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MANHATTAN DISTRICT HISTORY

BOOK V - ELECTROMAGNETIC PLANT

VOLUME 4 - SILVER PROXIMITY

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MANHATTAN DISTRICT HISTORY  
BOOK V - ELECTROMAGNETIC PLANT  
VOLUME 4 - SILVER PROGRAM ✓

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FOREWORD

The history of the silver program remained essentially static from 15 September 1945, the date of the previous foreword (hereunder) to 31 December 1946, the date on which supervision and control by the Manhattan District were terminated.

The silver used in the racetracks of the Elektromagnetic Plant is still in place under guard in the Plant. The United States Atomic Energy Commission is now acting as a depository for the Treasury Department for this silver.

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FOREWORD

This volume, which consists of a summary, main text and four appendices, describes the Silver Program of the Manhattan District. ✓  
While the program was essentially a procurement problem in connection with the Electromagnetic Project, this separate discussion has been prepared because the use of such a large and valuable quantity of silver as an industrial material rather than as a precious metal is a unique development having no precedent; and because the fabrication program was organized and administered as a separate operation. ✓ ?

The discussion covers the action occurring prior to 1 July 1945 and encompasses the work necessary to procure, fabricate and complete the installation of the silver. ✓ There remains the future problem of returning the metal to the U. S. Treasury when the purpose of the installation has been completed. ✓

The information contained in this discussion is based on documents contained in the District Files supplemented by unofficial diaries and personal knowledge of the work. ✓

15 September 1945 ✓

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MANHATTAN DISTRICT HISTORY  
BOOK V - ELECTROMAGNETIC PROJECT  
VOLUME 4 - SILVER PROGRAM

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SUMMARY

1. Introduction. - The purpose of the Silver Program was to provide silver conductor for use in the electromagnets of the Y-12 plant in place of copper which was not obtainable. ✓ The program covered the procurement of about 14,700 tons of silver from the U. S. Treasury, safeguarding, fabricating and accounting for it, until its eventual return to the Treasury. ✓ The authorizations for the program are described in Book V - Volume I and in addition include Public Law No. 137, 78th Congress, approved 12 July 1943, which authorizes the use of government owned silver for war purposes. ✓ The cost of the program to 1 July 1945 was \$2,482,626, including \$2,158,615 for fabrication and \$324,011 for transportation and storage. ✓ Future considerations require plans to return, "six months after the cessation of hostilities", the same amount of silver to the Treasury as was obtained under the lease agreement. ✓

2. Procurement.

a. Preliminary work on the Y-12 plant, done in the summer of 1942, indicated that large quantities of conductor would be needed and it was decided that silver would be used if available. ✓ The treasury Department had silver available; and it was learned that the Defense Plant Corporation was also using large quantities. The Silver Program was divided into two Programs to facilitate accounting. ✓ A definition of programs is as follows: Program I covered the fabrication of silver for 446 magnet coils of the original plant and Program II covered the 494 magnet coils of the plant extension. ✓

b. Two agreements with the Treasury Department, one of 29 August 1942 for 175,000,000 F.T.O. of silver which was supplemented by 32,200,000 F.T.O., and one of 14 October 1943, when an additional 300,000,000 F.T.O. was



required, constituted the authority for the War Department to procure silver from the Treasury and prescribed the terms. ✓ The 14 October 1943 agreement was made for the total amount of 507,200,000 F.T.O. and superseded the agreement of 29 August 1942. ✓

c. Withdrawals were made from the U. S. Bullion Depository at West Point, N. Y. upon formal request to the Treasury Department. ✓ The silver bars, weighing approximately 1000 F.T.O. at .999 fineness, were accepted at the Treasury weight as certified on melt cards accompanying each bar. ✓ Receipts were issued for amounts withdrawn. ✓ Of the 507,200,000 F.T.O. authorized for withdrawal, the actual total quantity withdrawn was 427,814,149.02 F.T.O. ✓ Silver bars, numbering 165,446 and weighing 12,593,911.00 pounds, were transported to the casting plant under the provisions of the D.P.C. Contract for Program I. ✓ The facilities of U. S. Trucking Corporation were engaged to handle 195,008 bars weighing 14,099,446.15 pounds for Program II. ✓

### 3. Fabrication.

a. The procedure in general consisted of converting the bullion bars into billets of a convenient size for extrusion into strips, which were then used as the conductor in the magnet coils. ✓ Special problems involving guarding, accounting and inspection were encountered as none of the contractors except the Defense Plant Corporation would accept the responsibility for the silver. ✓ Handy and Harmon, process consultants, were engaged because of their wide experience in silver processing and were instrumental in the selection of the billet casting contractor. ✓ The Defense Plant Corporation was selected for Program I because they were handling a similar program at a plant with the only available production capacity. ✓ The U. S. Metals Refining Company, because of its experience in handling the Defense Plant Corpor-

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ation work, was selected for Program II. ✓

b. Contractual arrangements with the D.P.C. under Contract No. W-7401-eng-12 provided for all transportation, guarding, fabrication, accounting and recovery of scrap until the total weight of War Department Silver in their custody was delivered to the War Department at Carteret, N. J. ✓ The contract further provided that the War Department would accept its proportionate share of D.P.C. costs, expenses and liabilities incurred. ✓ Total payments through 1 July 1945 were \$270,271.78 with an estimated \$35,000 due upon final settlement. ✓ The contract also provided that the War Department accept its proportionate share of the D.P.C. melt loss which was determined when recovery operations were completed. ✓ The proportionate share was determined as that fraction which had as its numerator the weight of War Department silver melted and as its denominator the total weight of War Department and D.P.C. silver melted. ✓ The War Department share of the melt loss was determined as 20,076.42 F.T.O. and was repaid by an equal weight of silver from scrap from fabricating operations. ✓ For Program II, the U. S. Metals Refining Company Contract No. W-7407-eng-126 provided for all melting, casting and recovery operations, previously managed by the D.P.C. ✓ Total payments on the contract were \$173,240.23. ✓ The District provided the protection, accounting and inspection work. ✓

c. Casting Operations were the same under each program, with the actual handling of the metal being performed by employees of the U. S. Metals Refining Company. ✓ The silver bullion bars, weighing approximately 1000 F.T.O. were received at the casting plant from guarded trucks which had transported them from West Point. ✓ They were counted, weighed in lots of about 30,000 pounds, and moved to the melting furnace. ✓ The molten metal was poured into

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cylindrical copper molds. ✓ The resulting billets were 9-3/4 inches in diameter, 15 to 16 inches long and weighed from 390 to 435 pounds. ✓ When cooled, they were numbered and marked, weighed in lots and stored until ready for the extrusion plant. ✓ In all, 75,009 billets weighing 30,933,183 pounds were cast. ✓ Transportation to the Extrusion Plant was provided for by U. S. Trucking Corporation under Contract No. W-7401-eng-27.

d. Phelps Dodge Copper Products Company was selected as contractor for fabricating strip as it was the only concern with sufficient production capacity and equipment. ✓ Contract No. W-7405-eng-22, at a cost of \$1,626,447.51, provided for the conversion of billets, into rectangular strips three inches wide and of varying thickness from .170 inches to .440 inches, as required for the different type of magnet coils. The first of these strip forming operations was performed by heating the billets in a furnace. ✓ The heated billet was then ejected directly into an extrusion press and elongated into strip, 5/8 inches thick, 3 inches wide and 40 to 50 feet long. ✓ The extended strips were cooled, trimmed and coiled. ✓ The strips were cold-rolled to size, inspected for defects and recoiled. ✓ All coils, except those straightened for use as busbar, were annealed to soften the metal sufficiently for ease in handling during subsequent magnet winding process. ✓ They were then cooled, numbered, weighed, wrapped in heavy paper and packed for shipment. ✓ A total of 74,568 coils weighing <sup>28,062,502.44</sup>~~28,062,502.25~~ pounds were produced. ✓ A furnace accident occurred on 25 March 1944 in which a failure of the automatic heat control caused a localized overheating which affected fifteen billets, completely melting ten of them. ✓ The furnace was immediately shut down and, when cooled, dismantled to recover all silver. ✓ It was ascertained with reasonable accuracy that no losses occurred other than those due to re-

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processing of recovered residues. ✓ Transportation from the extrusion plant to Milwaukee, Wisconsin, was handled by rail freight. ✓ A total of 258 carloads was shipped between February 1943 and May 1944 with no loss. ✓ Shipping charges were \$240,599.60. ✓ Three shipments of silver strips were made to the Clinton Engineer Works from Bayway. ✓ Temporary storage space at Bayway Terminal Warehouse was leased to store metal strips prior to shipping to Milwaukee. ✓

e. Allis-Chalmers Mfg. Company, Milwaukee, Wisconsin, was selected as contractor for magnet coil fabrication, under the technical supervision of Stone and Webster Engineering Corporation. ✓ The five contracts relieved Allis-Chalmers of responsibility for the silver. ✓ The procedure for the fabrication of magnet coils included receiving of silver shipments, and storage of coils in the fenced inclosures near the fabrication shop. ✓ The coils were then taken inside, weighed, trimmed and braced into "reels" of about 24 coils. ✓ The silver from the "reels" was then wound, suitably insulated, around the steel bobbin plates of the magnet coils. ✓ When wound, steel covers were welded in place and the units tested, painted and prepared for shipment. ✓ A total of 940 magnet coils containing 27,418,249.23 pounds of silver were fabricated during the period from February 1943 to August 1944. ✓ During the course of the work 80 magnet coils were sent back from the Clinton Engineer Works to be rewound because of damage during installation and initial operation. ✓ Transportation to Clinton Engineer Works was by rail on flat cars. ✓ No losses occurred although one coil was damaged in an accident. ✓

f. The Contractor for busbar fabrication was the Watson-Flagg Engineering Corporation, electrical subcontractor under Stone & Webster Engineering Corporation for construction of the Y-12 plant. ✓ The fabrication of

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busbar took place in a restricted fabrication shop. ✓ As the silver was needed it was taken from a locked storage room, weighed, processed, reweighed and each piece stamped with an identification number. ✓ Armed guards accompanied all busbar until it was permanently installed in the process buildings. ✓ From August 1943 until September 1944, 8863 pieces of silver weighing a total of 268,744.69 pounds were fabricated. ✓

4. Returns to The Treasury. - A general requirement of the program was the eventual return of all the silver to the Treasury, causing the adoption of detailed steps to collect and reprocess all economically recoverable scrap. ✓ Because of the high value and the technical processes, it was decided that the engagement of a metallurgical consultant would be desirable. ✓ The firm of Lucius Pitkin, Inc., New York, N. Y. was engaged under Contract No. W-7421-eng-17 to perform the consultant and auditing service required. ✓ Cost as of 1 July 1945, was \$17,064.07. ✓ A diligent scrap collection effort extended throughout the program and this was followed by a general cleanup at each work location, which consisted of dismantling and cleaning machines, scraping floors, etc. ✓ The converting of scrap to bullion bars for return to the Treasury was handled under three contracts. ✓ The casting contract with U. S. Metals Refining Company provided for wrecking and rebuilding the furnace and treatment of all residues from the casting operation. ✓ To expedite the return of small clean scrap an agreement was entered into with the U. S. Treasury whereby 2,580,792.97 F.T.O. of silver were handled by the U. S. Assay Office, New York, N. Y. ✓ The bulk of the scrap was converted by the American Metal Company, Ltd., parent company of the U. S. Metals Refining Company, under Contract No. W-7407-eng-129. ✓ Under this contract 20,161,109.48 F.T.O. of silver scrap were processed. ✓ The transfer of

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metal to the U. S. Treasury was accomplished by delivery to the U. S. Assay Office, New York, N. Y., the War Department being credited with the amount in each shipment at a weight determined by the Assay Office scales. ✓  
A total of 24,293,608.05 F.T.O. of silver has been returned. ✓

5. Security Measures. - The general security policies for the silver program included the usual measures of the District and in addition involved the organization of separate guard forces, employment of consultants and special inspections. ✓ All reasonable efforts were taken for safeguarding information and the District policies on clearance of personnel were followed. ✓ The guard was uniformed, armed and trained. ✓ Guards were stationed to protect the silver at all times when it was being processed and accompanied all shipments except shipment of magnet coils from Milwaukee to Clinton Engineer Works. ✓ Special inspections of the entire silver program were made by District personnel to determine the efficiency of security and accounting. ✓ In addition, routine security inspections were performed by the District Security and Intelligence Section. ✓

6. Accounting for Metal.

a. An accurate accounting of the silver was necessary because of the extremely high value of the quantity of metal involved. ✓ The accounting system was necessarily detailed as it reflected the disposition of more than 14,000 tons of silver to the nearest ounce. ✓ A central control office in New York, N. Y. received the records of all the subsections and from them compiled the Master Ledger in which the progress of the silver through all stages of the program is recorded. ✓ At the U. S. Bullion Depository the West Point records were kept by District employees who witnessed the withdrawals and recorded the weights of shipments, for which Interim Receipts were given to the

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Treasury. ✓ The Carteret records at the U. S. Metals Refining Company consisted of reports showing furnace charges, billets produced, shipments made and daily inventories. ✓ Bayway records were kept of the silver received, daily strip production, weight of scrap and dust, weight of coils and shipments. ✓ The Milwaukee records, which were also forwarded to New York for checking and ledger entry, reflected the weight of silver in each magnet coil. ✓ The Clinton Engineer Works records consisted of an accounting of the busbar as it was being fabricated and installed. ✓

b. An audit of the Silver Program was made by Kessler and Kessler, a well-known New York accounting and auditing firm, to insure the accuracy of the records. ✓ A review of accounts shows that the disposition of 427,814,149.02 F.T.O. withdrawn from the Treasury was as follows: 399,449,618.38 F.T.O. were wound in magnet coils; 3,915,274.20 F.T.O. were installed as busbar; 24,293,608.05 F.T.O. were returned to the Treasury; and 155,648.39 F.T.O. were lost during processing. ✓

7. Organization and Personnel. - In general the Administration of the Silver Program was performed by the Special Accountability Section of the District. ✓ The responsibility was delegated by the District Engineer to the Special Accountability Officer who maintained close coordination with the Y-12 Unit Chief for determination of specifications and schedules. ✓ The following District personnel held key positions in the administration of the Silver Program: Col. James C. Marshall, Col. K. D. Nichols, Lt. Col. A. C. Johnson, Maj. W. E. Kelley, Capt. P. E. O'Meara, Capt. Spencer B. Powers, Capt. Ross C. Hill, Capt. F. V. Summers, Sgt. T. H. Schiercke, and Mr. H. F. Green, Jr.. Technical consultants who assisted in the work were the Handy and Harmon firm and Lucius Pitkin, Inc. ✓ The Treasury Department and the Defense Plant Cor-

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poration were among the other agencies whose assistance and cooperation was helpful. ✓ The following men performed outstanding service in assisting the Silver Program: Mr. D. W. Bell, Under Secretary of the Treasury; Dr. Leland Howard, Ass't Director of the Mint; Mr. E. E. Lynch, Supt. of the U. S. Assay Office; Mr. H. R. Rutland, and Mr. H. P. Jenkins, Defense Plant Corporation. ✓

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MANHATTAN DISTRICT HISTORY ✓

BOOK V - ELECTROMAGNETIC PROJECT ✓

VOLUME 4 - SILVER PROGRAM ✓

SECTION 1 - INTRODUCTION ✓

1-1. Purpose. - The purpose of the silver program was to provide silver for use as electrical conductor in the large electromagnets of the process plant. ✓ Normally, copper would have been used in the magnet coils, which are essentially continuous windings of insulated metal ribbon around iron cores. ✓ However, in the Fall of 1942 when the procurement of equipment was started, copper was high on the list of critical materials and the diversion of the huge tonnage required would have seriously handicapped other war work. ✓ Therefore, it was decided to use silver as a substitute. ✓

1-2. Scope. - The program involved the procurement, in the form of bullion bars, of approximately 14,700 tons of silver worth about \$304,000,000 from the U. S. Treasury; casting the bars into cylindrical billets at Carteret, N. J.; extruding and rolling the billets into strips of the proper size at Bayway, N. J. and fabricating the strips into magnet coils at Milwaukee, Wisconsin and busbar at Clinton Engineer Works. ✓ The extremely high value of the material required the adoption of extensive guard and accounting measures for protection throughout the program, and the engaging of recognized consultants for advice on technical problems concerning fabrication, refining and eventual return of the metal to the U. S. Treasury. ✓

1-3. Authorization. - The program was authorized by the general authorizations referred to in Volume 1 of this Book and in addition by Public Law No. 137 - 76th Congress approved 12 July 1943, which authorizes the use of Government owned silver for war purposes as follows: ✓

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"The President is authorized, through the Secretary of Treasury \*\*\* to sell or lease for domestic purposes for a period not longer than six months after the cessation of hostilities in the present war \*\*\* any silver held or owned by the United States \*\*\*. ✓

1-4. Cost. - The cost attributable to handling and fabricating the silver was \$2,482,626 as of 1 July 1945. ✓ This figure includes \$2,158,615 for fabrication and \$324,011 for transportation and storage costs (See App. A1). ✓

1-5. Future Considerations. - Throughout the program it was necessary to steer all activities and accounting toward eventual return of the silver to the Treasury in the exact amounts and form in which it was first withdrawn. ✓ The lease agreement (See Par. 2-3) by which the metal was obtained from the Treasury commits the War Department to return the silver to the Treasury at the end of six months following the cessation of hostilities in the present war, as proclaimed by the President, or, under certain conditions, earlier. In addition to the accurate accounting for the metal this commitment requires that the District plan for obtaining silver to replace that lost in processing (See Par. 6-4). ✓

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SECTION 2 - PROCUREMENT

2-1. Preliminary Work. - The preliminary designs for the Y-12 magnets were developed during the summer of 1942 on the basis of research work done at the University of California. ✓ Although not complete, the designs indicated large quantities of conductor would be needed. ✓ In August 1942, when it was decided that silver would be used if available, the Treasury Department was approached and it was determined that sufficient quantities of silver could be obtained. ✓ It was also learned that the Defense Plant Corporation had obtained large amounts of silver for use as electrical conductor in Defense Plant Facilities. ✓

2-2. Definition of Programs. - In describing the subsequent phases of the Silver Program frequent reference will be made to Program I and Program II. ✓ Program I is defined as the processing and handling of silver in connection with the 446 magnet coils for the original plant and Program II covers the processing and handling of silver for the 494 silver magnet coils of the plant extension as authorized 11 September 1943. ✓ This division of the Silver Program was set up in order to provide for more accurate accounting during the operations period. ✓

2-3. Agreements with the Treasury Department.

a. Agreement of 29 August 1942. - Upon determining that sufficient silver was available for use, the Secretary of War, Henry L. Stimson, by his letters of 29 August 1942 (See App. B1) to the Secretary of Treasury, formally requested and subsequently received authority for the transfer of 175,000,000 Fine Troy Ounces of silver to the custody of the War Department. ✓ The letter which constituted the agreement provided that title to the silver was to remain in the United States; that any silver

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received by the War Department was to be returned in the quantity, form and fineness (purity) in which and to the place from which it was received, at the expiration of five years from the date of receipt, or upon written notice that the return of such silver was necessary for reasons connected with the monetary requirements of the United States; that the silver was to be installed or used as a substitute for copper in Government-owned plants essential to the war effort; and that the War Department would take all reasonable precautions for the protection of such silver and assume all expense, risk of loss, and obligations arising out of or in connection with its use. ✓ This agreement was supplemented on 28 April 1943 and on 14 July 1943 to provide for the transfer to the War Department of an additional 32,200,000 Fine Troy Ounces of silver required to meet design changes in the Electromagnetic Plant. ✓

b. Agreement of 14 October 1943. - Upon authorization of the extension to the plant it was estimated that it would be necessary to obtain an additional 300,000,000 Fine Troy Ounces of silver and arrangements were made with the Treasury Department for the procurement of this additional quantity. ✓ In the interim, Public Law No. 137 (See Par. 1-3) had been enacted and it was desirable to base the lease agreement on the provisions of that law. ✓ It was also considered desirable for administrative purposes to include in this agreement the 207,200,000 Fine Troy Ounces which had been arranged for previously. ✓ Accordingly, the agreement of 29 August 1942 was terminated and superseded by the new agreement entered into with the Treasury Department effective 14 October 1943 (See App. B2) by which the withdrawal of a total of 507,200,000 Fine Troy Ounces of silver was authorized. ✓

2-4. Withdrawals.

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a. Procedure. - The amounts shown in the authorizing agreements were based on preliminary estimates but the actual amounts withdrawn were taken from determinations of specific quantities required by the magnet coil and busbar manufacturers on the basis of design studies (See App. D1). ✓ Upon the determination of these quantities the War Department made formal requests to the Treasury Department to deliver silver over specified periods of time and in amounts which included reasonable allowances for scrap incurred during fabrication. ✓ Silver was withdrawn from the U. S. Bullion Depository at West Point, New York, in bullion bars of .999 fineness weighing approximately 1000 Troy Ounces. ✓ The bars were not weighed out at the Depository but were accepted at the Treasury weight as certified on melt cards accompanying each bar. ✓ An Interim Receipt was issued to the Treasury for the total weight of each day's shipments, and was later replaced by a Permanent Receipt (See App. D2), signed by an Army Officer authorized to receive the silver for the Manhattan District. ✓ Although the certified weights of the Treasury are of accepted probity, each shipment was check weighed at the U. S. Metals Refining Company (billet casting) Plant at Carteret, New Jersey, to guard against possible errors or loss in shipment. ✓

b. Quantities Withdrawn. - Of the 507,200,000 ounces authorized for withdrawal the total amount of silver actually obtained from the Treasury was 427,814,149.02 Fine Troy Ounces. ✓ As shown on the chart (App. A2) withdrawals started 30 October 1942 and were completed in January 1944, with 183,477,895.11 F.T.O. being taken for Program I and 244,336,253.91 F.T.O. being taken for Program II. ✓ All of the silver shown except for 38,924,947.61 F.T.O. was obtained from the West Point Depository. ✓ The latter quantity, obtained during Program II, was silver located at Carteret, New Jersey, in the

custody of the Defense Plant Corporation. ✓ This metal was transferred to the custody of the Treasury by the Defense Plant Corporation, and the Treasury immediately signed it over to the Manhattan District at Carteret, New Jersey, thus saving transportation and handling costs to and from the West Point Depository (See App. E2). ✓

2-5. Transportation to Casting Plant.

a. Program I. - Movement of the silver from West Point, New York, to the Casting Plant at Carteret, New Jersey, during Program I was handled by the Defense Plant Corporation under the provisions of Contract No. W-7401-eng-12 (See Par. 3-4). ✓ Under this Contract, Manhattan District representatives transferred the silver to the Defense Plant Corporation at West Point, New York, and the D.P.C. trucked the metal to Carteret, New Jersey, under guard. ✓

b. Program II. - In November 1943, when withdrawals began for Program II, the Defense Plant facilities were no longer available. ✓ Therefore, the U. S. Trucking Corporation was engaged under Contract No. W-7401-eng-83, dated 5 November 1943, (See App. D3) on the basis of a low bid. ✓ Total payments to the Contractor were \$33,306.52. ✓

c. Trucking Data.

	<u>Program I</u>	<u>Program II</u>
Hauling began	30 October 1942	23 November 1943
Hauling completed	18 August 1943	19 January 1944
Number of bars	165,446	195,008
Weight in lbs.	12,593,911.00	14,099,446.15

Note that the weight of silver shown in the trucking data cannot be directly reconciled with the weight withdrawn from the West Point Depository as

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shown in Paragraph 2-4b. The trucking weight, shown in gross avoirdupois pounds was obtained by converting the fine troy ounce bar contents for each shipment, into gross weight. To accomplish this the standard conversion factor must be used and in addition the fineness of the silver must be taken into consideration. Appendix A11 demonstrates the tedious calculations necessary. The examples used in the appendix also show the type of calculation which must be used to reconcile other figures used from time to time throughout the text. For further detail, it is recommended that the consultants' reports (Appendix D21) be obtained and perused.

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### SECTION 3 - FABRICATION

3-1. General. - The fabrication process involved the converting of silver bullion bars into strips of suitable dimensions for use in the plant equipment. ✓ Studies made during the fall of 1942 showed that the strip fabrication required two distinct steps. ✓ First, casting the metal into billets and then either extruding the billets into strips or rolling them into sheets to be slit into strips. ✓ The extrusion process was finally selected on the basis of available plant capacities (See Par. 3-7). ✓ A special problem which is not normally encountered when Government-owned material is furnished to a contractor arose because none of the concerns except the Defense Plant Corporation was willing to accept responsibility for the silver. ✓ Thus it became necessary for the District to furnish the protection and controls in all other operations. ✓ This involved establishing guard, accounting and inspection forces to cover the entire operation, and the taking of extraordinary measures for recovery of all scrap, dust and residues. ✓

3-2. Process Consultant. - In the course of the survey to establish the fabrication process and to locate possible fabricators, the Handy and Harmon firm of Bridgeport, Connecticut, was engaged as consultant, under Contract No. W-7405-eng-5 (See App. D4), because of their wide experience in silver processing. ✓ Handy and Harmon served without fee and were reimbursed for out-of-pocket expenses amounting to \$2.62. ✓ More than thirty concerns were checked as to availability and production capacity (See App. D5). ✓

#### 3-3. Selection of Billet Casting Contractors.

a. Defense Plant Corporation. - The Defense Plant Corporation was selected as the billet casting contractor for Program I because that

agency was handling a similar program at the plant of the only available metal refinery. ✓ The Defense Plant Corporation had surplus production capacity available and were willing to undertake the work with their own organization, making it unnecessary for the Manhattan District to set up a guard and accounting force (See App. D6). ✓

b. U. S. Metals Refining Company. - When Program II was authorized the Defense Plant Corporation had completed its casting work. ✓ However, the U. S. Metals Company had the special production facilities necessary and was the only concern with the necessary experience in handling the large quantities of silver to be processed, so it was selected for Program II casting, as the only logical contractor at that time (See App. D7). ✓

3-4. Contractual Arrangements.

a. Defense Plant Corporation. - Contract No. W-7401-eng-12, dated 26 October 1942, with the Defense Plant Corporation (See App. B3), covered the casting operations for Program I. ✓ The contract required the D.P.C. to take the silver billets from the War Department at West Point, New York, handle all transportation, guarding, fabrication, accounting, and recovery of scrap until the same weight of metal was delivered in the form of billets to the War Department at Carteret, New Jersey. ✓ Payment provisions were as follows: ✓

(1) Proportionate Share of D. P. C. Costs. - The Contract provided that the War Department should pay its proportionate share of the total Defense Plant Corporation costs, expenses and liabilities incurred. ✓ The "proportionate share" was defined as that fraction which had as its numerator the weight of War Department silver melted and as its denominator the total weight of War Department and Defense Plant Corporation silver melted. ✓ Pay-

ment in part was to be made at the stipulated rate of \$45.00 per short ton delivered and a final adjustment was to be made at the completion of operations and accounting. ✓ The total payments through 1 July 1945 were \$270,271.78 with an estimated \$35,000 due upon final settlement. ✓

(2) Proportionate Share of D. P. C. Losses. - As in the case of all metals, certain normal losses occurred in the melting and casting of silver, because of oxidation, volatilization, etc. ✓ Because Defense Plant Corporation and War Department silver was melted simultaneously in the same furnace, and because the melt losses (See App. D8) could not be ascertained until the recovery operations were completed, it was determined that the War Department should receive its full weight of contributed silver without deductions or allowances for melt loss, and upon the completion of recovery operations return to the D. P. C., in silver, the War Department's proportionate share of the total melt losses sustained. ✓ The War Department share of the melt loss was finally determined as 20,076.42 Fine Troy Ounces (See App. D8), which was repaid by an equal weight of silver from scrap from fabricating operations. ✓

b. U. S. Metals Refining Company. (See App. D9). - The casting work for Program II was performed by U. S. Metals Refining Company under Contract No. W-7407-eng-126, dated 8 November 1943, which provided for all melting, casting and recovery operations previously managed by the Defense Plant Corporation. ✓ However, on this program it was necessary that the District establish an organization for protection, accounting and inspection work. Total payments to the contractor were \$173,240.23. ✓

3-5. Casting Operations. - The casting was done in the same manner under each program, with actual handling of the metal being performed by

employees of the U. S. Metals Refining Company. A brief description of the work is given below and a flow sheet is shown as Appendix A3.

a. Receiving and Weighing of Silver. - Silver bullion bars, weighing approximately 1000 Troy Ounces each, were received at the casting plant from guarded trucks which had transported them from West Point. After a physical count, the bars were unloaded upon tared yard cars and weighed on two separate track-scales, in lots of approximately 30 thousand pounds, under the supervision of a government inspector; they were then moved by narrow gage railroad to a reverberatory type melting furnace.

b. Casting of Billets. - The molten silver at the casting temperature of 1800 to 1900° F, was poured from the furnace into cylindrical copper molds mounted on a large "casting wheel" which revolved past the furnace spout. The resulting billets were sound, reasonably smooth, 9-3/4 inches in diameter, 15 to 16 inches long and weighed from 390 to 435 pounds. The billets when cool were numbered and marked, weighed in lots, then stored under guard in neat readily-counted piles until required by the extrusion plant (See App. B4).

c. Production Data. - Casting operations began 31 October 1942 and were finally completed 24 January 1944. In all, 75,009 billets, weighing a total of 30,933,183 pounds, were cast for the War Department. The weight of billets cast exceeds the total weight of silver obtained from the Treasury because clean scrap obtained from fabrication operations (See Par. 4-3), was returned to the casting plant and remelted. A small number of billets (370) weighing 151,251 pounds were not shipped to the extrusion plant, as they were in excess of the total required. The chart (Appendix A4) shows graphically billet production at the U. S. Metals Plant.

