

September 14, 2016

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

SUBJECT: DOW CHEMICAL COMPANY – U.S. NUCLEAR REGULATORY COMMISSION
ROUTINE INSPECTION REPORT NO. 50-264/2016-201

Dear Dr. O'Connor:

From July 19 - 21, 2016, the U.S. Nuclear Regulatory Commission (NRC, or the Commission) conducted an inspection at your Dow TRIGA Research Reactor. The inspection included a review of activities authorized for your facility. The enclosed report presents the results of that inspection.

This inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspector reviewed selective examinations of procedures and records, observed various activities, and interviewed various personnel. Based on the results of this inspection, no safety concern or noncompliance of requirements was 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 and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of 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).

P. O'Connor

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Should you have any questions concerning this inspection, please contact Johnny Eads at (301) 415-0136 or by electronic mail at Johnny.Eads@nrc.gov.

Sincerely,

/RA/

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

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

Enclosure:
As stated

cc w/enclosure: See next page

Dow Chemical

Docket No. 50-264

cc:

Office of the Mayor
333 West Ellsworth
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Test, Research, and Training
Reactor Newsletter
University of Florida
202 Nuclear Sciences Center
Gainesville, FL 32611

P. O'Connor

- 2 -

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

Docket No. 50-264

License No. R-108

Report No. 50-264/2016-201

Licensee: The Dow Chemical Company

Facility: TRIGA Research Reactor

Location: Midland, Michigan

Dates: July 19-21, 2016

Inspector: Johnny Eads

Approved by: Anthony J. Mendiola, Chief
Research and Test Reactors Oversight Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY

The Dow Chemical Company
TRIGA Research Reactor
Inspection Report No. 50-264/2016-201

The primary focus of this routine, announced inspection was the onsite review of selected aspects of the Dow Chemical Company (the licensee's) Class II research reactor facility safety programs including: (1) organization and staffing; (2) operations logs and records; (3) procedures; (4) requalification training; and (5) committees, audits and reviews; (6) surveillance and limiting conditions for operation; (7) experiments; (8) health physics; (9) design changes; (10) emergency planning; (11) maintenance logs and records; (12) fuel handling logs and records; and (13) transportation activities. The licensee's programs were acceptably directed toward the protection of public health and safety, and in compliance with the U.S. Nuclear Regulatory Commission requirements.

Organization and Staffing

- The licensee's organization and staffing was in compliance with the requirements specified in the Technical Specifications (TSs).

Operations Logs and Records

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

Procedures

- The inspector found that appropriate procedures were in effect, new procedures were being prepared as needed, and dated procedures were being updated as necessary.

Requalification Training

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

Committees, Audits, and Reviews

- The Reactor Operations Committee provided the oversight required by the TS.

Surveillance and Limiting Conditions for Operations

- Surveillance was observed to be performed in accordance with requirements as stated in the TS.

Experiments

- Experiments were reviewed and approved as required by TS.

Health Physics

- Surveys were being completed and documented as required.
- Postings met regulatory requirements.
- Personnel dosimetry was being worn and recorded doses were within the NRC's regulatory limits.
- Radiation monitoring equipment was being maintained and calibrated as required.
- The Radiation Protection Program satisfied regulatory requirements.
- The radiation protection training program was being administered as required.
- Environmental monitoring satisfied license and regulatory requirements.

Design Changes

- No changes, tests, or experiments subject to Title 10 of the *Code of Federal Regulations* Section 50.59 reporting were performed.

Emergency Planning

- The emergency preparedness program was conducted in accordance with the Emergency Plan.

Maintenance Logs and Records

- The licensee maintained records documenting principal maintenance activities.

Fuel Handling Logs and Records

- Fuel handling and inspection activities were completed and documented as required by TS and facility procedures.

Transportation of Radioactive Materials

- The program for shipping radioactive material satisfied regulatory requirements.

