

July 9, 2009

Dr. Melinda P. Krahenbuhl  
Facility Director  
Dow Chemical Company  
1602 Building  
Midland, MI 48674

SUBJECT: DOW CHEMICAL COMPANY- NRC INSPECTION REPORT  
NO. 50-264/2009-201

Dear Dr. Krahenbuhl:

The U.S. Nuclear Regulatory Commission (NRC) conducted an inspection on June 22-26, 2009, at your DOW TRIGA Research Reactor (Inspection Report No. 50-264/2009-201). The inspection included a review of activities authorized for your facility. The enclosed report presents the results of that inspection. Areas examined during the inspection are identified in the enclosed report. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations of activities in progress. 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* Part 2.390 "Public inspections, exemptions, and 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 (PARS) component of NRC's document system (Agencywide Document Access and Management System (ADAMS)). ADAMS is accessible from the NRC Web site at (the Public Electronic Reading Room) <http://www.nrc.gov/reading-rm/adams.html>.

Should you have any questions concerning this inspection, please contact Jack Donohue at 301-415-3163 or electronic mail at [Jack.Donohue@nrc.gov](mailto:Jack.Donohue@nrc.gov).

Sincerely,

**/RA/**

Johnny H. Eads, Chief  
Research and Test Reactors Branch B  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

Docket No. 50-264

License No. R-108

Enclosure:  
As stated

cc w/encl: See next page

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

Docket No: 50-264

License No: R-108

Report No: 50-264/2009-201

Licensee: The Dow Chemical Company

Facility: TRIGA Research Reactor

Location: Midland, Michigan

Dates: June 22 - 26, 2009

Inspector: Jack Donohue

Approved by: Johnny H. Eads, Chief  
Research and Test Reactors Branch B  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

## EXECUTIVE SUMMARY

The Dow Chemical Company  
TRIGA Research Reactor  
Inspection Report No. 50-264/2009-201

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 organization and staffing; operations logs and records; procedures; requalification training; surveillance and limiting conditions for operation; experiments; design changes; committees, audits and reviews; emergency planning; maintenance logs and records; fuel handling logs and records. The licensee's programs were acceptably directed toward the protection of public health and safety, and in compliance with NRC requirements.

### Organization and Staffing

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

### Operations Logs and Records

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

### Surveillance and Limiting Conditions for Operation

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

### Experiments

- No new experiments were requested but procedures existed to review them pursuant to Technical Specification requirements should one be requested.

### Design Changes

- No new changes, tests, or experiments subject to 10 CFR Part 50.59 reporting were performed.

Committees, Audits and Reviews

- The Committee on Reactor Operations provided the oversight required by the Technical Specifications.

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 Technical Specification and facility procedures.

## REPORT DETAILS

### Summary of Facility Status

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 and IP 92701)

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
- Selected portions of the operations logbooks for the past two years
- Organizational structure and staffing
- Administrative controls
- TS for the Dow TRIGA Research Reactor (DTRR), Amendment No. 8, dated February 11, 1998
- Reactor Logbooks Nos. 100 to 105, covering operations from September 2007 to present
- Dow Nuclear Research Reactor Procedure (DNRRP) No. 3, "Administrative Procedures," dated September 2006
- DNRRP No. 3.2, "Programmatic and Personnel Responsibility," dated September 2006
- DNRRP No. 3.4, "Procedural and Administrative Limitations," dated September 2006
- DOW TRIGA Research Reactor Annual Report – 2007 to present

#### b. Observations and Findings

Through discussions with licensee representatives, the inspector determined that the management structure at the facility had not changed although a new Facility Director (FD) has been appointed since the previous NRC inspection. The reactor staff consisted of three individuals, all of whom maintained NRC Senior Reactor Operator (SRO) licenses. A review of applicable records verified that staffing was as required by TS 6.1 and the licensee's procedures.

c. Conclusions

The licensee's organization and staffing was 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 procedural requirements:

- Reactor Logbooks Nos. 100 to 105 covering operations from September 2007 to present
- Scram Log, dated from January 2007 to present
- DOW TRIGA Research Reactor Annual Report - 2007, dated March 20, 2007
- DOW TRIGA Research Reactor Annual Report - 2008, dated February 27, 2009
- DNRRP No. 3, "Administrative Procedures," dated September 2006
- DNRRP No. 3.3.5, "Authorization for Operation of the Reactor," dated September 2006
- DNRRP No. 3.4, "Procedural and Administrative Limitations," revision 11, dated July 2008
- DNRRP No. 3.5, "Reactor Operations Log Book," dated September 2006
- DNRRP No. 4.1.1, "Daily Prestart Checkout," Revision 11, dated November, 2006
- DNRRP No. 4.1.2, "Daily Startup/Shutdown," Revision 11, dated November 2006
- DNRRP No. 4.6.1, "Procedure for Startup, Operation, and Shutdown of the DOW
- TRIGA Research Reactor," Revision 11, dated November 2006
- DNRRP No. 4.6.2, "Samples in the Lazy Susan - Placement and Retrieval," Revision 11, dated November 2006
- Completed "Daily Checklist" forms, dated from September 14, 2007 to present

b. Observations and Findings

The inspector observed a reactor checkout, startup, approach to critical escalation to power and a typical irradiation. The inspector verified that reactor operating characteristics and procedure 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 an increased number of scrams that have been occurring at the facility. There were 14 scrams logged in 2007, 22 scrams in 2008 and four scrams recorded to date in 2009. The majority of the recorded scrams were a result of computer errors, with the digital control system locking up. The licensee has investigated this trend further, but has not uncovered a method to correct the observed problems. The licensee is working with the manufacturer of the control console to devise a solution to the problem. When a scram occurs, the root cause analysis is completed by the RS or the alternate RS before the resumption of operations. The licensee stated that a change to the equipment following the amendment approval will potentially eliminate this condition.

c. Conclusions

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 6.3, Operating Procedures, 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 16, September 15, December 10, 2008 and March 23, 2009
- DNRRP No. 3.2.2, "ROC - DOW TRIGA Reactor," dated September 2006
- DNRRP No. 3.3.2, "Review Procedure," dated September 2006
- DNRRP Chapter 4, "Operational Procedures," Revision 11, dated November 2006

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 and sample handling, 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 a procedure change for Chapter 4 of the facility operating procedures was completed. The licensee has implemented a recent change to add procedure revision dates to the change pages to better provide configuration control of documents. This issue was considered by the NRC as an Inspection Follow-up Item (IFI) at a previous inspection and was reviewed during this inspection and now considered closed (IFI 50-264/2007-201-01).

c. Conclusions

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 10 CFR 55 and the Requalification Program:

- DNRRP No. 3.8, "DOW TRIGA Research Reactor Requalification Program," dated August 14, 1987
- Reactor Logbooks Nos. 100 to 105 covering operations from September 2007 to present
- Requalification training records for the last requalification cycle
- Operator active license status
- Operator physical examination records
- Reactivity manipulation records
- DNRRP No. 3.8, "DOW TRIGA Research Reactor Requalification Program," dated August 23, 2007
- 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 10CFR Part 55.59 "Requalification". The inspector reviewed the requalification program records of the three SROs currently employed at the facility. The RS and the alternate RS is responsible for the implementation of the requalification program and administers 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 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 four

hours per quarter. The inspector noted that average SRO operating hours for the previous quarter were 182 hours with the least at 113 hours.

c. Conclusions

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

**5. 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 conditions for operation (LCOs) specified in TS Section 4.0 were met:

- DNRRP No. 4.1.1, "Daily Prestart Checkout," Revision 11, dated November 2006
- DNRRP No. 4.1.2, "Daily Startup/Shutdown (checklist)," Revision 11, dated November 2006
- DNRRP No. 4.1.2, "Daily Checklist," Revision 11, dated November 2006
- DNRRP No. 4.1.3, "Monthly Checklist," Revision 11, dated November 2006
- DNRRP No. 4.1.4, "Semi-Annual Checklist," Revision 11, date November 2006
- DNRRP No. 4.1.5, "Annual Checkout," Revision 11, dated November 2006
- DNRRP No. 4.1.2.1, "Thermal Calibration," Revision 11, dated November 2006
- DNRRP No. 4.2.2, "Area Monitor Calibration," Revision 11, dated September 2006
- DNRRP No. 4.2.3, "Water Radioactivity Monitor Calibration," Revision 11, dated November 2006
- DNRRP No. 4.2.4, "Continuous Air Monitor Calibration," dated Revision 11, dated November 2006
- DNRRP No. 4.2.5, "Control Rod Calibration," dated June 6, 2008
- DNRRP No. 4.4.1, "Procedure for the Control Rod Removal and Inspection," Revision 11, dated November 2006
- DNRRP No. 4.4.2, "Rod Drop Time," Revision 0, dated January 22, 1991
- Completed "Water Radioactivity Monitor Calibration" forms, dated from January 24, 2007 to January 19, 2009
- Completed "Area Monitor Calibration" forms, dated from January 24, 2007 to January 9, 2009
- Completed "Continuous Air Monitor Calibration" forms, dated from January 24, 2007 to January 21, 2009
- Completed "Daily Checklist" forms, dated from January 2007 to present
- Completed "Thermal Calibration" forms, dated January 24, 2007, January 16, 2008 and January 16, 2009
- Completed "Annual Checkout" forms, for 2007, 2008 and 2009

- Completed "Semi-Annual Checklist" forms, dated February 15 and August 11, 2007, January 23 and August 15, 2008 and January 21, 2009
- Completed "Monthly Checklist" forms, dated from January 4, 2007 to present
- DOW TRIGA Research Reactor Annual Report - 2007, dated March 6, 2008
- DOW TRIGA Research Reactor Annual Report - 2008, dated February 27, 2009

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 June 24, 2009. 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. Conclusions

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

**6. 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
- ROC meeting minutes, dated June 16, September 15, December 10, 2008 and March 23, 2009
- Reactor Logbooks Nos. 100 to 105, covering operations from 2007 to present
- DNRRP No. 3, "Administrative Procedures," dated September 2006
- DNRRP No 3.3, "Rules Governing Experiments, Storage and Handling of, and Accountability for Nuclear and Radioactive Material," dated

- September 2006
- DNRRP No 3.3.1, "Classes of Experiments," dated September 2006
- DNRRP No 3.3.5, "Authorization for Operation of the Reactor," dated September 2006
- DNRRP No. 3.4, "Procedural and Administrative Limitations," dated September 2006
- DNRRP No. 3.5, "Reactor Operations Log Book," dated September 2006
- DNRRP No. 4.6.2, "Samples in the Lazy Susan - Placement and Retrieval," Revision 11, dated November 2006
- TRIGA Activation Request Form, Version 7, dated January 1997
- Completed "TRIGA Activation Request Form" forms, dated from November 2007 to present
- Completed Approval Sheet for Special Experiments, "Annual Fuel Inspection," for 2008 and 2009

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 The Dow Chemical Company. All experiments conducted are in accordance with approved authorization requests. The 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 with a new camera device. 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. Conclusions

No new experiments were requested. Procedures existed to review them pursuant to TS requirements should one be requested.

**7. 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, the inspector reviewed selected aspects of:

- Facility design changes and records
- Facility configuration and associated records
- ROC meeting minutes, dated June 16, September 15, December 10, 2008 and March 23, 2009

- DNRRP No. 3, "Administrative Procedures," dated September 2006
- DNRRP No. 3.2.2, "Reactor Operations Committee - DOW TRIGA Reactor," dated September 2006
- DNRRP No. 3.4, "Procedural and Administrative Limitations," dated September 2006
- DNRRP No. 4.5.3, "Maintenance," dated November 2006
- DOW TRIGA Research Reactor Annual Report - 2006, dated March 20, 2007

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. 10 CFR 50.59 states, "The licensee shall maintain records of changes in the facility, of changes in procedures, and of tests and experiments made pursuant to paragraph (c) of this section. These records must include a written evaluation which provides the bases for the determination that the change, test, or experiment does not require a license amendment pursuant to paragraph (c)(2) of this section." During the last inspection, the inspector could not verify that the change a coolant system was presented to and reviewed by the ROC as required. DNRRP No. 4.5.3 specifies that the Maintenance Form must be completed for any maintenance to the water system. The licensee stated that no maintenance form was completed for this activity. The licensee was informed that failure to conduct a written evaluation of design changes was identified as an Unresolved Item<sup>1</sup> (URI) pending corrective actions and implementation of controls to prevent recurrence. This issue will be reviewed during a future inspection (URI 50-264/2007-201-02). Failure to conduct a written evaluation of design changes. This issue was reviewed during the present inspection and the following was identified. To resolve this URI, a change was written and approved to procedure DNRRP 4.53 that incorporates 10CFR Part 50.59 considerations prior to signoff and authorization. This item is considered closed.