3-6. Transport to Extrusion Plant. - The U. S. Trucking Corporation was engaged to haul the silver billets from Carteret, New Jersey, to the extrusion plant at Bayway, New Jersey, under unit price Contract No. W-7401-eng-27, dated 11 January 1943. ✓ The contract was awarded on the basis of experience in handling silver for the Defense Plant Corporation, excellent equipment and low price. ✓ The Contract was modified in November 1943 to provide for the addition of Program II requirements (See App. D10). ✓ Significant data on the contract is tabulated below: ✓

	<u>Program I</u>	<u>Program II</u>
Hauling began	2 November 1942	29 November 1943
Hauling completed	1 November 1943	5 May 1944
Number of billets	32,754	41,885
Weight of billets in lbs	13,548,455	17,233,477
Total payment to Contractor	\$18,495.53	

3-7. Selection of Contractor for Fabricating Strips. - At the time the best procedure for fabricating silver was being investigated, practically all mill capacity in the country was choked with current production. ✓ Hence the problem of selecting a contractor was not so much one of choosing a process as it was of finding a concern who could do the job at all. ✓ The Defense Plant Corporation was using the method of slitting bars from rolled sheets but had all available capacity tied up on its work. ✓ This left only the extrusion process and the Phelps Dodge Copper Products Company the only concern with sufficient capacity (See App. D5). ✓

3-8. Contract Arrangements for Strip. - Unit Price Contract No. W-7405-eng-22, dated 27 November 1942, with the Phelps Dodge Copper Products Company, provided for the Bayway, New Jersey, Plant to convert silver bil-

lets, by extruding and rolling, into rectangular strips, three inches wide and of thickness varying from .375 inches to .440 inches, as required for different types of magnet coils. ✓ Small quantities, .170 inches and .300 inches were fabricated for the special XAX and XBX magnets (See Vol. 3 - Design). ✓ Supplemental Agreements provided for increases in quantity, changes in size and the fabrication of straight hard strips for busbar (See App. D11). ✓ The total cost of the work performed under this contract was \$1,626,447.51. ✓

3-9. Strip Forming Operation. (See App. A5)

a. Receiving. - The billets were trucked in from Carteret, New Jersey, accepted at the Carteret weight in lots of 72 to 74 and stored near the Preheating Furnace. ✓

b. Extrusion. - Processing started at the Extrusion Furnace. ✓ Billets were loaded into one end of the 60 foot long furnace on nichrome steel carriages and on moving through the furnace were gradually heated to a temperature of 1200 to 1500° F. ✓ From the furnace a billet was ejected hydraulically directly into the extrusion press (a hydraulic press which forced the billet through a die) extruding it into a flat wire strip 5/8 inches thick, three inches wide and 40 to 50 feet long. ✓ The remaining metal in the press cylinder was then ejected and sheared from the flat strip. This butt end was 10-1/2 inches in diameter, 1 to 2 inches thick and weighed about 30 pounds. ✓ The extruded strip then passed via conveyor through a cooling water spray, the rough ends were trimmed off and the strip turned into coils about 3 feet in diameter, to facilitate handling. ✓ Under normal conditions 30 coils per hour could be processed. ✓ Manhattan District armed guards were posted to see that all butts and trimmings were saved and stored in locked



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containers.✓

c. Rolling to Size. - The strips were cold-rolled to proper shape and size by passing twice through a rolling machine which consisted of a pair of 12 inch tandem rolls and additional sizing rolls.✓ They were inspected for size and defects as they were being recoiled.✓ The ends were trimmed by power saw in a restricted enclosure and the coils were moved to the annealing furnace.✓

d. Annealing and Finishing. - All coils, except those straightened for use as busbar, were annealed in a gas fired, controlled atmosphere furnace, at a temperature of 1000° F for an hour and fifteen minutes, to soften the metal sufficiently for ease in handling during the subsequent magnet winding process.✓ They were then cooled, stamped with a serial number and government property stamp, weighed, wrapped in heavy paper and packed in freight cars for shipment (See App. B5).✓

e. Production Data. - Extrusion work began 2 November 1942.✓ The production from Program I of 32,346 soft coils, weighing 12,182,506.88 pounds, and 387 coils, weighing 148,489.06 pounds, for busbar, was completed on 11 November 1943.✓ Program II began 30 November 1943 and was completed 11 May 1944. A total of 41,421 soft coils, weighing 15,574,034.56 pounds, and 414 hard coils, weighing 157,471.94 pounds, were produced during that period.✓ Scrap silver, weighing 2,717,586.25 pounds was recovered during fabrication and cleanup and 1,861.31 pounds were lost.✓ The Production Chart (App. A6) shows production rates for the program.✓

f. Furnace Accident. - During operations on 25 March 1944 a failure of the automatic heat control on the preheating furnace caused a localized overheating which affected fifteen billets, completely melting ten of



them. ✓ The furnace was immediately shut down and, when cool, the affected section was entirely dismantled. ✓ The melted silver had run in and around the carriages, rails, bricks and pieces of copper on the floor. ✓ The carriages, rails and bolts were removed, scraped and chipped, then discarded. ✓ The brick and dust, along with chunks of silver, were first sweated apart, then saved for processing. ✓ It was ascertained with reasonable accuracy that no loss occurred other than those due to reprocessing of the recovered residues (See App. B5). ✓

3-10. Transportation from Extrusion Plant.

a. To Allis Chalmers, Milwaukee. - Shipments of coiled strip were moved to the magnet coil manufacturers at Milwaukee, Wisconsin, by rail freight. ✓ A shipment usually consisted of six sealed cars of silver accompanied by not less than three armed guards in a special caboose. ✓ The total shipment of 258 carloads was begun 8 February 1943 and completed 15 May 1944. ✓ No losses occurred during the shipping period. ✓ Shipping charges totaled \$240,599.60. ✓

b. To Clinton Engineer Works, Tennessee. - Three shipments of silver, in straight lengths packed in strapbound wooden boxes, were sent from Bayway to the Clinton Engineer Works, Tennessee. ✓ The first shipment of one car left 28 May 1943. ✓ The second shipment, consisting of two trailer trucks accompanied by an escort car, was sent 20 September 1943 and the final shipment, by rail in two carloads, was sent 10 April 1944. ✓ No loss or damage occurred en route. ✓

c. Storage at Bayway, New Jersey. - Storage space for quantities of fabricated silver strip was necessary because the strip could not be produced at the rate at which it would be used in magnet coil manufacture. ✓

Thus it was necessary to start strip fabrication well in advance of magnet manufacture. ✓ To meet this need, space in the Bayway Terminal Warehouse was leased, because it was immediately adjacent to the Phelps Dodge Plant and was served by the same railroad spur. ✓ After the warehouse was no longer needed for coil storage, it was used temporarily as a place in which to sort and clean scrap silver collected from the fabricating plants. ✓ Space was leased under two separate leases, beginning in December 1942 and terminating 31 August 1944. ✓ Contract No. W-1098-eng-3072 (App. D12) provided for lease of 9,600 sq. ft. of space from Bayway Terminal Warehouse and Subcontract No. 24 (1-1147), under the Stone and Webster AEC Contract, provided for sublease of 6,400 sq. ft. additional space from Monsanto Chemical Company (App. D13). ✓ Silver coils stored in this warehouse were under Manhattan District guard and counted every eight hours. ✓

3-11. Selection of Contractor for Magnet Coil Fabrication. - Allis Chalmers Manufacturing Company, Milwaukee, Wisconsin, was selected as the manufacturer of the magnet coils for the Electromagnetic Plant because it was one of three large manufacturers experienced in building heavy electrical equipment. ✓ It was the policy of the Manhattan District to distribute the work as widely as possible and the other two companies qualified for the work were selected to furnish other related equipment (See Volume 3 - Design). ✓

3-12. Contracts with Allis Chalmers Manufacturing Company. - Manufacture of magnet coils by Allis Chalmers was performed under five Government lump sum contracts for different types of magnet coils. ✓ The contracts provided for construction of the coils in accordance with specifications and drawings furnished by and under the technical supervision of Stone and Webster Engineering Corporation. ✓ Special provision was included in each contract for the Dis-

trict to remain fully responsible for the accounting and safeguarding of the silver at all times. ✓ The cost of magnet fabrication is not included as part of the silver program because the magnet manufacture was a direct equipment problem in connection with the Electromagnetic Plant. ✓ The contracts and costs are discussed fully in Volume 3 - Design. ✓

3-13. Fabrication of Magnet Coils. (See App. A7).

a. Receiving and Storage. - The operations were conducted in such a way that strict accountability was maintained by District personnel at all times. Shipments of silver in earloads were checked against packing lists as the cars were unloaded. ✓ Each car contained about 300 coils or approximately 115,000 pounds. ✓ The coils were unloaded by a crane and stacked in easily counted rows inside fenced enclosures adjacent to the fabrication shop (See App. B6). ✓

b. Weighing and Brazing. - When taken inside the fabrication shop, the coils were weighed individually and after their ends had been trimmed on a circular saw they were passed through straightening molds to a brazing machine. Here the coil was joined to the preceding coil by inserting a strip of silver solder between the butted ends, holding them together under pressure and heating the joint with an acetylene torch until the solder melted. (Approx. 45 seconds) ✓ The joint was then water cooled, the excess solder was ground off, the process was repeated on succeeding coils, until 24 coils were joined to form a "reel" (See App. B6). ✓

c. Winding. - These "reels" of silver were wound under tension around the bobbin plate of the magnet casing, which was mounted on a revolving "winding machine". ✓ The silver was properly insulated from the casing by fiber board and from itself by fiber paper between turns. ✓ When a magnet coil

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was completely wound with the required number of turns and layers, the steel cover and side or wrapper plates were welded into place. ✓ The completed units were tested for leaks and electrical "shorts", then painted and prepared for shipment (For photographs see App. C1, C2 and C3). ✓

d. Production Data. - A total of 940 magnet coils, containing 27,418,249.23 pounds avoirdupois of silver (399,449,618.38 FTO), were fabricated during the period from February 1943 to August 1944. ✓ This included both programs, the breakdown of which is as follows:

<u>Program I</u>		<u>Program II</u>	
<u>Type</u>	<u>No.</u>	<u>Type</u>	<u>No.</u>
Alpha I	364	Alpha II	403
Beta	76	Beta	79
XAX - Pilot Plant	3	Alpha I - Spares	12
XBX - Pilot Plant	3		
	—		—
Total -	446		494

Production rates during the period are shown graphically in App. A8. ✓

For an explanation of the difference in types of magnet coils see Volume 3 - Design. ✓

e. Magnet Coil Repair. - During the course of the work, 80 Alpha I magnet coils were returned to Allis-Chalmers for repair of insulation which had been damaged during installation and initial operation at the Clinton Engineer Works (See Volume 3). ✓ The steel casings were machined off and saved for re-use. ✓ The silver conductor was unwound, cleaned and coiled for rewinding. ✓ The closing operations were conducted in the same manner as previously described except that advantage was taken of the oppor-

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tunity to incorporate a stronger insulation design in the repaired units. ✓

3-14. Transportation to Clinton Engineer Works. - Completed magnet coils, with all openings sealed, were loaded on flat cars and securely blocked for shipment to the Clinton Engineer Works. ✓ Consideration was given to establishing a guard force for the purpose of safeguarding the shipments, but it was decided that since the silver was welded inside sealed steel cases better security would be achieved by sending unguarded units over different routes and time schedules than if group shipments under guard were adopted (See App. D14). ✓ A route checking system was established to insure prompt handling at junction points and immediate protection in case of accident. ✓ Only one major accident occurred during the course of the shipments. ✓ A car carrying one magnet coil was derailed and overturned in Evansville, Indiana. ✓ The magnet coil was damaged sufficiently to require return for rebuilding, but the silver was not exposed. ✓ No losses occurred during shipment. ✓

3-15. Contract for Busbar Fabrication. - Since the variety of shapes and lengths of busbar required made it necessary to do the fabrication on the job, Stone and Webster Engineering Corporation as constructor was responsible for the field fabrication. ✓ The Watson-Flagg Engineering Corporation, electrical contractor under Stone and Webster Subcontract No. 43-F-6228, dated 28 May 1943, performed the actual work of forming and installing the busbar (See Volume 5). ✓ The subcontract provided for responsibility for and control of the silver to remain with the District at all times. ✓

3-16. Fabrication of Busbar.

a. Receiving and Storage. - Silver shipped from Bayway was received at the Clinton Engineer Works by a representative of the District, who examined the boxes and accepted the silver at the shipping weight. ✓ The

boxes were then placed in a locked storage room of the restricted fabrication shop in the plant area until needed. ✓

b. Fabrication. - As the silver was needed it was taken from the storage room, weighed and processed. ✓ Each finished piece was weighed and stamped with an identification number in accordance with the master drawings. ✓ Armed guards accompanied all busbar leaving the fabrication shop until the pieces were permanently installed. ✓ Any pieces which could not be installed during the day were returned to the storage room to be reissued the following day (See App. A9 and B7). ✓

c. Production Data. - Operations began on 24 August 1943 and were completed on 25 September 1944, during which time 8863 pieces of busbar, weighing 268,744.69 pounds (3,915,274.20 FTO), were fabricated. ✓



#### SECTION 4 - RETURN TO THE TREASURY

4-1. General. - As pointed out in Paragraph 2-3, a condition of the agreement by which the silver was obtained from the Treasury Department stipulates that it shall be returned in the quantity, form and fineness in which it was received. ✓ Unless this stipulation is modified at some time in the future, it will be necessary to remove all silver from the electromagnetic plant and return it to the Treasury. ✓ Because of the high value of the material, collections of scrap and residues resulting from each step of the fabrication operations were made in conjunction with those operations and, because of the requirement for return to the Treasury, it was necessary to refine and process these collections for return to the Treasury in the form received. ✓

4-2. Engagement of Metallurgical Consultant. - Although the procurement and fabrication of the raw silver into magnet coils and busbar constituted a major program, the technological processes involved were not so complex as those included in refining the scrap and residues to satisfy Treasury Department requirements as to fineness, etc., consequently, it was considered advisable to retain a metallurgical consultant firm to advise the War Department on that phase of the work. ✓ Upon the recommendation of Handy and Harmon (See App. D15), the firm of Lucius Pitkin, Inc., New York, N. Y., was engaged under Contract No. W-7421-eng-17, dated 25 May 1944 (See App. D16), to supervise, check and otherwise represent the District in the process of weighing, sampling and assaying, and in the treatment of residues and scrap; this firm was also to submit metallurgical and audit reports as requested. ✓ The assay reports submitted by this contractor were necessary to maintain proper accounting of the silver, and the audit reports requested by the War Depart-

ment provided assurance of the accuracy of the Program. ✓ The contract cost as of 1 July 1945 was 17,000.07. ✓

#### 4-1. Scrap Collection.

a. General scope. - A conscientious and diligent effort to collect and safeguard scrap and dust extended throughout the program, to minimize the possibility of losses. ✓ Consequently, the cleanup programs at the various work locations consisted chiefly of dismantling and cleaning the machinery, and the sweeping and screening of floors. ✓ However, considerable amounts of partially processed silver, along with the scrap and cleanup residues, had to be collected, refined and returned to the Treasury in the form of bullion bars. ✓ Recovery operations were preceded by inspection and planning to lay out orderly cleanup programs and to prevent the expenditures of time and money not justified by economical recoveries. ✓

b. Cleanup at the Casting Plant. - Under the provisions of the Defense Plant Corporation Contract (See App. B3), for the casting operations by the U. S. Metals Refining Company at Carteret, N. J., an ounce for ounce return of all War Department metal was required, with the stipulation that the War Department would accept its proportionate share of the losses to be determined after the work was completed. ✓ Hence the District, although concerned, did not engage directly in the scrap collection at Carteret during Program I. ✓ After completion of the Program II casting operations, the District supervised a thorough cleaning of the plant by the U. S. Metals Refining Company (See App. B5). ✓

c. Cleanup at the Extrusion Plant. - Scrap at the Phelps Dodge Refractory Plant was collected in four different forms: clean butt ends and end trimmings, contaminated metal, sandings and sweepings. ✓ During the period when

casting operations were in progress at U. S. Metals, the clean metal was returned for remelting, while the contaminated metal and swarfs were stored for refining. The final cleanup program consisted of dismantling the machines and cleaning the parts, foundations, pits and floors; cleaning all storage areas and any equipment which had come in contact with the silver (See App. B5).✓

d. Cleanup at Allis Chalmers, Milwaukee. - The fabricating operation at Allis-Chalmers resulted in a large quantity of clean end-trim-  
mings and sawdust, which were collected throughout the program.✓ In addition, surplus coils were weighed and cut into short lengths for return.✓ Contaminated metal consisted of joints which were cut out and the residues of the final cleaning, cleaning, and scraping job performed on the shop and equipment.✓ Scrap was shipped to the refining plant by rail freight, in locked boxes, accompanied by Manhattan District Guards (See App. B9).✓

e. Cleanup at Clinton Engineer Works. - Cleanup operations in busbar shop at the Y-12 plant followed the same procedure as at the other fabrication shops, but were much simpler, because the work was relatively small and more easily controlled.✓ Shipments to the refining plant were by Railway Express (See App. B7).✓

4-4. Converting Scrap to Bullion Bars. - Scrap was converted to bullion bars under the provisions of three contracts:✓

a. U. S. Metals Refining Company. - The U. S. Metals Refining Company, Carteret, N. J., contract (See Par. 3-3) provided for the wrecking of the casting furnace and the recovery and treatment of all silver which it was commercially possible to recover.✓ The resulting residues were weighed, sampled and assayed and then combined for refining.✓ The contractor was ob-

lighted to return to the Manhattan District bars of commercial silver weighing approximately 1000 ounces and not less than .999 fineness. ✓ A total of 1,571,782.02 Fine Troy Ounces were recovered under this contract (See App. 91). ✓

b. U. S. Assay Office. - To expedite the return of scrap silver to the Treasury, an agreement, dated 24 February 1944, was reached with the U. S. Treasury Department (See App. 110), whereby the U. S. Assay Office, New York, N. Y., melted small pieces of clean silver scrap, at the rate of 2-1/2 mills per Troy Ounce. ✓ The Assay Office facilities were very limited and other arrangements were necessary for the conversion of the majority of the scrap. ✓ A total of 2,580,792.97 Fine Troy Ounces was processed for a cost of \$5,456.45. ✓

c. American Metal Company, Ltd. - The bulk of the scrap was converted to bullion bars by the American Metal Company, Ltd. under Contract No. -7807-ang-129, dated 2 March 1944 (See App. 117). ✓ The award was made on the basis of low cost to the Government. ✓ Processing of scrap was done at the plant of the U. S. Metals Refining Company, Carteret, N. J., which is a subsidiary of American Metals Company, Ltd. ✓ Operations were supervised by the Manhattan District and by Lucius Pitkin, Inc., consultants. ✓ A total of 20,161,121.83 Fine Troy Ounces of silver were processed from scrap collected at the various fabrication plants, for a total cost of \$55,364.60. ✓

d. Transfer of Metal to U. S. Treasury. - The silver converted into bullion bars was returned to the U. S. Treasury at the U. S. Assay Office, New York, N. Y. ✓ The War Department account was credited for the amount contained in each shipment at the weight determined by the Assay Office scales. ✓ Internal receipts issued at the time of the transaction were subsequently re-

placed by permanent receipts, acknowledging delivery by the War Department. ✓  
Of the 24,313,684.47 Fine Troy Ounces of scrap silver processed into bul-  
lion bar and returned to the Treasury, 24,293,608.05 Fine Troy Ounces were  
credited to the War Department account (See App. D18), and 20,076.42 Fine  
Troy Ounces were transferred to the D.P.C. as payment for melt losses sus-  
tained under Contract No. W-7401-eng-12 (See Par. 3-4, App. D8 and A10). ✓

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## SECTION 5 - SECURITY MEASURES

5-1. General Security Policies. - In addition to the usual security measures of the District such as safeguarding information, clearance of personnel, etc. (See Book I Vol. 14), it was necessary to take unusual precautions throughout the Silver Program, because of the high value of the material involved. ✓ For this reason, guard forces were organized and maintained at each work location, responsible consultants were employed to aid in the metallurgical and technical phases of the program (See Par. 4-2) and periodical inspections were conducted by special inspectors appointed by the District Engineer, to investigate the procedures and precautions used to assure that they were adequate. ✓ It was, at times, difficult to strike a balance between security and economy when consideration was given to the thousands of small, easily stolen pieces of silver, being fabricated into equipment for one of the most highly secret projects of the war. ✓ However, overguarding was not adopted and useless restrictions were avoided. ✓

5-2. Safeguarding Information. - In keeping with the general security policies of the District the Silver Program was assigned a secret classification, to conceal the War Department's interest in so large an undertaking in precious metals and hence avoid drawing attention to the primary work of the District. ✓ All reasonable efforts to further this policy were followed, such as using coded commercial bills of lading, consigning the shipments to non-military personnel, having officers appear in civilian clothes at certain installations and carrying on conversations and correspondence in accordance with established regulations for safeguarding information. ✓

5-3. Clearance of Personnel. - In accordance with established secur-

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ity policies, all employees of the Government and contractors involved in the program were investigated and cleared before being allowed access to classified information. ✓ The contractors maintained armed plant guard forces and required positive identification of all persons entering the plant. ✓ All employees wore identification badges. ✓

5-4. Guard.

a. General Guard Measures. - Certain features of the guard system were common to all work locations. ✓ All guards were armed and uniformed. ✓ They were strategically stationed to protect the silver from theft, sabotage and loss. ✓ The men worked eight hour shifts which were systematically scheduled so that the silver was uniformly guarded twenty-four hours a day, seven days a week. ✓ They were instructed in proper guarding and security measures by trained military personnel. ✓ All guards were instructed in the use of firearms and attended periodical target practices. ✓ In general, all shipments were guarded; truck shipments were made in convoys of not less than two trucks and were protected by armed guards, who rode in the cab while in motion and patrolled around the shipment when it stopped. ✓

b. Plant Guards. - District guard forces, numbering from 20 to 60 civilian patrolmen, supervised by Army Officers, were located at each fabrication plant. ✓ The silver guards were in addition to the regular contractors' guards and were present at all locations where silver was exposed, controlling the handling of the metal and access to the areas where it was processed or stored.

c. Shipping Guards. - Shipments of silver were made by convoy between work locations. When trucks were used, the guards rode in the cabs of the trucks or in passenger cars immediately following. For short hauls

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through populated areas, the armament consisted of pistols, but for the longer trips, such as West Point to Carteret, N. J., or from Bayway to Tennessee, the guards were also armed with riot guns. ✓ Guards over rail shipments rode in a special caboose or escort car which was never separated from the shipment. ✓ When the train was stopped, guards patrolled around the shipment, inspecting the car seals, wheels, floors, etc. ✓ The only shipments which were sent unguarded were the shipments of magnet coils from Milwaukee to the Clinton Engineer Works, and in this service it was considered that the silver was safe inside the welded steel cases. ✓

5-5. Inspections. - In accordance with instructions from the District Engineer, periodical inspections of the Silver Program were made by District personnel not directly connected with the program. ✓ The inspections were made for the purpose of observing the operations, inquiring into the security and accounting measures, determining if previous recommendations were followed and making new recommendations, with a view to achieving the optimum in the security and accuracy of the program. ✓ Comprehensive reports were submitted, covering all operations, from the receipt of silver at the West Point Depository to its installed location at the Clinton Engineer Works (See App. D19). ✓ In addition, the District Security and Intelligence Section made frequent plant inspections and arranged to inspect shipments at junction points, to check on the safety of the metal and the efficiency of the guards.

