

December 13, 1996

Mr. Larry Giebelhaus  
Project Manager  
The Dow Chemical Company  
1261 Building  
Midland, MI 48667

SUBJECT: CONFIRMATORY SURVEY AND INSPECTION AT THE DOW CHEMICAL COMPANY'S  
MIDLAND AND BAY CITY, MI, MAGNESIUM THORIUM REMEDIATION SITES  
(NRC REPORT NO. 040-00017/96002(DNMS))

Dear Mr. Giebelhaus:

This refers to the inspection conducted November 19-20, 1996, at the Dow Chemical Company's Midland and Bay City, Michigan sites, and to the discussion of our findings with you and members of your staff at the conclusion of the inspection. The purpose of the inspection was to conduct a confirmatory survey at the Midland site and to determine whether the finding and concerns of our August 5-8, 1996, inspection have been addressed by the licensee in accordance with NRC requirements. The confirmatory survey of the Midland site was conducted at the request of Dow Chemical, to release a portion of the site which had been excavated, so the excavation could be filled in. The area in and around the excavation was found to have contamination above the NRC guidelines for release of the site for unrestricted use.

During this inspection, certain of your activities were found to be in violation of NRC requirements, as specified in the enclosed Notice. A written response is required. The violation is a repeat violation. In your response to this violation, please describe why your proposed corrective action is expected to be more successful in preventing future or similar violations than the corrective action taken in the past.

Based on the results of this inspection, the NRC has determined that Dow Chemical should continue to remediate the Midland site and send a copy of the final survey data to NRC Region III for review. NRC Region III will review the data and, if acceptable, set up a date for a confirmatory survey.

Soil and split samples were collected during this inspection. The results of these analysis of these samples and comparisons of the analysis of the split samples will be addressed under separate cover.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, the enclosure, and your response to this letter will be placed in the NRC Public Document Room (PDR).

Larry Giebelhaus

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Should you have any questions regarding the inspection, please do not hesitate to contact Mr. Kulzer at (630) 829-9875.

Sincerely,

Original Signed by

Cynthia D. Pederson, Director  
Division of Nuclear Materials Safety

License No. STB-00527  
Docket No. 040-00017

Enclosures: 1. Notice of Violation  
2. Inspection Report  
No. 040-00017/96002(DNMS)

cc w/encls: D. Minnaar, Michigan Department of Public Health  
Bureau of Environmental & Occupational Health

bcc w/encls: J. Hickey, NMSS  
J. Buckely, NMSS  
J. Parrott, DWM  
PUBLIC (IE07)

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NAME	Kulzer		Jorgensen		Pederson			
DATE	12/ /96		12/ /96		12/13/96			

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Larry Giebelhaus

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Should you have any questions regarding the inspection, please do not hesitate to contact Mr. Kulzer at (630) 829-9875 or myself at (630) 829-9800.

Sincerely,

Original Signed by

Cynthia D. Pederson, Director  
Division of Nuclear Materials Safety

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NAME	Kulzer	<input checked="" type="checkbox"/>	Jorgensen	<input checked="" type="checkbox"/>	Pederson	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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NOTICE OF VIOLATION

The Dow Chemical Company  
Midland, Michigan

License No. STB-00527  
Docket No. 040-00017

During an NRC inspection conducted November 19-20, 1996, a violation of NRC requirements was identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions" (Enforcement Policy), NUREG-1600 (60 FR 34381; June 30, 1995), the violation is listed below:

Condition 9, "Authorized Use", of License No. STB-00527, Amendment No. 6, dated July 19, 1996, states that, "Licensed material shall be possessed and used during site activities leading to its removal from the Midland and Bay City sites in accordance with the statements, representations, and procedures as contained in the amendment request dated October 12, 1995; and the supplemental information submitted by letters dated December 6, 1995; March 11, 1996; and May 24, 1996."

Section 9.0, "Work Area Control," of the *Radiological Health & Safety Plan For the Remediation of the Magnesium-Thorium Slag Piles at The Dow Chemical Company's Midland and Bay City, Michigan Sites*, October 1995 (incorporated by reference into Amendment No. 6) pages 25 and 26, specifies radiological control limits for three zones. The Plan states in part for the Clean Zone, "potentially contaminated personnel/materials are not allowed in this zone".

Contrary to the above, on November 19-20, 1996, contamination was found to be buried in the soil in the Clean Zone outside of the restricted Contamination Zone.

This is a repeat violation.

This is a Severity Level IV violation (Supplement VI).