REPORT DETAILS

Summary of Facility Status

The Dow Chemical Company (Dow or the licensee's) 300 kilowatt Training Research Isotope Production General Atomics (TRIGA) Mark I research reactor has been operated in support of experiments, reactor operator training, and periodic equipment surveillances. During the inspection, the reactor was operated in support of on-going work.

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 in Technical Specification (TS) Section 6.1:

- Staff qualifications and management responsibilities
- Staffing requirements for the safe operation of the reactor
- Organizational structure and staffing
- TS for the Dow TRIGA Research Reactor (DTRR) dated June 18, 2014
- Reactor Logbooks Nos. 120 to 122, covering operations from April 17, 2015 to present
- Dow Nuclear Research Reactor Procedure (DNRRP) No. 3, "Administrative Procedures," dated June 17, 2014
- DNRRP No. 3.2, "Programmatic and Personnel Responsibility," dated June 17, 2014
- DNRRP No. 3.4, "Procedural and Administrative Limitations," dated June 17, 2014
- DTRR Annual Reports – 2014 and 2015

b. Observations and Findings

Through discussions with licensee representatives, the inspector determined that the management structure at the facility had not changed since the previous U.S. Nuclear Regulatory Commission (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.

Enclosure

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 procedural requirements:

- Reactor Logbooks Nos. 120 to 122, covering operations from April 17, 2015 to present
- Scram Log, dated from September, 2014 to present
- DTRR Annual Reports – 2014 and 2015
- 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 a reactor checkout, startup and approach to criticality, escalation to power. The inspector verified that reactor operating characteristics and procedurally required entries were recorded on the operations log. A review of the logs indicated that TS operational limits had not been exceeded. The information required for the startup checkout and the shutdown checklist are included in the operations log. Operations records confirmed that shift staffing met the minimum requirements for duty personnel. The inspector determined that reactor operations were carried out following written procedures and TS requirements.

Unintentional scrams that occurred during reactor operations were recorded in the master log. The inspector noted that there were a number of scrams that have been occurring at the facility and that this number remains high. When a scram occurs, the root cause analysis is completed by the Reactor Supervisor (RS) or the alternate RS before the resumption of operations. The licensee stated that this remains a focus for improvement at the facility.

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
- Records of changes and temporary deviations to procedures
- Reactor Operations Committee (ROC) meeting minutes dated June 15, 2015, December 4, 2015, and June 15, 2016
- DNRRP No. 3.2.4, "ROC - DOW TRIGA Reactor," dated June 17, 2014
- DNRRP No. 3.3.2, "Review Procedure," dated June 17, 2014
- DNRRP Chapter 4, "Operational Procedures," dated December 15, 2014

b. Observations and Findings

Procedures had been formulated for the safe, routine operation of the reactor. Records showed that procedures for potential malfunctions (e.g., radioactive releases and contaminations and abnormal events) had also been developed and were available to be implemented as required. The inspector noted that procedural changes were being reviewed and approved by the ROC as required by TS. Training of personnel on procedures and changes was acceptable. Through observation of various activities at the facility, including reactor operation, the inspector determined that licensee personnel conducted activities in accordance with applicable procedures.

Review of ROC meeting minutes and discussions with the licensee indicated the request and approval of procedure changes for operating procedures were documented.

c. Conclusion

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

4. **Requalification Training**

a. Inspection Scope (IP 69001 and IP 92701)

The inspector reviewed the following to verify compliance with the requirements in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 55, "Operators' Licenses," and the Requalification Program:

- DTRR Requalification Program, approved by the NRC on September 6, 2011
- Reactor Logbooks Nos. 120 to 122, covering operations from April 17, 2015 to present
- Requalification training records for the last requalification cycle
- 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. The RS and the alternate RS 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 licensee stated that all of the licensed operators operate the reactor a minimum of 4 hours per quarter. The inspector verified that the average SRO operating hours met 10 CFR 55.59 requirements.

c. Conclusion

The licensee's requalification program was implemented satisfactorily, the program was up-to-date, and plan requirements were met.