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SECTION 6 - ACCOUNTING FOR METAL

6-1. General. - Accurate accounting for the silver was necessary because of the extremely high value of the quantity of metal involved and to parallel the care with which silver is handled by the Treasury Department. ✓ The records of each operation were quite detailed, because it was necessary to reflect the disposition of more than 14,000 tons of silver, to the nearest ounce. ✓ The following paragraphs describe the way in which the records were compiled and how they were verified, and give a summary of the contents. ✓

6-2. Accounting System.

a. Control Office. - A central control office to administer the program was set up in October 1942 in the District Office, then located in New York, N. Y., and continued at that location until February 1945. ✓ The clerical staff in this office received records from all operating subsections and from them compiled the Master Ledger in which the progress of the silver through all stages of the program is recorded (See App. D20). ✓ Independent accounts of the work of the subsections were maintained and were compared with the original accounts at the work locations, at frequent intervals, in order to detect errors of computation or inventory. ✓ As suboffices completed their work the records were forwarded to the control office. ✓

b. West Point Records. - At the U. S. Bullion Depository, a clerical staff of from three to six District employees witnessed the withdrawals. The bars of silver which had been individually weighed by the Treasury were combined in melts and the total weight of each melt, consisting of approximately 24 bars, was determined and recorded on the Bar List for each truck shipment. ✓ A Daily Summary Sheet, containing the total weight

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of the shipments, was made for each day. An Interim Receipt was given to the Treasury by the War Department for the weight as shown on the Daily Summary. Copies of the Bar Lists, Summary Sheets and Interim Receipts were forwarded to New York for checking and entry into the ledger.

c. Carteret Records. - Silver arriving at the U. S. M. E. Company, Carteret, N. J., was physically checked against the appropriate bar lists. It was then weighed in lots of approximately 30,000 pounds and checked against the Treasury weight for that lot. Reports showing furnace charges, billets produced, shipments made and daily inventories were forwarded to New York for checking and ledger entries.

d. Bayway Records. - At the extrusion plant, records were kept of the silver received, daily strip production, weight of scrap and dust, weight of coils, shipments to other plants, etc. The silver was accounted for in lots which approximated a week's production of strip and the resulting scrap was charged against each particular lot.

e. Milwaukee Records. - Silver arriving at Milwaukee for fabrication into magnet coils was accepted by coil count. Each coil was weighed immediately before being put into production and checked against the weight from Bayway, which was shown on a tag with the coil and on the packing list. As the coils were combined to form "reels", the weight of each reel was recorded on a Reel Sheet and when wound into a magnet coil the weight was recorded on a Tank Report. The weight of scrap produced was charged against each coil, reel and tank and was recorded daily in a scrap report. Copies of Milwaukee Records were forwarded to New York for checking and ledger entry. As Magnet Coils were shipped out, copies of the bills of lading were forwarded to New York (See App. B6).

f. Clinton Engineer Works Records. - At the Clinton Engineer Works the daily requirements of metal were checked out of the locked storerooms and weighed and the weight was recorded. ✓ The busbar was formed in accordance with detailed plans, the finished bars were weighed to the nearest ounce and the weight was recorded in the Busbar Schedule, opposite the piece number and diagram. ✓ As the pieces were installed, their locations were indicated on detailed drawings. ✓ A Daily Report of Production was maintained and forwarded to New York for checking and entry in the ledger (See App. B7). ✓

6-3. Audit.

a. Auditing Firm. - For assurance beyond all reasonable doubt that the records of the District contained an accurate and complete accounting of the Silver Program, Lucius Pitkin, Inc., as consultants, employed the services of Kessler & Kessler, a well-known New York accounting and auditing firm, to make complete audits of the silver accounts (See App. D21). ✓

b. List of Audit Reports. - The reports submitted were an Audit Report for Program I, an Interim Report of Accounts for Program I and Program II, and the Final Audit Report for Program I and II. ✓ A sub-audit of the Furnace operations at Carteret, and the Report of Cleanup Operations at Bayway, supported the accuracy of these accounts. ✓

c. Accuracy of Records. - It was the opinion of the consultants, supported by the audits, that the books and accounts of the Silver Program were complete and accurate and that the Program was conducted with meticulous attention to detail (See App. D21). ✓

6-4. Review of Accounts. - The balance sheet, Appendix A10, shows that the disposition of 427,514,149.02 Fine Troy Ounces withdrawn from the

Treasury was as follows: 399,449,618.38 Fine Troy Ounces were wound into magnet coils; 3,915,274.20 F.T.O. were installed as busbar; 24,293,608.05 F.T.O. were returned to the Treasury as bullion bar converted from scrap; and 155,648.39 F.T.O. were lost during processing (See App. D20). ✓ This loss, when considered as a separate weight of silver, is an appreciable amount, but the percentage loss of only thirty-six thousandths of one percent is considered an excellent accomplishment. ✓ There is no undertaking of like magnitude in the use of precious metals which can be used as a criterion for comparison; however, this loss compares favorably with normal losses incurred in handling smaller amounts under ideal conditions. ✓ The loss is much less than the estimated two percent for which a reserve fund was set aside in appropriations available to the Army Service Forces (See App. D22). ✓ As previously mentioned, recovery operations were based on competent inspection and sampling to avoid processing residues which were worth less than the cost of recovery (See App. B8 and B9). ✓



SECTION 7 - ORGANIZATION AND PERSONNEL

7-1. General Description. - The administration of the Silver Program was performed by the Special Accountability Section of the District. Responsibility for the safeguarding, processing, accounting and coordinating of the flow of silver, from its withdrawal at West Point, through the fabrication plants, to its installation at the Clinton Engineer Works, was delegated by the District Engineer to the Special Accountability Officer in October 1942. ✓ The work at each fabrication plant was performed by clerical and guard forces organized at each location, as shown on the organization chart (See App. A12). ✓ The chart shows the organization as it functioned during the major program operations, from the spring of 1943 to the fall of 1944. ✓ During the development and closing out of the program, the sections shown were added and discontinued as required, the total personnel of the section being reduced to two in February 1945. ✓ In addition to reporting directly to the District Engineer, the Special Accountability Officer maintained close coordination with the Y-12 Unit Chief, for determination of specifications and schedules. ✓

7-2. Personnel. - The following personnel held key positions in the administration of the Silver Program: ✓

Col. James C. Marshall. - The Silver Program was initiated under the direction of Col. Marshall, District Engineer, from June 1942 until July 1943. ✓ He personally handled negotiations in Washington, D. C., to initiate the work. ✓

Col. K. D. Nichols. - Deputy District Engineer until July 1943 and then District Engineer; handled much of the initial negotiations and process selection work. ✓

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Lt. Col. A. C. Johnson. - Washington Liaison Officer for the District; continued negotiations in Washington and handled part of the process investigation. ✓

Major W. E. Kelley. - As Unit Chief for the Electromagnetic process from March 1943 to October 1944, was responsible for coordinating the silver program with the Y-12 work. ✓

Capt. P. E. O'Hearn. - Was appointed Special Accountability Officer in October 1942 and served until March 1943. ✓

Capt. Spencer B. Powers. - Succeeded Capt. O'Hearn as Special Accountability Officer in March 1943 and supervised the program during its major operations, until November 1944. ✓

Capt. Ross C. Hill. - Present Special Accountability Officer, was appointed Assistant Special Accountability Officer in February 1943, and served in that capacity until he relieved Capt. Powers in November 1944. ✓ During most of this period Capt. Hill also served as Area Engineer in Milwaukee, in charge of work connected with K-25 and Y-12 procurement. ✓

Capt. F. V. Summers. - Assisted Capt. Powers in New York from August 1943 to June 1944. ✓

Sgt. T. H. Schiercke. - Performed very valuable work from January 1944 until February 1945 as technical assistant. ✓

Mr. E. J. Green, Jr. - Was the engineer in charge of work at Milwaukee, Wisconsin, from June 1943 until October 1944, when he assumed his present post as civilian assistant to the Special Accountability Officer. ✓

7-3. Consultants. - Consultant Contractors who assisted in the technical phases of the program were the Handy and Harmon firm of Bridgeport, Conn., who worked on the selection of processes and fabrications (See Par.

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3-2) and Lucius Pitkin, Inc., New York, N. Y., who performed technical services in connection with the processing and return of silver (See Par. 4-2). ✓

7-4. Other Agencies.

a. The Treasury Department. - Throughout the program the cooperation and assistance of the Treasury Department and its lower echelons were responsible in a large measure for the successful prosecution of the work. Mr. D. W. Ball, Under Secretary of the Treasury, Dr. Leland Howard, Assistant Director of the Mint and Mr. E. R. Lynch, Superintendent of the U. S. Assay Office, New York, N. Y., performed outstanding service in assisting the War Department Program. ✓

b. Defense Plant Corporation. - The willingness of the Defense Plant Corporation to share experience and facilities in the early stages of the program aided greatly in the work. ✓ Defense Plant Corporation personnel assisting in this work were Mr. H. R. Rutland and Mr. H. P. Jenkins, who were in charge of the Defense Plant Corporation silver program. ✓

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MANHATTAN DISTRICT HISTORY  
BOOK V - ELECTROMAGNETIC PLANT  
VOLUME 4 - SILVER PROGRAM  
APPENDIX "A"  
CHARTS

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MANHATTAN DISTRICT HISTORY

BOOK V - ELECTROMAGNETIC PLANT

VOLUME 4 - SILVER PROGRAM

APPENDIX "A"

CHARTS

<u>No.</u>	<u>Description</u>
1	Cost of Silver Program ✓
2	Withdrawal and Returns to U. S. Treasury ✓
3	Route of Silver for Fabrication into Billets at U. S. Metals Refining Company, Carteret, N. J. ✓
4	Billet Production at U. S. Metals Refining Company, Carteret, N. J. ✓
5	Route of Silver for Fabrication into Strips at Phelps Dodge Copper Products Company, Bayway, N. J. ✓
6	Strip Production and Shipments at Phelps Dodge Copper Products Company, Bayway, N. J. ✓
7	Route of Silver for Fabrication of Magnet Coils at Allis-Chalmers Mfg. Company, West Allis, Wisconsin. ✓
8	Production of Magnet Coils - Allis-Chalmers Mfg. Company, West Allis, Wisconsin. ✓
9	Route of Silver for Fabrication of Busbar at Clinton Engineer Works, Oak Ridge, Tennessee. ✓
10	Balance Sheet - Statement of Silver Leased by the War Department from the Treasury as of July 1, 1945. ✓
11	Typical Silver Calculations ✓
12	Specimen Organization Chart ✓

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COST OF SILVER PROGRAM

FABRICATION

<u>Contractor</u>	<u>Contract No.</u>	<u>Date</u>	<u>Description</u>	<u>Amounts</u>
Defense Plant Corporation	W7401 eng-12	10-26-42	Melting & Casting Silver	\$ 270,271.78 *
U. S. Metals Refining Co.	W7407 eng-126	11-8-43	Melting & Casting Silver	173,240.23
Phelps Dodge Cop. Prods. Co.	W7405 eng-28	11-27-42	Fabrication of Strip	1,626,447.51
Defense Plant Corporation	W7401 eng-93	12-3-43	Equipment	9,765.87
American Metal Co., Ltd.	W7407 eng-129	3-2-44	Refining & Melting Scrap	55,364.60
U. S. Assay Office	Letter Agreement	2-24-44	Melting of Scrap	6,458.45
Handy & Harmon	W7405 eng-5	10-1-42	Consultants	2.62
Lucius Pitkin, Inc.	W7421 eng-17	6-25-44	Consultants	17,064.07 *

Cost of Fabricating Silver

\$ 2,158,615.13

HANDLING

Treasury Department	Letter Agreement	10-14-43	Handling at West Point	\$ 11,856.12
U. S. Trucking Co.	W7401 eng-27	1-11-43	Carteret to Bayway	18,495.53
U. S. Trucking Co.	W7401 eng-83	11-5-43	West Point to Carteret	33,306.52
Transfer Charges	Gov't Bills of Lad.		Bayway to West Allis	240,599.60
Switch Charges	Gov't Bills of Lad.		Hawley Plant to A. C.	222.08
Bayway Terminal Whse.	W1098 eng-3072		Storage at Bayway	4,354.60
S&W (Monsanto Chem.)	S&W (Sub. No. 24)		Storage at Bayway	1,036.80
Klug & Smith	W7425 eng-51	1-14-44	Loading Cars at Hawley Pl.	14,139.80

Cost of Handling Silver

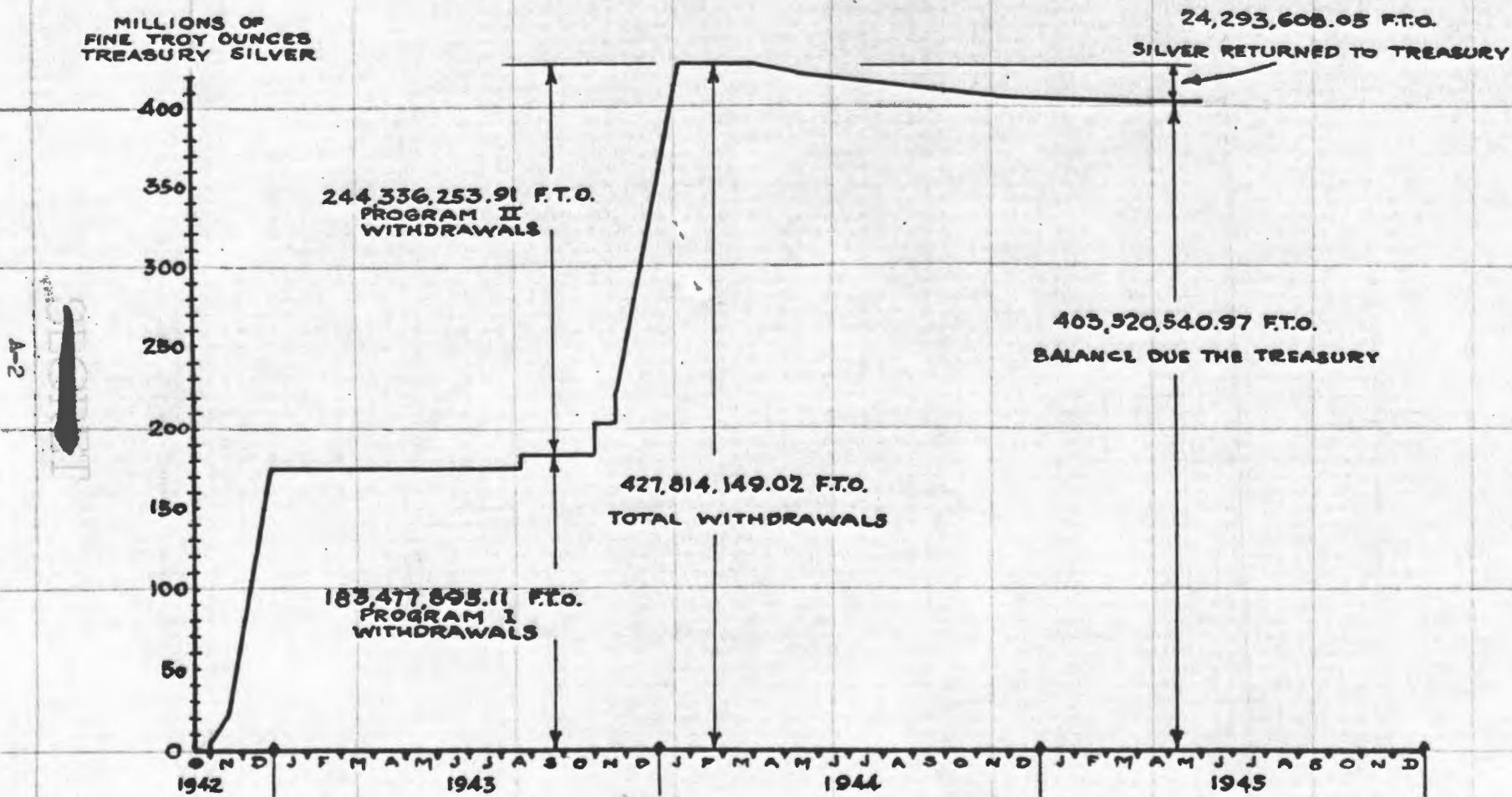
\$ 324,011.05

Total Cost of Fabricating and Handling

\$ 2,482,626.18

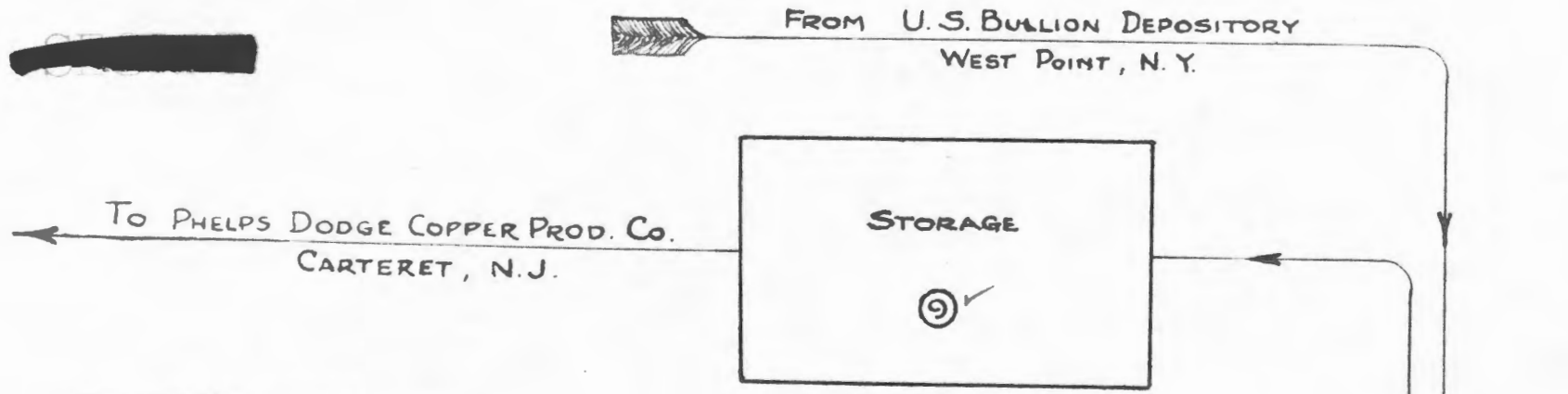
\* Amount Paid as of 1 July 1945

MILLIONS OF  
FINE TROY OUNCES  
TREASURY SILVER



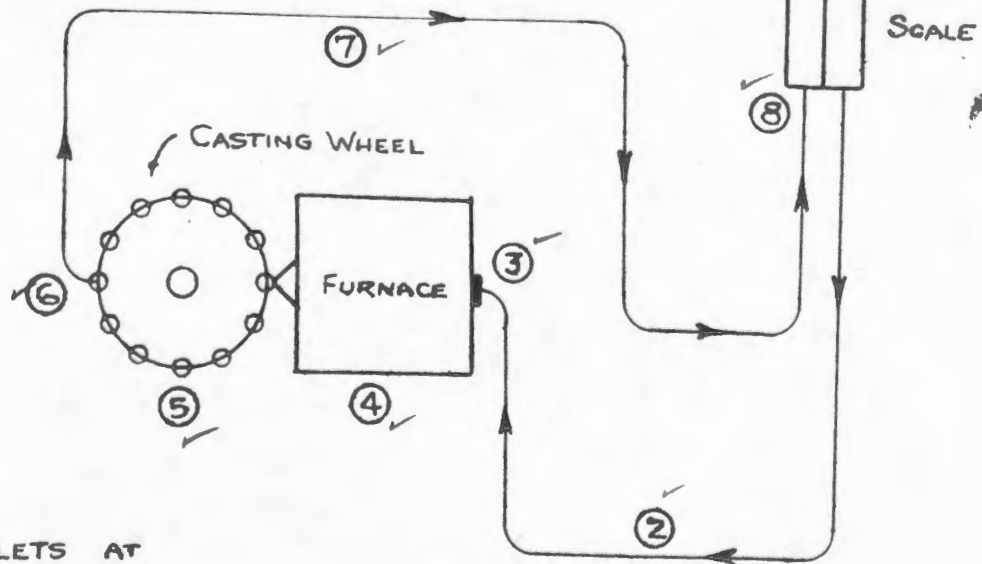
MANHATTAN DISTRICT SILVER PROGRAM  
WITHDRAWALS AND RETURNS  
JUNE 1, 1945





ROUTE OF SILVER

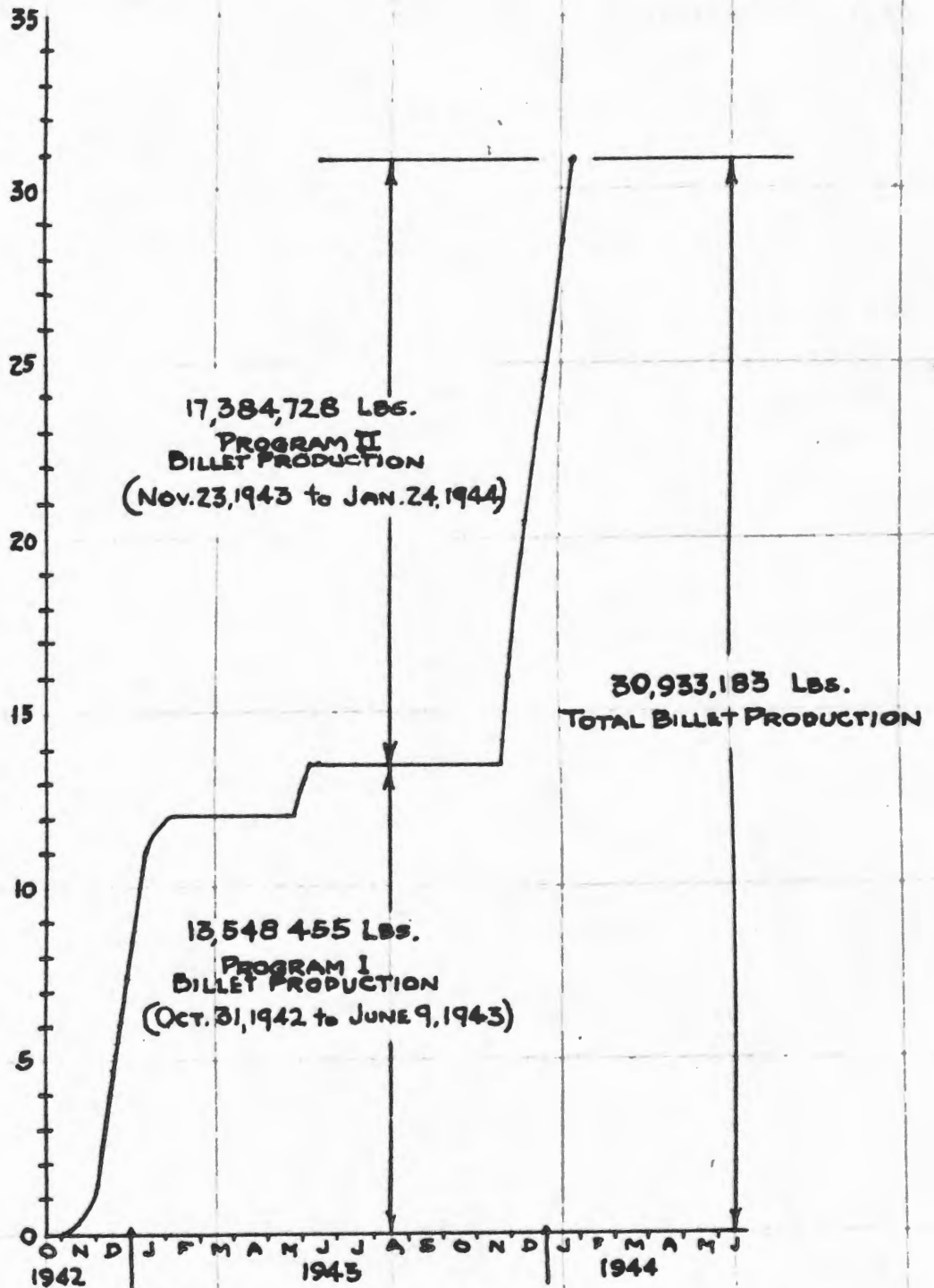
- A
- ① BARS RECEIVED AND WEIGHTED ✓ ed X
  - ② MOVED TO FURNACE ✓
  - ③ BARS CHARGED INTO MELTING FURNACE ✓
  - ④ MELTED TO CASTING TEMPERATURE ✓
  - ⑤ CAST INTO CYLINDRICAL BILLETS ✓
  - ⑥ BILLETS NUMBERED ✓
  - ⑦ TRANSFERRED TO SCALE FOR WEIGHING ✓
  - ⑧ BILLETS WEIGHED BY LOTS ✓
  - ⑨ STORAGE ✓



ROUTE OF SILVER  
FOR FABRICATION INTO BILLETS AT  
U. S. METALS REFINING COMPANY  
CARTERET, N. J. ✓

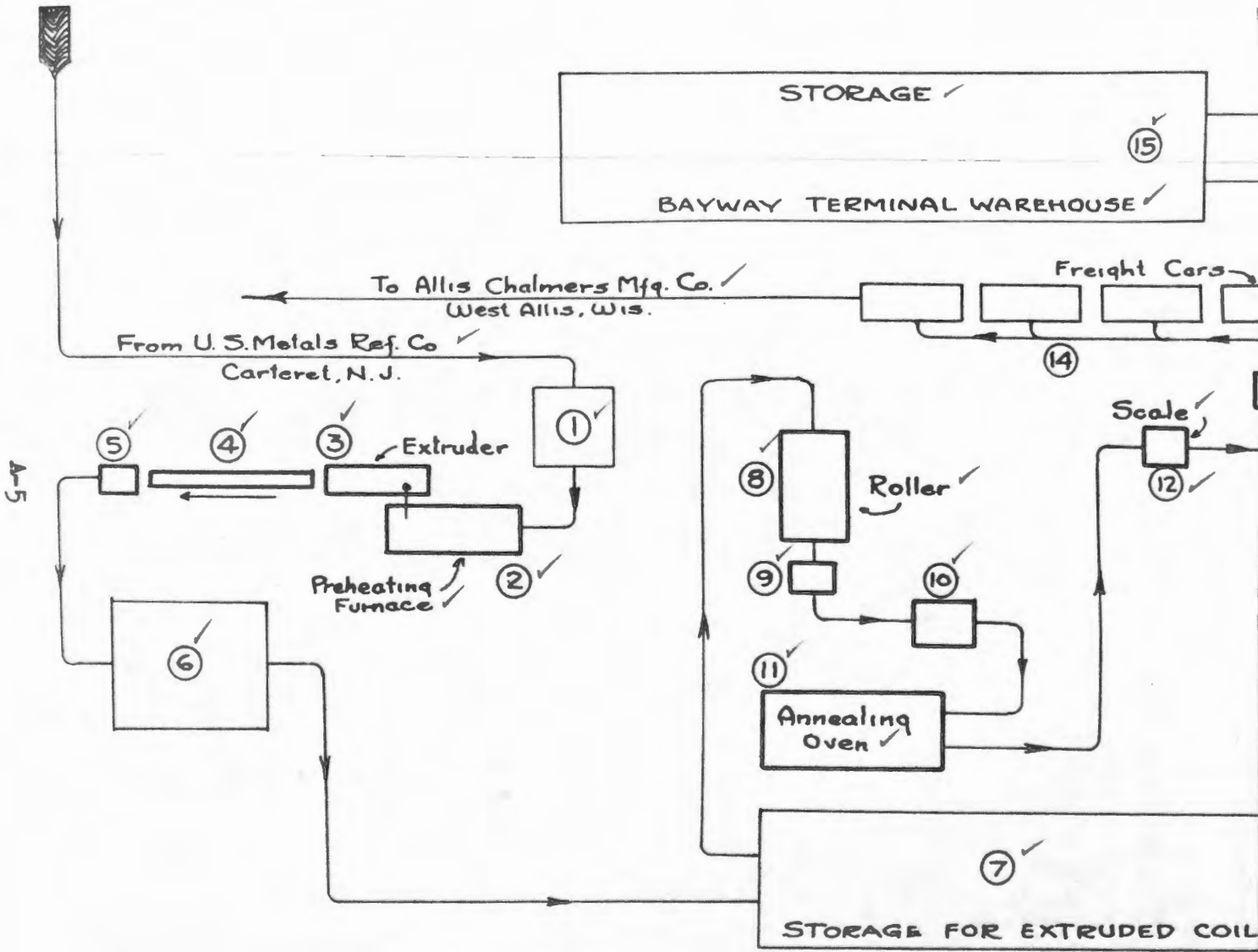
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MILLIONS OF POUNDS  
PRODUCED



MANHATTAN DISTRICT SILVER PROGRAM  
BILLET PRODUCTION  
U.S. METALS REFINING CO. CARTERET, N.J.