Dated at Lisle, Illinois  
this 13th day of December 1996

U.S. NUCLEAR REGULATORY COMMISSION  
REGION III

Docket No.: 040-00017  
License No.: STB-00527  
Report No.: 040-00017/96002(DNMS)  
Licensee: Dow Chemical Company  
Facilities: 1. The Dow Chemical Company-Michigan Division  
2. DowBrands (wholly owned subsidiary of The Dow  
Chemical Company)  
Location: 1. Main Street, Midland, MI 48667  
2. 4868 East Wilder Road, Bay City, MI 48706  
Dates: November 19-20, 1996  
Inspectors: E. Kulzer, Radiation Specialist  
J. Parrott, Project Manager  
Accompanying  
Personnel: R. Skowronek, Michigan Department of Public Health  
R. Rotta, Michigan Department of Public Health  
Approved By: B. L. Jorgensen, Chief   
Decommissioning Branch

## EXECUTIVE SUMMARY

**DOW CHEMICAL COMPANY  
MAGNESIUM-THORIUM REMEDIATION PROJECT  
MIDLAND AND BAY CITY, MI, PLANTS  
NRC Inspection Report No. 040-00017/96002(DNMS)**

This was a confirmatory survey and inspection at the Midland and Bay City, Michigan sites. The survey was conducted at the request of the Licensee, to allow release of a portion of the site which had been excavated, so the excavation could be filled in. The licensee had indicated the area was ready for release. The area in and around the excavation was found to have contamination above the NRC's release guidelines for unrestricted use; the Licensee needs to continue to remediate this site.

During this inspection, the NRC inspectors determined that the licensee's oversight of its contractor's decontamination and remediation activities were generally adequate, with the exemption noted below. The inspection included a review of actions taken in regards to the areas of concern found in the August 5-8, 1996, inspection.

The NRC inspectors identified one cited repeat violation as follows:

- The licensee failed to ensure control of licensed material within radiological control zones as specified in the license conditions (Section 2.2)

The licensee took immediate and adequate steps to correct the above violation prior to the completion of the NRC inspection.

## DETAILS

### Background

The Dow Chemical Company (Dow) was issued a license by the Atomic Energy Commission (AEC) in 1962 to use thorium metal compounds for the production of thorium-magnesium alloys at Bay City and Midland, Michigan. In 1973, the license was amended to authorize storage only or transfer of metal or process sludge to authorized recipients. Licensed operations resulted in the production of slag material and contaminated soil containing thorium that now require disposal.

Waste material and contaminated soil are being stored at the Midland and Bay City sites. Dow was authorized via NRC license Amendment No. 6, dated July 19, 1996, to excavate the contaminated thorium slag/soil materials, and transport these materials by rail to the Envirocare facility in Clive, Utah, for disposal. The licensee estimated that approximately 400 railcars (approximately 96-100 cubic yards per railcar) would be needed to transport contaminated slag/soil to the Envirocare facility. Additionally, the licensee projected completion of the decontamination and remediation activities to be by the end of November 1996.

License Amendment No. 6, incorporated by reference (License Condition No. 9) *Dow's Radiological Health & Safety Plan For the Remediation of the Magnesium-Thorium Slag Piles at The Dow Chemical Company's Midland and Bay City, Michigan Sites*, outlines the health and safety guidelines and procedures to be used by the licensee in remediating these two sites.

Once the sites have been remediated, the licensee will conduct a final survey of the sites, and submit the results to the NRC for review. The licensee's proposed final survey plan is currently under review by the NRC, and will be incorporated into the license via an amendment. After NRC review of the final survey report, the NRC will conduct a confirmatory survey. Based on the results of the licensee's final survey and the NRC confirmatory survey, Dow's license may be terminated, allowing the release of the Midland and Bay City sites for unrestricted use.

### Inspection Observations and Findings

#### 1.0 Radiation Protection Program (IP 83822)

##### 1.1. Contamination Control

The inspectors determined that the licensee's health physics contractor personnel were, in most cases, performing adequate radiological surveys and collecting analytical samples for detection and measurement of removable radiological contamination.

Section 9.0 "Work Area Control", pages 25-26, of the licensee's *Radiological Health & Safety Plan For Remediation of the Magnesium-Thorium Slag Piles at The Dow Chemical Company's Midland and Bay City, Michigan Sites* states, in part, "access to these zones shall be

controlled for people, vehicles and equipment by fencing and posting the area, or using other methods to prevent inadvertent exposure to contaminated materials." The Plan states in part for the Clean Zone, "potentially contaminated personnel/materials are not allowed in this zone." The Health and Safety Plan was incorporated into Dow's license via License Amendment No. 6, dated July 19, 1996.

The inspectors identified an area at the Midland site where the licensee's survey and control program failed to identify and prevent the release of contamination from a "Contamination Zone" to a "Clean (Support) Zone".

The licensee defined the Clean Zone as follows: "This zone covers all areas outside of the Contamination Reduction Zone. Adverse exposure in this zone is unlikely since it is an uncontaminated area. Field support for most operations including field team communications, sanitary facilities, and safety equipment will be located in this zone. Potentially contaminated personnel/materials are not allowed in this zone. As areas of the sites are decontaminated, they may be fenced and also managed as clean areas."

The NRC inspectors determined by direct observation and measurements performed with radiation survey meters, that contamination that was buried in the ground was found outside of the Contamination Zone at the Midland site. Specifically, the inspectors observed an area of contaminated material approximately 1-2 feet wide by 3-8 feet long, along the north fence of the Midland "Contamination Zone". (These measurements were in agreement with the contractor's measurements).

