

U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-264/84-01(DRP)

Docket No. 50-264

License No. R-108

Licensee: Dow Chemical U.S.A.  
1602 Building  
Midland, MI 48640

Facility Name: Dow TRIGA Reactor

Inspection Conducted: October 24-26, 1984

Inspectors:

J. E. Hyder  
J. E. Hyder  
Los Alamos National Laboratory  
Safety Assessment Group

11/19/84  
Date

K. R. Ridgway  
K. R. Ridgway  
Nuclear Regulatory Commission  
Region III

11/29/84  
Date

Reviewed by:

C. C. Thomas  
C. C. Thomas  
Los Alamos National Laboratory  
Safety Assessment Group

11/20/84  
Date

Approved by:

E. R. Schweibinz  
E. R. Schweibinz  
Nuclear Regulatory Commission  
Technical Support Section

12-04-84  
Date

Inspection Summary

Inspection on October 24-26, 1984 [Report No. 50-264/84-01(DRP)].

Areas Inspected: Routine, unannounced inspection of records, logs, and organization; review and audit functions; requalification training; procedures; surveillance activities; experiments; fuel-handling activities; radiation control practices; radwaste management program; and follow-up of two licensee event reports. The inspection involved 14 inspector-hours onsite by 1 NRC contractor inspector and 14 inspector-hours onsite by 1 NRC inspector including 0 inspector-hours onsite during off-shifts.

Results: One item of noncompliance was identified in the areas inspected: The Commission was not notified of the failure of a required safety circuit while the reactor was operating at full licensed power (Paragraph 7).

8412130317 841210  
PDR ADOCK 05000264  
PDR  
Q

## DETAILS

### 1. Persons Contacted

- \*D. L. Berry, Research Manager, Inorganic Analysis, and  
Chairman, Reactor Operations Committee
- \*C. W. Kocher, Reactor Supervisor
- \*K. J. Kelly, Assistant Reactor Supervisor
- T. J. Quinn, Senior Reactor Operator
- T. W. Parsons, Health Physicist
- \*C. Vaughn, Jr., Industrial Hygienist

\*Indicates those present at the exit interview.

### 2. General

This inspection, which began at 1:00 p.m. on October 24, 1984, was conducted to examine the overall program at the Dow TRIGA Reactor. However, this inspection did not examine the security and material accountability and control activities. The facility was toured shortly after arrival, and the conditions of the facility were found to be acceptable.

The Dow TRIGA Reactor is a part of the Analytical Laboratory and formerly was used almost exclusively as a neutron source for activation analysis. It is now used 15 to 20% of the time as a radiation source to study the effect of radiation on materials. The reactor is used almost daily and, frequently, several times per day.

### 3. Organization, Logs, and Records

The facility organization was reviewed and verified to be consistent with the Technical Specifications and the Safety Analysis Report (1966). The minimum staffing requirements were verified to be present during reactor operation and fuel handling operations.

The reactor logs and records were reviewed to verify that

- a. required entries were made,
- b. significant problems or incidents were documented,
- c. the facility was being maintained properly, and
- d. records were available for inspection.

D. L. Berry has replaced P. J. Knoll as Research Manager of Inorganic Analysis and Chairman of the Reactor Operations Committee (ROC).

No items of noncompliance or deviations were identified during this part of the inspection.

### 4. Reviews and Audits

The licensee's review and audit program records were examined by the inspectors to verify the following.

- a. Reviews of facility changes, operating and maintenance procedures, design changes, and unreviewed experiments had been conducted by a safety review committee as required by Technical Specifications or Hazards Summary Report.
- b. The review committee and/or subcommittees were composed of qualified members, and quorum and frequency of meeting requirements had been met.
- c. Required safety audits had been conducted in accordance with Technical Specifications requirements, and any identified problems were resolved.

The License and Technical Specifications do not require internal audits; however, the Industrial Hygiene Services department reviews radiation safety practices at the Reactor Laboratory.

No items of noncompliance or deviations were identified in this portion of the inspection.

#### 5. Requalification Training

The inspector reviewed procedures, logs, and training records and interviewed personnel to verify that the requalification training program was being carried out in conformance with the facility's approved plan and NRC regulations. Requalification examinations were conducted during January of 1982, 1983, and 1984.

One Licensed Senior Reactor Operator terminated his role with the reactor facility before the January 1984, Requalification Examination.

No items of noncompliance or deviations were identified in this section of the inspection.

#### 6. Procedures

The inspector reviewed the licensee's procedures to determine if procedures were issued, reviewed, changed or updated, and approved in accordance with Technical Specifications and SAR requirements.

This review also verified that

- a. procedure content was adequate to safely operate and maintain the facility;
- b. responsibilities were clearly defined; and
- c. required checklists and forms were used.

The inspector determined that the required procedures were available and that the contents of the procedures were adequate. Minor revisions have been made in several procedures, with all such revisions being reviewed and approved by the ROC.

Several minor changes have been made in the reactor instrumentation and controls (for example, modification of linear and per cent power scram test circuits). Although the minutes of the ROC indicate the committee was made aware of the proposed changes, they do not reflect an approval before the change. The licensee agreed that, in the future, prior committee approval would be documented clearly. [Open Item 50-264/84-01-01].

No items of noncompliance or deviations were identified in this portion of the inspection.

## 7. Surveillance Activities

The inspectors reviewed procedures, surveillance test schedules, and test records, and discussed the surveillance program with responsible personnel to verify that

- a. when necessary, procedures were available and adequate to perform the tests,
- b. tests were completed within the required time schedule, and
- c. test records were available.