5. **Committees, Audits, and Reviews**

a. 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 meeting minutes dated June 15, 2015, December 4, 2015, and June 15, 2016
- DTRR Annual Reports – 2014 and 2015
- 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 is defined in the TSs and the inspector verified that the committee was following all aspects of the requirements. The ROC had quarterly meetings as required by TS 6.2.2 and a quorum was always present as required. Review of the minutes indicated the ROC provided guidance, direction and oversight, and ensured suitable use of the reactor. The minutes provided an acceptable record of ROC review functions and of their safety oversight of reactor operations.

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 as requested by DNRRP. 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 TSs were acceptably completed by the ROC.

6. Surveillance and Limiting Conditions for Operation

a. Inspection Scope (IP 69001 and IP 92701)

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

- DNRRP No. 4.1.1, "Daily Prestart Checkout," dated July 2014
- DNRRP No. 4.1.2, "Daily Startup/Shutdown (checklist)," dated July 2014
- DNRRP No. 4.1.3, "Monthly Checklist," dated December 2014
- DNRRP No. 4.1.4, "Semi-Annual Checklist," dated December 2014
- DNRRP No. 4.1.5, "Annual Checkout," dated July 2014
- DNRRP No. 4.2.1, "Thermal Calibration," dated November 2006
- DNRRP No. 4.2.2, "Area Monitor Calibration," dated November 2006
- DNRRP No. 4.2.3, "Water Radioactivity Monitor Calibration," dated November 2006
- DNRRP No. 4.2.4, "Continuous Air Monitor Calibration," dated July 2014
- DNRRP No. 4.2.5, "Control Rod Calibration," dated June 2014
- DNRRP No. 4.4.1, "Procedure for the Control Rod Removal and Inspection," dated November 2006
- DNRRP No. 4.4.2, "Rod Drop Time," dated November 2006
- Completed "Daily Checklist," forms for 2016

- Completed "Annual Checkout," forms for 2015
- Completed "Monthly Checklist," forms for 2015 and 2016

b. Observations and Findings

The inspector noted that daily, monthly, semiannual, and annual channel checks, tests, and/or calibrations for TS-required surveillance were completed as required. 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 July 20, 2016. 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. Experiments

a. Inspection Scope (IP 69001)

To ensure that the requirements of TS Sections 3.7 and 6.4 were being met concerning experimental programs, the inspector reviewed selected aspects and/or portions of:

- Experimental administrative controls and precautions
- Approved reactor experiments documentation
- Review and approval process for experiments
- DNRPP No 3.3,"Rules Governing Experiments, Storage and Handling of, and Accountability for Nuclear and Radioactive Material," dated June 2014
- Completed "TRIGA Activation Request Form," forms dated from November 2015 to present
- Completed Approval Sheet for Special Experiments, "Annual Fuel Inspection," for 2015 and 2016

b. Observations and Findings

One of the many uses for the DTRR is the irradiation of various materials. The most frequently used experimental facilities are the pneumatic tube irradiation facility and the lazy susan. Samples that have been irradiated at DTRR include various materials that are produced or utilized at Dow. All experiments conducted are in accordance with approved authorization requests. The Facility Director (FD) or RS reviews and approves all routine samples to be irradiated in accordance with the TS limitations for each sample to be irradiated in the core. No new routine experiments had been initiated, reviewed, or approved since the previous inspection at the facility. One special experiment was approved to conduct the annual fuel inspections. This special inspection must obtain ROC approval prior to performance. All new and special experiments are reviewed and approved by the ROC.

The inspector confirmed that all of the experiments conducted were in accordance with TS limits and procedural requirements.

c. Conclusion

Experiments were reviewed and approved as required by TS.

