC minutes and files

b. Observations and Findings

Since the last inspection a number of 50.59 modifications and an upgrade to the console computers were performed. The facility design change procedures were followed and TS, ROC, and licensee requirements were met. The design changes were reviewed, approved, implemented, tested, and controlled as required by TS, and licensee procedures.

Post change test verified that the systems were operational.

c. Conclusions

The licensee's design change procedures were in place and were implemented as required.

10. **PROCEDURES**

a. Inspection Scope (IP 69001)

The inspector reviewed selected aspects of:

- administrative controls
- procedures

- 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 ROC or RS as required. Oversight and review were provided by the reactor staff 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.

The inspector noted however, a number of mismatches between some written procedures and the present manner and frequencies in which some operations /surveillance activities were performed. It appears that some older licensee procedures had not been formally updated when newer practices were implemented. The DIR stated that the written procedures would be reviewed and updated to match present practices or the activities would be performed as outline in the written procedures. This will be reviewed during a future inspection as an Inspection Follow-up Item (IFI 50-264/2001-201-02).

c. Conclusions

Procedural control and implementation programs satisfied TS requirements.

11. **SECURITY**

a. Scope (IPs 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. DOW Chemical Plant security 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 PPP training was provided to both the 1602 Building staff and the Dow Chemical Plant security. Acceptable security response and training, in accordance with procedures,



were demonstrated through alarm and drill responses. Security dispatch response information and staff rosters were current.

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 June 20, 2001. The licensee acknowledged the findings presented.

## PARTIAL LIST OF PERSONS CONTACTED

### Licensee

*W. Rigot	Facility Director & Reactor Supervisor
*T. Quinn	Assistant Reactor Supervisor for Training & Operations
*M. Buckmann	Assistant Reactor Supervisor
*S. Yusuf	Senior Reactor Operator

\* Attended exit meeting

## 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

IFI 50-264/2001-201-01	The DIR would contact the facility project manager to determine if a TS change would be necessary to Section 4 of the TS.
IFI 50-264/2001-201-02	Written procedures would be updated to match present practices or activities would be performed as in current procedures.

### Closed

NONE

## PARTIAL LIST OF ACRONYMS USED

DIR	Facility Director/Supervisor
LCO	Limiting Conditions for Operations
NRC	Nuclear Regulatory Commission
PPP	Physical Protection Program
RP	Requalification Program
RS	Reactor Supervisor
ROC	Reactor Operations Committee
SRO	Senior Reactor Operator
RO	Reactor Operator
TS	Technical Specifications