

September 12, 1996

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

SUBJECT: ROUTINE INSPECTION AT THE DOW CHEMICAL COMPANY'S MIDLAND AND
BAY CITY, MI, MAGNESIUM THORIUM REMEDIATION SITES (NRC REPORT
NO. 040-00017/96001(DNMS))

Dear Mr. Giebelhaus:

This refers to the inspection conducted August 5-8, 1996, at the Dow Chemical Company's Midland and Bay City, Michigan Plants. The purpose of the inspection was to determine whether activities authorized by the license were conducted safely and in accordance with NRC requirements.

The inspection was an examination of activities conducted under your license as they relate to radiation safety, and to compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, independent measurements and observations of activities in progress.

Based on the results of this inspection, the NRC has determined that a violation of NRC requirements occurred. This violation, the failure to prevent the spread of contamination from a "contamination zone" to "clean zone" is cited in the enclosed Notice of Violation (Notice). No response is required regarding the violation because the inspectors verified that effective corrective actions were implemented.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and the enclosure 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. McCann at (630) 829-9856 or myself at (630) 829-9800.

Sincerely,

Original Signed by R. Caniano for

Cynthia D. Pederson, Director
Division of Nuclear Materials Safety

License No. STB-527
Docket No. 040-00017

Enclosure: 1. Notice of Violation
2. Inspection Report
No. 040-00017/96001(DNMS)

cc w/encl: D. Minaar, Michigan Department of Public Health
Bureau of Environmental & Occupational Health
M. Weber, DWM
J. Parrott, DWM

bcc w/encl: PUBLIC (IE07)

DOCUMENT NAME: R:\INSPRPTS\CONTAMIN\DOW96001.DNM

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NOTICE OF VIOLATION

The Dow Chemical Company
Midland, Michigan

License No. STB-527
Docket No. 040-00017

During an NRC inspection conducted August 5-8, 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-527, 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, "that access to these zones shall be controlled for people, vehicle 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, "that potentially contaminated personnel/materials are not allowed in this zone".

Contrary to the above, on August 6, 1996, the licensee failed to identify or control the migration of radiological contamination into areas identified as a "Clean Zone", which presented an exposure hazard to personnel. This contamination had washed into the Clean Zone from a restricted Contamination Zone.

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

The inspection showed that actions had been taken to correct the identified violation and to prevent the recurrence. Consequently, no reply to the violation is required and we have no further questions regarding this matter.

Dated at Lisle, Illinois
this 12th day of September 1996

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No.: 040-00017

License No.: STB-00527

Report No.: 040-00017/96001(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: August 5-8, 1996

Inspectors:

- G. M. McCann, Senior Radiation Specialist
- E. Kulzer, Radiation Specialist
- J. Parrott, Project Manager

Accompanying Personnel:

- D. Minaar, Michigan Department of Public Health

Approved By: J. W. McCormick-Barger, Chief
Decommissioning Branch

EXECUTIVE SUMMARY

DOW CHEMICAL COMPANY
MAGNESIUM-Thorium REMEDIATION PROJECT
MIDLAND AND BAY CITY, MI, PLANTS
NRC Inspection Report No. 040-00017/96001(DNMS)

This was a routine, announced inspection to evaluate the licensee's oversight of health physics controls, decontamination survey and analytical procedures, and remediation activities.

During this inspection, the NRC inspectors determined that the licensee's oversight of its contractor's decontamination and remediation activities were generally adequate. The inspection included the observation of the contractor's health physics, safety, radiological survey and sample collection activities.

The NRC inspectors identified one cited violation as follows:

- The licensee failed to prevent the release of licensed material between radiological control zones as specified in the licensee's license application (Section 2.2)

In addition, the NRC inspectors identified one violation of minor safety significance as follows:

- The licensee failed to assure that only individuals identified in their license application signed Radiation Work Permits (RWP), in that a staff health physicist sign a RWP, instead of the Radiation Safety Officer or the Alternate Radiation Safety Officer, who were the only two individuals authorized by the license to sign RWPs. This failure constituted a violation of minor significance and is being treated as a Non-cited Violation, consistent with Section IV of the NRC Enforcement Policy (Section 1.0).

The licensee took immediate and adequate steps to correct the above violations 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) will 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 mid to 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*, which 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 Management Oversight (IP 87104)

The NRC inspectors interviewed Dow and its contractor management personnel, and determined that, based on these interviews and review of management control records, the licensee and its contractor, were adequately overseeing the remediation activities being conducted at the Dow Midland and Bay City Sites.