8. Health Physics

a. Inspection Scope (IP 69001)

The inspector reviewed the following to verify compliance with 10 CFR Part 19, "Notices, Instructions and Reports to Workers: Inspection and Investigations," 10 CFR Part 20, "Standards for Protection Against Radiation," and the applicable TS requirements:

- Radiological signs and posting in various areas of the facility
- Area and personnel dosimetry results for 2015 and 2016 to date
- Facility and equipment during tours
- Radiation protection training records
- Maintenance and calibration of radiation monitoring equipment, including the water radioactivity monitor, area radiation monitor, and the continuous air monitor
- Organization and staffing
- DNRRP No. 3.3.3, "Handling, Storage, and Disposal of Radioactive Material," dated June 2014
- DNRRP No. 4.2.2, "Area Monitor Calibration," dated November 2006
- DNRRP No. 4.7.1, "Wipe Tests and Radiation Surveys," dated November 2006

b. Observations and Findings

(1) Surveys

The inspector reviewed monthly radiation and contamination surveys of the reactor building, which were conducted by the facility staff. The results were documented on the appropriate forms, evaluated as required and corrective actions taken when readings or results exceeded set action levels. The number and location of survey points was adequate to characterize the radiological conditions. The licensee investigates any readings above background levels. The inspector verified that the Radiation Safety Officer (RSO) reviews all of the survey records. The RSO also conducts an annual independent contamination survey of the facility and has verified that all of the readings are as expected.

(2) Postings and Notices

The inspector reviewed the postings required by 10 CFR Part 19 at the entrances to various controlled areas including the Reactor Bay, and radioactive material storage areas. The postings were acceptable and indicated the radiation and contamination hazards present. The facility's radioactive material storage areas were found to be properly posted. No unmarked radioactive material was found in the facility.

(3) Dosimetry

The licensee used a National Voluntary Laboratory Accreditation Program-accredited vendor to process personnel dosimetry. Through direct observation, the inspector determined that dosimetry was used in an acceptable manner by facility personnel. For visitors to the facility, radiation exposures are recorded through the permanent staff at the facility. Records indicate that no abnormal readings were obtained.

An examination of the records for the inspection period showed that all exposures were well within NRC limits and within licensee action levels. All of the staff and researchers associated with the facility wear Optically Stimulated Luminescence Dosimeter (OSLD) badges and minimal doses were recorded for 2015 through present. The as low as reasonably achievable (ALARA) goal specified in the radiation safety procedures is to keep exposures to less than 10 percent of the applicable NRC requirements and the licensee consistently meets this goal.

(4) Radiation Monitoring Equipment

The calibration verification of portable survey meters and friskers was completed by a contracted company. The calibration records of 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 TS 4.4 while records were being maintained as required. The inspector verified that proper precautions are always used to maintain doses ALARA while conducting the calibrations. The inspector reviewed the licensee's tracking system for ensuring the instrument calibrations are completed on time and found it to be useful.

(5) Radiation Protection Program

The licensee's Radiation Protection Program (RPP) was established through the procedures. The RPP provides guidance for keeping doses ALARA and is consistent with the guidance in 10 CFR Part 20. The inspector verified that the RPP was being reviewed annually as required by 10 CFR 20.1101, "Radiation protection programs," paragraph (c). No issues related to the RPP were identified in the review of the program. The RSO reviews the overall implementation of the radiation protection program at the DTRR.

The RPP requires that all personnel who work with radioactive materials receive training in radiation protection, policies, procedures, requirements, and the facilities prior to having unescorted access at the facility. The RSO is responsible for conducting the training and all of the training is typically conducted both on a computer and with practical applications. A test is administered at the end of the training to verify that the individuals understood the material presented. The training covered the topics required to be taught in 10 CFR Part 19 and the review of training materials and tests indicated that the staff were instructed on the appropriate subjects.

(6) Facility Tour

The inspector toured the reactor facility, counting laboratories and accompanying facilities. Control of radioactive material and control of access to radiation and high radiation areas were observed to be acceptable. The postings and signs for these areas were appropriate. Licensee personnel followed the indicated precautions for access to controlled areas.