The failure to prevent radiological contamination in a Clean Zone is a repeat violation of License Condition 9 (Violation 040-00017/96002-01(DNMS)).

The continued presence of contaminated soils at the Midland site shows that the site has not been completely remediated and is not ready for unrestricted release.

Prior to the end of the inspection, the inspectors verified corrective actions taken by the licensee to correct the above violation. The NRC inspectors determined that the licensee had remediated the areas of contaminated slag/soil from the clean area by installing additional fencing. This was also done during the August 5-8, 1996, inspection.

## 1.2 Air Sampling

The NRC inspectors determined, from the review of radiological analyses of air samples collected from some of the licensee's environmental air samplers that air concentrations of radiological materials were decreasing. This was in contrast to findings during records review conducted as part of the August 5-8, 1996, inspection. The average air concentrations remained below the 10 CFR Part 20 limits. The inspectors determined that the Licensee had taken steps to mitigate the airborne

concentrations by increased water sprinkling of the excavation sites and enhanced management oversight. Increasing the moisture levels and the fact that the concentration of contamination in the soil was decreasing, were effective in reducing environmental air levels.

### 1.3 Security

The inspectors observed that the remote surveillance camera that was not working during the August 5-8, 1996, inspection has been repaired and was operational. This is in agreement with information the licensee provided the NRC on August 20, 1996, that the surveillance camera was again functioning.

### 2.0 Management Oversight (IP 87104)

The NRC inspectors verified by records review that the ALARA Committee was meeting and performing oversight activities pursuant to license commitments. The ALARA Committee was monitoring environmental air levels for trends, and noted the monthly decrease in these levels due, at least in part, to keeping the soil wet.

A violation of minor significance found during the August 5-8, 1996, inspection which was being treated as a Non-cited Violation, consistent with Section IV of the NRC Enforcement Policy, was also reviewed. This Non-cited Violation concerned the signing of a Radiation Work Permit (RWP) by an unauthorized person. The inspectors verified that the licensee had implemented and was adequately controlling its Radiation Work Permit (RWP) Program .

### 3.0 Waste Disposal (IP 84900)

The NRC inspectors observed that controls had been put in place during the August 5-8, 1996, inspection, to contain what appeared to be radiologically contaminated run-off to a storm sewer adjoining the Midland burial site. These controls continued to be effective.

### 4.0 Department of Transportation (DOT) (IP 86750)

The NRC inspectors reviewed the licensee's DOT program with the DOT Coordinator. All trucks and railroad cars are properly placarded with the UN Classification Number 3077, which indicates hazardous but not radioactive and below Regulated Quantity. All truck and rail shipments also have the required shipping papers. The trucks coming from Midland to Bay City have concentrations of approximately 5-6 picocuries per gram (pCi/g) of soil. The soil at Bay City contains approximately 30 pCi/g of soil.

As of November 20, 1996, 431 railcars had been sent to Envirocare. There were 80 railcars loaded on site, and Dow plans to load another 65 rail cars this year, weather permitting. Envirocare will not accept

any railcars after the end of November because of the problem of freezing. The waste from the Midland site will continue to be trucked to Bay City, until the Midland site has been decontaminated.

#### 4.0 Independent Measurements (IP 87104)

The NRC inspectors performed direct radiological surveys to confirm the adequacy of the licensee's radiological postings and controls. Additionally, the NRC inspectors collected soil samples and split soil samples from the contractor to compare results. The results of the analysis of the samples and splits will be made under separate cover letter.

#### 7.0 Exit Meeting (IP 87104)

At the conclusion of the onsite inspection on November 20, 1996, the preliminary results of the inspection (the fact that radiation levels were in excess of the NRC release guidelines for unrestricted use, and additional contamination was still being removed from the site) were discussed with the individuals identified below. The Midland site could not be released for unrestricted use. The Dow representatives stated that the barrier fence would be left up until a confirmatory survey has been made.

## Partial List of Persons Contacted

- \*L. Giebelhaus, Project Manager, THORAD Project, Dow
  - \*K. Baker, Ph.D., Radiation Safety Officer (RSO),  
Environmental Restoration Group, Inc., (ERG)
  - \*C. Oliver, Dow Chemical, Project Engineer
  - \*B. Reiss, Contractor Owners Representative, Dow  
E. Boyce, Radian, Site Manager  
G. Hisel, ERG, Midland Site Lead RCT  
R. Berlin, Ph.D., Dames & Moore, Health Physics Consultant to Dow
- \* Attended onsite exit meeting conducted November 20 , 1996.

## INSPECTION PROCEDURES USED

- IP 83822: Radiation Protection
- IP 84900: Low-level Radioactive Waste Storage
- IP 87104: Decommissioning Inspection For Materials Licensees
- IP 86750: Solid Radioactive Waste Management and Transportation of  
Radioactive Materials