The NRC inspectors verified that the ALARA Committee was meeting and performing oversight activities pursuant to license commitments.

The inspectors also verified that the licensee had implemented and was adequately controlling its Radiation Work Permit (RWP) Program . The inspectors identified one instance where an RWP (Permit-THORAD-13) had been signed by an individual not authorized pursuant to the licensee's license. However, the inspectors determined that the individual who signed the RWP was a qualified health physicist, and that the RWP had been discussed and verbally approved by the Alternate RSO prior to work being performed. This failure constitutes a violation of minor significance and is being treated as a Non-cited Violation, consistent with Section IV of the NRC Enforcement Policy.

2.0 Radiation Protection Program (IP 83822)

2.1 Radiation Training Program

The NRC inspectors interviewed, and observed job related safety task performed by several Dow and Dow contractor personnel, e.g., radiation control technicians, truck drivers, heavy equipment operators, and construction and health physics personnel at both Dow sites. Based on the above interviews and review of training records, the NRC inspectors determined that the licensee's training program had been adequately implemented .

2.2. Contamination Control

The inspectors determined that the licensee possessed an adequate number of survey and analytical radiation detection and measurement equipment, appropriate for the types of radiation of concern. Additionally, the inspectors verified that adequate calibrations of the radiological equipment were being performed, and that the calibration records were being adequately maintained.

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. The inspectors determined that the following surveys were being performed: railroad cars and trucks, designated for transport of the thorium contaminated slag/soil; licensee's contamination control zones; and construction equipment and personnel. The surveys and sample collections were conducted at appropriate intervals. The inspectors verified that adequate records of these surveys were being completed and maintained.

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, "that access to these zones shall be controlled for people, vehicle 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, "that 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 two areas 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 slag/soil had been washed out from the Contamination Zone at the Midland Site. Specifically, the inspectors observed an area of contaminated material approximately 3-5 feet wide by 10-20 feet long, along the North fence of the Midland "Contamination Zone". Additionally, the inspectors identified another area of slag/soil, approximately 2-4 feet wide by 6-10 feet long) leaving the North-East end of the fenced "Contamination Zone".

The failure to prevent radiological contamination in a Clean Zone is a violation of License Condition 9 (violation 040-00017/96001-01(DNMS)).

Prior to the end of the inspection, the inspectors verified corrective actions taken by the licensee to correct and prevent future occurrence of the above violation. The NRC inspectors determined that the licensee had remediated the areas of contaminated slag/soil from the clean area. Further, the licensee expanded the Contamination Zone, to include the above areas, by installing additional fencing and placing additional postings. The licensee's personnel also dug a trench around the slag/soil piles to capture and divert any future contaminated rain water back into the Contamination Zone. To facilitate identification of ground contamination in areas with high ambient gamma radiation background levels when performing radiation survey surveillance of the clean zones, the licensee also implemented the use of a second survey meter, that is, the detector was shielded on the sides which reduced the influence of high gamma radiation background levels.

2.3 Personnel Monitoring

The NRC inspectors interviewed the licensee's health physics contractor management personnel and reviewed related records regarding their external and internal radiological personnel monitoring programs. The NRC inspectors determined, based on these interviews and record reviews, that the licensee's external and internal monitoring programs were in compliance with NRC regulations and license commitments.

2.4 Air Sampling

The NRC inspectors interviewed the licensee's health physics contractor management personnel and reviewed related records regarding their occupational (work place and breathing zone monitoring) and environmental monitoring programs. The NRC inspectors verified, based on these interviews and record reviews, that the licensee's radiological air monitoring program was in compliance with NRC regulations and license commitments.

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 increasing. Although it appeared that the average air concentrations were below the 10 CFR Part 20 limits, the NRC inspectors discussed this trend with the licensee's management and its health physics contractor. The inspectors determined that the licensee was aware of the trend and had taken steps to mitigate the airborne concentrations by increased water sprinkling of the excavation sites and management oversight.

2.5 Respiratory Protection

The NRC inspectors interviewed the health physics contractor and construction personnel regarding their respiratory protection program. The inspectors also observed a number of breathing zone samplers being used by these personnel during various construction and loading operations involving thorium contaminated slag/soil materials. The NRC inspectors verified, based on these interviews and observations that the licensee's respiratory protection program was in compliance with NRC regulations and license commitments.

2.6 Posting

The NRC inspectors interviewed the health physics contractor personnel regarding their program for posting areas containing radiological materials. The NRC inspectors verified, based on these interviews and observations made during the inspection, that the licensee's program for posting radiological areas, was in compliance with NRC regulations and license commitments.