SOURCE : MASTER LEDGER, INDEX 3.1 AND 3.2

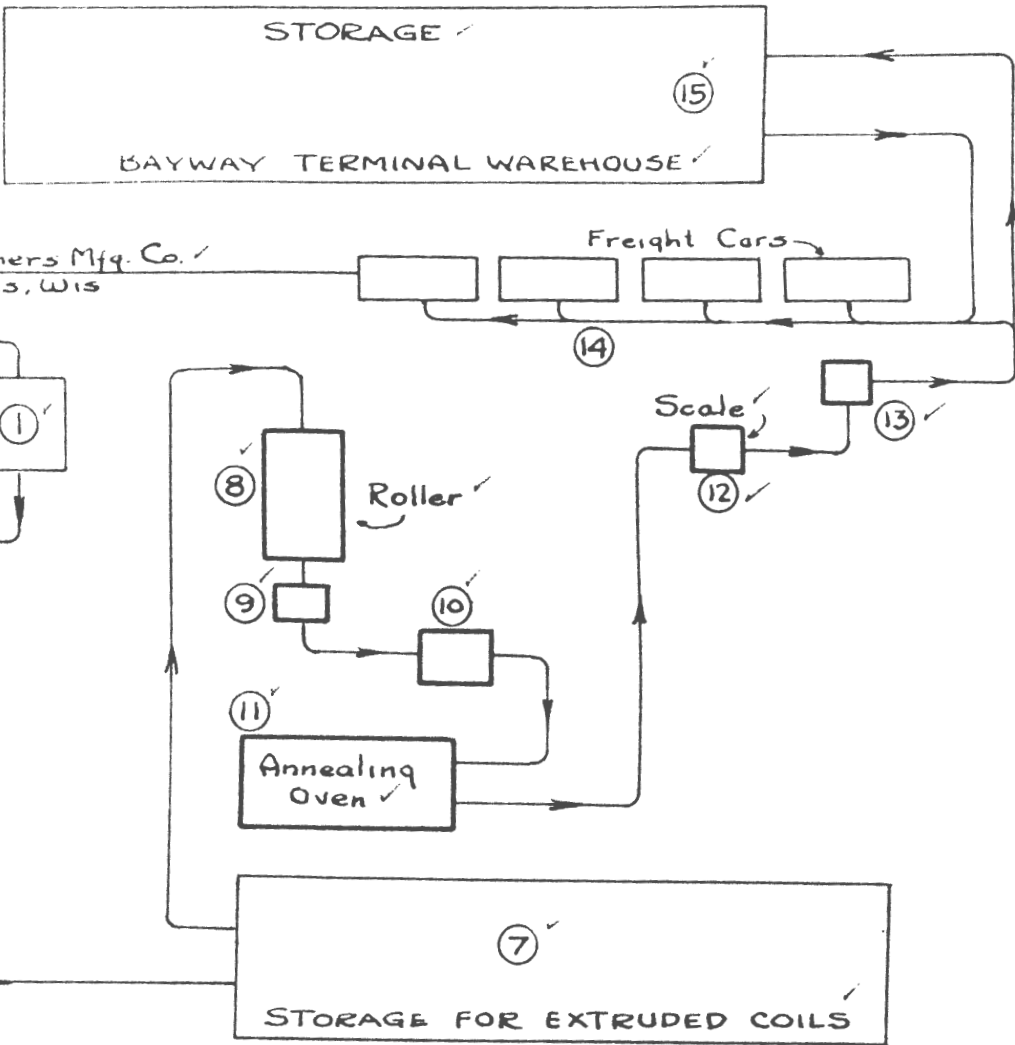


ROUTE OF SILVER  
 FOR FABRICATION INTO STRIPS AT  
 PHELPS DODGE COPPER PRODUCTS COMPANY ✓  
 BAYWAY, N.J. ✓

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ROUTE OF SILVER

- ① BILLETS RECEIVED AND STORED ✓
- ② PREHEATED IN FURNACE AT 1200-1500°F ✓
- ③ EXTRUDED INTO STRIPS ✓
- ④ STRIPS WATER COOLED ON CONVEYOR ✓
- ⑤ STRIPS TRIMMED AND COILED ✓
- ⑥ STORAGE FOR DAILY PRODUCTION ✓
- ⑦ GENERAL STORAGE FOR EXTRUDED COILS ✓
- ⑧ COLD ROLLED TO SPECIFIED SIZE ✓
- ⑨ INSPECTED AND COILED ✓
- ⑩ ENDS OF COILS TRIMMED BY SAWING ✓
- ⑪ ANNEALED AT 1000°F FOR ONE HOUR ✓
- ⑫ WEIGHED AND NUMBERED ✓
- ⑬ WRAPPED IN HEAVY PAPER ✓
- ⑭ LOADED IN FREIGHT CARS ✓
- ⑮ STORAGE OF EXCESS PRODUCTION ✓

ROUTE OF SILVER  
FOR FABRICATION INTO STRIPS AT  
PHELPS DODGE COPPER PRODUCTS COMPANY ✓  
BAYWAY, N.J. ✓

MILLIONS OF POUNDS

30

25

20

15

10

5

0

O N D J

1942

F M A M J

1943

J A S O N D

1944

J F M A M J

1944

28,062,502.44 LBS.  
PRODUCED AND SHIPPED

15,731,506.50 LBS.  
PROGRAM II

12,330,995.94 LBS.  
PROGRAM I

PRODUCTION

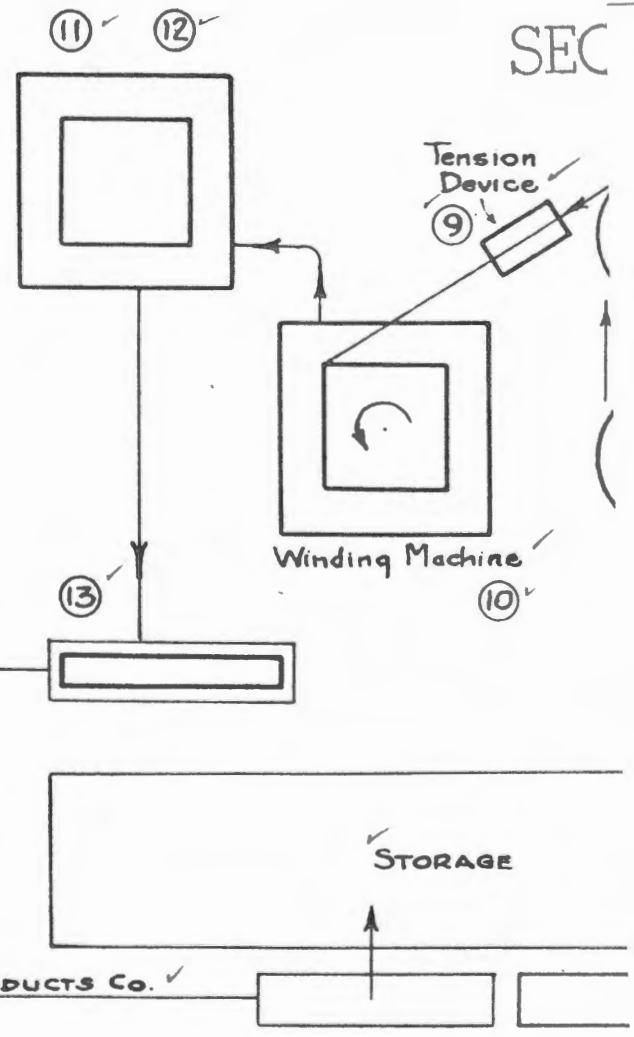
SHIPMENTS

MANHATTAN DISTRICT SILVER PROGRAM  
STRIP PRODUCTION AND SHIPMENTS  
PHELPS DODGE COPPER PRODUCTS COMPANY  
BAYWAY, NEW JERSEY

SOURCE: MASTER LEDGER INDEX 7.1 AND 7.2  
6.1 AND 6.2

ROUTE OF SILVER

- ① COILS OF SILVER RECEIVED & STORED ✓
- ② STORAGE FOR DAILY PRODUCTION ✓
- ③ STRIPPED OF WRAPPING & WEIGHED ✓
- ④ ENDS TRIMMED BY SAWING ✓
- ⑤ COIL PLACED FLAT ON REVOLVING TABLE ✓
- ⑥ END BRAZED TO PRECEDING COIL ✓
- ⑦ WOUND ON SPOOL FORMING A "REEL" ✓
- ⑧ TRANSFERRED TO SPINDLE FOR WINDING ✓
- ⑨ TENSION DEVICE FOR UNIFORM WINDING ✓
- ⑩ WOUND ON INSULATED STEEL CASING ✓
- ⑪ COVER AND SIDE PLATES WELDED ✓
- ⑫ TESTING AND FINAL INSPECTION ✓
- ⑬ BLOCKED VERTICALLY ON FLATCARS ✓



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A-7

ROUTE OF SILVER  
FOR FABRICATION OF MAGNET COILS AT  
ALLIS CHALMERS MANUFACTURING COMPANY  
WEST ALLIS, WISCONSIN ✓

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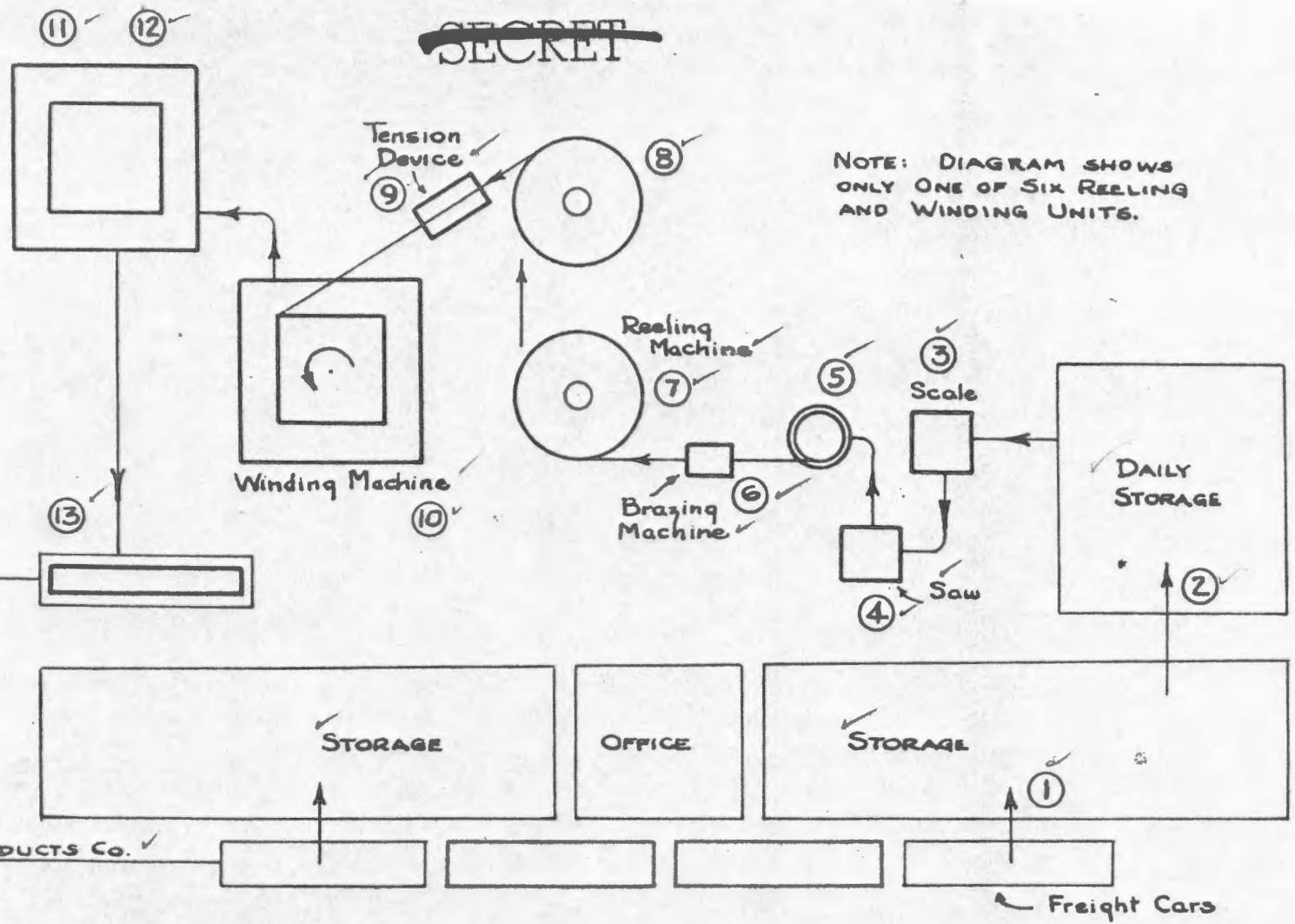


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- ER
- RECEIVED & STORED ✓
- PRODUCTION ✓
- WINDING & WEIGHED ✓
- SAWING ✓
- REVOLVING TABLE ✓
- FEEDING COIL ✓
- FORMING A REEL ✓
- WINDING MIDDLE FOR WINDING ✓
- UNIFORM WINDING ✓
- BRASS STEEL CASING ✓
- WELDED ✓
- INSPECTION ✓
- ON FLATCARS ✓

ENGINEER WORKS  
MADISON, TENN.

ALLIS CHALMERS DODGE COPPER PRODUCTS CO.  
BAYWAY, N. J.



NOTE: DIAGRAM SHOWS ONLY ONE OF SIX REELING AND WINDING UNITS.

ROUTE OF SILVER  
 FOR FABRICATION OF MAGNET COILS AT  
 ALLIS CHALMERS MANUFACTURING COMPANY  
 WEST ALLIS, WISCONSIN ✓

NUMBER OF  
MAGNET COILS

1050

900

750

600

450

300

150

0

A N J J A S O N D J F M A M J J A S O N D

1943

1944

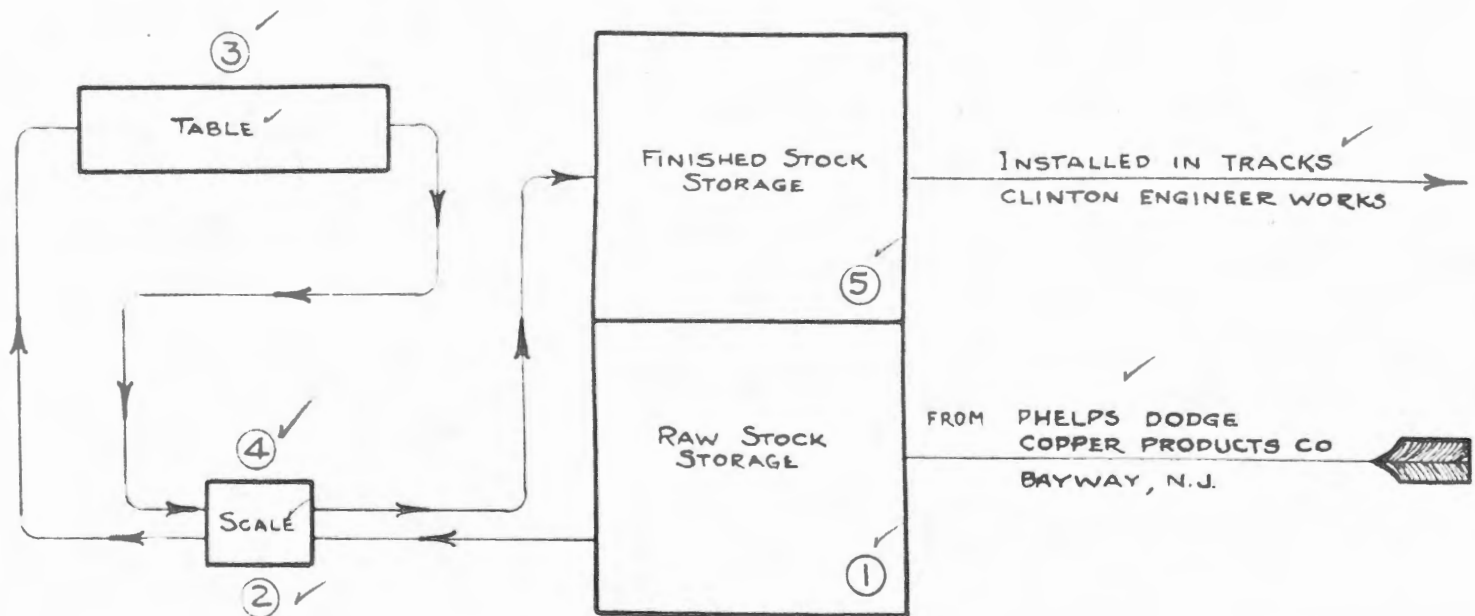
494 MAGNET COILS  
PRODUCED  
PROGRAM II

446 MAGNET COILS  
PRODUCED  
PROGRAM I

940 MAGNET COILS  
TOTAL PRODUCED

MANHATTAN DISTRICT SILVER PROGRAM  
PRODUCTION OF MAGNET COILS  
ALLIS CHALMERS MANUFACTURING COMPANY  
WEST ALLIS, WISCONSIN

SOURCE: MILWAUKEE MONTHLY REPORTS



ROUTE OF SILVER  
FOR FABRICATION OF BUSBARS AT  
CLINTON ENGINEER WORKS  
OAK RIDGE, TENN.

- ROUTE OF SILVER
- ① BUSBARS RECEIVED AND STORED ✓
  - ② UNPACKED AND WEIGHED ✓
  - ③ CUT AND BENT TO SHAPE ✓
  - ④ FABRICATED BUSBARS WEIGHED ✓
  - ⑤ STORAGE FOR FABRICATED BARS

STATEMENT OF SILVER LEASED BY THE WAR DEPARTMENT FROM THE TREASURY

AS OF JULY 1, 1945

Silver withdrawn from Treasury

From West Point Prog. I

183,477,895.11 ✓

From West Point Prog. II

205,411,306.30 ✓

D. P. C. Scrap Prog. II

38,924,947.61 ✓

Scrap Silver processed into Bullion Bar

24,313,684.47

Silver paid to D.P.C. (Prop. Melt Loss)

20,076.42

Silver returned to Treasury

24,293,608.05

A-10

A Silver in Magnet Coils at C.E.W.

399,449,618.38 ✓ ?

See 3.10, 3.13, 6.4

A Silver installed as Busbar at C.E.W.

3,915,274.20 ✓ ?

Silver lost in Fabrication

155,648.39

Balance due the Treasury

403,520,540.97

NOTE: All Weights in Fine Troy Ounces

427,814,149.02

427,814,149.02

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?

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x

TYPICAL SILVER CALCULATIONS

1. By custom, formal transactions involving the handling of silver make use of the troy ounce as the basic unit of weight. ✓ Hence, the basic documents recording the District silver program show the weights as troy ounce figures. ✓ In actual practice, it was not convenient to use troy ounces because the available scales and balances for handling the huge quantities of metal were graduated in avoirdupois pounds and ounces. ✓ This difference in units necessitated arithmetic conversion based on the accepted conversion factor:

$$14.58333333 \text{ troy ounces} = 1 \text{ pound avoirdupois.} \checkmark$$

2. The measure of purity of silver, called fineness, is based on having 1000 parts of silver in each thousand parts of material. Thus, "thousand fine" silver is pure silver. ✓ Absolutely pure silver is not commercially practical to use because the refining process must be carried to uneconomical limits. ✓ The silver program of the District was based on the use of 999 fine silver. ✓ However, in some instances, metal of different fineness was handled and must be accounted for in the calculations when converting gross avoirdupois weights to fine troy ounce silver content. ✓

Example:

1 pound avoirdupois of 999 fine silver contains

$$1 \times 14.58333333 \times .999 = 14.56874999 \text{ or } 14.57 \text{ fine}$$

troy ounces of silver. ✓

3. Reconciliation of the withdrawal amounts shown in paragraph 2-4b with the weights shown as trucking data in paragraph 2-5<sup>c</sup> may be

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accomplished as shown below:

<u>Fine Troy Ounces</u>	<u>Program I</u>	<u>Gross Troy Ounces</u>
	<u>Fineness</u>	
182,940,020.46 ✓	+	183,123,143.59 ✓
204,046.09 ✓	+	204,148.16 ✓
<u>333,828.56 ✓</u>	+	<u>333,912.04 ✓</u>
183,477,895.11 ✓		183,661,203.79 ✓
183,661,203.79 GTO ÷ 14.58333333 = 12,593,911.12 lbs. av.		
12,593,911.12		
<u>12,593,911.00</u>		

0.12 Difference due to dropping decimal places during conversion of 31 separate lots as shipped.

Program II

244,336,253.91 FTO obtained from Treasury.  
38,924,947.61 FTO taken at Carteret, New Jersey.  
 205,411,306.30 FTO trucked from West Point.

<u>Fine Troy Ounces</u>	<u>Fineness</u>	<u>Gross Troy Ounces</u>
205,411,306.30	÷	205,616,923.22
205,616,923.22 ÷ 14.58333333 = 14,099,446.16 lbs. av.		
14,099,446.16		
<u>14,099,446.15</u>		

0.01 Difference due to dropping decimal places during conversion of lots as shipped.



21X-4

<b>SPECIAL ACCOUNTABILITY OFFICER ASSISTANT</b>
<b>NEW YORK, N.Y.</b>

<b>CONSULTANTS</b>
--------------------

1 - Administrative Asst. 1 - Technical Asst. 5 - Clerks      1 - Steno
<b>NEW YORK, N.Y.</b>

<b>ASSISTANT</b>
<b>MILWAUKEE, WIS.</b>

<b>WEST POINT, N.Y.</b>
1- Inspector 4- Clerks 1- Guard Officer 30- Guards

<b>CARTERET, N.J.</b>
1- Inspector 7- Clerks 1- Guard Officer 40- Guards

<b>BAYWAY, N.J.</b>
1- Engineer 4- Inspectors 3- Clerks 40- Guards

<b>OAK RIDGE, TENN.</b>
1- Inspector 30- Guards

<b>WEST-ALLIS, WIS.</b>
1- Engineer 10- Clerks 60- Guards

Specimen  
 Organization Chart  
 For  
**SPECIAL ACCOUNTABILITY SECTION**  
**MANHATTAN DISTRICT**

~~SECRET~~

MANHATTAN DISTRICT HISTORY  
BOOK V - ELECTROMAGNETIC PLANT  
VOLUME 4 - SILVER PROGRAM  
APPENDIX "B"  
DOCUMENTS

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MANHATTAN DISTRICT HISTORY

BOOK V - ELECTROMAGNETIC PLANT

VOLUME 4 - SILVER PROGRAM

APPENDIX "B"

DOCUMENTS

<u>No.</u>	<u>Description</u>
1	Agreement with U. S. Treasury Department, August 29, 1942. ✓
2	Agreement with U. S. Treasury Department, October 14, 1943. ✓
3	Defense Plant Corporation Contract - W-7401-eng-12. ✓
4	Memo - Subject: Procedure as observed, Melting and Casting Operations, U. S. Metals Refining Company Plant at Carteret, N. J. dated 17 April 1944. ✓
5	Memo - Subject: Procedure as observed, Fabrication Operations and Cleanup after Completion of Operations at Phelps Dodge Copper Products Company, Bayway, N. J. ✓
6	Memo - Subject: Operations of Special Accountability Section, Milwaukee Area, dated 27 November 1944. ✓
7	Memo - Subject: Operations of Special Accountability Section at Clinton Engineer Works, Oak Ridge, Tennessee dated 12 December 1944. ✓
8	Memo - Subject: Description of Cleanup and Breakdown of Casting Wheel and No. 6 Furnace U. S. Metals Refining Company Plant, Carteret, N. J. ✓
9	Memo - Cleaning and Recovery Operations of Special Accountability Section at Allis-Chalmers Mfg. Company, West Allis, Wisconsin, dated 19 October 1944. ✓
10	Agreement with U. S. Assay Office, dated 24 February 1944. ✓

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The Honorable,

The Secretary of the Treasury.

Dear Mr. Secretary:

In connection with my letter to you of today requesting the transfer of custody of 6,000 tons of silver to the War Department to be used as a substitute for copper, may I advise you that the important project, the use for which this silver is desired, is a highly secret matter. At this time the interests of the Government do not permit my disclosing the nature of the use.

The silver is desired for use on property which will be Government-owned, it will be adequately guarded at all times, and the use is of such a nature that the silver will not be consumed and will be available for return at the expiration of the use.

The use of the silver which is contemplated not only will relieve a substantial amount of other critical materials for use in the war effort but is in itself of the utmost importance to the prosecution of the war.


Sincerely,

*Wm. Henry L. Stimson*

Secretary of War.

