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This document consists of 5 pages  
No. 4 of 4 copies, Series a.

ARMY SERVICE FORCES  
MANHATTAN ENGINEER DISTRICT  
INTELLIGENCE AND SECURITY DIVISION  
CHICAGO BRANCH OFFICE  
P. O. Box 6770-A  
CHICAGO 80, ILLINOIS

IN REPLY  
REFER TO

EIDM CIS

3-0  
/lvb  
15 February 1945

Subject: Shipment Security Survey at Mallinckrodt Chemical Works.

MEMORANDUM to the Officer in Charge.

1. The Mallinckrodt Chemical Works, St. Louis, Missouri, was contacted by the undersigned on 16 November 1944, for the purpose of making an investigation to determine security provided shipments of interest to the Manhattan Engineer District. The investigation included shipments of vital materials originating with the Mallinckrodt Company and those received by them. Particular attention has been given to the future production and shipment schedules of these materials.

2. Mallinckrodt is engaged in the processing of special materials under secret contracts W7405-Eng 1 and W7405-Eng 29 held by the Madison Square Area.

- a. Contract W7401-Eng 1.
  - (1) Black oxide - raw material.
  - (2) Sodium Salt - raw material and also an important intermediate.
  - (3) Orange oxide - important intermediate.
  - (4) Brown oxide - finished product.
  
- b. Contract W7405-Eng 29 - First Phase.
  - (1) Brown Oxide - raw material.
  - (2) Green Salts - finished product.
  
- c. Contract W7405-Eng 29 - Second Phase.
  - (1) Green Salt - raw material.
  - (2) Biscuits - important intermediate.
  - (3) Slag - By-product.
  - (4) Ingots - cut into billets.
  - (5) Croppings - important intermediate - is reprocessed.
  - (6) Sawdust - important intermediate - is reprocessed.
  - (7) Metal - finished product in form of billets, eggs and samples.

3. Method of shipping.

a. Of the eight methods available for shipping which provide a varying degree of security, Mallinckrodt Company now is using five of these which include:

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(1) Railway Express, carload, hand-to-hand signature armed guard service.

(2) Railway Express, less than carload, hand-to-hand signature, armed guard service.

(3) Rail freight, carload, sealed cars.

(4) Motor freight, commercial carrier, truck load, Government seals on vans.

(5) ATC. This method is going to be discontinued within the next few days, as it has been proven unsatisfactory for shipments between St. Louis and Chicago.

b. All carload material received or those originating from the plant, are loaded or unloaded within the plant area proper by Mallinckrodt employees. The plant is located in a factory and low-class dwelling area, and there are no factors contributing to the sabotage hazard. In buildings where work of interest to the Manhattan Engineer District is being done, they are guarded by plant auxiliary police and all buildings are well protected by fences. The buildings that are adjacent to the street have their windows protected by heavy wiring or screens. For added protection on shipments being received or sent out, there is a large enclosed area where trucks can enter for loading or unloading, and there is also a spur track extending into the plant.

c. All shipments are sent on Government Bills of Lading, and when shipments are received on a memorandum shipping ticket or on a commercial bill of lading, these are converted by the Area Engineer at destination to Government Bills of Lading. All bills of lading executed by the Area Engineer, St. Louis, Missouri, are done so in accordance with AR55-155, paragraph 32, and District shipment policy.

d. The Killion Motor Freight Company and the Trans-American Freight Line, Inc. are the only two firms used for shipment via commercial truck. Mr. B. Harbstereit, Office Manager of Trans American, and Mr. Barnett of Killion, St. Louis Manager, stated that only their most trusted competent drivers are ever used on these shipments. The drivers of the two companies are briefed prior to departing on a trip and they are told that in case they should get into trouble or have an accident, Lieutenant Velten, the Area Engineer, should be contacted and under no circumstances should the truck be left out of their sight. A record check failed to reveal whether or not any of the drivers had been cleared by the Manhattan District or the Service Command, and it is also the opinion of Lieutenant Velten, St. Louis Area Engineer, that these men have not been cleared.