(7) Environmental Monitoring

Several OSLDs were placed around the inside walls of the reactor facility and minimal doses were recorded. Records show that there was minimal radiation exposure to the environment from the reactor during the previous year. There was no liquid effluent discharged from the reactor facility. The licensee indicated that gaseous effluents from the reactor facility were less than 1 millirem/year.

c. Conclusion

The inspector determined that: (1) surveys were being completed and documented as required, (2) postings met regulatory requirements, (3) personnel dosimetry was being worn and recorded doses were within the NRC's regulatory limits, (4) radiation monitoring equipment was being maintained and calibrated as required, (5) the RPP satisfied regulatory requirements, (6) the radiation protection training program was being administered as required, and (7) environmental monitoring satisfied license and regulatory requirements.

9. Design Changes

a. Inspection Scope (IP 69001)

The inspector reviewed the following materials to verify compliance with regulatory requirements. In order to verify that any modifications to the facility were consistent with 10 CFR 50.59, "Changes, tests and experiments," the inspector reviewed selected aspects of:

- Facility design changes and records
- Facility configuration and associated records
- DNRRP No. 4.5.3, "Maintenance and Modifications," dated June 2014
- DTRR Annual Reports – 2014 and 2015

b. Observations and Findings

Through review of applicable records and interviews with licensee personnel, the inspector determined that there have not been any significant changes at the facility in the previous two years.

c. Conclusion

Based on the records reviewed, the inspector determined that the licensee's design change program was being implemented as required.

10. Emergency Planning

a. Inspection Scope (IP 69001)

The inspector reviewed the implementation of selected portions of the emergency preparedness program including:

- DTRR Emergency Plan (E-Plan), dated December 4, 2012
- Emergency Planning Drills conducted May 6, 2015 and May 19, 2016
- Procedure entitled, "1602 Building Radiation Emergency," revised July 27, 2007
- Emergency response facilities, supplies, equipment, and instrumentation

- Monthly Inventories of Emergency Equipment
- Memorandum of Agreement, Office of Emergency Management, County of Midland Michigan, dated December 19, 2014

b. Observations and Findings

The inspector reviewed the revised E-Plan in use at the DTRR and verified that the E-Plan was being properly implemented at the facility. The inspector reviewed the emergency facilities, instrumentation, and equipment and verified that the emergency response equipment, in general, was as described in the E-Plan. Through direct observation, records review, and interviews with emergency organization personnel, the inspector determined that they were capable to respond, and knowledgeable of the proper actions to take in case of an emergency. The facility staff is responsible for responding to an emergency during all hours and making assessments and corrective as well as protective actions. The responsibility and authority for directing and coordinating emergency response activities are assigned to the FD/RS, acting as the emergency director. All facility personnel receive annual emergency response training. The inspector verified that the licensee has continually reviewed the E-Plan and conducted an inventory of the emergency response equipment.

Emergency drills had been conducted annually as required by the E-Plan. The drills for 2015 and 2016 were both practical exercises and tested the notification and response of emergency personnel. Critiques were written and discussed following the drills to document any problems identified during the exercises. The action items that resulted were incorporated as part of the lesson learned policy.

The inspector visited the Dow Emergency Services and Security Center. While at the center, the inspector talked to the Emergency Services and Security Delivery Specialist about the supplies and equipment at the Support Center that would be available in case of an emergency. The coordinator stated that designated individuals on the emergency services teams had radiation training and if additional support is needed, other support staff can respond. The staff was very helpful and knowledgeable on the requirements and their responsibilities. The inspector observed that there appeared to be a good working relationship between the licensee and the Emergency Services and Security Center which was capable to handle a variety of events that could happen at the DTRR.

c. Conclusion

The emergency preparedness program was conducted in accordance with the requirements stipulated in the E-Plan.