The previous operational inspection (50-264/81-02) identified some deficiencies in the licensee's maintenance documentation (Open Item 50-264/81-02-01). Although the licensee has increased the details in their maintenance records, they do not specify when or how a problem is identified or what checks or calibrations confirm the equipment has been repaired. This remains an open item.

A comparison of the Maintenance Log and the Daily Reactor Operation Log revealed that in September 23, 1983, while the reactor was at power, the "Log Channel" failed. The reactor was promptly "scrammed." This channel is identified as one of the "Minimum Reactor Safety Circuits" by the Technical Specifications F. 5. Contrary to License Condition 3.D.(1), the licensee failed to notify the Commission of incident "which could have prevented a nuclear system from performing its safety function" (Noncompliance Item 50-264/84-01-02). The licensee acknowledged that this event had not been reported to the NRC, explaining that having scrambled the reactor promptly, they felt that safety had not been compromised.

## 8. Experiments

The inspectors verified the following by reviewing experiment records and other reactor logs.

- a. Experiments were conducted using approved procedures and under approved reactor conditions.
- b. New experiments or changes in experiments were reviewed properly and approved.
- c. The experiments did not involve an unreviewed safety question.
- d. Experiments involving potential hazards or reactivity changes were identified in the procedures.

- e. Reactivity limits were not or could not have been exceeded during the experiment.

No items of noncompliance or deviations were identified during this part of the inspection.

#### 9. Fuel Handling Activities

The facility fuel handling program was reviewed by the inspector. The review included verifying approved procedures for fuel handling and their technical adequacy in the areas of radiation protection, criticality safety, Technical Specifications, and security plan requirements. The inspectors determined, by records review and discussions with personnel, that fuel-handling operations and startup tests were carried out in conformance with the licensee's procedures.

During early January of each year, as part of the requalification training program, all licensee operators participate in the inspection of each fuel element and each control element.

No items of noncompliance or deviations were identified during this part of the inspection.

#### 10. Radiation Control

The inspector reviewed records, interviewed personnel, and made observations and independent surveys to verify that radiation controls were being carried out in accordance with the license and NRC regulations. The areas covered were

- a. posting and labeling of restricted areas and radioactive materials,
- b. control of irradiated samples,
- c. calibration of radiation-detection instruments,
- d. required periodic dose and contamination surveys,
- e. exposure records of personnel, and
- f. posted areas of the facility.

The licensee has established an instrument calibration program (now semi-annual for most instruments); this closes Open Item 50-264/81-02-02. Also, radiation and contamination surveys have been performed monthly since the previous inspection; this closes Open Item 50-264/81-02-03.

The fixed-position area radiation monitor above the reactor is calibrated semi-annually by the reactor staff using a reported 9.2-mg Ra source. The exact history and thus "certification" of this Ra source could not be determined. The licensee agreed to verify the "certification of the source," calibrate this source, or replace this source with one of proven strength. (Open Item 50-264/84-01-03).

No items of noncompliance or deviations were identified during this portion of the inspection.

## 11. Radwaste Management

The licensee had not released any liquid radioactive wastes since the last radwaste inspection in June 1983 [50-264/83-02(DRMSP)].

The facility has no gaseous effluent monitor because calculations in the Safety Analysis Report demonstrated that 10 CFR 20 offsite limits would not be exceeded with continuous pneumatic sample operation. The pneumatic sampler is used only a few hours per week. The air in the reactor room is sampled continuously for particulate activity. Solid waste is held for decay and monitored before removal from the facility. Samples that do not decay promptly (still radioactive, after about a year) are transferred to NRC By-Product Material License No. 12-00265-06. This material then is packaged and shipped to a licensed disposal site in accordance with applicable regulations.

## 12. Licensee Event Report Followup

Through direct observations, discussions with licensee personnel, and review of records, the following event reports were reviewed to determine that reportability requirements were fulfilled, immediate corrective action was accomplished, and corrective action to prevent recurrence had been accomplished in accordance with Technical Specifications.

By letter dated April 28, 1982 (Event Report 82-01), the licensee informed Region III that on April 21, 1982, while the reactor was operating at a steady-state power level of 5 W, one of the linear safety channels had been deliberately disabled. During this inspection, the operator acknowledged that his actions had been motivated by a desire to determine the response of the ion chamber to loss of compensating voltage, and it was only later that he realized that he had violated Technical Specification F.5. The Reactor Supervisor stated that, in the future, any proposed new or unusual test will be reviewed by the ROC before any actions. This Event Report is considered closed.

By letter dated October 20, 1982 (Event Report 82-02), the licensee notified Region III that on October 6, 1982, after the reactor had been shut down, the Continuous Air Monitor (CAM) (required by Technical Specification A.3.) was found to be inoperable, and it was assessed that the CAM had not been functioning during at least part of the reactor run. The unit was repaired and has functioned adequately since. This Event Report is considered closed.

No items of noncompliance or deviations were identified in this section of the inspection.

## 13. Exit Interview

The inspectors met with licensee representatives (denoted in Paragraph 1) at the conclusion of the inspection on October 26, 1984, and summarized the scope and findings of the inspection.

The following specific matters were discussed.

1. The failure to properly notify the Commission of an incident that could have prevented a nuclear system from performing its safety function (Sec. 7).
2. The lack of recorded ROC approvals before changes in the reactor facility (Sec. 6).
3. The need for more details in the maintenance log (Sec. 7).
4. The necessity of confirming the strength of the instrument calibration source (Sec. 10).