4. Method of packing materials for shipment.

a. Black oxide is received from the Eldorado Gold Mines, Port Huron, Canada, in sealed carload lots. Originally, the oxide was

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packed in beer barrels and braced in the car by 2 by 4 planking. Inasmuch as this proved unsuccessful, the method of packing has been changed and now metal containers are used. These containers are three feet high and eighteen inches across. All containers are serially numbered for inventory purposes and when filled weigh approximately one hundred pounds.

b. Brown oxide, orange oxide, sodium salt and green salt is packed in fiber drums that weigh seventy-five pounds when filled.

c. C-1, C-2 and C-4 is packed in fifty-gallon whiskey barrels.

d. C-3, C-5 and D-2 is packed in five-gallon containers with a steel clamp top.

e. X metal samples are packed in small glass tubes that are approximately two inches in diameter and 3/4 inches long. These are wrapped in two to three layers of heavy foil paper. The tubes are then packed and reinforced with cotton in a heavy cardboard box that is approximately five inches square. This box then is reinforced with heavy cloth tape. The over-all weight of the entire packing varies from one to two pounds.

f. X metal eggs are packed in wooden boxes with built-in reinforced slots, and there are eight of these slots to a box. The eggs are placed individually in each slot and a wooden top is screwed on.

g. X metal billets are packed in wooden boxes measuring 5" x 5" x 13" that are reinforced by metal bands.

5. Code symbols used by Mallinckrodt Chemical Works.

a. Orange Oxide - 264 or 274

b. Sodium Salt - Chemical S

c. Brown Oxide - 306

d. Black Oxide - 162, 172 or 182

e. Black oxide is listed on freight bills as Chemical K-82 and consigned to Lt. E. M. Velten. The code number of Black Oxide has been changed from time to time. It was first called K-35, then C-55 and now K-82.

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6. Discussions.

a. Several of the bills of lading of the Area Engineer, St. Louis, Missouri, were checked and one direct recommendation was made. It was suggested that upon using railway express on a full carload or LCL money waybill, the following notation should be placed on the bottom of the bill of lading, "Request armed guard service at no additional cost to the government." No figures as to the total valuation of the materials shipped were shown on any of the Government Bills of Lading examined.

b. Under the proposal now being discussed that Chicago be designated as a consolidating point for shipments of "X" metal from various locations throughout the east to Site W, the shipment of metal from Mallinckrodt to W will be handled by armed guard, rail freight in a consolidated shipment.

7. Recommendations.

a. It is recommended that billets now shipped to Site W for Mallinckrodt on money waybill, railway express be converted to carload lots using MED guards.

(1) Billets are now shipped to Site W from Mallinckrodt Chemical Works on money waybill, railway express, carload lots every other Tuesday. These shipments average 30,000 pounds, and by shipping this amount it is possible to take advantage of the 65% discount rate of the Railway Express Company.

(2) If this shipment were made on the average of once a month, shipping 60,000 pounds rather than 30,000 pounds, and using MED guards it would be possible to save approximately \$1840.00 per month, and at the same time have closer supervision of the materials while enroute and more adequate security. Even if the materials were shipped under the present plan, whereby sending 30,000 pounds every other Tuesday, it would still be possible by using MED guards to save approximately \$220.00 on each move. If 60,000 pounds of material were shipped per month by Railway Express, money waybill, it would cost \$3708.00 against \$1867.72 with the using of MED guards for this rail movement.

(3) The method for computing the cost for this shipment with MED guards was accomplished by taking their base pay while in travel status, plus their pay for compensatory time earned,

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cost of shipping the product based on \$1.42 per hundred pounds that is allowed on 30,000 pound minimum weight shipments, less 47.455 per cent discount rate allowed when government materials are sent on land grant territory. Also the expense for the drivers car at the rate of four second-class fares from St. Louis to Site W, per diem for the men, and the rail fares involved from Chicago, Illinois, to St. Louis, Missouri, and from Pasco, Washington, to Chicago, Illinois, was taken into consideration. It is to be noted that the absolute maximum expenses that would be involved were taken into consideration for computing the cost with MED guards. (See Exhibit F)

b. It is recommended that a small and cheaply constructed non-combustible storage shed be built adjoining the guard post.

(1) Lieutenant Velten, the Area Engineer at Mallinckrodt Chemical Works, states that it would be impossible to store more than 30,000 pounds of billets because of the lack of adequate storage space. In comparison to the cost of making this move from St. Louis to Site W on the present arrangement whereby using railway express, money waybill against the cost of using MED guards on moves of this sort, the cost of constructing the storage shed would be more than offset by the savings on this shipment.

F. W. SIMONS,  
1st Lieut., Military Intelligence,  
Shipment Security Control Officer.

- 6 Incls.:
- Incl. 1, Exhibit A, in dup.
  - Incl. 2, Exhibit B, in dup.
  - Incl. 3, Exhibit C, in dup.
  - Incl. 4, Exhibit D, in dup.
  - Incl. 5, Exhibit E, in dup.
  - Incl. 6, Exhibit F, in dup.