RAC:hg  
2-27-42

S 101-032  
RAC Br. 6209  
LJD Br. 6018

  
Chief of Staff  
B-1

8/27/42

AUG 29 1942

**The Honorable,**

**The Secretary of the Treasury.**

**Dear Mr. Secretary:**

In an effort to conserve critical materials and at the same time expedite construction of a war project, the Manhattan District of the Corps of Engineers requires 6,000 tons of silver to be used as a substitute for copper in the construction of that project. ✓ It is understood that the Treasury has available a quantity of silver adequate for the needs of the war project. ✓

Representatives of the Chief of Engineers have discussed the use of this silver with Mr. S. W. Hall, Under Secretary of the Treasury, who has advised that the transfer proposed herein is in general accord with the procedure recently followed by the Defense Plant Corporation and the Reconstruction Finance Corporation in their agreements with the Treasury effecting the similar use of a large tonnage of silver. ✓ At the request of the Treasury Department, the War Department has obtained clearance for the tonnage required from the War Production Board and the Army and Navy Munitions Board. ✓

Accordingly, I request that the Treasury transfer to the War Department custody of certain silver now held by the Treasury, upon the following terms and conditions: ✓

(1) The Treasury will at any time up to June 30, 1944, deliver to the War Department, upon the latter's request, for uses in accordance with the purposes described in this letter, silver containing in all approximately 175,000,000 fine troy ounces and not in excess of the amount of silver deemed by the Secretary of the Treasury to be unoccupied and unproductive and unnecessary for reasons connected with the monetary requirements of the United States (such silver to the extent available to be in the form of bars .999 fine), at such places where the same is now held, at such times, and in such quantities, as the War Department may from time to time request by five (5) days' written notice signed by the District Engineer, Manhattan District, Corps of Engineers, such delivery to be made against receipts therefor duly executed by the District Engineer, Manhattan District, Corps of Engineers. ✓

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Letr. to the Secretary of the Treasury (Cont'd)

(2) At all times, regardless of the person in whose possession such silver shall be, title thereto shall be and remain, as it now is, in the United States. ✓

(3) Any silver received by the War Department will be returned in the quantity, form and fineness in which and to the place from which it was received. ✓ The silver shall be so returned upon the expiration of five (5) years from the date of the receipt of such silver by the War Department, or upon written notice by the Secretary of the Treasury to the effect that the redelivery of any part, or all, of such silver is necessary for reasons connected with the monetary requirements of the United States or upon the termination of the arrangement described herein for any other cause whether or not specifically stated herein, whichever of the foregoing events shall first happen. ✓ The War Department will return the identical silver received by it to the place from which it received the silver, and if such silver is not redelivered, silver of an equivalent quantity, form and fineness will be delivered to the place from which the War Department received the silver. ✓

ok. ✓  
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(4) The silver will be installed or used as a substitute for copper or other strategic materials only in plants which are owned by the United States, or any department, agency, independent establishment or other instrumentality thereof, and which are essential to the war effort and are appropriate plants in which the silver may be installed or used pursuant to this arrangement. ✓

(5) The War Department will take all reasonable precautions for the protection of such silver and to assure the performance by the War Department of its duties in connection with such silver as herein provided, and, in addition, will take the following specific action: ✓

a. Place upon and maintain at all times by stamping, or otherwise, a clear mark showing that such silver is the property of the United States. ✓

b. Maintain such mechanical or custodial safeguards, or both, as in the opinion of the War Department will be adequate to protect such silver. ✓



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Ltr. to the Secretary of the Treasury (Cont'd)

c. Upon request of the Treasury, will make appropriate reports respecting the silver, consistent with the purposes of this arrangement, and also will make periodic inventories of the silver and communicate the results to the Treasury. ✓

d. Assure that in the event that provision is made for the acquisition of title to any plant, or any part of any plant, where such silver is installed, by any private person, the title of the United States to such silver shall be fully protected. ✓

(6) The War Department will assume all expense, risk of loss and obligations arising out of, or in connection with the delivery, redelivery, transportation, fabrication, installation or maintenance of such silver. ✓

If the arrangement described in this letter meets with your approval, it is requested that you indicate your approval by signing this letter and one of the copies, in the place provided at the foot hereof, and returning the copy so approved to me. ✓

Sincerely yours,

*1st Henry L. Stimson*  
Secretary of War.

Approved: August 29, 1942

*1st Herbert C. Guston*

Secretary of the Treasury.

RAC:dah  
Br. 6209

SPPDL

RAC Br. 6209

LJD Br. 6018

8/27/42

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14 October 1943

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My dear Mr. Under Secretary:

Reference is made to the arrangement entered into on August 29, 1942, as supplemented April 28, 1943 and July 14, 1943, between the Secretary of War and the Secretary of the Treasury for the transfer to the War Department of the custody of approximately 207,200,000 fine troy ounces of silver for use as a substitute for copper in the construction of a war project.

In a letter dated September 23, 1943, Brigadier General L. R. Groves requested that steps be taken to make available to the War Department an additional 300,000,000 fine troy ounces of silver for similar use in a manner which will permit substantially all of it to be returned at the expiration of the use.

This Department has been advised by representatives of the War Department and the Defense Plant Corporation that the Defense Plant Corporation now has in the plant of the United States Metals Refining Company, Carteret, New Jersey, approximately 30,000,000 fine troy ounces of silver delivered under the Agreement of May 6, 1942 between the Secretary of the Treasury and the Defense Plant Corporation. It is understood that it would be in the best interests of the Government that said approximately 30,000,000 fine troy ounces of silver be obtained by the War Department at the plant of the United States Metals Refining Company in the form and fineness in which the silver is at the time of delivery. Said approximately 30,000,000 fine troy ounces of silver will constitute a portion of the additional 300,000,000 ounces needed by the War Department.

In a letter to the Secretary of the Treasury, dated October 12, 1943, the Acting Chairman of the War Production Board has recommended that the Secretary of the Treasury lease to the War Department approximately 507,200,000 fine troy ounces of silver held or owned by the United States, for domestic use in the construction of a war project, upon such terms as the Secretary of the Treasury deems advisable.

NOV 1 1943

Accordingly, I am prepared, as Secretary of the Treasury, to lease to the War Department, in accordance with the provisions of the Act of July 12, 1943 (Public Law 137, 78th Congress), 507,200,000 fine troy ounces of silver held and owned by the United States upon the following terms:

(1) The Secretary of the Treasury will at any time up to December 31, 1944, lease to the War Department, upon the latter's request, for use in accordance with the purposes described in this letter, silver containing in all approximately 507,200,000 fine troy ounces (such silver to the extent available to be in the form of bars .999 fine), and will deliver such silver at such places where the same is now held, at such times, and in such quantities, as the War Department may from time to time request by five (5) days' written notice signed by the District Engineer, Manhattan District, Corps of Engineers, such delivery to be made against receipts therefor duly executed by the District Engineer, Manhattan District, Corps of Engineers.

(2) All silver heretofore delivered to the War Department pursuant to the arrangement dated August 29, 1942, as supplemented April 28, 1943 and July 14, 1943, entered into between the Secretary of War and the Secretary of the Treasury, shall be deemed, for all purposes, to have been leased and delivered by the Secretary of the Treasury to the War Department pursuant to the terms of this lease, at the United States Silver Bullion Depository, West Point, New York, in bars containing approximately 1,000 troy ounces .999 fine.

(3) At all times, regardless of the person in whose possession such silver shall be, title thereto shall be and remain, as it now is, in the United States.

(4) Any silver heretofore or hereafter received by the War Department will be returned in the quantity, form and fineness in which and to the place from which it was received or was deemed to have been received as provided herein. The silver shall be so returned upon the expiration of six (6) months after the cessation of hostilities in the present war, as proclaimed by the President, or upon written request by the Secretary of the Treasury to the effect that the redelivery of any part, or all, of such silver is necessary for reasons connected with the monetary requirements of the United States, or upon the termination of the lease described herein for any other cause whether or not specifically stated herein, whichever of the foregoing events shall

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C. S. ENGINEER OFFICE  
MILITARY BULLION AREA  
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first happen. ✓ The War Department will return the identical silver received by it to the place from which it received or is deemed to have received silver, and if such silver is not redelivered, silver of an equivalent quantity, form and fineness will be delivered to the place from which the War Department received or is deemed to have received the silver. ✓

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(5) If silver presently held by the Defense Plant Corporation at the plant of the United States Metals Refining Company, Carteret, New Jersey, is delivered to the War Department in the form and fineness in which such silver is at the time of its return to the Secretary of the Treasury by the Defense Plant Corporation, pursuant to the Agreement dated May 6, 1942 between the Secretary of the Treasury and the Defense Plant Corporation, such silver will be returned by the War Department, pursuant to the terms of this lease, at the United States Silver Bullion Depository, West Point, New York, in bars containing approximately 1,000 troy ounces .999 fine. ✓

(6) The silver will be installed or used as a substitute for copper or other strategic materials only in plants which are owned by the United States, or any department, agency, establishment or other instrumentality thereof, and which are essential to the war effort and are appropriate plants in which the silver may be installed or used pursuant to the terms of this lease. ✓

NOV 10 1943

(7) The War Department will take all reasonable precautions for the protection of such silver and to assure the performance by the War Department of its duties in connection with such silver as herein provided, and, in addition, will take the following specific actions: ✓

(a) Place upon and maintain at all times by stamping, or otherwise, a clear mark showing that such silver is the property of the United States. ✓

(b) Maintain such mechanical or custodial safeguards, or both, as in the opinion of the War Department will be adequate to protect such silver. ✓

(c) Upon request of the Treasury, will make appropriate reports respecting the silver consistent with the purposes of this lease, and also will make periodic inventories of the silver and communicate the results to the Treasury. ✓

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(d) Assure that in the event that provision is made for the acquisition of title to any plant, or any part of any plant, where such silver is acquired by any private person, the title of the United States to such silver shall be fully protected. ✓

(3) The War Department will assume all expense, risk of loss, and obligations arising out of, or in connection with the delivery, redelivery, transportation, fabrication, installation or maintenance of such silver. ✓

(9) In the event that the Secretary of the Treasury determines that all or any part of the silver leased to the War Department is to be held as security for outstanding silver certificates heretofore or hereafter issued, the Secretary of the Treasury will so notify the War Department. It is understood that any such notification will not affect or alter the rights, duties or obligations of the Secretary of the Treasury or the War Department under this lease. ✓

(10) Upon the execution of this lease, the arrangement between the Secretary of War and the Secretary of the Treasury dated August 29, 1942, as supplemented April 28, 1943 and July 14, 1943, shall be terminated. ✓

If the lease set forth in this letter meets with your approval, it is requested that you indicate your approval by signing this letter and one of the copies, in the place provided at the foot hereof, and returning the copy so approved to me. ✓

Very truly yours,

*W. B. E.*  
Secretary of the Treasury.

The Honorable

The Under Secretary of War.

Approved: *R. H. P.*  
Under Secretary of War

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WAR DEPARTMENT  
UNITED STATES ENGINEER OFFICE  
MANHATTAN DISTRICT  
P. O. BOX 42  
STATION F  
NEW YORK, N. Y.

IN REPLY  
REFER TO

Letter Contract #7401-Eng. 12

October 26, 1942

Defense Plant Corporation  
Lafayette Building  
811 Vermont Ave., N. W.  
Washington, D. C.

Gentlemen:

1. It is the opinion of the War Department that in the present emergency the use of silver to take the place of copper and other strategic and critical materials is necessary in the interest of National Defense and for the prosecution of the war effort; and that the melting and casting thereof is required to enable this Department to utilize such silver in its War Program. ✓

2. We understand that Defense Plant Corporation has already arranged with the Treasury Department (hereinafter called "Treasury") for the use of certain silver (hereinafter sometimes referred to as "Defense Corporation Silver") for similar purposes and in connection therewith, has at its own cost and expense:

- (a) Entered into a contract for the transportation and delivery of said silver from West Point, New York, to the plant of United States Metals Refining Company (hereinafter called the "Refining Company") at Carteret, New Jersey. ✓

Certified True Copy  
By *R. C. Connelley*  
R. C. CONNELLEY, Major, C.E.

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- (b) Entered into a contract with said Refining Company covering, among other things, the melting of said silver, up to an amount of forty thousand (40,000) short tons (avoirdupois) and casting same into specified shapes and weights, weighing of same, and general provisions as to charges, treatment of residues, wrecking of furnace and recovery operations.
  - (c) Created and established a force of armed guards and other safeguarding facilities for the protecting of said silver continuously from the time it is delivered to Defense Plant Corporation at the Silver Depository, West Point, New York, through all stages of transit and fabrication until said silver is cast and loaded into cars at said plant of Refining Company at Carteret, New Jersey, and all operations of Refining Company at its said plant with respect to said Silver has been concluded.
  - (d) Created and established an administrative staff of clerks and supervisors for the weighing, recording and general supervision of the entire protective operation conducted with respect to Defense Corporation Silver from the time it is delivered to Defense Plant Corporation at the Silver Depository

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at West Point, New York, until it is cast and loaded into cars at the Carteret, New Jersey, plant of Refining Company and all operations of Refining Company at its said plant with respect to said Silver have been concluded. ✓

(The facilities referred to in the foregoing subdivisions (a), (b), (c), and (d) and any modifications thereof that Defense Plant Corporation may make hereafter, are hereinafter sometimes referred to as "Defense Plant Corporation Facilities" or "the Facilities.") ✓

3. This Department is about to receive from Treasury at said Silver Depository, West Point, New York, certain other silver (hereinafter sometimes called "War Department Silver"), approximately six thousand (6,000) short tons (avoirdupois) in weight, which it proposes to have melted and cast in molds to be supplied by this Department at Refining Company's plant in Carteret, New Jersey, and desires to avail itself of said Facilities covering the period that War Department Silver is received by this Department at the Silver Depository at West Point, New York, until it is melted, cast, recovery operations concluded and loaded into trucks or cars at Refining Company's plant at Carteret, New Jersey. ✓

4. This Department, to save the cost and expense of creating and maintaining its own arrangements for so transporting, guarding and fabricating, and for other reasons in the public interest, requests that the use of said Facilities be extended and furnished to said War Department Silver during said period. ✓

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5. In consideration of Defense Plant Corporation's acceding to this request, this Department will and does hereby make the following commitments:

(a) This Department will pay and reimburse Defense Plant Corporation its proportionate share of the sum total amount of Defense Plant Corporation's costs, expenses for, and liabilities incurred (hereinafter sometimes referred to as "the cost") in connection with the creation, maintenance and furnishing of said Defense Plant Corporation Facilities, or any part thereof, from the date the first of said Facilities were created to the date fixed in paragraph 5, subdivision (e) hereof. It is understood that this Department's said proportionate share shall be computed in the following manner (provided, however, that to the result of such computation there will be added other elements of cost attributable to War Department Silver in addition to those specifically mentioned in this paragraph 5, which in particular cases may be properly chargeable):

Up to and as of the date fixed in paragraph 5, subdivision (e) hereof, ascertain the cost to or against Defense Plant Corporation for and in connection with creating, maintaining and furnishing of the Facilities, or any of them, from May 1, 1942, the date when the first of such Facilities were created under Plancor 1081 for the servicing of Defense Corporation Silver.

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This Department will, ten days after demand, pay and reimburse Defense Plant Corporation that portion of such sum total cost which is found by multiplying same by a fraction, the numerator of which shall be the number of short tons (avoirdupois), or fraction thereof, of War Department Silver charged into No. 6 furnace at the plant of said Refining Company and the denominator of which shall be the sum of said short tons of War Department Silver and Defense Corporation Silver, or fractions thereof, charged into No. 6 furnace up to the time said furnace is wrecked for recovery operations. ✓

For the cost of furnishing Defense Plant Corporation Facilities to War Department Silver only in part, whether before or after the date of so wrecking said furnace, this Department will, in addition, upon ten (10) days' written demand therefor, pay and reimburse its proportionate share for the part of said Facilities so provided or furnished. ✓

- (b) For and on account of said proportionate share of the cost computed in the manner aforesaid, this Department will, upon the tenth day of each month pay Defense Plant Corporation the sum of Forty-five (\$45.00) Dollars for each short ton (avoirdupois), and fraction thereof, of War Department Silver with respect to which Defense Plant Corporation Facilities have been furnished, in whole or in part, during the preceding calendar month. ✓

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- (c) Thirty (30) days after said Furnace No. 6 has been wrecked for recovery purposes and Refining Company has completed recovery operations, this Department will, upon ten days' written notice, pay to Defense Plant Corporation an amount sufficient fully to reimburse said Corporation the unpaid balance for each and every and all of the cost ascertained in the aforesaid manner, for or in connection with the furnishing of said Defense Plant Corporation Facilities, or any part thereof, to War Department Silver.
- (d) It is understood that in the furnishing of the Facilities, some of both War Department Silver and Defense Corporation Silver may be melted simultaneously in the same furnace and fused so as to lose identity; it is further understood that both said Silvers will inevitably sustain melt losses, whether melted simultaneously or not, in an amount that cannot be ascertained until Refining Company has completed its recovery and other operations with respect to War Department Silver and with respect to Defense Corporation Silver; and it is further understood that all of said War Department Silver may be melted, cast and delivered so that this Department may, under these circumstances, receive back all of its said Silver without deduction or allowance for the melt losses properly attributable thereto.

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This Department will, accordingly, upon **thirty (30)** days' notice in writing from Defense Plant Corporation, deliver for and to the account of Defense Plant Corporation an amount of silver, of fineness not less than .999, to the Silver Depository at West Point, New York, or at such other place as may be designated by Treasury. ✓ The amount of silver to be so delivered shall be ascertained in a manner similar to that described in paragraph 5, subdivision (a) hereof; that is to say, the sum total amount of melt losses sustained by both War Department Silver and by Defense Corporation Silver shall be multiplied by a fraction, the numerator of which shall be the amount, in avoirdupois, of War Department Silver melted and recovered as of the date fixed in paragraph 5, subdivision (e) hereof and the denominator of which shall be the sum of the amounts, in avoirdupois, of all War Department Silver and Defense Corporation Silver melted and recovered as of the date fixed in paragraph 5, subdivision (e), hereof. ✓

- (e) All obligations of Defense Plant Corporation with respect to furnishing said Facilities, or any part thereof, shall cease and terminate **thirty (30) days** from the date when said Furnace No. 6 has been wrecked for recovery purposes and recovery operations by Refining Company have been concluded. ✓

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- (f) This Department shall have a representative present at all stages in the furnishing of Defense Plant Corporation Facilities and its representative shall have access, at times to be mutually agreed upon, to the records of Defense Plant Corporation pertaining to the creation, maintenance and furnishing of said Facilities. ✓
- (g) All risk of loss or damage to War Department Silver, or any part thereof, arising from or connected with the furnishing thereto of Defense Plant Corporation Facilities, or any part thereof, is assumed by and shall be borne by this Department, solely, and any such loss or damage shall be made good by this Department at its own cost and expense. ✓ The liability of this Department hereunder shall be and is sole, absolute and not dependent upon any question of fault or negligence, or acts of commission or omission, or upon whether the cause of risk of loss or of damage, arose from act of the common enemy, force majeure, Act of God, or from any other cause whatsoever, whether the same be within or without the control of Defense Plant Corporation or any of its officers, directors, agents or employees. ✓ This Department:
- (1) will make no claim, whether for damages or otherwise, against Defense Plant Corporation, its officers, directors, agents, and employees, and
  - (11) will defend, save harmless and indemnify said Defense Plant Corporation, its officers, directors,

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agents, and employees from any claim or claims which may be asserted against it or them or any of them;

for or on account of any loss or damage to War Department Silver, or any part thereof, or arising from or connected with the furnishing thereto of Defense Plant Corporation Facilities, or any part thereof, whether or not such claim or claims may be predicated upon fault or negligence, or acts or commission or omission, act of the common enemy, force majeure, Act of God, or from any other cause whatsoever, whether the same be within or without the control of Defense Plant Corporation or any of its officers, directors agents or employees. The obligations of this Department set forth and referred to in subparagraph (ii) of paragraph (g) of this paragraph 5 shall be subject to the availability of appropriated funds which can be used by this Department for the purpose of satisfying such obligations. If no adequate appropriation is available, this Department agrees to use its best efforts to obtain such an appropriation.

6. The services to be obtained by this instrument are authorized by, and for the purposes set forth in, and are chargeable to the following procurement authorities, the available balances of which are sufficient to cover the cost of the same: Eng. 31110 P430-07 A0905-23.

7. This agreement is authorized by the following laws: Sec. 7 (a) Act of May 21, 1920 (41 Stat. 613), as amended by Sec. 601 of the Act of June 30, 1932 (47 Stat. 417) and as further amended by the Act of July 20, 1942 (Public Law-570-77th Congress), and the First War Powers Act, 1941,

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and Executive Order No. 9001-.

8. No member of or Delegate to the Congress of the United States of America shall be admitted to any share or part of this agreement or to any benefit arising therefrom, but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.

9. It is agreed that any difference or dispute, whether of law or of fact, between the Defense Plant Corporation and this Department (including without limitation any difference or dispute in respect to the computation of the cost hereunder) arising under or in connection with this agreement which cannot be disposed of between the parties shall be submitted to the Attorney General of the United States whose decision in the matter will be final, conclusive and binding upon the parties.

10. It is understood that the Defense Plant Corporation has included in the contracts with parties other than the War Department providing for the facilities, the clauses required by Federal statute and Executive Order.

If the foregoing is acceptable to you, it is desired that you so indicate hereon and on the inclosed two copies of this letter and return the original and two copies to the Contracting Officer on or prior to October 29, 1942. Such acceptance will constitute this letter a contract.

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This document consists of 11 page  
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Very truly yours,

THE UNITED STATES OF AMERICA

By /s/ J. C. Marshall  
J. C. MARSHALL  
Col., Corps of Engineers  
Contracting Officer

Accepted: October 29, 1942  
DEFENSE PLANT CORPORATION

By: /s/ John W. Snyder  
Executive Vice President

APPROVAL RECOMMENDED:

---

APPROVED: October 28, 1942

By Direction of the Under Secretary of War

/s/ Albert J. Browning  
ALBERT J. BROWNING  
Colonel, General Staff Corps,  
Director, Purchases Division.

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WAR DEPARTMENT

This document consists of 2 pages.  
No. 6 of 8 copies, Series A.

UNITED STATES ENGINEER OFFICE

MANHATTAN DISTRICT

P. O. BOX 42  
STATION F  
NEW YORK, N. Y.

IN REPLY  
REFER TO

D-1

March 11, 1943

Supplement No. 1

Defense Plant Corporation  
LeRoyette Building  
511 Vermont Avenue, N. W.  
Washington, D. C.

Gentlemen:

Reference is to Contract #7101-Ing. 12, dated October 26, 1942, wherein Defense Plant Corporation has agreed to furnish shells. Also and services necessary to salt and coat approximately six thousand (6000) short tons of "Bar Department Silver". It is the desire of the War Department at this time to revise the estimate of the weight of Silver to be pelleted and coat in solids.

The original estimate of six thousand (6000) tons has been found to be less than the required amount by approximately Twenty-Four thousand (24000) tons because of increased requirements and loss to scrap in the fabrication process.

Therefore it is requested that the Defense Plant Corporation east for the War Department a total of approximately Eight Thousand Four hundred (8400) tons of shells. The additional metal necessary is to be obtained from scrap returned to the recycling plant by the War Department or from additional new silver furnished by the War Department. The furnishing of Defense Plant Corporation facilities with respect to such additional scrap metal or additional new silver (the sum of both not to exceed approximately Twenty-Four hundred (2400) short tons (seventy-two) in weight, or any part thereof, shall in all respects be under, pursuant and subject to all the terms and conditions set forth in Letter Contract #7101-Ing. 12 of October 26, 1942.

If the foregoing is acceptable to you, it is desired that you so indicate hereon and on the enclosed three copies of this letter and return the original and two copies to the Contracting Officer. Such acceptance will constitute this letter a part of Letter of Contract #7101-Ing. 12.

Very truly yours,

THE UNITED STATES OF AMERICA

By W. L. C. Marshall  
J. C. Marshall

Col., Corps of Engineers  
Contracting Officer

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Defense Plant Corporation

March 11, 1943

Accepted: March 30, 1943

DEFENSE PLANT CORPORATION

By: Sam H. Eshbands  
Executive Vice President

APPROVAL RECOMMENDED:

/s/ L. R. Groves  
Deputy Chief, Construction Div.,  
OCE

APPROVED: \_\_\_\_\_

By Direction of the Under  
Secretary of War

/s/ Albert J. Browning

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REFER TO

WAR DEPARTMENT  
UNITED STATES ENGINEER OFFICE  
MANHATTAN DISTRICT  
P. O. BOX 42  
STATION F  
NEW YORK, N. Y.

~~SECRET~~

17 April 1944

Subject: Procedure as Observed - Melting and Casting Operations  
U.S. Metals Refining Company plant at Carteret, N.J.

MEMORANDUM to Captain S. B. Powers.

The bars received, unloaded, checked against shipping papers.

Floors swept before and after the handling of the bars. Sweepings saved for recovery metal possibly lost due to chipping and/or abrasion when placing bars in charging pans.

Under guard supervision at all times.

The yard cars and pans were weighed daily for tare purposes and protected from moisture and rain to prevent weight changes due to water.

Scales were checked daily at their minimum and maximum capacities. All weighing done by the same men, and a uniform method of reading and beam swing maintained. All weighings made on two scales and have to check within two pounds.

In my opinion the weighing method is sound, accurate within the limits of the scales, and considering the weights of the loads and the construction of the scales to withstand these loads. Capacity 20 tons, graduated to 1 lb. sensitivity 1 lb.

No possible loss of metal during these operations.

FURNACE: Reverberatory type, pulverized coal fired.

Well built and according to best practice; several improvements made as experience gained from last heat indicated, such as slight change in bottom contour, different type of brick and different joints.

Charging of metal to furnace, all mechanical, no losses entailed during this operation.

Furnace charge about 130 tons per 24 hours. Charged in afternoon; ready for casting following morning.

Guard always on duty on charging side.

Furnace was fired with powdered coal.

All flues of tight construction, no loss of flue dust.

For flue dust recovery; a cyclonic precipitator and a baghouse using 7 chambers, 78 bags per chamber.

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Subject: Procedure Observed - Melting and Casting Operations  
U.S. Metals Refining Company plant at Carteret, N.J.

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The size of the precipitators and of the chambers are more than ample to handle the volume of gases, about 50% of rated capacity.

Cleaning of bags mechanical; removal of dust from all hoppers mechanical; flue dust put in tared hopper cars, kept covered at all times to prevent any loss from dusting.

Bags under constant observation and kept in repair. Lime is added to prevent rapid deterioration of bags.

#### PROCESS OF MELTING - PRECAUTIONS AGAINST LOSSES

Not too high a melting temperature, this prevents losses of metal due to spraying, oxidation, absorption by furnace lining.

Reducing flame maintained, to prevent oxidation and excessive oxygen over metal pool.

A cover of charcoal kept on surface of molten metal, this to prevent absorption of gases and help prevent oxidation.

Molten metal was poled to free it of occluded oxygen and other gases. This for the purpose of making sound castings and to prevent spitting or sprouting.

Surface of metal pool cleaned of all slag.

Casting ladle metal pool kept covered with charcoal.

Casting temperature by eye 1800-1900 F., a good casting temperature for Ag.

Sampling of melt well done and is a good representative sample of the melt.

Slag handled carefully during processing through mill. Sampling done more carefully than in general practice.

All clean metal from slag recharged.

The Lucius Pitkin representative was in attendance during the processing and sampling of each lot.

The handling, melting, casting, sampling and assaying of the metal and residue materials done in accordance with metallurgical practice, additional precaution taken and changes made where experience and the nature of the material and its precious metal contents indicated.

Casting procedure was such that all castings resulted in sound and reasonably smooth billets and reasonably approximating the same weight.

Billets were cleaned of all fins and loose pieces, numbered and marked, put on tared yard cars, 24 billets to a car, then weighed and stored. Handling was carefully done to prevent abrasion loss.

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Subject: Procedure Observed - Melting and Casting Operations.  
U.S. Metals Refining Company plant at Carteret, N.J.

They were kept constantly under guard custody at all times.

After the removal from storage of the billets, the ground was carefully cleaned, cleanings going to sweeps.

Billet size, diameter  $9\frac{3}{4}$  in.; length approximately 15-16 inches, weight 390 to 435 pounds.

Respectfully submitted.

