BC# 11547

# ADMINISTRATIVE RECORD FOR THE MADISON SITE

MADISON, ILLINOIS

## Site Management Records-

Memo- Authority Determination: Former Dow Chemical Company Site, Madison, IL

US Army Corps of Engineers
St. Louis District®

DOE F 1325.8
(8-89)
EFG (07-90)

United States Government 096631 Department of Energy

# memorandum

DATE: FEB 21 1991

REPLY TO ATTN OF: EM-421

SUBJECT: Authority Determination--Former Dow Chemical Company Site, Madison, IL

TO: The File

The attached review documents the basis for determining whether DOE has authority for taking remedial action at the former Dow Chemical Company facility in Madison, Illinois, under the Formerly Utilized Sites Remedial Action Program (FUSRAP). The Dow facility was used by the Mallinckrodt Chemical Works as a subcontractor for uranium metal extrusion and rod straightening during the late 1950s and in 1960. The following factors are significant in reaching a determination:

- 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 the 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 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.

A draft copy of the attached authority review was furnished to the Office of General Counsel for review. The review was modified in accordance with the verbal recommendations of that office.

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After review of the available original records, the radiological survey report, and the authority review, I have determined that the Department of Energy has authority to conduct remedial action at the former Dow Chemical Company facility in Madison, Illinois.

W. Alexander Williams, PhD
Designation and Certification Manager
Off-Site Branch
Division of Eastern Area Programs
Office of Environmental Restoration

Attachment

cc:
Steve Miller, GC-11

096631

Authority Review For
Spectrulite Consortium, Inc.
College and Weaver Streets
Madison, Illinois

## INTRODUCTION

As part of the Formerly Utilized Sites Remedial Action Program (FUSRAP), the U.S. Department of Energy (DOE) has reviewed available information on the Spectrulite Consortium site in Madison, Illinois. The site is being investigated for potential inclusion in FUSRAP, which applies to certain sites previously involved with activities of the Manhattan Engineering District (MED) or U.S. Atomic Energy Commission (AEC), both DOE predecessors. Such sites may require remedial action if they have residual contamination from those previous activities. This review is conducted to determine whether DOE would have the authority for remedial action at the Spectrulite site.

Spectrulite Consortium is located in Madison, Illinois at the intersection of College and Weaver Streets. The plant was owned and operated by the Dow Metal Products Division of Dow Chemical Company during the 1950s and 1960s. In the late 1950s and in 1960 Dow performed uranium extrusion research and development and rod-straightening operations for Mallinckrodt Chemical Company, a prime AEC contractor. These efforts may have caused the uranium contamination now present at the site.

The remainder of this review consists of the following sections:

Sections: Operational History
Current Conditions
Authority Analysis
Discussion and Conclusions
Copies of References

The information presented in these sections is in summary form. Pertinent references are identified in the text and a copy included in Section 6 for further use.

## OPERATIONAL HISTORY

The Dow Chemical Company offices and facilities in the St. Louis area were suppliers of materials (chemicals, induction heating equipment, and magnesium metal products) and services under purchase orders issued by the Mallinckrodt Chemical Works. Only one Mallinckrodt subcontract with Dow Chemical Company has been found (Ref. a). Subcontract No. 25034-M dated 15 March 1957 was for "...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 a work cycle (tentatively determined as 20 billets); and pick up of the billets or extruded metal at the conclusion 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.

CURRENT CONDITIONS

Spectrulite Consortium currently uses the facility for metal extrusion and machining.

A radiological survey was conducted by Oak Ridge National Laboratory in March 1989. Survey results demonstrated 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 occurred (Ref. b). The maximum uranium surface contamination in dust was 13.6 times the average DOE guidelines limit, while average uranium contamination from 18 samples was 2.5 times the DOE guidelines limit (Guidelines for Residual Radioactive Materials at Formerly Utilized Sites Remedial Action Program and Remote Surplus Facilities Management Program Sites, Rev. 2, March 1987).

AUTHORITY ANALYSIS

The authority determination is made according to the FUSRAP protocol by considering the answers to five questions based on available records. The answers to these questions from a review of available information are provided below.

- Was the site/operation owned by a DOE predecessor or did a DOE predecessor have significant control over the operations or site?

