

September 25, 2006

Mr. Ben Baker  
Project Manager  
The Dow Chemical Company  
47 Building  
Midland, MI 48674

SUBJECT: NRC INSPECTION REPORT 040-00017/06-001 - (DNMS)  
THE DOW CHEMICAL COMPANY BAY CITY SITE (THORAD PROJECT),  
BAY CITY, MICHIGAN

Dear Mr. Baker:

On August 25, 2006, the NRC completed an inspection at the Dow Chemical Company Bay City site (Thorad Project), Bay City, Michigan. The purpose of the inspection was to determine whether decommissioning activities were conducted in accordance with your Decommissioning Plan (DP), Final Status Survey Plan (FSSP), Radiological Health and Safety Plan (RHASP), and NRC regulations. Specifically, during on-site inspections on May 10 and July 25, 2006, the NRC inspectors evaluated the performance of your remediation and final status surveys of the Support Zone, Rail Spur Loading Area, the path between the Support Zone and Rail Spur Loading Area, sample collection and analysis, and field laboratory operations. The inspectors obtained independent and split soil samples, and samples previously analyzed by your on-site laboratory to be analyzed at the NRC's contract laboratory in Oak Ridge, Tennessee. At the conclusion of the on-site inspections, the NRC inspectors discussed the preliminary findings with members of your staff. On August 25, 2006, the inspectors completed an in-office review of the laboratory data results for the soil samples that were collected during the inspections and conducted a telephone exit interview with the Site Radiation Safety Officer, Mr. Dave Wojtkowiak.

This inspection consisted of an examination of decommissioning activities at the Thorad Project site as they relate to safety and compliance with the Commission's rules and regulations. Areas examined during the inspection are identified in the enclosed report. Within these areas, the inspection consisted of a selective examination of representative records, interviews with personnel, and independent confirmatory measurements.

Based on the results of this inspection, the NRC did not identify any violations of NRC regulatory requirements.

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B. Baker

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We will gladly discuss any questions you have concerning this inspection.

Sincerely,

**/RA/**

Jamnes L. Cameron, Chief  
Decommissioning Branch  
Division of Nuclear Materials Safety

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

Enclosure:  
Inspection Report 040-00017/06-001(DNMS)

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**U.S. NUCLEAR REGULATORY COMMISSION**

**REGION III**

Docket No.: 040-00017

License No.: STB-527

Report No.: 040-00017/06-001(DNMS)

Licensee: The Dow Chemical Company (TDCC)

Facility: TDCC Bay City (Thorad Project) Site

Location: Bay City, MI

Dates: May 10, 2006 (on-site inspection)  
July 25, 2006 (on-site inspection)  
August 25, 2006 (in-office review and telephone exit)

Inspector: Eugenio A. Bonano, Health Physicist  
Samuel J. Mulay, Health Physicist  
Peter J. Lee, PhD., CHP, Health Physicist

Approved By: Jamnes L. Cameron, Chief  
Decommissioning Branch  
Division of Nuclear Materials Safety

Enclosure

## **EXECUTIVE SUMMARY**

### **The Dow Chemical Company (TDCC) Bay City (Thorad Project) Site, Bay City, MI Inspection Report No. 040-00017/06-001(DNMS)**

The radioactive material of concern at the Bay City site is thorium-232 in the form of foundry slag containing magnesium. This material was produced between 1940 and 1970 as residual from the production of magnesium-thorium alloy for defense purposes (including aircraft engines and aeronautical structural components). Portions of the process slag have been mixed with soil and limited amounts of construction debris. The thorium concentrations varied from 2 to 7,000 picocuries per gram (pCi/g) at the Bay City site. The estimated total activity of 9.7 Ci of Th-232 was distributed through approximately 60,000 yards of slag, soil, and construction debris. TDCC contracted the URS Corporation (formerly Radian International) to remove the thoriated material from the site. Excavated contaminated soil was transported by rail to the Envirocare facility in Clive, Utah for final disposal.

#### **Close-out Inspection and Survey**

- The inspectors concluded that the licensee, and its contractor, conducted work in accordance with the approved DP, FSSP, and NRC regulations.