*T. H. Schierke*

T. H. SCHIERKE.

~~SECRET~~



- 33 SA
- Subject: 1. Procedure as Observed - Fabricating Operations ✓  
2. Clean-up after completion of operations. ✓  
3. In Conclusion. ✓

At Phelps Dodge Copper Products Corporation plant at Bayway, N.J. ✓

Product: Flat wire, 3 inches wide and in thicknesses of .440; .420; .375 inches. x

Specifications: Width: 3 inches, tolerance  $\pm$  or - .015 inches. ✓  
Thickness: as listed above, tolerance  $\pm$  or - .005 inches. x  
Hardness: 55-65 Rockwell ✓

The tolerance as to width was changed towards the end of the program to plus or minus .025 inches. ✓

Process: Extrusion and Rolling. ✓

Procedure:

The billets were received in Bayway, as Carteret lots, 72 to 74 billets per lot. ✓ The weight as per the Carteret scales was recorded as the receiving weight. ✓

They were then unloaded to the storage area via a lift and conveyor. The storage area was on a concrete floor covered with one inch planking and was next to the inlet end of the preheating furnace. ✓

The preheating furnace: 60 feet long, 10 feet wide, gas fired and temperature automatically controlled. ✓ This was used to heat and hold the billets to temperatures between 1200 and 1500 degrees Fahrenheit. ✓

The billets were placed on nichrome carriages and so moved into and through the furnace to the extruder, riding on three parallel pairs of rails. The furnace when full held 118 billets. ✓

There was no loss of metal incurred in this operation. ✓

A billet and carriage was then ejected from furnace to the extruding press. ✓ This is a type of hydraulic press which forces the billet metal through a die, extruding it to a flat wire, 5/8 inches thick, 3 inches wide and approximately 40 to 50 feet in length. ✓ The remaining metal in the press cylinder was then ejected and sheared from flat wire. ✓ This piece, known as a butt, is 10 1/2 inches in diameter and from 1 to 2 inches thick, weighing about 30 pounds. These were thrown into steel boxes; when full, they were weighed and the weight recorded as scrap. ✓

The flat wire then passed via conveyor, through a water spray. A shears cutting off the rough split end. ✓ These ends after accumulating in a steel box were weighed as scrap. ✓ A machine then coiled each strip into coils about 3-feet in diameter. ✓ The coils were then numbered and stored till needed for rolling. ✓

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Under normal conditions an average of 30 billets per hour were extruded.

Possibility of metal losses are as follows. (They are all recoverable.)

Thin pieces adhering to dies and holders.

Thin pieces extruding between cylinder and piston head also between cylinder and die holders.

Pieces adhering to dummy heads.

Slivers dropping when butts are sheared off.

Slivers dropping when end is sheared from flat wire.

Possible metal losses. (Not recoverable)

Metal penetrating into fine cracks in dies and cylinders.

Metal that may have adhered to workmen's clothing and soles of shoes.

The afore mentioned furnace and extruding press were not used exclusively on our metal, coalesced copper being also run. Generally, they ran continuously for four days on our metal.

Due to the pressure, the condition of cylinder wall and temperatures, varying amounts of the metal being extruded adhered to the cylinder walls.

To clear out the adhering silver, three (3) copper billets were compressed and then ejected. This picked up practically all of the adhering silver. Also two to five of the next copper butts were layed aside for inspection, to see if silver was visable on them. The outer surfaces of the copper billets and butts showing silver were machined, the turnings being saved.

In the case of the adhering copper, the silver billets were just extruded, leaving a contaminated butt. Generally the first fifteen or twenty butts being so contaminated. These contaminated butts were kept separate and will be handled differently from the clean scrap when scrap is disposed of.

Possible metal losses. (Recoverable)

Silver adhering to copper butts.

Possible metal loses (Not recoverable)

Silver that adhered to cylinder wall and was subsequently extruded with copper.

The coils were then moved to the rolling section; being transported by towmotor a distance of about 1500 feet. No loss of metal was incurred during this movement.

Here the coils were put through a pair of twelve inch tandem rolls as well as sizing rolls. Each coil made two passes through these rolls. They were then checked for size and if within tolerances.

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These coils were elongated from 40 - 50 feet to 65 - 78 feet. ✓

At the sizing rolls numerous slivers were sheared off, these were cleaned up daily by our men to avoid loss. ✓

During rolling operations the coil ends become damaged and are not to size, coils had to have square and true ends, also, on some ends a pipe existed. ✓ Because of these reasons both ends of each coil were cut off with a circular saw. ✓ These pieces varied in sizes from a couple of inches to several feet. ✓

This sawing operation caused the dust and sawing chips to fly about. Due to this, the sawing was done in an inclosed booth. The booth was constructed of wood, the floor area and the sides for height of four feet were covered with heavy canvas. ✓ The floor working area was of a raised steel grill construction. ✓ This permitted the sawdust to fall through and so minimized the amount of sawdust that the workmen had to step in. ✓

The workmen were required to keep their coveralls (without pockets), gloves, caps and face shields in the booth. ✓ A floor mat and waste was used to clean their shoes and soles. ✓ This was all done to prevent loss of the dust. ✓

The pieces cut off were thrown into a steel box outside the booth. A chute in the booth wall permitted this without metal loss. The coils were then freed of dust with high pressure air. The coils were then removed from the booth.

All waste, rags, wood, paper and gloves used in and around sawing booth and rolls were saved. ✓

All saw dust was cleaned from the booth weekly and saved in steel drums. ✓

A glass window in the booth permitted guard observation. ✓

Possible losses of metal. ✓ (Recoverable) ✓

Slivers in and around rolls and auxiliary machinery. ✓  
Slivers becoming imbedded in tar flooring ✓  
Dust and slivers being imbedded in grease packing of the bearings. ✓  
Sawdust sticking to walls of booth, saws, clothing, gloves and waste. ✓  
Sawdust falling to floor outside of booth and being imbedded in tar flooring. ✓

Possible losses of metal. (Not recoverable)

Dusting of small quantities of metal due to rolling.  
Slivers stuck to clothing; also becoming imbedded in the soles of workmen's shoes.  
Residue dust sticking to coils and subsequently lost during the transporting and annealing of the coils.  
Sawings and dust becoming imbedded in the soles of shoes.

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The straight lengths were cut from the unannealed coils. Each coil was run through a straighting roll and cut into four (4) equal lengths. Cutting was done with a power shears. Each straight length was about 14 - 18 feet long. The respective coil number was stamped on each length. They were then run through a truing roll and then packed. The four straight lengths from each coil were packed together in a separate wooden box.

The only loss incurred here would be very small and is due to friction from the rolls in straighting and truing. It was not recoverable.

The coils were then taken to a large annealing furnace. First placed on carriages and so rolled into the furnace. Here they were kept at a temperature of a 1000 degrees fahrenheit for a period of one hour fifteen minutes. No loss of metal was incurred here except minute quantities of residue dust that might have remained adhered to the coils. ✓

After cooling, the coils were brought to the scales. Here the coil number was stamped on each coil as was a government ownership stamp. The coils were then rolled on the scales, weighed, weight recorded, rolled to wrapping machine, wrapped with heavy paper and then packed in freight cars. ✓

The scale used was a "Howe, Weight-o-Graph" maximum capacity 450 pounds, graduated to 1/4 pounds. In using the scale ounces were estimated. Weights recorded to one ounce. ✓

The scale was checked and tested daily before use and then once an hour during use. Eight (8) fifty pound test weights were used. These were checked and standardized by the New Jersey State Bureau of Weights and Measures.

The coil weights were checked by two men; one, our representative; the other, a company checker. ✓

Care was used to place the coil in the center of the scale platform and precautions were taken to minimize shock. ✓

#### Tests:

The physical laboratory of the Phelps Dodge plant made from ten to sixteen tests on each finished lot. Findings reported were; width, thickness, hardness (Rockwell scale) and tensile strength. ✓

During operations, a failure of the automatic heat control on part of the heating furnace caused a localized over-heating which effected 15 billets, completely melting ten. This area is known as Zone 2, location shown on diagram. ✓

This was noticed on 25 March 1944 at 9 P.M. The furnace was immediately shut down.

When cool, this section, about 10 feet long, was completely torn down. ✓

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The melted silver had run in and around the carriages, rails, brick and pieces of copper. This was broken up and pulled out by crane. All brick and dust on this area was taken out and saved. ✓

The undersigned checked this area as well as the rest of the interior of the furnace and found no other indications of silver in the furnace. ✓

The pieces of material cemented together with silver were put in a special furnace and the silver sweated out.

The lining of this special furnace was then torn down and put with the other brick and cobbing.

The carriages, rails and bolts were scraped and shipped and then discarded. ✓

The sweated silver contaminated with copper and the brick and cobbing were sent to the U.S. Metals Refining Co. plant at Carteret for processing. ✓

It was broken down as follows: ✓

Lot No.

5A/SD-129A	965 lbs.	
5B/SD-129B	1000 "	
5C/SD-129C	1001 "	
5D/SD-129D	1003 "	
6/SD-130	330 "	A partly melted billet accepted as .999 fin
8A/SD-131A	906 "	
8B/SD-131B	1001 "	
8C/SD-131C	778 "	
0-130	1136 "	Brick and cobbing. ✓

METAL RECOVERIES AND RETURNABLE

Lot	Gross Weight. lbs.	Weight Troy ozs.	Ag. Content	Less Processing	Returnable
5A/SD-129A	965	14,072.92	13,874.49	13,839.80	13,825.96
5B/SD-129B	1000	14,583.33	14,445.52	14,409.41	14,395.00
5C/SD-129C	1001	14,597.92	14,286.25	14,250.53	14,236.28
5D/SD-129D	1003	14,627.08	14,569.30	14,532.89	14,518.36
6 /SD-130	330	4,812.50	4,807.69	4,807.69	4,807.69
8A/SD-131A	906	13,212.50	8,816.04	8,794.00	8,785.21
8B/SD-131B	1001	14,597.92	7,908.42	7,888.65	7,880.76
8C/SD-131C	778	11,345.83	7,559.73	7,540.83	7,533.29
0-130	1136		701.08	676.54	675.86
Totals			86,968.52	86,740.34	86,658.41
Processing Loss				228.18	
Seinorage Loss					81.93
			86,968.52		86,740.34

86,968.52 troy ounces - - 5,963.6 lbs. ✓

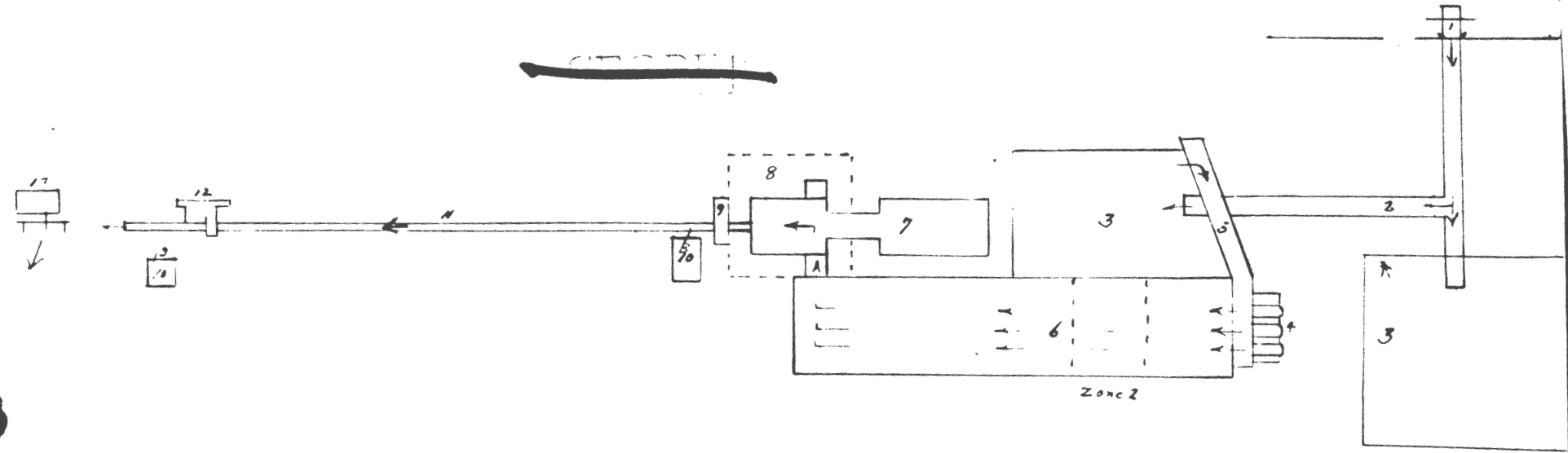
The exact weight of the 15 billets involved was not known, but in taking the average weight per billet for that lot, the 15 billets weighed about 6,000. pounds. This gives a discrepancy of 36 pounds. It is therefor reasonable to assume that no loss was incurred due to this mishap except through processing and seinorage. This amounted to 310.11 troy ozs. or 21.26 avoird. pounds. ✓

to rolls

↑

10

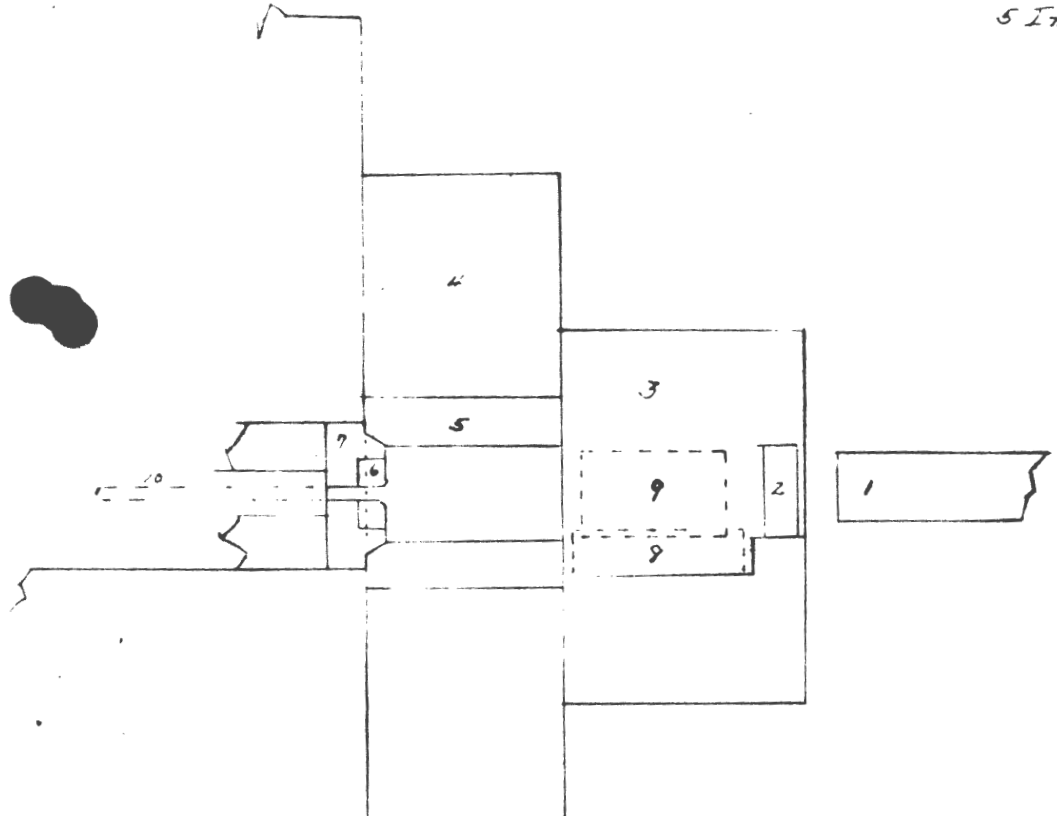
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not to scale

- 1 Lift
- 2 Conveyor
- 3 Storage areas
- 4 Rams
- 5 Inlet Conveyor
- 6 Furnace
- 7 Press
- 8 Pit
- 9 Butt Cutter
- 10 Steel boxes
- 11 Conveyor, water spray
- 12 Shears
- 13 Coiler
- 14 Coil storage area

→ metal route



not to scale, Cross section Press

- 1 Ram
- 2 Dammy Head
- 3 Conveyor Chamber
- 4 Cylinder Block
- 5 Cylinder
- 6 Die
- 7 Die Holder
- 8 Carriage
- 9 Billet
- 10 Flat Wire



CLEAN-UP:

The last silver billet was extruded the night of 8 May. Three (3) copper billets followed, were compressed and squeezed through. These billets were machined, the turnings going to scrap.

The conveyor and lift used to unload and move the billets was cleaned by a thorough brushing.

The storage areas were next cleaned; wood planking brushed and all of the floor swept, sweepings burned.

The conveyor used for the flat wire was cleaned where necessary. Water trough checked, cleaned of all chips.

The shears used for trimming, well scraped and cleaned.

All the dummy heads checked, two were found to be holding silver in holes. These were drilled out.

The face of all dies and die holders were machined, then scraped and brushed. Some of the dies were cracked. These hairline cracks did contain a small amount of silver but would not hold enough to pay for the cost of their destruction and subsequent recovery of silver.

The butt cutter was scraped and brushed.

The extruder press was dismantled for repairs and during this time all parts were examined for silver and cleaned where necessary.

The carrier and heater housing and parts thereof were free of silver.

The cylinder and ram were found to be free of silver as was all auxiliary parts pertaining to their operation.

The pit around and under the working end of the extrusion press (see diagram) was cleaned by scraping out all grease and metal. This mass was burned to free metallics from the grease. A considerable amount of silver was found in this pit.

The furnace was entered and thoroughly checked by crawling through and inspecting the bottom, sides, roof and rails. No metal was found.

All the carriages used were checked and found to be free of silver.

The grease packing from all bearings on the rolls was scraped out and burned. The bearings and holding blocks as well as the rolls and auxiliary machinery was cleaned by scraping and brushing. All cleanings burned.

The sawing booth was next dismantled all wood, paper and the canvas was burned.

The working men's coveralls, gloves, caps and face shields were burned as was the mat and all wastes.

The steel floor grates were scraped and brushed then washed with carbon tetrachloride to free of all grease and oil which in turn might hold saw dust.

The two power saws were dismantled, brushed and washed in carbon tetrachloride as was all extra saws and all other tools and equipment.

All of the floor area around the rolls, a space about 6 feet by 20 feet was taken up and saved. Depth 1/4 of an inch. The floor was of concrete covered with a thin surface of tar. This was done by scraping and chipping. This was all burned.

The floor area around and under the sawing booth, a space about 14 feet by 20 feet was of concrete covered with steel plates. Tar filled the spaces between the steel plates and partly covered the surface of same.

The steel plates were lifted, scraped and brushed than the top 1/4 inch of concrete was chipped. All scraping and chipping saved and burned.

The above material was burned to rid it of tar also aided in breaking down the concrete.

Since the coils during annealing moved through the annealing furnace on carriers, no loss would occur, but the furnace was inspected and found to be clean.

At the scales no losses occurred that possibly could be recovered.

The burning of all material so indicated above was done in an incinerator, built especially for this purpose. All ashes were saved and are to be processed.

Processing to be done by the U.S. Metals Refining Co. at their Carteret plant.

To one Lot #GS-38-E, weight 1,096 pounds.

Burned ashes  
Steel turnings and chips  
Floor cleanings

It contained 3,931.74 troy ounces of metal.

The turnings from the copper billets and some sawings swept from sawing booth and from the saws were added to the lots of clean sawings.

In Conclusion:

All checking and inspection was done by the undersigned.

In the fabrication of metals there are certain unavoidable losses that are not recoverable.

Although precautions were taken, generally this metal was handled as would a metal of lesser value. This was done because of the pressing need of the finished material.

In view of the above the following list shows where unavoidable losses tend to be but not as to amounts.

Silver adhering to cylinder wall and subsequently be extruded with the copper shapes.

Silver penetration into cracks of dies.

Silver powdered and dusting off in the rolling operation.

Silver sawings carried off on laborers shoes and clothing


Silver lost by labor filing and sandpapering slight imperfections on coils.

Abrasion loss, due to the rolling of the coils during weighing and wrapping operations.

The weight variations that might occur due to the weighing of the input metal to the nearest pound, the weighing of the melted scrap to the nearest .01 ounce troy as credited by the U.S. Treasury and also the inherent weight variations of the scales used, as shown by the weights of coils at Bayway and at Milwaukee (similar scales used at both places) will have considerable influence as to the apparent losses or gains.

In view of the amount of metal worked upon and as to the above the apparent loss as shown by the records seems reasonable.

Respectfully submitted,



T. H. SCHIERCKE, T/3

IN REPLY  
REFER TO

WAR DEPARTMENT  
UNITED STATES ENGINEER OFFICE  
MANHATTAN DISTRICT  
P. O. BOX 42  
STATION F  
NEW YORK, N. Y.

~~SECRET~~

27 November 1944

Subject: Operations of Special Accounts Section - Milwaukee Area

Memo to: Captain R. C. Hill

A. General

1. Operations of the Special Accountability Section in the Milwaukee Area were performed at Allis-Chalmers Manufacturing Co., West Allis, Wisconsin. The responsibility of the Section included the storage, use and protection of a valuable engineering material which was wound into large reactors.

2. Allis-Chalmers Manufacturing Co., provided the labor and supervision for the fabrication of the reactors. ✓ Reactor casings on which the metal was wound were made in Allis-Chalmers Tank & Plate Shop, as were the wrapper and cover plates. ✓ Inspection for conformance to specification was performed by Stone & Webster.

3. The work performed by this Section was on a 24-hour day, seven days per week basis, and included:

(a) Accountability of Metal: Clerks kept an accurate and complete record of the amounts of metal in the various locations throughout fabrication. ✓ The metal was at all times the property of the U. S. Government.

(b) Security: Armed U. S. Government Guards were at all locations where metal was used to safeguard the material and its end product from sabotage, espionage and loss. ✓

(c) Inspection: Those manufacturer's methods and procedures were inspected which affected the safe and proper use of the metal and the equipment of which it became a part. ✓

4. The reactors were built in two programs. The first shipment of metal was received 12 February 1943. ✓ Program I consisted of 446 reactors on Order Nos. 2-0142-6250-51-68-90-91-92. ✓ Program II began in January 1944 and consisted of 494 reactors on Order Nos. 2-0142-6354-55-56-57-60-64-65-70. ✓ As the work progressed a daily record was maintained as to the status and location of individual reactors.

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Subject: Operations of Special Accounts Section - Milwaukee Area

B. Receiving and Storage:

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1. Shipments were received from Bayway, N.J. in carload lots protected by armed guards. The average shipment consisted of six cars, each car containing about 300 coils or approximately 115,000 pounds. Each coil weighed approximately 380 pounds and was about 30" in diameter.

2. Upon the shipments arrival into Allis-Chalmers West Allis plant, the Chief Convoy Guard was relieved of his responsibility when he checked car and seal numbers with the Shift Leader of Government Guards in Allis-Chalmers plant and received the receipted Bill of Lading.

3. The shipments were placed either on side track north of Seven Shop or side track north of Hawley Plant where seals were broken by Government Guard as each car was ready for unloading. The contents of car checked, counted and recorded immediately.

4. Metal was stock-piled by carload lots in the East and West enclosures outside of Seven Shop or was unloaded directly from car to the restricted area inside Seven Shop. On Program II this storage space was insufficient and space was found against the retaining wall at the Allis-Chalmers Hawley plant. Here the coils were rolled on transfer trucks from the boxcars and placed in stock piles by crane. As the material was needed, it was reloaded in boxcars and delivered to Seven Shop. A seven foot wire mesh fence was erected around all storage spaces. These areas were constantly patrolled by armed guards.

5. To facilitate the accounting of these operations, records were kept by coil count rather than by weight. If the coils counted, checked the number of pieces listed on the Bill of Lading, the weight represented was accepted.

6. Coils had been securely wrapped in paper and as all handling was by rolling or rope slings, no loss of metal was incurred during this operation.

C. Weighing:

1. Material was brought into Seven Shop by rolling the coils to the platform directly from the car, or from stockpile to flat car by crane then rolling from car to the platform. Material was moved from platform to floor by overhead crane and placed in rows ready for weighing.

2. The coils were stripped of paper and moved by wall crane to a Howe Weight-O-Graph Scale (capacity 450 lbs.) and weighed to the nearest ounce. (See "General Instructions for Weighing Operations" attached)

3. All coils varying by more than four (4) ounces from the advised weight were weighed twice.

4. All coils varying more than two (2) pounds from the advised weight were set aside, reweighed and inspected by Chief of Section.

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Subject: Operations of Special Accounts Section - Milwaukee Area

5. The scale was checked every hour by loading to full capacity with test weights. Howe scale representatives made periodical checks and kept scale in good order. West Allis City Sealer inspected the scale frequently and certified its accuracy.

6. At the time of weighing, the coil weight was recorded on the identification tag that accompanied the coil, and the number that had been die stamped on the coil checked against the tag number. All reactor reports were computed using Milwaukee weights.

g Metal into Reels:

cc  
th  
th  
enk  
To ensure a good braze it was necessary to true-up the ends of the saw. On the first Program the ends were cut perpendicular to the coil and the part cut off recorded as "Dust". In Program II cut at an angle of 45° to the edge of the coil and the scrapped as "End-cuts".

The coils were then placed on a revolving table and one end put through a straightening device consisting of power driven rollers and several guide rollers. The rollers straightened and brought the end of the coil into a brazing machine where it was made flush with the preceding coil.

3. A strip of silver solder, called "Silfos", was inserted between the coils, held under 40 lbs. pressure, and heat applied by an acetylene torch for approximately 45 seconds or until the solder melted. The joint was then cooled with a stream of water for 60 seconds.

4. The excess solder was ground off with an emery grinder and the coil wound around the preceding coil to form a reel. A reel consisted of 20 coils for Program I and 24 coils for Program II, and was approximately 6 ft. in diameter. Reels were numbered consecutively.

5. The weight of each reel was determined by listing the individual weights of coils from tags on a reel sheet, adding these weights, and deducting such "dust", "end-cuts" or scrap as pertained to that reel. Five brazing machines were available for this operation.

6. Small chips, flakes, etc., were recovered by vacuum cleaning each machine daily and by a thorough cleaning at the end of the job. A tray was provided to catch emery grindings and was emptied daily. The amount recoverable was so small and its fineness indeterminable at the moment, consequently a weight deduction could not be made from individual reels.

E. Winding of Metal on Reactor:

1. A painted reactor casing was leveled and bolted to the winding machine. A connection was brazed to the end of a reel which had been pulled through a tension machine from a revolving pedestal.

~~SECRET~~

Subject: Operations of Special Accounts Section - Milwaukee Area

2. The connection was bolted to the reactor casing and as the winding machine turned, the metal was uniformly wound around the bobbin plate. The tension machine kept the metal rib on at an even and adequate tension by retarding the progress of the metal through friction against fibre pads.

3. Succeeding reels were joined together by a brazing machine between the tension machine and the revolving pedestal so as not to disturb the tension between the tension and winding machines.

4. A Reactor was completely wound when the required number of turns and layers had been put on. The metal ribbon was then cut and the weight pertinent to that reel computed by measurement from the preceding joint to the cut. The weight of reels and parts of reels plus connection weight were totaled to give the weight of metal in a reactor. Six winding machines were used in this operation.