  DOE and its predecessors have never owned the site. Mallinckrodt was responsible for procuring and installing auxiliary equipment at Dow, supplying uranium, and surveying/restoring the site. Per the subcontract, Mallinckrodt and Dow agreed to schedule design and development work and determine the time and date of work cycles with regard to Dow's operating schedule. Mallinckrodt was responsible for uranium accountability; the uranium was AEC property. Mallinckrodt was to arrange for periodic airborne radioactivity surveys by AEC's health and safety lab.

- Was a DOE predecessor agency responsible for maintaining or ensuring the environmental integrity of the site (i.e., was it responsible for clean-up)?

  For the research and development in gamma phase extrusion, Mallinckrodt agreed to design and provide dust sampling and other protective equipment, conduct complete surveys, and establish a program for area clearance after each cycle. Dow would not accept a standard contract indemnity clause, and Mallinckrodt agreed to clauses which indemnify and hold Dow harmless against atomic energy hazards. The AEC agreed to this provision. The contract also required Mallinckrodt to arrange for air quality surveys by the AEC Health and Safety Laboratory. The subcontract had standard AEC provisions for security. For the later uranium rod straightening orders, the records do not indicate responsibility for the environmental integrity of the site.

- Is the waste or radioactive material on the site the result of DOE predecessor related operations?

  The elevated Uranium-238 levels are probably the result of the extrusion operations with Mallinckrodt supplied uranium. There are elevated thorium levels present at the site, but these do not exceed guidelines and are due to the current owner's extrusion processes.

- Is the site in need of further clean-up and was the site left in a non-acceptable condition as a result of DOE predecessor related activity?

  Radiological surveys indicate Uranium-238 contamination in excess of DOE guidelines. The contamination is localized to exposed beams, and its presence is consistent with DOE predecessor operations.

- Did the present owner accept responsibility for the site with the knowledge of its contaminated condition and that additional remedial measures are necessary before the site is acceptable for use without radiological restrictions?

  There is no evidence that Spectrulite Consortium accepted responsibility for or was aware of the site's radiological condition when they purchased the former Dow plant.

DISCUSSION AND CONCLUSIONS

Residual radioactivity in excess of DOE guidelines is most probably due to operations performed by Dow as a subcontractor to Mallinckrodt. There is no evidence that the Dow site processed uranium except as a Mallinckrodt subcontractor. Based on the Mallinckrodt and AEC involvement in site operations and the Mallinckrodt/AEC agreement to indemnify Dow against atomic hazards, DOE has the authority under the Atomic Energy Act for remedial action at the Spectrulite site. This authority is limited to the residual uranium at the facility and does not include the thorium also present at the facility.

COPIES OF REFERENCES

The following is the list of references that are provided in this section.

a. Mallinckrodt/Dow Contracts Package, 1956 and 1957.

b. Cottrell, W.D. and J.K. Williams, 1990: Preliminary Results of the Radiological Survey at the Former Dow Chemical Company Site, Madison, Illinois. ORNL/TM-11552. Oak Ridge National Laboratory, Oak Ridge, Tennessee, December, 1990.

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bcc:
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BC # 11547

# ADMINISTRATIVE RECORD FOR THE MADISON SITE

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US Army Corps of Engineers
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DOE F 1325.8
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United States Government

Department of Energy

# memorandum

84416
IL.26

DATE: OCT 08 1992

REPLY TO ATTN OF: EM-421 (W. A. Williams, 903-8149)

SUBJECT: Authorization for Remedial Action at the Former Dow Chemical Company Site in Madison, Illinois

TO: Manager, DOE Oak Ridge Field Office

This is to notify you that the former Dow Chemical Company site in Madison, Illinois, is designated for remedial action under the Formerly Utilized Sites Remedial Action Program (FUSRAP). This notification does not constitute a FUSRAP baseline change control approval. Approval of the baseline change will be accomplished through the normal baseline change control procedures.

The site was used by the former Atomic Energy Commission for the extrusion and shaping of uranium metal during the late 1950s. A radiological survey found residual uranium on the steel support beams for the building roof. Because of the limited extent of the contamination, the site may be remediated using the expedited cleanup process now under development.

R. P. Whitfield
Deputy Assistant Secretary
for Environmental Restoration

cc:
J. Fiore, EM-42
J. Wagoner, EM-421
L. Price, OR