UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

October 19, 2018

Dr. Paul O'Connor, Facility Director
Dow Chemical TRIGA Research Reactor
Dow Chemical Company
Building 1602
Midland, MI 48674

SUBJECT: DOW CHEMICAL COMPANY – U.S. NUCLEAR REGULATORY COMMISSION ROUTINE SAFETY INSPECTION REPORT NO. 05000264/2018201

Dear Dr. O'Connor:

From August 28 - 29, 2018, the U.S. Nuclear Regulatory Commission (NRC) conducted a routine safety inspection at the Dow Training, Research, Isotopes, General Atomics Research Reactor. The inspection included a review of activities authorized for your facility. The enclosed report presents the results of that inspection.

The inspection examined activities conducted under your license as they relate to public health and safety to confirm compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspection consisted of selected examination of procedures and representative records, observations of activities, and interviews with personnel. Based on the results of this inspection, no findings of non-compliance were identified. No response to this letter is required.

In accordance with Title 10 of the *Code of Federal Regulations*, Section 2.390, "Public inspections, exemptions, requests for withholding," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (Agencywide Documents Access and Management System (ADAMS)). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

If you have any questions concerning this inspection, please contact Michael Takacs at (301) 415-2042, or by electronic mail at Michael.Takacs@nrc.gov.

Sincerely,

/RA/

Anthony J. Mendiola, Chief
Research and Test Reactors Oversight Branch
Division of Licensing Projects
Office of Nuclear Reactor Regulation

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

Enclosure:
As stated

cc: See next page

cc:

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1790 Building
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Dr. Wayde Konze
Global Research and Development Director for Analytical Sciences
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SUBJECT: DOW CHEMICAL COMPANY – U.S. NUCLEAR REGULATORY COMMISSION ROUTINE SAFETY INSPECTION REPORT NO. 05000264/2018201
DATE: OCTOBER 19, 2018

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

Docket No.:	50-264
License No.:	R-108
Report No.:	05000264/2018201
Licensee:	The Dow Chemical Company
Facility:	TRIGA Research Reactor
Location:	Midland, Michigan
Dates:	August 28 - 29, 2018
Inspector:	Michael Takacs
Approved by:	Anthony J. Mendiola, Chief Research and Test Reactors Oversight Branch Division of Licensing Projects Office of Nuclear Reactor Regulation

Enclosure

EXECUTIVE SUMMARY

The Dow Chemical Company
TRIGA Research Reactor
NRC Inspection Report No. 05000264/2018201

The primary focus of this routine, announced inspection of the Dow Chemical Company (Dow or the licensee) Class II research reactor facility was the onsite review of selected aspects of the safety programs including: (1) organization and staffing; (2) operations logs and records; (3) procedures; (4) requalification training; (5) committees, audits and reviews; and (6) surveillance and limiting conditions for operation. The licensee's programs were acceptably directed toward the protection of public health and safety and in compliance with U.S. Nuclear Regulatory Commission (NRC) requirements.

Organization and Staffing

- The licensee's organization and staffing was in compliance with the requirements specified in its technical specifications (TSs).

Operations Logs and Records

- The licensee's operations logs and record keeping program conformed to its TS requirements.

Procedures

- The licensee was maintaining and implementing written procedures in accordance with its TS requirements.

Requalification Training

- Current operator requalification was conducted as required by the Requalification Program.

Committees, Audits, and Reviews

- The Reactor Operations Committee (ROC) provided the oversight required by its TS.

Surveillance and Limiting Conditions for Operations

- Surveillance was conducted and limiting conditions for operations was maintained in accordance with its TS requirements.

REPORT DETAILS

Summary of Facility Status

The Dow 300 kilowatt Training, Research, Isotopes, General Atomics (TRIGA) Mark I research reactor has been operated in support of research and development, reactor operator training, and periodic equipment surveillances. During the inspection, the reactor was operated in support of research and development.

1. Organization and Staffing

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

The inspector reviewed the following to verify compliance with the organization and staffing requirements specified in TS Section 6.1:

- Staff qualifications and management responsibilities
- Organizational structure and staffing
- TS for the Dow TRIGA Research Reactor (DTRR) dated June 18, 2014
- Reactor Operation log books Numbers (Nos.) 125 to 126, covering operations from November 8, 2017, to present
- Dow Nuclear Research Reactor Procedure (DNRRP) Chapter 3, "Administrative Procedures," dated June 17, 2014
- DNRRP No. 3.2, "Programmatic and Personnel Responsibility," dated June 17, 2014
- DTRR Annual Reports – 2016 and 2017

b. Observations and Findings

Through discussions with licensee staff, the inspector determined that the management structure at the facility had not changed since the previous NRC inspection. The reactor staff consisted of two individuals, both of whom maintained NRC senior reactor operator (SRO) licenses. A review of applicable records verified that staffing was as required by TS Section 6.1 and the licensee's procedures.

c. Conclusion

The licensee's organization and staffing were in compliance with the requirements specified in the TS.