5. Trays were provided to recover all chips and flakes as might be deposited in the tension machines. Additional saw dust and filings were swept or picked up by vacuum cleaner immediately. All machines were cleaned periodically and cleaned thoroughly at the end of the job. The amount recoverable was so small and its fineness indeterminable at the moment consequently a weight deduction could not be made from each reactor.

6. During the course of the work eighty (80) tanks were returned from Clinton Engineer Works for rewinding. A copy of "Instructions for Unwinding Tanks" is attached. The procedure for rewinding is the same as above.

F. Closing and Shipment of Reactors:

1. After the reactor left the winding machine the metal was securely tied in position and final connections (flexible copper) attached.

2. As each side and cover plate was welded into position, electrical tests for shorts were made, and that section sealed. When the unit was completely welded, tested, and sealed, it was painted and ready for shipment.

3. All of Program II Reactors and Program I Beta Reactors contained an iron core inserted before final painting.

4. Program II Reactors were placed in driers to remove moisture and were then filled with oil.

5. Once the reactor was closed and sealed, the metal content was not disturbed and no loss of metal was incurred. Extra precautions were taken by the Guard Force to prevent carelessness, accident and sabotage during closing operations.

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**Subject: Operations of Special Accounts Section-Milwaukee Area**

6. All openings were sealed with a lead seal having the Allis-Chalmers inspectors number stamped on it. The number on the openings was recorded and reported to Clinton Engineer Works. ✓

*H. F. Green, Jr.*  
H. F. GREEN, Jr.

2 Inc.: General Instructions for Weighing Operations ✓  
Instructions for Unwinding Tanks ✓

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GENERAL INSTRUCTIONS FOR WEIGHING OPERATIONS

1. Scales must be checked and tested daily before use and once each hour during routine operations. ✓ The scales shall be tested more frequently, if in the opinion of the operator the action of the scales so indicate. ✓
2. All scale tests shall be made at 200#, 350# and 400#, and a record made thereof showing the date, time of day and the variation, plus or minus, from the correct readings. ✓
3. Coils to be weighed or weights used in testing must be placed in the center of the scale platform. ✓ Care should be taken in applying the load so as to minimize shock. ✓
4. All readings on the dial are to be taken only after the scale has come to rest. ✓ In the event of a disagreement between two operators as to the scale reading, the lower reading shall be taken. ✓
5. Any adjustment shall be made at 350#. ✓ Adjustment to be made only if the scale varies more than one ounce plus or minus at 350#. ✓
6. When the scale is not in use, no load should be left on the scale platform. ✓
7. If the weight of any coil varies over four ounces plus or minus from the shipper's weight, the coil shall be weighed again. ✓
8. If the weight of any coil varies two pounds or more from the shipper's weight, it shall be set aside and called to the attention of the chief of the section. ✓

*Ross C Hill*  
ROSS C. HILL  
Capt., Corps of Engineers  
Area Engineer

~~SECRET~~

INSTRUCTIONS FOR UNWINDING TANKS

1. Put the respective tank number on a Reel Sheet. ✓
2. Make headings for the layers that are to come off. Number the layers consecutively, using the next higher number to the last layer unwound on the previous tank. ✓ 1/2 tank 2 numbers, full tank 4 numbers. Put the layer numbers on a manila tag and attach it to the reel on which the layer is wound. ✓
3. As the layers are unwound, check the coil numbers as they come off by writing just the coil number down in the line under the layer number. Check each coil as it comes off against the original tank sheets to be sure that they are the same. ✓ Any difference in number make special note of and report to Mr. Green. ✓
4. At the end of each layer measure to the closest 1" the distance between the last joint to come off and the end of the layer. ✓ This measurement and the resulting weight should be put at the bottom of the row of coil numbers. Show where the measurement was made, either on reel or tank. ✓ Weight per lin. ft. = 5.07#. ✓
5. If a broken joint necessitates putting a layer on more than one reel, number both reels with the same numbers as they will eventually be put together when being rewound. ✓
6. Connections taken from a tank should be listed on the bottom of the sheet. Show coil no. and weight. ✓ Be sure to list the connections in the connection book. ✓
7. All unwound material will be rewound on another reel to inspect the joint and for straightening. ✓ When this is done make up your final layer sheet showing all weights, deductions, and remarks. ✓
8. Do not throw your original numbering sheet away but attach it to the typed tank report to which it applies. ✓ This report should then be brought into the office for filing. ✓ You now have reel sheets left for your file that are complete, properly identified, and can be put on any repaired tank casing. ✓

*H. F. Green Jr.*  
H. F. GREEN, Jr.

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IN REPLY  
REFER TO EIDM SA

WAR DEPARTMENT  
UNITED STATES ENGINEER OFFICE  
MANHATTAN DISTRICT  
P. O. BOX 42  
STATION F  
NEW YORK, N. Y.

~~SECRET~~

12 December 1944

Subject: Operations of Special Accountability Section at Clinton Engineer Works, Oak Ridge, Tenn.

To: Captain Rose C. Hill, Manhattan District, Oak Ridge, Tenn.

A. General:

1. Operations of the Special Accounts Section at the Clinton Engineer Works, Oak Ridge, Tenn. were in connection with the Y-12 Program.
2. It was the responsibility of this Section to account for a valuable engineering material during its fabrication into bus bars and to protect it against loss until erected into buildings.
3. Stone & Webster was the contractor in charge of erection. Watson-Flagg was sub-contractor in charge of fabrication of bus bar.
4. The first shipment of metal was received from Bayway, N.J. on 3 June 1943. Fabrication of bus bar started 24 August 1943.
5. Fabrication of the first part of Y-12 Program was performed in a restricted section of Warehouse Building 9720-1. The work of Y-12 Extension was performed in a building erected for that purpose.

B. Protection:

1. The bus bar material remained property of the U. S. Government at all times.
2. An armed guard was maintained in the fabricating shop. This guard was present wherever and whenever metal was taken from the stockrooms.
3. Guards also accompanied all metal leaving the fabricating shop until such time as it was installed in buildings. In any case where the supply of bus bar in the building exceeded the amount that could be erected in place at quitting time, the unused quantity was returned to the storeroom for safe-keeping.
4. The fabricating shop and storerooms were restricted areas. Contractor's men who handled, fabricated, or erected bus bars were specially selected and approved by Stone & Webster Engineering Co.

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B-7

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Subject: Operations of Special Accountability Section at C.E.W. Oak Ridge, Tenn.

5. The guard force consisted of a select group of Roane Anderson Guards under the direction of Chief of Special Accounts Section. This Guard Force operated on a 24 hour day, 7 day a week basis.

C. Accounting:

1. A strict account of all bus material on hand was made each day.
2. Each morning, or whenever bus material was needed for work in the fabricating shop, the foreman of the shop applied for it to Mr. E.W. Doyle, the Government representative in charge of material. The metal was kept under lock and key and the Government representative had possession of the only key.
3. The material as taken from stockroom was weighed in the presence of the Government representative and the weight recorded. This material was fabricated into finished bus in accordance with plans for the various building. There was no apparent loss incurred during bending or punching operations.
4. All bus fabricated during the day was weighed and the weight recorded, as was the weight of scrap, dust and unused stock. The scale used was a Howe Weight-O-Graph, 450# capacity. All weighings were made to the nearest ounce.
5. From the various weight slips a daily balance sheet was made showing the weight of the raw material received; finished bus completed; scrap; dust, chips, filings, etc.; raw stock left over; and difference in weights, if any. If an excessive difference developed between the material received and that accounted for at the end of the day a careful re-check was made to account for the difference.

D. Identification of Pieces:

1. The fabrication of bus material was done from work sketches prepared by Watson Flagg Engineering Co. The total run of bus shown on wiring plans was broken up into sections to suit the length of bars available. As each section was completed, the bars were stamped, bundled together, and tagged with the number shown on work sketches.
2. The system of numbering bus bars was such that the various sections of bars could be easily identified with the wiring plans of Stone & Webster Engineering Co. and indicated the exact location where each section was placed in the building.
3. The system of identification was as follows:
  - (a) The first letter referred to the track in which the piece was erected (eg. A,B;C, on Program I and 6L1-9P2 on Program II)
  - (b) The next figure was the section or "line" identification (eg. A, B, C, D)
  - (c) The third number was the number of the piece in the section (eg. 1, 2, 3, etc.) These numbers were run consecutively for each drawing.

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Subject: Operations of Special Accountability Section at C.E.W., Oak Ridge, Tenn.

4. A record of the identification numbers was kept on a set of Stone & Webster electrical equipment plans which indicated the position of each bar installed. ✓

5. A schedule showing identification number, length, shape, and weight of the bars was maintained. ✓ This schedule and the record set of plans gave complete information of the bus bar in each track. ✓

E. Cleanup:

1. Extreme care had been exercised during the course of work to keep any and all loss at the absolute minimum. ✓

2. The motor driven saw used in cutting material was completely inclosed. ✓ The saw was cleaned daily by means of a vacuum cleaner and completely dismantled and cleaned at the completion of the job. ✓

3. The floor and benches were thoroughly brushed each day. Packing boxes in which the material was shipped to C.E.W. were inspected and cleaned before discarding. ✓

4. The three locked metal boxes provided for scrap and dust were used for shipping same to Carteret. ✓

*H. F. Green Jr*  
H. F. GREEN, Jr.

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DESCRIPTION OF:

CLEAN-UP AND BREAKDOWN OF:

1-Casting Wheel  
2-#6 Furnace

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Casting Wheel:

The last castings from the wheel were made 24 January 1944. ✓

Started cleaning of casting wheel, afternoon of 25 January 1944. ✓

Dismantled wooden platform where the chipping and cleaning of the billets was done. ✓

All of this wood and all other wood used as platforms around casting wheel were burnt in furnace as was all collected rags and papers. ✓ The resulting ashes were incorporated with the last fluedust lot. ✓

All of the following parts were scraped, chipped where necessary and all were brushed to remove any adhering silver. ✓ All cleaned parts were inspected by Mr. J. Burns, the L.Pitkin representative and by T.H.Schiercke and passed upon as to their freedom of silver. ✓

48 molds; 119 bottoms; all pipes, pipe fittings, unions, nuts and bolts; all bottom frames and stirrups; all flanges, walk plates and mold carrying frames; main brackets, wheel housing and base; all tools and hand ladles. ✓

The casting spout and the two casting ladles had first all metallics removed, then clay and brick. ✓ The steel shells were then scraped and brushed. ✓

A charcoal bin (steel box) was emptied of remaining charcoal which was put with sweeps, then box brushed. ✓ This was suggested and done because box was close to casting wheel and that silver very likely splashed in and on it. ✓

All supporting girders, building girders and all steel parts around and near casting spout were scraped and wire brushed. ✓ This included all platforms, chain hangers and levers. ✓

All fire cans brushed, ashes to sweeps. ?

All residue bone ash to sweeps, the containers were brushed. ✓

The outlet sump well cleaned, scraped and chipped. ✓ The outlet pipe was well baffled but pipe was checked and cleaned out beyond this baffle. ✓

Conveyor pit and sump cleaned as was the conveyor and table. ✓

The whole pit area was cleaned, all loose brick and concrete was chipped out to solid part or where fill or cinders was reached, surface of fill or cinders taken, all went to sweeps. ✓

All cracks in concrete were chipped and scraped. ✓

All of floor area around casting wheel and all permanent pipes well-cleaned and brushed for a distance of 20 feet. ✓

Residues and cleanings were routed as follows:

- Ashes from burnings to Lot#19/SD-50 ✓
- Metallics " #20/SD-51 ✓
- Sweepings and misc. " #4-0-47 ✓
- 13 Cans of brick & dirt " #5-0-48 ✓

Furnace #6:

The last cast from the furnace was made 24 January 1944. ✓

The work of dismantling the furnace was started the afternoon of 1 February 1944. ✓ The roof was first reinforced, they then started to chip off slag and metal from wall on pouring side and only above metal line. ✓ The area chipped was from end of bench to start of nose, from roof to metal line. ✓

These bricks were then removed. ✓ The uptake was cleaned of adhering baked fluedust. ✓

There was no work done on the furnace from 3 February through 11 February except the cleaning of fluedust from the dutch oven, boiler, heat economizer and fan. ✓

Work was resumed 12 February. ✓ The uptake was first removed and kept separate. ✓ A grab sample was taken by selecting bricks from various places. ✓

The roof was then taken down and separated into two parts—the nose section and the main section. ✓

Next the remaining side walls above the metal line except the nose were removed, this included brick and clay from the three doors. ✓

The ~~the~~ nose side walls and the walls below the metal line were removed. ✓ At the nose there were several outside courses of brick. Since these bricks were there as a support and in no way in contact with the metal, they were discarded. ✓

The metal sheet on the bottom was then removed, estimated that it weighed about 7000 lbs., maximum thickness 1½ inches. ✓ A section of the sheet made heavy penetration into and between the bricks. ✓ This caused the bottom bricks to be cemented together and to the sheet. ✓ A jackhammer was needed to remove the brick. ✓

The first course of the bottom magnesite brick was then removed, metal penetration in second course. ✓

The brick and slag from top of bench was then removed. ✓ This was found to be heavily covered with metal, estimated that 1000 lbs. were removed. ✓ Some of this metal came from splashing but the major portion probably due to bars falling on the bench during charging operations and then melting. ✓

The clay and sand layer between the first and second courses with clay and dust resulting from the previous dismantling operations was removed, also sand fill of bench plus sweepings from around furnace. ✓ This was all kept together as a lot of fines. ✓

The second course of the bottom was next removed, some penetration was found, it was spotty and in no place did it extend the depth of the brick. ✓

The clay and sand layer between the second and third courses was then removed. ✓

Since there was no penetration through second course to surface of the third course, this third course was not removed. ✓ It was well cleaned, closely inspected and found to be clean. ✓

The metal sheets due to their bulk and with no facilities for cutting them available, they were melted into smaller pieces in a temporary furnace. This was constructed with old furnace brick. This brick was returned to the lot for processing.

Then the pit around the outside of the furnace and the space under the furnace was cleaned. There was found two pieces of Detroit bus bar in this pit, weighed about 20 lbs., undoubtedly fell in here during charging operations.

Finally the whole area around the furnace was swept up.

The brick of the uptake was discarded because the grab samples taken showed that there was not enough silver retained to pay for the processing. A ton contained 5.99 troy ounces of silver value of \$4.26, processing would cost, \$22.59 per ton.

The dutch oven was not dismantled, since the fluedust did not sinter to the brick. It was decided that a good cleaning would free the brick of practically all fluedust. The value of the fluedust retained would not pay for processing. A grab sample of bricks was taken from various parts of the oven. A ton would contain 1.16 troy ounces of silver, value of \$.82, processing would cost \$22.54 per ton. The fluedust was brushed and blown out.

The waste heat boiler was not dismantled. It was decided as in the case of the dutch oven to remove the fluedust. The fluedust was brushed and blown out. A grab sample of bricks was taken from various parts of the construction. A ton would contain .15 troy ounces of silver per ton, value of \$.11; processing would cost \$22.54 per ton. The fluedust was brushed and blown out.

The heat economizer and the fan which follow respectively after the waste heat boiler were blown out of all fluedust. These are of all steel construction and cleaned easily.

The flues leading from the fan to the cyclonic precipitators and baghouse were well cleaned as were the cyclonic precipitators, the baghouse flues, all chambers, hoppers and screw conveyors.

Following is the segregation of the recovered materials from the furnace into lots for processing.

Cobbing chipped from side wall	to Lot #1-0-42
Side wall, chipped brick	" " 5-0-48
Fluedust from uptake	" " 19/SD-50
Fluedust, slag from dutch oven	" " 21/SD-52
Roof, main section	" " 5-0-48
Roof, nose section	" " 1-0-42
Remaining side walls above metal line	5-0-48
Side walls, nose section	to Lot 1-0-42
Side walls below metal line	" " 1-0-42
Metal sheets and metallics	" " 24A/SD-78A
Metal sheets and metallics	" " 24B/SD-78B
Metal sheets and metallics	" " 24C/SD-78C
Bottom, 1st course	" " 1-0-42
Top of bench	" " 1-0-42
Sand & clay between 1st & 2nd courses	2-0-45
Bottom, 2nd course	" " 3-0-46

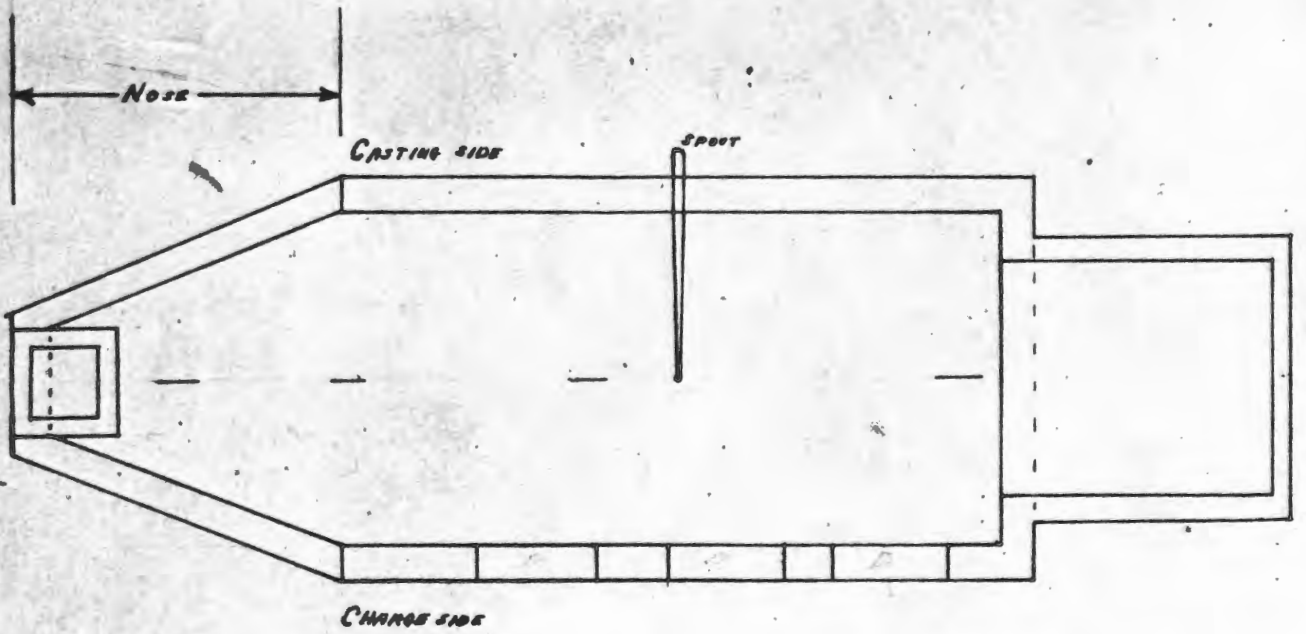
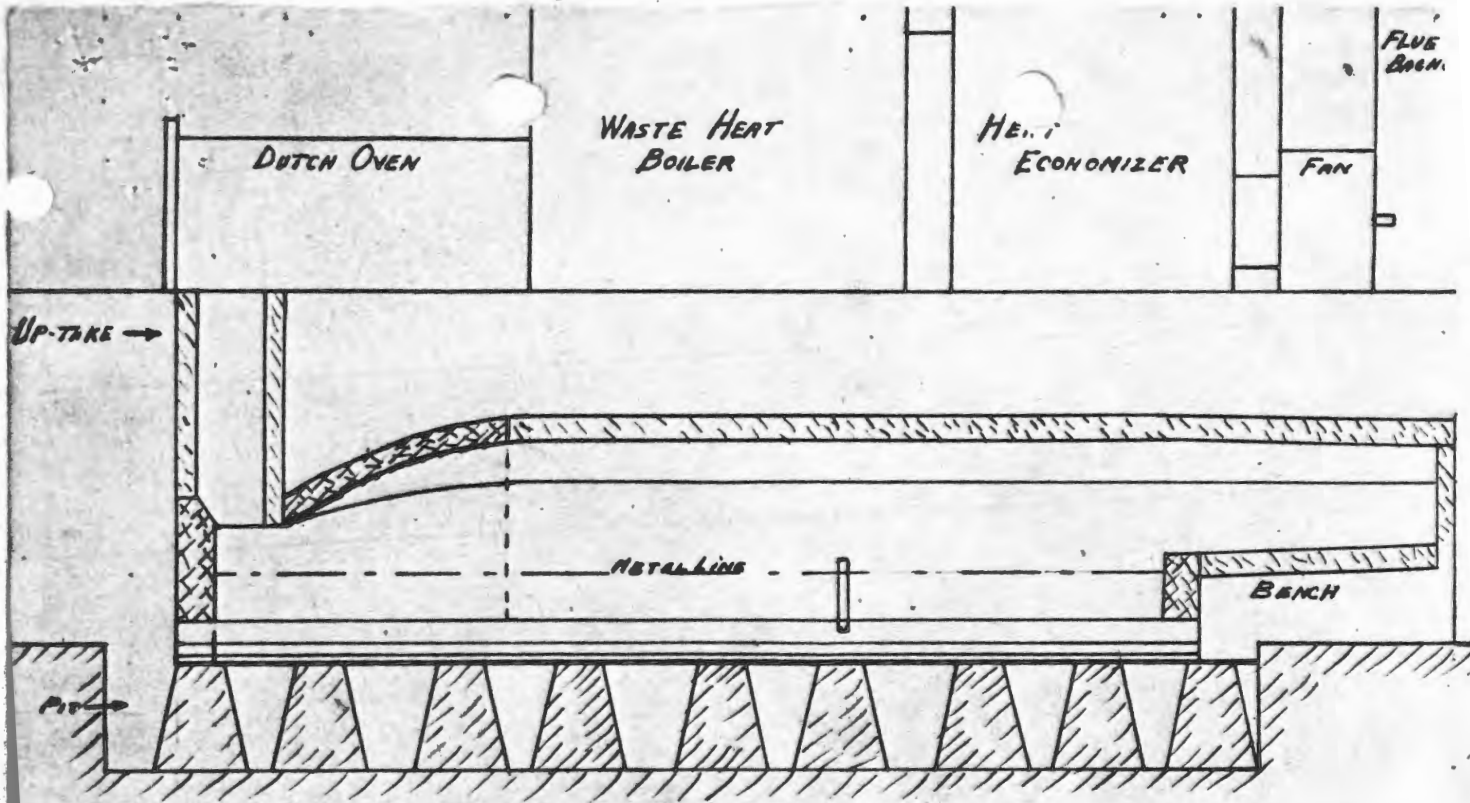
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Sand and clay between 2nd & 3rd courses	to Lot #3-0-46
Outside pit cleanings and sweepings	" " #3-0-46
Slag and cobbing resulting from melting operations on the metallics	" " 23/SD-76
Cleanings from flues and all of baghouse	" " 22/SD-62
Burnt wool bags	" " 25/SD-92

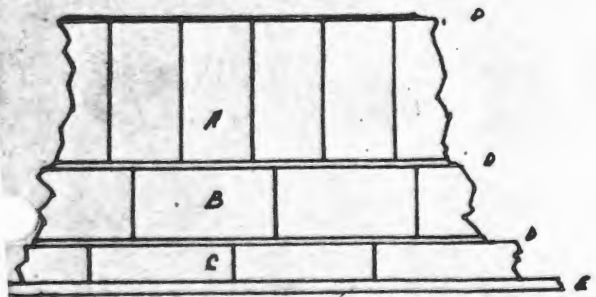


T.H. SCHIERKE

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Section, Bottom  
No. 7



- A - MAGNESITE BRICK
- B - SILICA BRICK
- C - SILICA BRICK
- D - SAND & CLAY
- E - STEEL BOTTOM PLATE

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 DIAGRAM #6 FURNACE  
 scale 1/8" = 1"

TABLE I.

#	Gross Weight lbs.	Moisture	Gross Dry Weight Pounds.	Tons.	Average Assay.
1-0-42	156,359.	.09 %	156,218.28	78.1091	500.225 ozs./ton
2-0-45	25,499.	.44 %	25,386.80	12.6934	1208.2625 " "
3-0-46	53,600.	.24 %	53,471.36	26.7357	24.125 " "
4-0-47	6,141.	11.21 %	5,452.59	2.7263	2773.175 " "
5-0-48	123,112.	.15 %	122,927.33	61.4637	119.700 " "
Sub-total	364,711.		363,456.36	181.7282	
19/SD- 50	10,132.	.44 %	10,087.42	5.0437	2562.450 ozs./ton
20/SD- 51	2,084.9	none	2,084.90	1.0424	939.100 Fine
21/SD- 52	4,463.	.38 %	4,446.04	2.2230	4376.8250 ozs./ton
22/SD- 62	4,178.	4.38 %	3,995.00	1.9975	1843.100 " "
23/SD- 76	4,809.	none	4,809.00	2.4045	5893.925 " "
24A/SD-78A	4,151.96	none	4,151.96	2.0759	995.75 Fine
24B/SD-78B	4,186.37	none	4,186.37	2.0931	998.15 "
24C/SD-78C	2,413.53	none	2,413.53	1.2067	995.725 "
25/SD- 96	1,093.	64.29 % *	390.31	.1952	2373.1000 ozs./ton
Totals	402,222.76		400,020.79	200.0102	

Total Cobbing 387,184.03 193.5921  
 Total Metallics 12,836.76 6.4181

\* burning loss no moisture

Production, from:

Fluedust 58,731.86 9 lots of each, figures all  
 Slag 167,783.00 in office records.

B Not Processed.

Stack 26,250. none 13.125 5.99 ozs./ton  
 Dutch Oven 35,000. " 17.500 1.16 " "  
 Boiler 46,900. " 23.450 .15 " "



Table II

<u>Lot #</u>	<u>Ag. Content ozs.</u>	<u>Less Loss Processing ozs.*</u>	<u>Returnable Fine Ozs.</u>
1-0-42	39,072.12	37,704.60	37,666.90
2-0-45	15,336.96	14,800.17	14,785.37
3-0-46	645.00	622.43	621.81
4-0-47	7,560.51	7,295.89	7,288.59
5-0-48	<u>7,357.20</u>	<u>7,099.70</u>	<u>7,092.60</u>
Sub-total	69,971.79	69,522.79	67,455.27
19/SD- 50	12,924.23	12,891.92	12,879.03
20/SD- 51	28,553.15	28,481.77	28,453.29
21/SD-52	9,729.68	9,705.36	9,695.65
22/SD- 62	3,681.59	3,672.39	3,668.72
23/SD- 76	14,171.94	14,136.51	14,122.37
24A/SD-78A	60,292.07	60,141.34	60,081.20
24B/SD-78B	60,938.36	60,786.01	60,725.22
24C/SD-78C	35,046.83	34,959.21	34,924.25
25/SD- 96	<u>463.23</u>	<u>462.07</u>	<u>461.61</u>
Total;	295,772.87	292,759.37	292,466.61
Production:			
Fluedust	55,300.09	55,161.85	55,106.69
Slag	1,197,817.96	1,194,823.43	1,193,628.61
Samples	<u>167.65</u>	<u>167.65</u>	<u>167.65</u>
Total	1,253,285.70	1,250,152.93	1,248,902.95
Grand total	1,549,058.57	1,542,912.30	1,541,369.56
Loss, Processing		6,146.27	
Loss, Seinoage		<u>1,549,058.57</u>	<u>1,542,912.30</u>
			1,542.74
			<u>1,542,912.30</u>

\* Weight of returnable in commercial silver bars 999 fine.



