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United States Government

Department of Energy

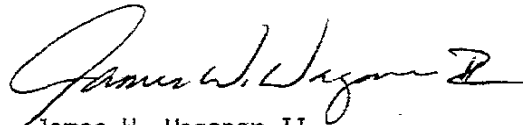
# memorandum

DATE: **SEP 25 1992**  
REPLY TO  
ATTN OF: EM-421 (W. A. Williams, 903-8149)  
SUBJECT: Authorization for Remedial Action at the Former Dow Chemical Company Facility in Madison, Illinois  
TO: L. Price, OR

The site of the Former Dow Chemical Company in Madison, Illinois, which is currently owned and operated by the Spectrulite Consortium, is designated for inclusion in the Formerly Utilized Sites Remedial Action Program (FUSRAP). This designation is based upon the results of a preliminary radiological survey and other information described in the attached Designation Summary. The authority determination and preliminary survey report also are attached for information.

The site has been assigned a low priority under the FUSRAP protocol, as the contamination is localized to overhead beams and limited in extent. Under present building use, it is highly unlikely that an individual working in or frequenting these remote areas would receive a significant exposure. Because the contamination is limited in extent and contained entirely inside the building, we recommend that cleanup of the site follow the proposed expedited protocol currently under development. We will work closely with your staff, the designation contractor, and the property owner to ensure that remedial action is conducted efficiently.

The effect of this designation on the FUSRAP baseline should be evaluated, documented and submitted for approval under the baseline change control procedures.



James W. Wagoner II  
Director  
Division of Off-Site Programs  
Office of Eastern Area Programs  
Office of Environmental Restoration

Attachments

bcc:  
Weston

Distribution:  
EM-40 (2)  
EM-42 (3)  
EM-FOR  
EM-GTN  
Pat Suspense  
Williams Reader

EM-421:wagoner:djn:903-8145:9/18/92:granitel.dsg

P. Hevner Review: pk 10/1  
M. White Review: mLw 10/1

Williams <sup>CH</sup>  
EM-421  
9/17/92  
Wagoner  
EM-421  
9/25/92

Fulmer  
EM-42  
10/8/92

Flore  
EM-42  
10/9/92

Bauditz  
EM-40  
10/5/92

Wrightfield  
EM-40  
10/7/92

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**FORMERLY UTILIZED SITES  
REMEDIAL ACTION PROGRAM**

**DESIGNATION SUMMARY  
FOR THE FORMER  
DOW CHEMICAL COMPANY  
IN MADISON, ILLINOIS**

September 1991

U.S. Department of Energy  
Office of Environmental Restoration

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Designation Summary  
Former Dow Chemical Company

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## INTRODUCTION

The Department of Energy (DOE), Office of Environmental Restoration, has reviewed the past activities of the Atomic Energy Commission (AEC) at the Former Dow Chemical Company in Madison, Illinois, and has completed a radiological survey of the site (Cottrell and Williams, 1990). DOE has determined that residual uranium dust levels in overhead beam locations exceed current DOE radiological guidelines (USDOE, 1987; 1990) for use of the building without radiological restrictions. Because of the inaccessibility and limited extent of the residual contamination, there is no significant risk to workers or the general public under current site use.

From the results of the survey and a review of available historical documents, the DOE has concluded that this site shall be designated for remedial action under the Formerly Utilized Sites Remedial Action Program (FUSRAP) and assigned a low priority. The remainder of this report summarizes the site information and the designation decision.

## BACKGROUND

### Site Function (Williams, 1991)

The Dow Chemical Company offices and facilities in the St. Louis area supplied materials (chemicals, induction heating equipment, and magnesium metal products) and services under purchase orders issued by Mallinckrodt Chemical Works, a prime AEC contractor. In 1957, Mallinckrodt subcontracted to Dow to conduct "...certain research and development work in gamma phase extrusion of uranium metal, ...to be done at Dow's Madison, Illinois plant; ...." According to the subcontract, the work was to be performed in monthly work cycles of 28 hours each for 12 consecutive months. The makeup of each work cycle was defined as 6 hours for set-up time, 16 hours for experimentation (extrusion), and 6 hours devoted to cleanup.

In addition to auxiliary equipment and tool design, Dow supplied the use of its press, labor, and plant facilities necessary to perform the work cycles. Mallinckrodt responsibilities included: procurement and installation of the auxiliary equipment designed by Dow; modifications to the dust arresting and other protective equipment required by plant area surveys made from time to time during the course of the work; arrangement for complete survey of breathing zone air quality to be conducted periodically by the AEC Health and Safety Laboratory; establishment of a program for area clearance after each cycle; supply (to Dow) of the uranium billets allocated for each work cycle; and pick up of the billets or extruded metal at the end of a work cycle.