11. Maintenance Logs and Records

d. Inspection Scope (IP 69001)

To verify that the licensee was complying with the applicable regulations, the inspector reviewed selected aspects of:

- DNRRP No. 4.5.3, "Maintenance and Modification," dated June 2014
- Completed "Dow TRIGA Research Reactor Maintenance," forms from 2015 to present

e. Observations and Findings

The inspector reviewed the maintenance records related to 2015 and 2016 scheduled and unscheduled preventive and corrective maintenance activities. Routine/preventive maintenance was controlled and documented on reactor maintenance forms, which are maintained in a binder. All maintenance of reactor systems was reviewed by the FD/RS or the alternate RS. Implementation of changes to equipment, systems, tests, or experiments are generally done by the staff at the facility. After all maintenance items are completed, system operational checks are performed to ensure the affected systems function before returning them to service. During a facility tour, the inspector noted that the equipment in the Control Room and the Reactor Room was operational.

f. Conclusion

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

12. Fuel Handling Logs and Records

g. Inspection Scope (IP 69001)

To verify that TS and procedural requirements were being met, the inspector reviewed selected aspects of:

- Reactor Logbooks Nos. 120 to 122, covering operations from April 17, 2015 to present
- DNRRP No. 4.3.2, "Movement of Fuel - General Requirements," dated December 2012
- DNRRP No. 4.3.3, "Movement of Fuel - Approach to Criticality," dated December 2012
- DNRRP No. 4.3.4 a, "Procedure for the Performance of the Annual Fuel Inventory," dated June 2014
- Fuel movement and inspection records for 2015

h. Observations and Findings

The inspector determined that the licensee was maintaining the required records of the various fuel movements that had been completed and verified that the movements were conducted and recorded in compliance with procedure. All fuel movements were noted in the Operating Logbook as well as in the Fuel Element Location and Inventory Logbook. The fuel element inspections generally included all of the fuel elements every four years and inspection of the control rods on an annual frequency, which is more frequent than the TS requirements. Inspections of the fuel elements and control rods showed consistency with accepted values and did not indicate any deterioration of cladding. Data recorded for fuel handling was clear and cross-referenced in the operations logs and the core map. Log entries clearly identified, as required by procedure, that a minimum of two persons were present when fuel was being moved. The inspector determined that the procedures and the controls specified (ROC approval) for these operations were acceptable.

c. Conclusion

Fuel handling and control rod inspection activities were completed and documented as required by TS and facility procedures.

13. Inspection of Transportation Activities

a. Inspection Scope (IP 86740)

To verify compliance with regulatory and procedural requirements for transferring or shipping licensed radioactive material, the inspector reviewed the following:

- Selected records of various types of radioactive material shipments
- Dow Radiation Protection Manual

b. Observations and Findings

Through records review and discussions with licensee personnel, the inspector determined that the licensee had not shipped any radioactive material since the previous inspection in this area under the reactor license. Transfer of radioactive material to other Dow facilities was under the Broad Scope License (21-00265-06) with guidance from the Radiation Safety Committee, the RSO and the Dow Radiation Protection Manual.

c. Conclusion

No radioactive material shipments had been made under the auspices of the reactor license during the past year.

14. Exit Interview

The inspector presented the inspection results to licensee management at the conclusion of the inspection on July 21, 2016. 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

B. Haskins	Senior Reactor Operator
W. Konze	Director Analytical Sciences
P. O'Connor	Facility Director
J. Seeburger	Emergency Services and Security
J. Weldy	Radiation Safety Officer
S. Yusuf	Reactor Supervisor

INSPECTION PROCEDURES USED

IP 69001	Class II Non-Power Reactors
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ITEMS OPENED, CLOSED, AND DISCUSSED

Opened:

None

Closed:

None

Discussed:

None

LIST OF ACRONYMS USED

10 CFR	Title 10 of the <i>Code of Federal Regulations</i>
DNRRP	Dow Nuclear Research Reactor Procedure
IP	Inspection Procedure
NRC	U.S. Nuclear Regulatory Commission
ROC	Reactor Operations Committee
RS	Reactor Supervisor
RSO	Radiation Safety Officer
SRO	Senior Reactor Operator
TRIGA	Training Research Isotope Production General Atomics
TS	Technical Specification