Table III

## Metal charged into #6 Furnace(input)

	Gross Ozs.	Fine Ozs.
Bars, U.S. Treasury	205,616,923.15	205,411,306.30
Misc., D.P.C. *	38,963,911.52	38,921,947.61
Scrap, Program I	3,867,718.75	3,863,851.03
Scrap, Program II	<u>6,614,081.25</u>	<u>6,607,467.17</u>
Total	255,062,634.67	254,807,572.11

\* This consists of bars, V.C. cakes and bus bar.

## Billets Produced:

# Billets	U.S.M.R. scales	Gross ozs.	Fine ozs.
,255	17,384,728. lbs.	253,527,283.28	253,273,756.00

## Billets shipped to Bayway:

41,885	17,233,477. lbs.	251,321,539.53	251,070,217.99
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## Billets remaining at Carteret:

370	151,251. lbs.	2,205,743.75	2,203,538.01
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Table IV

Input;	254,807,572.11	f	ine	ozs.
Output;	253,273,756.00	"	"	
21/SD-52	9,729.68	"	"	
19/SD-50	12,924.23	"	"	
20/SD-51	28,553.15	"	"	
24A/SD-78A	60,292.07	"	"	
24B/SD-78B	60,938.36	"	"	
4 - 0 -47	7,560.51	"	"	
1 - 0 -42	39,072.12	"	"	
2 - 0 -45	15,336.96	"	"	
3 - 0 -46	645.00	"	"	
5 - 0 -48	7,357.20	"	"	
24C/SD-78C	35,046.83	"	"	
22/SD-62	3,681.59	"	"	
25/SD-92	463.23	"	"	
23/SD-76	14,171.94	"	"	
Fluedust	55,300.09	"	"	
Slag	1,197,817.96	"	"	
Samples	167.65	"	"	
Stack *	78.61	"	"	
Dutch Oven *	20.30	"	"	
Boiler *	3.52	"	"	2
Total	254,822,917.00	"	"	
Diff.	15,344.89	"	"	theoretical Gain.

\* not processed

Table V

Fine Ozs.		Fine Ozs.	
Input;	254,807,572.11	Billets produced;	253,273,756.00
		Recoveries;	1,541,369.56
Total	254,807,572.11	Total	254,815,125.56
Apperent Gain	15,242.46	Processing loss	6,146.27
		Seinorage loss	1,542.74
Total	254,822,814.57	Total	254,822,814.57

\*\*\*\*\*  
B

Apparent Gain	15,242.46
Less processing loss	6,146.27
Less seinorage loss	<u>1,542.74</u>
Gain	7,553.45

In Conclusion:

In any process of this type it is natural and normal to expect a loss, melting or processing, whatever the case might be. Since at no time a melting program of this magnitude with this metal has ever been recorded, no criteria exists to indicate the apparent losses that could be expected or be reasonable. But taking into consideration the precautions previously listed under melting and casting, the thoroughness of the clean-up and allowing a baghouse efficiency of 90%, a loss of .003% could at least be expected.

The apparent gain as shown by the figures may be reasonably explained by the following:

1. Assaying and sampling errors, due to the richness of the material; richness being in heavy metallics contained therein and their subsequent segregation in some of the samples. The sampling was done to the best ability that the facilities of the mill permitted. This followed normal commercial practice.

2. Weight variations: Weighing of the input metal on scales, sensitive to .005 troy oz. and to nearest .01 troy oz. Weighing of the output metal on scales sensitive to 1 lb. av. and to nearest 1 lb. av. Weight errors due to dust, dirt and grease.

The loss, listed as processing loss, is due to a recovery percentage that past practices and experience has established for various types of processing. This is an accepted commercial practice.

The loss, listed as seiorage loss, is due to the returning of .999 fine metal for 1000 fine metal as shown by the assays. This is a commercial practice established through the years. This is a safety factor to cover the variable losses, such as, melting losses, absorption losses, and losses caused by inherent assay errors. If the above were not done the charges would have to be increased to cover.

The loss, listed as loss not processed, is due to the metal contained in materials which were not processed because the materials did not contain sufficient metal to pay for their recovery; this was previously explained in detail.

Respectfully submitted,



T. H. SCHIERCKE

WAR DEPARTMENT  
UNITED STATES ENGINEER OFFICE  
MANHATTAN DISTRICT  
P. O. BOX 42  
STATION F  
NEW YORK, N. Y.

IN REPLY  
REFER TO

~~SECRET~~

19 October 1944

Subject: Cleaning and Recovery Operations on Special Accountability Work.

Memo to: Captain R. C. Hill

1. The following is a final report of the cleaning operations, at Allis Chalmers plant, West Allis, Wisconsin, for the recovery of all metal not recoverable during the normal process of fabrication.
2. Extreme care had been exercised during fabrication to keep all losses at a minimum. Trays were placed under rollers and cleaned frequently. Each shift cleaned their machines daily with vacuum cleaner and brush. Dust from emery grinders was caught in trays. Saws were enclosed and emptied daily. Allis Chalmers sweepers accumulated floor sweeping in special boxes for that purpose. U. S. Government guards were constantly on the alert to recover metal in case of accident and to caution workmen against carelessness.
3. Cleaning operations were begun about 1 July 1944 by Allis Chalmers Manufacturing Co., and continued intermittently, since each machine or portion of a machine was cleaned as soon as it was no longer needed for manufacturing purposes. On 19 July 1944, Klug and Smith Co. (contractors) were called in to complete this work as a manpower shortage prohibited Allis Chalmers Mfg. Co. from using the additional labor required to exercise the extra precautions necessary. Klug & Smith's work was limited to that required because of special cleaning and recovery operations. Cleaning operations were completed on 21 September 1944.
4. The type of metal recovered was in the form of chips, flakes, grindings from emery wheels and sawdust. Metal pieces of any size were accounted for as scrap during the normal process of fabrication.
5. Cleaning and recovery operations were necessary at all points where the metal came in contact with other material (as in tension machines, winding tables, spacing blocks, reeling machines, etc.) and on the floors in the vicinity of the saws, grinders and all other equipment used in the fabrication.
6. The following machinery and equipment was cleaned as stated:
  - a. Saws No. to clean -- 6

Five saws used throughout the job were completely dismantled, brushed and washed with solvent. This cleaning included stands and motor housings. One saw, very little used, was brushed thoroughly.

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1-2-1

Subject: Cleaning and Recovery Operations on Special Accountability Work.

b. Coil Holders No. to clean -- 5

Five coil holders used to support coils before entering the straightening device were thoroughly brushed and washed with solvent.

c. Straightening Device No. to clean -- 5

Five straightening devices used to straighten the individual coil before brazing were scraped, brushed and washed with solvent. Rollers were removed and cleaned.

d. Brazers No. to clean -- 8

Five stationary and three portable brazing machines used in joining the coils were scraped, dismantled where necessary, brushed and washed with solvent.

e. Reeling Machines No. to clean -- 5

Five reeling machines used in winding metal into reels were vacuum-cleaned where possible, gears and gear housings were washed with solvent, motor housings were dismantled and washed with solvent, oil pits were thoroughly cleaned.

f. Reels and Storage Stands No. to clean - approx. 50

All reels on which coils were wound were vacuumed and washed where necessary. All storage stands were vacuum cleaned.

g. Reel Turntables No. to clean -- 6

Six turntables used to support reels before metal entered the tension machine were vacuum-cleaned and washed where necessary.

h. Tension Device and attached Brazers No. to clean - 6

Six tension devices used to insure uniform tension in winding and six attached brazers used in joining succeeding reels were thoroughly brushed, dismantled where necessary and washed with solvent.

i. Winding Machines and Jacks No. to clean -- 6

Six winding machines used to wind metal on bobbin plate of reactor and attached jacks used to hold metal in place while winding were thoroughly brushed and washed with solvent where necessary. Motors and jacks were dismantled in cleaning.

j. Shearing Machine No. to clean -- 1

Shearing machine used to cut excess coils to 30" lengths for shipment to Carteret, N.J. was brushed and washed with solvent where necessary.

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**Subject: Cleaning and Recovery Operations on Special Accountability Work.**

7. The remaining incidental cleaning was handled in the following manner:

a. Wooden platforms around the six winding machines were thoroughly swept previous to dismantling, removed and floor scraped and swept clean.

b. Fences surrounding restricted areas in 5 & 7 shops were removed and entire floor areas thoroughly swept.

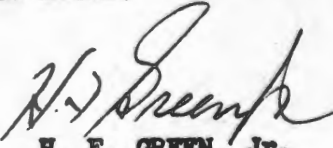
c. Wood block flooring in the vicinity of the major sawing operation, and in the vicinity of the bracing machines where braces were ground, was removed. Each block was thoroughly brushed and the floor swept. The wood blocks were not replaced at Government expense as A-C used these blocks for other repair work.

d. Scrap boxes, connection box, trays, oil cans, etc., were thoroughly cleaned or burned.

8. The accumulation of all rubbish, floor sweepings, brooms, rags, paper, spacers, oil, solvent, gear grease, etc. was burned in an incinerator and the ashes sifted to exclude nails, bolts, concrete, etc.

9. Ashes in the amount of 800 pounds were shipped to New York as part of scrap shipment on B/L No. WT-1491430 dated 18 August 1944. Via Railway Express B/L No. 1491491 dated 28 September 1944 an additional 800 pounds of ashes were shipped.

10. The amount of metal recovered from the ashes will be determined upon the completion of sampling and assaying by U.S. Metals Mfg. Co. and Lucius Pitkin's consultants. An appreciable amount of dust (approximately 50 pounds) was recovered from the cleaning of saws and was deposited in dust boxes reserved for non-contaminated metal.

  
H. F. GREEN, Jr.

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OFFICE OF  
DIRECTOR OF THE MINT  
IN REPLYING QUOTE INITIALS

~~SECRET~~  
TREASURY DEPARTMENT  
WASHINGTON 25



February 24, 1944

Mr. T. V. Summers,  
Captain, Corp of Engineers,  
Manhattan District United States Engineer Office  
War Department,  
P. O. Box 42, Station F,  
New York, New York

Dear Sir:

In reply to your two communications EIM SA-3 of February 21, 1944, addressed to the Assistant Director of the Mint, I have to advise that the Superintendent of the United States Assay Office at New York has been authorized to proceed with the proposed melting of silver scrap which you expect to supply him, at the rate of  $2\frac{1}{2}$  mills per troy ounce, computed on the after-melting weight of the bullion.

For your information, a carbon copy of the letter addressed to the Superintendent of the New York Assay Office, is herewith enclosed.

Very truly yours,

*Howard Howard*  
Acting Director of the Mint

Enclosure

~~SECRET~~

B-10  
1

Superintendent  
 United States Assay Office  
 No. 52 Old Slip  
 New York 5, New York

Dear Sir:

The Mint Bureau is in receipt of a communication from the Manhattan District, United States Engineer Office of the War Department, relative to proposed melting by the New York Assay Office of scrap silver resulting from War Department working of the silver Lease-Lent to them by the Treasury Department.

In this connection reference is made to your memorandum to the Bureau dated February 9, 1944, quoting an estimated price of  $2 \frac{1}{8}$  mills per fine troy ounce for the work. Their communication also mentioned that price. You are authorized to proceed with the work to the extent that your facilities are available therefor.

You should give temporary receipts for the silver bullion you receive from them, worded in harmony with the temporary receipts they gave you when the bullion was taken by them. You should also render them monthly bills for the work performed by you and repay the proceeds into the Treasury to the credit of the appropriation "Salaries and Expenses, Mints and Assay Offices," on account of work performed for others.

A carbon copy of their letter of February 21, 1944, is herewith enclosed for your information and guidance in dealing with them.

An additional letter received from the same office and under the same date states that the War Department expects to return to you approximately 3 million ounces per month of the silver heretofore issued to them. Temporary receipts should likewise be issued to them for such returned silver bullion.

Please note and observe the secret character of the matter.

The Manhattan District of the Engineer's Office of the War Department is being informed to the above effect.

Very truly yours,

(Signed) Leland Howard

Acting Director of the Mint

Enclosure

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MANHATTAN DISTRICT HISTORY  
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PHOTOGRAPHS

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BOOK V - ELECTROMAGNETIC PLANT  
VOLUME 4 - SILVER PROGRAM

APPENDIX "G"

PHOTOGRAPHS

<u>No.</u>	<u>Description</u>
1	Fabrication of Magnet Coils at Allis-Chalmers Mfg. Company (View looking east in No. 7 Shop)
2	Fabrication of Magnet Coils at Allis-Chalmers Mfg. Company (View looking west in No. 7 Shop)
3	Closing Operations of Magnet Coils Allis-Chalmers Mfg. Company

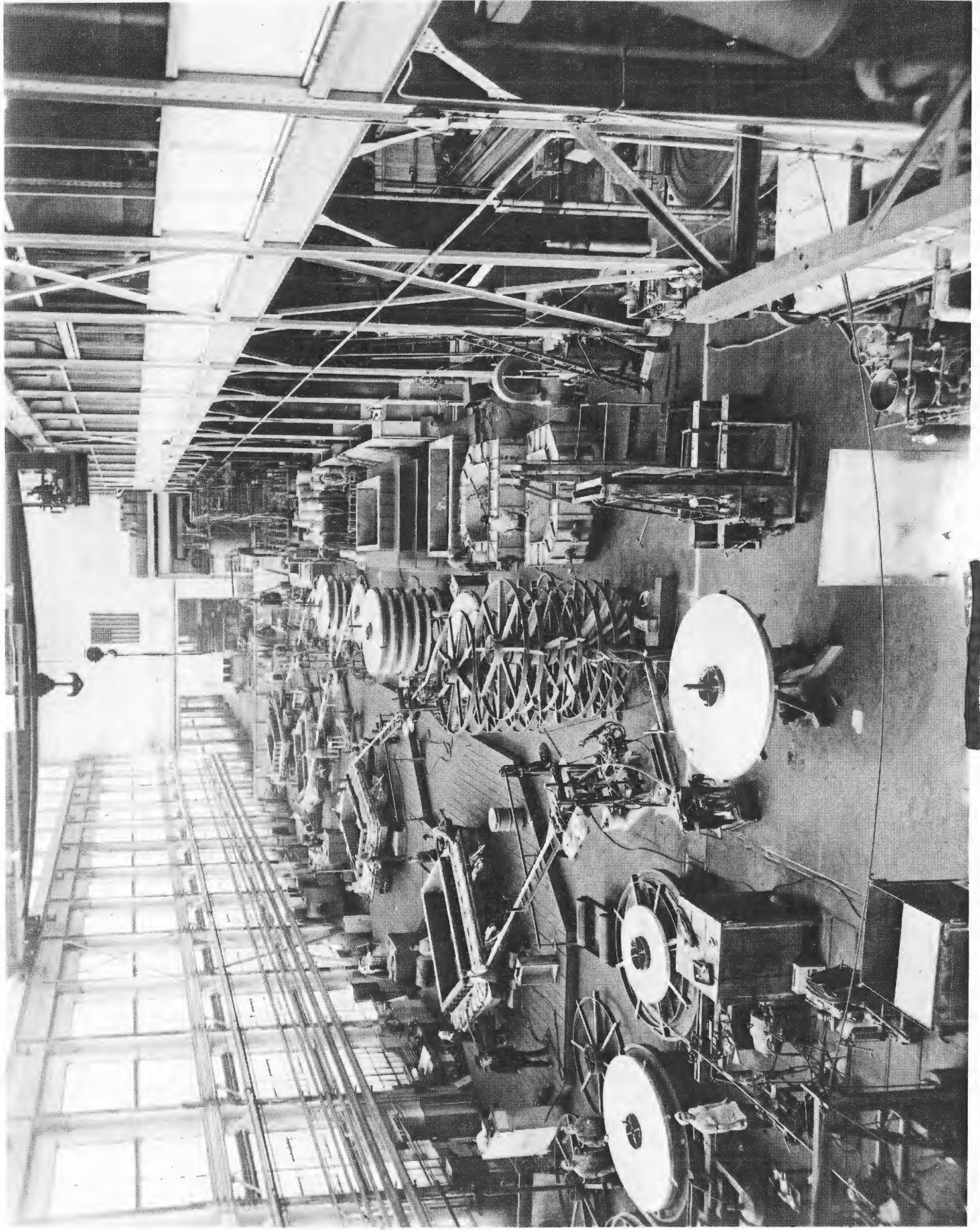
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G-1 Fabrication of Magnet Coils  
At Allis-Chalmers Mfg. Company  
(View looking east in No. 7 Shop)

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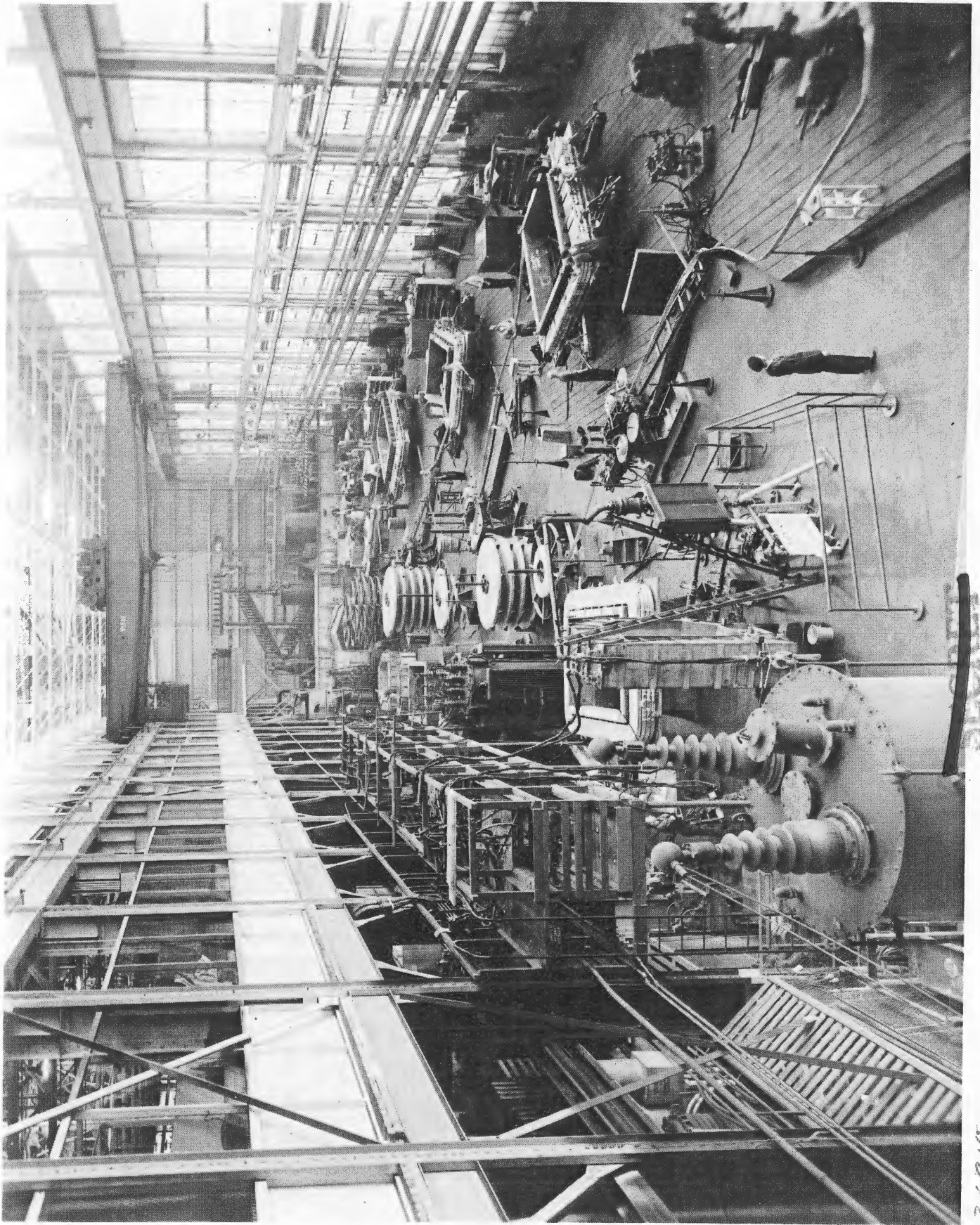
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C-2 Fabrication of Magnet Coils  
At Allis-Chalmers Mfg. Company  
(View looking west in No. 7 Shop)

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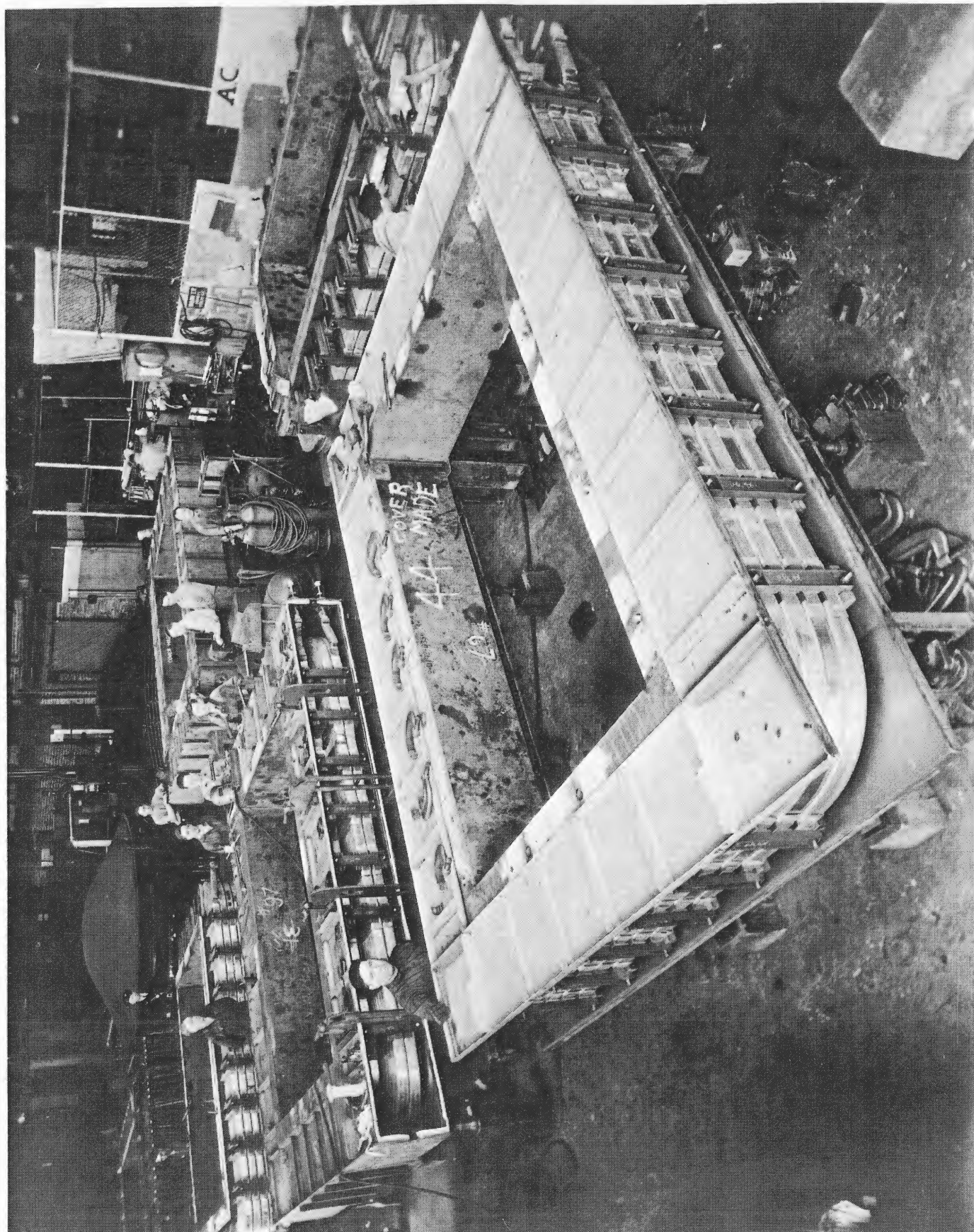


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C-3 Closing Operations of Magnet Coils  
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1 ✓	Stone and Webster Requirements ✓	Spec. Accts. File #640 - District Office ✓
2 ✓	Permanent Receipts for Treasury Withdrawals ✓	Spec. Accts. File District Office ✓
3 ✓	U. S. Trucking Corporation Contract W-7401-eng-83 ✓	M. D. Contract Section ✓
4 ✓	Handy and Harmon Contract W-7405-eng-5 ✓	M. D. Contract Section ✓
5 ✓	Possible Fabricators ✓	Spec. Accts. File #340 - District Office ✓
6 ✓	Memo - Capt. A. C. Johnson to Lt. Col. K. D. Nichols dated 4 September 1942 ✓	Spec. Accts. File #330 - District Office ✓
7 ✓	Record of Negotiations ✓	Spec. Accts. File #250 - District Office ✓
8 ✓	Letter from Defense Plant Corp. s/ Mr. F. T. Ronan, dated 17 May 1945 ✓	District Office Class. Files - No. 31628 ✓
9 ✓	U. S. Metals Refining Company Contract W-7407-eng-126 ✓	M. D. Contract Section ✓
10 ✓	U. S. Trucking Corporation Contract W-7401-eng-27 ✓	M. D. Contract Section ✓
11 ✓	Phelps Dodge Copper Products Company - Contract W-7405-eng-22 ✓	M. D. Contract Section ✓
12 ✓	Bayway Terminal Warehouse Contract W-1098-eng-3072 ✓	M. D. Contract Section ✓

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<u>No.</u>	<u>Description</u>	<u>Location</u>
13 ✓	Stone and Webster Eng. Corp. Subcontract #24 with Monsanto Chemical Company ✓	M. D. Contract Section ✓
14 ✓	Guarding Reactor Shipments - s/ Capt. R. C. Hill dated 16 July 1943 ✓	District Office Class. Files No. 3547 ✓
15 ✓	Nandy and Harmon Recommendation Letter dated 6 January 1943 ✓	Spec. Accts. File #330 - District Office ✓
16 ✓	Lucius Pitkins, Inc., Contract W-7421-eng-17 ✓	M. D. Contract Section ✓
17 ✓	American Metal Company, Ltd. Contract W-7407-eng-129 ✓	M. D. Contract Section ✓
18 ✓	Permanent Receipts for Returns to Treasury ✓	Spec. Accts. File District Office ✓
19 ✓	Security Surveys by District Office ✓	M. D. Classified Files - 410.2 ✓
20 ✓	Special Accountability Section Master Ledger and Supporting Documents ✓	Spec. Accts. File District Office ✓
21 ✓	Consultant's Reports ✓	Spec. Accts. File District Office ✓
22	Reserve Fund - Letter dated 7 May 1943. Subject: Silver Agreement with Treasury ✓	District Office Classified Files No. 784 ✓

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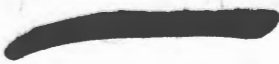
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~~RESTRICTED DATA~~  
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