2. Operations Logs and Records

a. Inspection Scope (IP 69001)

The inspector reviewed the following to ensure that selected records were maintained as required by TS Section 3 and licensee procedural requirements:

- Reactor Operation log books Nos. 125 to 126, covering operations from November 8, 2017, to present
- Scram log book entries from October 24, 2016, to present

- DTRR Annual Reports – 2016 and 2017
- DNRRP No. 3, “Administrative Procedures,” dated June 17, 2014
- DNRRP No. 3.3.5, “Authorization for Operation of the Reactor,” dated June 17, 2014
- DNRRP No. 3.4, “Procedural and Administrative Limitations,” dated June 17, 2014
- DNRRP No. 3.5, “Reactor Operations Log Book,” dated June 17, 2014
- DNRRP No. 4.1.1, “Daily Prestart Checkout,” dated July 9, 2014
- DNRRP No. 4.1.2, “Daily Startup/Shutdown,” dated July 9, 2014
- DNRRP No. 4.6.1, “Procedure for Startup, Operation, and Shutdown of the Dow TRIGA Research Reactor,” dated November 11, 2006

b. Observations and Findings

The inspector observed an SRO performing the reactor pre-startup checklist, followed by a reactor startup to criticality, along with an escalation to power. The inspector verified that reactor operating characteristics and entries required by procedure were recorded in the operations log book. A review of the logs indicated that TS operational limits had not been exceeded. The information required for the startup checklist and the shutdown checklist are included in the operations log. Operations records confirmed that shift staffing met the minimum requirements for reactor operations. The inspector determined that reactor operations were carried out following written procedures and TS requirements.

The inspector reviewed the scram log book and noted that during the 2017 to 2018 time frame, there were a number of scrams that have occurred at the facility during the reactor startup sequence. The cause has been determined to be due an old computer processor which will be replaced as part of the planned future reactor console upgrade project. As part of the console upgrade project, the licensee has performed acceptance tests on replacement components and is planning additional component tests. The licensee plans to communicate with NRC as required by Title 10 of the *Code of Federal Regulations* (10 CFR) 50.59, “Changes, tests, and experiments,” in support of this console upgrade project.

c. Conclusion

Within the scope of this review, the licensee’s operations record keeping program conformed to TS requirements.

3. Procedures

a. Inspection Scope (IP 69001)

The inspector reviewed the following to ensure that the requirements of TS Section 6.4 were being met:

- Administrative controls
- Procedural implementation
- Selected administrative and operations procedures
- ROC semi-annual meeting minutes dated December 11, 2017, and June 28, 2018

- DNRRP No. 3.3.2, “Review Procedure,” dated June 17, 2014
- DNRRP No. 3.3.5, “Authorization for Operation of the Reactor,” dated June 17, 2014
- DNRRP No. 3.3.6a, “Operation of the Reactor after Normal Working Hours,” dated June 17, 2014
- DNRRP No. 3.5, “Programmatic and Personnel Responsibilities,” dated June 17, 2014
- DNRRP Chapter 4, “Operational Procedures,” dated December 15, 2014
- DNRRP No. 4.1.1, “Daily Prestart Checkout,” dated July 9, 2014
- DNRRP No. 4.1.2, “Daily Startup/Shutdown,” dated July 9, 2014
- DNRRP No. 4.2.4, “Continuous Air Monitor Calibration,” dated December 2, 2016
- DNRRP No. 4.2.5, “Control Rod Calibration,” dated June 17, 2014
- DNRRP No. 4.4.1, “Procedure for the Control Rod Removal and Inspection,” dated November 11, 2006
- DNRRP No. 4.6.1, “Procedure for Startup, Operation, and Shutdown of the DOW TRIGA Research Reactor,” dated November 11, 2006

b. Observations and Findings

Procedures had been formulated for the safe operation of the reactor. The inspector noted that through the review of the ROC semi-annual meeting minutes, as well as discussions with the licensee personnel, procedural changes were being reviewed and approved by the ROC as required by TS. Training of personnel on procedures was acceptable. Through observation of various activities at the facility, including reactor startup and operation, the inspector determined that licensee personnel conducted activities in accordance with applicable procedures.

c. Conclusion

The inspector determined that the procedural review, revision and implementation program satisfied TS requirements.

4. Requalification Training

a. Inspection Scope (IP 69001)

The inspector reviewed the following to verify compliance with the requirements in 10 CFR Part 55, “Operators' Licenses,” and the Requalification Program:

- DTRR Requalification Program, approved by the NRC on September 6, 2011
- Reactor Logbooks Nos. 125 to 126, covering operations from November 8, 2017 to present
- Quarterly requalification training records and exams for all of 2017, and from January to July of 2018
- Operator active license status
- Operator physical examination records
- Reactivity manipulation records

b. Observations and Findings

The licensee's requalification program is described in the program submitted to the NRC and in accordance with 10 CFR 55.59 "Requalification." The inspector reviewed the requalification program records of the two SROs currently employed at the facility. Both SROs are responsible for the implementation of the requalification program and administer the written and operating examinations. The inspector verified that physical examinations of the licensed staff were conducted biennially as required. The inspector also verified that all of the licensed operators were reviewing the contents of all abnormal and emergency procedures on an annual basis. The numbers of hours spent by each operator in the facility performing licensed duties were recorded in the reactor logbook. The inspector verified that the average SRO operating hours met 10 CFR 55.59 requirements.

c. Conclusion

The licensee's operator requalification program was conducted as required by the Requalification Program

5. Committees, Audits and Reviews

a. Inspection Scope (IP 69001)

The inspector reviewed the following to ensure that the audits and reviews stipulated in TS Section 6.2 were being completed by the ROC.