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By: R. A. Walter  
Date: 1986  
T. F. Davis

Note: Above survey was made on 16 November 1944 by Lt. F. W. Simons and memorandum was revised on 15 February 1945 by Lt. Glenn E. Hitchcock.

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EXHIBIT A

SUMMARY OF SHIPMENTS

| <u>RECEIVES FROM</u>             | <u>MATERIAL</u> |                               | <u>SHIPS TO</u>                                | <u>MATERIAL</u>                                    |
|----------------------------------|-----------------|-------------------------------|--|--|
| Eldorado Gold Mines              | Black Oxide     |                               | Harshaw Chemical Co.                           | Green Salt   |
| Linde Air Products               | Black Oxide     |                               | Hanford Engr. Works                            | X Metal (Billets)                                  |
| Vitro Mfg. Co.                   | Sodium Salt     | (MALLINCKRODT CHEMICAL WORKS) | Chicago Area Engr. Chicago, Illinois           | Radio Active Sample of Metal                       |
| Chicago Area Engr. Chicago, Ill. | Scrap (Oxide)   |                               | Area Engineer, Chicago Area, Lamont, Illinois. | X metal (Eggs)                                     |
| Chicago Area Engr. Chicago, Ill. | Scrap (Nitrate) |                               | Clinton Engr. Works Y-12                       | Orange Oxide                                       |
|                                  |                 |                               | Harshaw Chemical Co.                           | Brown Oxide  |
|                                  |                 |                               | Linde Air Products                             | Brown Oxide  |
|                                  |                 |                               | Iowa State College                             | Green Salt   |
|                                  |                 |                               | duPont Co., East Area Warehouse                | High low scrap value, C-1, C-2, C-3, C-4, C-5, D-2 |
|                                  |                 |                               | Chicago Area Engr., Chicago, Ill.              | Tubealloy  |

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EXHIBIT R

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SUMMARY OF SHIPMENTS

| <u>SHIP TO</u>                               | <u>MATERIAL</u>               | <u>QUANTITY &amp; FREQUENCY</u>  | <u>METHOD OF SHIPMENT</u>  | <u>REMARKS</u>  |
|--|-------------------------------|--|--|---|
| Harshaw Chemical Co., Cleveland, Ohio.       | Green Salt                    | 8000 pounds weekly. During Sept. 6000 lbs. weekly was shipped. Oct. 12,000 lbs. weekly                         | Motor Freight<br>Trans-American<br>Govt. Bill of Lading<br>Sealed Trucks<br>Govt. Seals. |   |
| Hanford Engineer Works                       | X Metal (Billets)             | Company produces between 13,000 & 15,000 lbs. weekly. Ships every other Tuesday. Shipments average 30,000 lbs. | Express Carload,<br>Money Bill.  | This product was sent to Revere Copper & Brass Co., Detroit, Mich. till first of Nov. 1944. |
| Chicago Area Engineer                        | Radio Active Samples of Metal | Small sample daily   | ATC, will be changed to Express Money Bill latter part of Nov., 44.                      |   |
| Area Engineer, Chicago Area, Lamont, Ill.    | X Metal (Eggs)                | 2 to 3 lots daily. 1 lot equivalent to 63 lbs.   | Express LCL<br>Money Bill  |   |
| Clinton Engr. Works, (Y-12) Oak Ridge, Tenn. | Orange Oxide                  | 16 Nov. 24,000 - 7 Dec. 7,000 - 19 Dec. 8,000 - Starting 15 Dec. 15,000 lbs. weekly.                           | Govt. Bill of Lading<br>Killion Motor Freight Co. with Govt. Seals.                      | Product packed in 2½ gal. fiber drums. Driver not cleared but briefed.                      |
| Linde Air Products Tonawanda, N.Y.           | Brown Oxide                   | 20,000 average once a month. Used to ship weekly.  | Motor Freight.<br>Trans-American Freight Lines on Govt. Bill of Lading. Govt. Seals.     | Product packed in 2½ gal. fiber drums.  |
| Chicago Area Engineer                        | Tubealloy                     | 150 lbs. shipped daily.  | Money Way Bill<br>Railway Express<br>LCL   |   |