c. Conclusions

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

**8. Committees, Audits, and Reviews**

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

- Safety review records and audit reports since June 2001
- Responses to the review and audit reports
- ROC meeting minutes, dated June 16, September 15, December 10,

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<sup>1</sup> an URI is a matter about which more information is required to determine whether an issue in question is an acceptable item, a deviation, a nonconformance, or a violation

- 2008 and March 23, 2009
- Peer Review of the Dow TRIGA Research Reactor, dated December 2008
- DNRRP No. 3, "Administrative Procedures," dated September 2006
- DNRRP No. 3.2.2, "Reactor Operations Committee - DOW TRIGA Reactor," dated, September 2006
- DNRRP No 3.3, "Rules Governing Experiments, Storage and Handling of and Accountability for Nuclear and Radioactive Material," dated September 2006
- DNRRP No. 3.4, "Procedural and Administrative Limitations," dated September 2006

b. Observations and Findings

The ROC is defined in the TSs and the inspector verified that the committee is following all aspects of the requirements. The ROC had quarterly meetings as required by TS 6.2.1.c 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. Minor issues that were not safety related were noted in the audit reports and meeting minutes and the inspector observed that any safety related items were properly controlled. A Peer Review Audit was additionally 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. Conclusions

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

**9. Emergency Planning**

a. Inspection Scope (IP 69001)

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

- DOW TRIGA Research Reactor Emergency Plan (E-Plan), dated September 14, 1998
- EP Drill for 2008, dated September 8, 2008
- Review of the EP Drill on June 21, 2007
- Procedure entitled, "1602 Building Radiation Emergency," revised July 27, 2007
- Procedure entitled, " Emergency Procedures" dated February 2004

- Emergency response facilities, supplies, equipment, and instrumentation
- Monthly Inventories of Emergency Equipment

b. Observations and Findings

The inspector reviewed the 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. The previous inspector inquired about the statement in the E-Plan Section 9.B, which states that there are quarterly facility and building evacuations. The licensee stated that these evacuations are no longer conducted. The licensee also stated that the assessment equipment listed in Section 7.b.4 is also not current. The licensee plans on correcting these changes and will either request approval of the E-Plan, or will notify the NRC of the changes. This issue will be considered by the NRC as an Inspector Follow-up Item (IFI) and will be reviewed during the next inspection at the facility (IFI 50-264/2006-201-01). This inspector reviewed the current E-Plan to reflect the status of emergency evacuation drills and assessment equipment. The E-Plan was changed September 14, 2007 and submitted to the NRC. This change provided an update of the emergency evacuation drills and the assessment equipment. This IFI is considered closed.

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 2007 and 2008 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 1100 building, which is the Dow Emergency Services and Security Center on June 24, 2009. 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 inspector also visited the Dow Medical Center. The inspector talked to the Medical Physician and staff and discussed decontamination techniques used on medically injured personnel. 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 and the Medical Center which was capable to handle a variety of events that could happen at the DTRR.

c. Conclusions

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

**10. Maintenance Logs and Records**

a. Inspection Scope (IP 69001)

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

- Dow TRIGA Research Reactor Maintenance Forms, dated from 2007 to present
- DNRRP No. 3, "Administrative Procedures," dated September 2006
- DNRRP No. 4.5.3, "Maintenance," date June 16, 2008
- Completed "Dow TRIGA Research Reactor Maintenance" forms, from 2007 to present

b. Observations and Findings

The inspector reviewed the maintenance records related to 2007, 2008 and 2009 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 were 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.