- ROC semi-annual meeting minutes dated December 11, 2017, and June 28, 2018
- DTRR Annual Reports – 2016 and 2017
- DNRRP No. 3, "Administrative Procedures," dated June 17, 2014
- DNRRP No. 3.2.2, "Reactor Operations Committee - DOW TRIGA Reactor," dated, June 17, 2014
- DNRRP No. 3.4, "Procedural and Administrative Limitations," dated June 17, 2014

b. Observations and Findings

The ROC held semi-annual meetings and a quorum was always present as required by TS Section 6.2.2. Review of the minutes indicated that the ROC provided guidance, direction and oversight in support of reactor operations. At each meeting, the reactor supervisor provided a thorough reactor supervisor report which contained details on reactor operations, reactor system maintenance, operator training, procedure updates, and internal audit results. The ROC minutes and the reactor supervisor report provided an acceptable record of ROC review functions and of their safety oversight of the reactor facility.

Audits of the items required by TS 6.2.3 were completed by individuals appointed by members of the ROC. Additionally, a peer review audit was performed in December 2017 and found no safety concerns or areas of non-compliane with NRC regulations or TS requirements. The inspector noted that the safety

reviews and audits, and the associated findings, were acceptably detailed. The licensee immediately responded to all audit findings and ensured that the corrective actions were properly completed.

c. Conclusion

Review and oversight functions required by the TS were acceptably completed by the ROC.

6. Surveillance and Limiting Conditions for Operation

a. Inspection Scope (IP 69001)

The inspector reviewed the following to ensure that the surveillance requirements and limiting condition for operation (LCO) specified in TS Sections 3 and 4 were met:

- Reactor Logbooks Nos. 125 to 126, covering operations from November 8, 2017, to present
- Completed control rod calibration data sheets under DNRRP No. 4.2.5b, "Control Rod Calibration Data Sheet," dated January 17, 2017, July 17, 2017, January 23, 2018, and July 20, 2018
- Completed annual fuel inspection data sheets under DNRRP No. 4.3.4a, "Procedure for the of the Annual Fuel Inventory," dated January 16, 2017, and January 22, 2018
- Completed monthly checklist sheets under DNRRP No. 4.1.3a, "Monthly Checklist," for 2017
- Completed annual checkout sheets under DNRRP No. 4.1.5, Annual Checkout," for 2017

b. Observations and Findings

The inspector noted that daily, monthly, and annual surveillances of system and equipment checks, tests, and calibrations were completed as required by TS. The LCO verifications were completed on schedule and in accordance with licensee procedures. All of the recorded results were within the TS and procedurally prescribed parameters. The records and logs were noted to be complete and were being maintained as required. The procedures for the surveillances provided clear and concise direction and control of reactor operational tests and surveillances.

The inspector observed the licensee complete the startup checkout form for TS required items on August 28, 2018. All of the items on the startup checkout form were carried out appropriately and the personnel conducting the tests did so in a safe and knowledgeable manner. The inspector verified that all of the checks conducted were in compliance with TS required values and parameters.

c. Conclusion

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

7. Exit Interview

The inspector presented the inspection results to licensee management and staff at the conclusion of the inspection on August 29, 2018. The inspector described the areas inspected and discussed in detail the inspection observations. The licensee acknowledged the findings presented and did not identify as proprietary any of the material provided to or reviewed by the inspector during the inspection.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

W. Konze	Director Analytical Sciences
P. O'Connor	Facility Director
J. Weldy	Site Radiation Safety Officer
K. Wegner-Gave	Reactor Radiation Safety Officer
S. Yusuf	Reactor Supervisor
B. Haskins	Assistant Reactor Supervisor
J. Cassiday	Health Physics Technologist
N. Goodman	Reactor Operator Trainee

INSPECTION PROCEDURES USED

IP 69001	Class II Research and Test Reactors

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened:

None

Closed:

None

Discussed:

None

PARTIAL LIST OF ACRONYMS USED

10 CFR	Title 10 of the *Code of Federal Regulations*
DNRRP	Dow Nuclear Research Reactor Procedure
DTRR	Dow TRIGA Research Reactor
IP	Inspection Procedure
LCO	Limiting Condition for Operation
Nos.	Numbers
NRC	U.S. Nuclear Regulatory Commission
ROC	Reactor Operations Committee
SRO	Senior Reactor Operator
TRIGA	Training, Research, Isotopes, General Atomics
TS	Technical Specification