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1980

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Summary of Shipments (Continued)

| <u>SHIP TO</u>   | <u>MATERIAL</u>   | <u>QUANTITY &amp; FREQUENCY</u>  | <u>METHOD OF SHIPMENT</u>  | <u>REMARKS</u>                            |
|--|---|--|--|---|
| Harshaw Chemical Co., Cleveland, Ohio.                                     | Brown Oxide   | Sept. through Oct. 1944<br>10,000 lbs. weekly. Nov.<br>28,000 lbs. Starting<br>Nov. 30, 13,000 lbs.<br>weekly. | Motor Freight. (Trans-<br>American Freight Lines)<br>on Govt. Bill of Lading<br>with Govt. Sealed Trucks.<br>16,000 lbs. shipped per<br>truck. | Product packed in<br>2½ gal. fiber drums. |
| Iowa State College<br>Ames, Iowa.  | Green Salt  | 2,000 pounds per week.<br>Proposed plan is to dis-<br>continue this shipment<br>end of year.                   | LCL Express Money Way<br>Bill  |   |
| E. I. du Pont de<br>Nemours, East Area<br>Warehouse, Penns<br>Grove, N. J. | High & Low<br>Scrap Value<br>(Slag C-1,<br><del>C-2</del> ) (C-3, C-5)<br>(D-2 Dross) | 80,000 to 90,000 lbs.<br>Average once every month<br>to six weeks.   | Carload Freight, Govt.<br>Bill of Lading. No other<br>Security Govt. Seals on<br>car.  | Shipped in 5 gal.<br>barrels              |
| E. I. duPont de<br>Nemours, East Area<br>Warehouse, Penns<br>Grove, N. J.  | C-2   | 80,000 to 90,000 lbs.<br>every five or six weeks.  | Carload Freight<br>Govt. Bill of Lading<br>Govt. seals on car  | Shipped in 50 gal.<br>whiskey barrels     |
| E. I. duPont de<br>Nemours, East Area<br>Warehouse, Penns<br>Grove, N. J.  | C-4   | 100,000 to 120,000 lbs.<br>shipped on average of<br>once every four months.                                    | Carload Freight, Govt.<br>Bill of Lading, Govt.<br>Seals on car.   |   |

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SUMMARY OF SHIPMENTS

| <u>RECEIVES FROM</u>                       | <u>MATERIAL</u>    | <u>QUANTITY &amp; FREQUENCY</u>   | <u>METHOD OF SHIPMENT</u>   | <u>REMARKS</u>   |
|--|--------------------|---|---|--|
| Eldorado Gold Mines,<br>Port Hope, Canada. | Black<br>Oxide     | Quantity varies from<br>60,000 pounds to 160,000<br>pounds per month. Re-<br>ceives an average of<br>80,000 pounds per month. | Carload freight sealed<br>cars via Canadian Nat'l<br>out of Buffalo & ends up<br>on Chicago Eastern Ill.<br>R.R. (See Par. 4) | Shipped on commercial Bill<br>of Lading and converted to<br>Govt. Bill of Lading by Area<br>Engr. at Mallinckrodt. Black<br>oxide is sent from Port Hope<br>to Buffalo, N. Y., C/O<br>Francis R. Dowling, then<br>consigned to Mallinckrodt<br>Chemical Works under Code 182.<br>Shipped in 100 pound metal<br>containers. Containers 3'<br>high 18" wide. |
| Linde Air Products<br>Co., Tonawanda, N.Y. | Black<br>Oxide     | Starting Jan. 1945 for<br>indefinite period 30,000<br>pounds weekly will be<br>shipped.                                       | Full carload lots -<br>sealed cars.   | Code 162. Shipped in 100<br>pound metal containers. Con-<br>tainers 3' high 18" across.  |
| Vitro Mfg. Co.,<br>Pittsburgh, Pa.         | Sodium<br>Salt     | Receives 20,000 pounds<br>every ten days.   | Trans-American Motor<br>Freight Line. Sealed<br>Trucks.   | Drivers not cleared but<br>briefed by Mgr. Shipped on<br>Govt. Bill of Lading with<br>notation "Release at Lower<br>Valuation".  |
| Chicago Area Engineer<br>Chicago, Ill.     | Scrap<br>(oxide)   | Shipments average 1500<br>lbs. Sent every two<br>months.  | Railway Express,<br>Money Way Bill, LCL.  | On one occasion sent 32,000<br>lbs., full carload.   |
| Chicago Area Engineer<br>Chicago, Ill.     | Scrap<br>(Nitrate) | Once every four or five<br>months. Average 1500 lbs.  | Truck, Armed Guard<br>Service (MED)   |  |

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Date: 1980  
T. F. Davis

Note: This survey does not cover shipments of chemicals received by Mallinckrodt Chemical works, such as hydrofluoric acid, ammonia, magnesium, etc., that are purchased on open market and used in other products produced by the company.