c. Conclusions

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

## 11. Fuel Handling Logs and Records

### a. Inspection Scope (IP 69001)

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

- Reactor Logbooks Nos.100 to 105 covering operations from 2007 to present
- DNRRP No. 3.4, "Procedural and Administrative Limitations," dated September 2006
- DNRRP No. 3.5, "Reactor Operations Log Book," Revision 0, dated July 2, 2008
- DNRRP No. 4.3.2, "Movement of Fuel - General Requirements," Revision 0, dated July 2, 2008
- DNRRP No. 4.3.3, "Movement of Fuel - Approach to Criticality," Revision 0, dated July 2, 2008
- DNRRP No. 4.3.4, "Procedure for the Performance of the Annual Fuel Inventory," Revision 0, dated July 2, 2008
- DNRRP No. 4.4.1, "Procedure for the Control Rod Removal and Inspection," Revision 11, dated November 2006
- DNRRP No. 4.5.3, "Maintenance," Revision 1, dated June 16, 2008
- Fuel handling equipment and instrumentation
- Fuel movement and inspection records dated February 19, 2008 and January 19, 2009

### b. 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 for these operations were acceptable.

### c. Conclusions

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

**12. Follow-up on Previous open items**

a. Inspection Scope (IP 69001)

The inspector reviewed the actions taken by the licensee following identification of two IFI's and one URI during previous a inspection.

b. Observations and Findings

- (1) IFI 50-264/2006-201-01- Follow-up to E-Plan to reflect the current status of emergency evacuation drills and assessment equipment.

E-Plan changed July 27, 2007 to reflect the drills and assessment equipment. This proposed modified E-Plan was submitted to the NRC September 14, 2007

- (2) IFI 50-264/2007-201-01- Follow-up on licensee implementation on more structured procedural tracking system.

Recent change to add Procedure revision dates to change pages has been Incorporated.

- (3) URI 50-264/2007-201-02- Failure to conduct a written evaluation of design changes.

DNRRP 4.53 changed to add an additional document page to reflect 10CFR 50.59 considerations.

c. Conclusion

The issues regarding E-Plan drills and assessment equipment and the structured procedural tracking system are considered closed. The Unresolved Item concerning the 10 CFR 50.59 has been resolved and considered closed.

**13. Exit Interview**

The inspector presented the inspection results to licensee management at the conclusion of the inspection on June 26, 2009. The inspector described the areas inspected and discussed in detail the inspection observations. No dissenting comments were received from the licensee. 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. Deshmukh	Resource Lead – Inorganic
S. Dhingra	Chairman, Reactor Operations Committee and Director Analytical Sciences- Core R&D
B. Haskins	SRO – Assistant Reactor Supervisor
M. Krahenbuhl	Facility Director
M. Lee	Medical Physician and Medical Center Director
J. Seeburger	Emergency Services and Security Delivery Specialist
J. Weldy	Radiation Safety Officer
S. Yusuf	Reactor Supervisor

## INSPECTION PROCEDURES USED

IP 69001 CLASS II NON-POWER REACTORS

## ITEMS OPENED, CLOSED, AND DISCUSSED

### Opened:

None

### Closed:

50-264/2006-201-01	IFI	Follow-up to E-Plan to reflect the current status of emergency evacuation drills and assessment equipment. EP changed September 14, 2009 (review by NRC January 9, 2008)
50-264/2007-201-01	IFI	Follow-up on Licensee implementation on more structured procedural tracking system. Recent change to add Procedure revision dates.
50-264/2007-201-02	URI	Failure to conduct a written evaluation of design changes. DNR RP 4.53 changed to reflect 10 CFR 50.59 considerations.

### Discussed:

None

## LIST OF ACRONYMS USED

ADAMS	Agencywide Documents Access and Management System
ALARA	As Low As Reasonably Achievable
CFR	Code of Federal Regulations
DNRRP	Dow Nuclear Research Reactor Procedure
DTRR	Dow TRIGA Research Reactor
FD/RS	Facility Director/Reactor Supervisor
IFI	Inspector Follow-up Item
IP	Inspection Procedure
MREM	Millirem
NRC	Nuclear Regulatory Commission
OSLD	Optically Stimulated Luminescence Dosimeter
ROC	Reactor Operations Committee
RPP	Radiation Protection Program
RS	Reactor Supervisor
RSO	Radiation Safety Officer
TRIGA	Training Research Isotope Production General Atomics
TS	Technical Specification
URI	Unresolved Item

Dow Chemical Company

Docket No. 50-264

cc:

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