#### **Decommissioning Inspection Procedure for Materials Licensees**

- The inspectors concluded that the licensee, and its contractor, conducted decommissioning activities safely and in accordance with the RHASP, NRC and DOT regulations.

## Report Details

### 1 Closeout Inspection and Survey (83890)

#### 1.1 Inspection Scope

The inspectors evaluated the performance of the licensee's remediation, final status surveys (FSS), sample collection and analysis, and field laboratory operations to verify that work was done in accordance with the licensee's Decommissioning Plan (DP) and the Final Status Survey Plan (FSSP). The inspectors interviewed contractor personnel, performed side-by-side and independent radiological surveys, collected soil samples, and obtained a soil sample previously analyzed by the licensee's on-site laboratory to be counted at the NRC's contract laboratory, Environmental Survey and Site Assessment Program (ESSAP) of the Oak Ridge Institute for Science and Education (ORISE) located in Oak Ridge, Tennessee.

#### 1.2 Observations and Findings

During the May 10, 2006 in-process inspection, the inspectors performed side-by-side and independent radiological surveys (surface scans) using a calibrated Ludlum 2241-2 survey meter (NRC Tag Number: 061686, Serial Number: 132192, Calibration Due Date: July 1, 2006) with a Ludlum 44-10 sodium iodide 2 by 2 detector (Serial Number: PR110265) of the Support Zone, and the path between the Support Zone and the Rail Spur Loading Area. The inspectors collected three soil samples (sample numbers: DOW-06-1-01 (Grid C4/Sub Grid 02/Quad Ranch B), DOW-06-1-02 (Grid C4/Sub Grid 07/Quad A), and DOW-06-1-03 (Grid C3/Sub Grid 8)). The analytical results were documented in the ESSAP/ORISE laboratory report dated July 14, 2006, (see ADAMS ML061990605). The licensee remediated location Grid C4/Sub Grid 07/Quad A to concentrations below the release criteria of 3.2 pCi/g for thorium-232; and averaged the concentrations for Grid C3/Sub Grid 8 in accordance with NUREG 5849 to demonstrate compliance with the DP and the release criteria. The analytical result for the sample (DOW-06-1-01) taken from location Grid C4/Sub Grid 02/Quad Ranch B was less than the release criteria of 3.2 pCi/g, and therefore no action was taken. The radiation levels, measured at the surface of the other areas within the Support Zone, and the path between the Support Zone and the Rail Spur Loading Area were indistinguishable from natural background radiation levels.

During the July 25, 2006 in-process inspection, the inspectors performed side-by-side and independent radiological surveys (surface scans) using a Ludlum 2241-2 survey meter (NRC Tag Number: 059756, Serial Number: 130052, Calibration Due Date: March 21, 2007) with a Ludlum 44-10 sodium iodide 2 by 2 detector (Serial Number: PR110264), of the Rail Spur Loading Area. The inspectors collected six soil samples (NRC sample numbers: DOW-06-2-02, through DOW-06-2-07). The inspectors also obtained one soil sample (NRC sample number: DOW-06-2-01), previously analyzed by the licensee's on-site laboratory to verify the adequacy of the licensee's analytical counting capability and performance. The NRC's contract laboratory documented the soil sample analysis results in the ESSAP/ORISE laboratory report dated August 11, 2006 (see ADAMS ML062270167). The analytical results for samples, DOW-06-2-01 through DOW-06-2-05 and DOW-06-2-07 were below the approved

release criteria of 3.2 pCi/g for thorium-232. The analysis results for sample DOW-06-2-06 was slightly above the release criteria; but the licensee verified that remediation occurred when the NRC inspectors collected the soil sample from the sample location.

During decommissioning activities in the Support Zone and the Rail Spur Loading Area, the licensee's health physics (HP) technicians demonstrated knowledge of the conduct of remediation, final status surveys, sample collection, and performed quality assurance on field and laboratory instruments. The licensee's procedures were consistent with the DP. The inspectors did not identify any deficiencies with the licensee's surface scan results, or the radiological analytical results of the soil samples counted in the on-site laboratory. The licensee implemented a laboratory quality assurance program, which consisted of sending 5 percent of the soil samples (duplicates) to an independent third party laboratory for analysis. The inspectors did not identify any concerns with the laboratory quality assurance program.