2.7 Security

The NRC inspectors interviewed the licensee and its health physics contractor personnel regarding their program for controlling access to areas containing radiological materials. The NRC inspectors verified, based on these interviews and observations made during the inspection, that the licensee's program was in compliance with NRC regulations and license commitments.

The inspectors were informed that a remote camera surveillance system, located at the Bay City Site, installed as part of a corrective action to a violation identified during a previous NRC inspection (NRC Report No. 040-00017/95001), had stopped working just prior to the inspection. The NRC inspectors determined through interviews with Dow management and its contractor health physics personnel, that the licensee had, on an interim basis to compensate for the loss of the camera, increased the onsite guard's surveillance of the Bay City Site radiological contaminated controlled areas. The licensee informed the NRC on August 20, 1996, that the surveillance camera was again functioning.

3.0 Waste Disposal (IP 84900)

The NRC inspectors interviewed the licensee and its health physics contractor personnel regarding its program for storing and controlling the disposal of licensed materials. The NRC inspectors verified, based on the interviews and observations made during the inspection, that the licensee's program was in compliance with NRC regulations and license commitments.

The NRC inspectors observed what appeared to be radiological contaminated slag/soil rain water run-off (see Section 2.2 above) which had entered via a manhole, a storm sewer adjoining the Midland Burial Site. The NRC inspectors were informed by the licensee's health physics contractor that the potentially contaminated sediment was removed from the bottom of the storm sewer manhole. The inspectors were also informed during an August 20, 1996, telephone conversation that subsequent surveys of the storm sewer, fifteen foot of the sewer line leading down-stream from this manhole, and measurements performed at the next storm sewer manhole downstream, were all within radiological background values.

The inspectors also observed immediate actions taken by the licensee during the inspection to prevent future run-off into this storm sewer. The licensee's personnel sealed the storm sewer, and placed a sand berm between the fenced slag/soil to catch any potential future rain-water run-off.

4.0 Department of Transportation (DOT) (P 87104)

The NRC inspectors interviewed the licensee's health physics contractor personnel, and truck drivers regarding the licensee's program for the transport of thorium contaminated slag/soil between the Midland and Bay City Sites. The NRC inspectors also discussed the DOT requirements with these individuals, and observed several trucks (Midland and Bay City Sites) and rail cars (Bay City) loaded with thorium contaminated slag/soil. The NRC inspectors verified, based on the interviews and observations that the licensee's DOT program was in compliance with NRC regulations and license commitments.

5.0 Occupational Health & Safety Requirements (OSHA) (IP 93001)

The NRC inspectors interviewed the licensee's staff responsible for OSHA requirements. The inspectors verified that the licensee appeared to be complying with statements and documentation regarding OSHA requirements contained in the licensee's license.

6.0 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 some smears for removable contamination. The smears were collected at licensee control points, from railcars and trucks. The results of these inspectors surveys and smears verified (except for the violation noted in Section 2.2 above) that the licensee was controlling radiological exposure rates and removable contamination levels according to NRC requirements and license commitments.

7.0 Exit Meeting (IP 87104)

At the conclusion of the onsite inspection on August 7, 1996, the preliminary results of the inspection were discussed with the individuals identified below. The licensee expressed their desire to coordinate surveys with the NRC. The licensee expressed interest regarding the coordination of the NRC confirmatory survey of the Midland Site, after the licensee has finished remediation of the site and completed the final survey. The licensee expressed concern about the safety in leaving the pit, dug during the remediation of the contaminated material at the Midland Site, open.

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)
 - *D. Hunter, Field Operations Lead (FOL), Alternate RSO, ERG
G. Hisel, Health Physicist, ERG
 - *B. Berlin, Ph.D., Dames & Moore, Health Physics Consultant to Dow
G. Boyce, Radian, LLC, Midland Site Supervisor
S. Wieber, Radian, Excavator Operator
J. Bear, Fisher Contracting, Driver
T. Bear, Fisher Trucking, Driver
B. Reiss, Contractor Owners Representative, Dow
J. Sgro, Radian Project Manager
A. Sandow, Project Superintendent, Radian
M. Sandow, Industrial Hygienist, Health & Safety Officer, Radian
C. Loar, Radiological Control Technician (RTC), Radian
- * Attended onsite exit meeting conducted August 7, 1996.

INSPECTION PROCEDURES USED

- IP 93001: OSHA Interface Activities
- IP 83822: Radiation Protection
- IP 84900: Low-level Radioactive Waste Storage
- IP 87104: Decommissioning Inspection For Materials Licensees