In March 1960 the Uranium Division of the Mallinckrodt Chemical Works issued a purchase order for the straightening of Mallinckrodt-supplied uranium rods. Delivery of the rods to the Dow plant and pickup after the straightening operation was performed by Mallinckrodt personnel. Two rod straightening campaigns were identified in the purchase order. One was completed in December 1959. The other was completed in January 1960. Cleanup of the area after each campaign was identified and costed as a separate and distinct item in the purchase order. The actual periods of performance and the quantities of uranium metal involved in these operations is unknown. However, the total value of the purchase order and the unit cost identified with lot size indicate that the quantity of metal involved was probably small.

No other operation or period of involvement with the processing or handling of radioactive materials at the former Dow Madison plant have been discovered.

#### Site Description (Cottrell and Williams, 1990)

Madison, Illinois is located northeast of St. Louis, Missouri, across the Mississippi River. The former Dow Chemical Company Plant is in West Madison at the intersection of College and Weaver Streets. The plant consists of a large, multisectional complex of ten interconnecting buildings with a total area under roof of approximately 1.4 million square feet. The area in which the uranium extrusion and rod-straightening work occurred is located in Building 6, a large multistory metal building with concrete floors. The building is used by the current owner, Spectrulite Consortium, for metal extrusion and storage of equipment and parts.

#### Owner History

The Dow Chemical Company owned the site until 1969. The current owner and operator of the plant is the Spectrulite Consortium, Incorporated.

#### Radiological History and Status (Cottrell and Williams, 1990)

Mallinckrodt may have conducted cleanup of the plant facilities after uranium processing operations; however, no records have been located that provide details of the plant cleanup. Consequently, a radiological survey was conducted by Oak Ridge National Laboratory in March, 1989. Survey results indicate the presence of elevated concentrations of Uranium-238 and Thorium-232 in dust sampled from overhead beams in the building where the uranium extrusion and rod straightening work was conducted. The maximum uranium surface contamination in dust was 13.6 times the average DOE guideline, while average uranium contamination from 18 samples was 2.5 times the DOE guideline (USDOE 1987, 1990).

Authority Review (Williams 1991)

In 1991, the DOE determined that it has the authority to conduct remedial action at the site (USDOE 1986, Williams 1991). This determination of authority under FUSRAP was based in part upon the following significant factors.

Available records indicate that Dow was directly supervised by the Atomic Energy Commission (AEC) prime contractor. AEC staff approved the arrangements to use the facility and provided indemnification of Dow against atomic hazards.

As a part of the operations at the site, there were requirements concerning security, accountability, health, and safety. These were controlled by AEC directly or through its prime contractor. The AEC was expected to periodically monitor air quality during operations. The contamination at the site most likely resulted from airborne deposition of uranium on the roof support beams.

The uranium machined at the site was owned by the government.

AEC staff were substantially involved in the subcontract negotiation; as a result, AEC approved the indemnification clause. Mallinckrodt was also indemnified by the AEC; thus, AEC indemnified Dow against atomic hazards either directly by approving the subcontract or indirectly through the indemnification of Mallinckrodt.

**DESIGNATION DETERMINATION**

Survey results indicate that there is residual radioactive contamination on overhead beams at the site. The DOE has authority to conduct remedial action at the site under FUSRAP. Consequently, the site is hereby designated for inclusion in FUSRAP.

On the basis of the ranking procedure of the FUSRAP protocol (USDOE, 1986), the site is classified as a low priority site. This classification is based on the inaccessibility and limited extent of the residual contamination. Under current use conditions, there is no significant risk of exposure to site workers or the general public.

REFERENCES

Cottrell, W.D. and J.K. Williams, 1990: Results of the Radiological Survey at the Former Dow Chemical Company Site, Madison, Illinois. ORNL/TM-11182. Oak Ridge National Laboratory, Oak Ridge, Tennessee, December.

United States Department of Energy (USDOE), 1986: Formerly Utilized Sites Remedial Action Program, Summary Protocol, Identification - Characterization - Designation - Remedial Action - Certification. Office of Nuclear Energy, January.

USDOE, 1987: U.S. Department of Energy Guidelines for Residual Radioactive Materials at Formerly Utilized Sites Remedial Action Program and Remote Surplus Facilities Management Program Sites. Revision 2, Office of Nuclear Energy, March.

USDOE, 1990: Radiation Protection of the Public and the Environment. DOE Order 5400.5. Office of Environment, Safety, and Health, February 8.

Williams, W.A., 1991: "Authority Determination -- Former Dow Chemical Company Site, Madison, IL." DOE correspondence from Office of Environmental Restoration to file, February 21.



*Jan 6*

ORNL/TM-1155

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LABORATORY**

**MARTIN MARIETTA**

**PRELIMINARY RESULTS OF THE  
RADIOLOGICAL SURVEY  
AT THE FORMER  
DOW CHEMICAL COMPANY SITE,  
MADISON, ILLINOIS**

W. D. Cottrell  
J. K. Williams

OPERATED BY  
MARTIN MARIETTA ENERGY SYSTEMS, INC.  
FOR THE UNITED STATES  
DEPARTMENT OF ENERGY

*Jan 82*

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**MARTIN MARIETTA**

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