### 1.3 Conclusions

The inspectors concluded that the licensee, and its contractor, conducted work in accordance with the approved DP, FSSP, and NRC regulations.

## 2 **Decommissioning Inspection Procedure for Materials Licensees (87104)**

### 2.1 Inspection Scope

The inspectors evaluated the licensee's decommissioning activities to determine if activities were conducted safely and in accordance with its, "Radiological Health and Safety Plan (RHASP)". The Inspectors also observed and evaluated: postings, security and control of contaminated material; on-site and off-site environmental monitoring (air samplers); management organization and controls; occupational health and safety issues related to non-radiological safety hazards (OSHA); and radioactive waste management. The inspectors interviewed Dow and contractor personnel, and reviewed related documents and procedures.

### 2.2 Observations and Findings

The licensee's decommissioning activities during the inspections in May and July consisted of: 1) remediation (excavation and removal of contaminated soils from the affected site); 2) final status surveys of the Support Zone, Rail Spur Loading Area, and the path between the Support Zone and Rail Spur Loading Area; and 3) loading contaminated soil from the Rail Spur Loading Area onto rail cars for transport to Envirocare for waste disposal. The licensee maintained radiation work permits (RWPs) for all work performed on site. All RWPs were complete and thorough in addressing the radiological hazards present, and maintained as low as reasonably achievable (ALARA) goals as stated in the RHASP. Radiation workers received pre-job briefings, and their training records were complete and up to date. The licensee, and its contractor, demonstrated a safe work attitude as related to ALARA goals.

The licensee maintained appropriate safeguards to ensure security and control of material on site were in accordance with their procedures and regulatory requirements. All postings were in accordance with 10 CFR Part 20 requirements. The licensee also

maintained an on-site and off-site environmental monitoring program using air samplers on a routine basis. Personnel wore proper protective equipment and personal dosimetry, no overexposures were noted. In the area of management organization and controls, the licensee maintained proper levels of expertise and independence for job positions. The inspectors did not note any OSHA concerns during the inspections.

The licensee demonstrated proper use of survey instruments, and radiological survey records were detailed and complete. The licensee ensured that unaffected areas were free from contamination. The licensee loaded and transported rail cars in accordance with transportation regulations.

### 2.3 Conclusions

The inspectors concluded that the licensee, and its contractor, conducted decommissioning activities safely and in accordance with the RHASP, NRC and DOT regulations.

### 3 Exit Meeting

The inspectors presented preliminary inspection results to the licensee at the conclusion of the onsite inspections on May 10 and July 25, 2006. A final exit meeting was conducted by telephone on August 25, 2006, with the Site RSO to discuss the NRC's in-office review of the analytical results of the soil sample analyses. The Site RSO acknowledged the findings presented, and did not identify any materials that could be included in the inspection report as proprietary.

ATTACHMENT: SUPPLEMENTAL INFORMATION

## **SUPPLEMENTAL INFORMATION**

### **PARTIAL LIST OF PERSONS CONTACTED**

D. Nelson, NRC Project Manager, NMSS, DWM  
K. Coble, Michigan Department of Environmental Quality, WHMD, RPMWS  
B. Baker, Dow Project Manager  
D. Wojtkowiak, DOW Site Radiation Safety Officer

### **INSPECTION PROCEDURES USED**

IP 83890 Closeout Inspection and Survey  
IP 87104 Decommissioning Inspection Procedure for Materials Licensee

### **ITEMS OPENED, CLOSED, AND DISCUSSED**

Opened	None
Closed	None
Discussed	None

### **LIST OF ACRONYMS USED**

ADAMS	Agencywide Documents Access and Management System
ALARA	As Low As Reasonably Achievable
CFR	Code of Federal Regulations
DNMS	Division of Nuclear Materials Safety
DP	Decommissioning Plan
ESSAP	Environmental Survey and Site Assessment Program
FSS	Final Status Survey
NRC	Nuclear Regulatory Commission
ORISE	Oak Ridge Institute for Science and Education
OSHA	Occupational Safety and Health Administration
PARS	Publicly Available Records
pCi/g	microcuries per gram
RHASP	Radiological Health and Safety Plan
RSO	Radiation Safety Officer