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THE AEROSPACE CORPORATION



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19 September 1985

Mr. Arthur Whitman, NE-23
Division of Facility & Site
Decommissioning Projects
U.S. Department of Energy
Germantown, Maryland 20545

Dear Mr. Whitman:

AUTHORITY REVIEW - METAL FABRICATION CONTRACTOR SITES

The attached authority review prepared by Aerospace is provided for your consideration and determination of authority for remedial action by the DOE at the former MED/AEC metal fabrication contractor sites specifically identified therein.

As you know, this authority review is somewhat different from those previously prepared by Aerospace in that several sites are included. This generic approach will expedite the authority review process by grouping or consolidating potential FUSRAP sites under one authority review where similar tasks were performed and where the site owners/operators were bound under similar contractual arrangements and controls exercised by the MED and its agents. Furthermore, it is our recommendation that future sites, when appropriate, be included by reference to the attached authority review. More specifically, minimum qualifications recommended for inclusion of future sites under this authority review are sites involved in MED/AEC metal fabrication programs or projects prior to 1946, and sites where work was performed under subcontract with the University of Chicago (Metallurgical Laboratory) and/or DuPont during this period.

There are two principal factors which support a finding of authority for remedial action at these sites. The first is the lack of knowledge of the physical characteristics and health and safety hazards associated with the handling and processing of uranium metal during the period. It is apparent that site owners/operators were totally dependant on the Metallurgical Laboratory and DuPont, as agents of the government, to provide the support required to monitor health and safety in the workplace and provide



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special equipment to reduce the hazards associated with uranium metal fabrication processes. The second principal factor is the specific indemnification of the University of Chicago and DuPont against any liability arising from performance of work under their contracts. This indemnification was extended to their subcontractors. In addition to indemnification provisions, the prime contracts contained a "Disclaimer of Other Provisions of the Law" invoked by the President under authority of the War Powers Act of 1941. Another factor supportive of a finding of authority is the consequence of strict security measures which precluded or limited the dissemination of information that under normal circumstances would have been provided to the subcontractors.

Your approval of this generic approach to the authority review process, where appropriate, is requested.

A copy of the attached Authority Review is being provided to Mr. S. Miller, DOE-OGC, by copy of this letter.

I would be happy to respond to any questions or comments you might have regarding this matter.

Sincerely,



Charles D. Young
Environmental Controls and
Analysis Directorate
Government Support Division

CDY/smb

Attachments

cc: E. DeLaney
R. Lewis (w/o)
S. Miller
Whitman file

bcc: F. Hoch
B. Fritz
S. Jones
F. Newman (w/o)
E. Vierzba
A. Wallo

AUTHORITY REVIEW
METAL FABRICATION CONTRACTOR SITES

INTRODUCTION

During records searches and analyses conducted to support remedial action authority reviews, several contractor sites have been identified whose operations/activities had in common a number of factors or considerations that are pertinent to the determination of authority for remedial action. To expedite the authority review process, this review was prepared to address all sites where the following conditions were prevalent.

a. Work was performed during the early 1940's for the Office of Scientific Research and Development group located at the University of Chicago and the Manhattan Engineer District (MED) or their agents, the Metallurgical Laboratory and DuPont.

b. Agents of the government (University of Chicago and DuPont) were indemnified.

c. Sites were operated for a relatively short period under subcontracts and/or purchase order agreements placed by the University of Chicago or DuPont, MED's prime contractors.

d. Contractors or site operators had little or no knowledge of the materials or the potential hazards associated with the handling or working with the radioactive materials. The Metallurgical Laboratory was responsible for identification of the hazards, monitoring the work place and health of workers in the contractors' plants, and making specific recommendations for measures to protect the workers against the hazards of handling radioactive materials.

e. Equipment and facilities used were contractor owned and operated. And, in most instances, contractual arrangements were for the use of manpower and equipment to perform work specified under the direction of the MED or its agents:

f. Radioactive materials furnished the contractors or site operators were government owned. The government retained title to the materials throughout the process.

g. Department of Energy predecessors or their agents exercised control over contractor operations and were responsible for health and safety associated with the handling of radioactive materials.

h. With few exceptions, the development and production work done at these contractor facilities was done on weekends when the facilities were closed down for normal operations. It is apparent

that these arrangements were made to satisfy security requirements and in recognition of the potential hazards associated with the operations.

i. Because of the method of procurement, little or no information is available to describe the contractual relationship between the contractors and the MED or its agents.

The step in the feed materials production process following conversion of uranium oxides into cast uranium metal billets was the transformation of these metal billets into finished slugs or other special shapes. The initial research and development work was apparently sponsored by the Office of Scientific Research and Development and/or the Metallurgical Laboratory, predecessor of the Argonne National Laboratory, on small quantities of metal (uranium - also known as tuballoy) to determine physical properties and forming and machining characteristics. The work was done principally by the Metallurgical Laboratory at the University of Chicago and the facilities of several commercial metal fabricators. Limited information has been discovered to describe these operations that took place in late 1942 and early 1943. Summerville Tubing Company, Wycoff Drawn Steel Company, International Register Company, and Globe Steel Tubes are among those commercial firms that did the initial work in machining and centerless grinding in January and February of 1943. However, at this time, little is known about these commercial firms, their location, or the contractual arrangements under which the work was performed.

This work was performed prior to and, in some instances, concurrent with the MED's uranium slug procurement program under the direction of the I. E. du Pont de Nemours and Company to provide feed materials (uranium slugs) for the facilities at Hanford and the Clinton Semi-Works. Approximately 10 of the some 200 University of Chicago subcontractors (as of July 1946) are believed to have participated in the early metal fabrication program. Only about 14 of approximately 40 commercial contractors/vendors currently known to have participated in the slug procurement program during the early 1940's actually handled uranium metal. It is anticipated that other metal fabrication contractors will be identified as the FUSRAP records review process continues that will fall under this category. Therefore, where appropriate, this Authority Review and analysis will be applied to other contractor sites discovered in the future that operated under similar conditions. Specific MED contractor sites presently identified to which this review applies are:

<u>MED Contractors</u>	<u>Site Location</u>
American Chain & Cable Company	Bridgeport, CN
Baker Brothers, Inc.	Toledo, OH
B&T Metals Company	Columbus, OH
Carpenter Steel Company	Reading, PA

MED ContractorsSite Location

Copperweld Steel Company	Warren, OH
McKinney Tool & Manufacturing Company	Cleveland, OH
Wm. E. Pratt Manufacturing Company	Joliet, IL
Quality Hardware & Machine Company	Chicago, IL
C. H. Schnorr & Company	Springdale, PA

It should be noted that this review relates only to the determination of authority for remedial action. A separate assessment regarding potential for contamination will be completed for each site to determine if they require a radiological survey.

BACKGROUND

During the latter part of 1942, the E. I. du Pont de Nemours and Company (DuPont) was pressed into service under contract numbered W-7412-eng-1 as prime contractor for the design and construction of the Clinton and Hanford plants and for operating the latter. The initial contract, Letter Contract No. W-7412-eng-1, dated December 1, 1942, contains the following consideration.

"(2). It is recognized that you have no experience or special knowledge in the field of this project, that you will depend wholly on data and specifications of the War Department in carrying out the work, and that you therefore cannot assume responsibility for the correctness or adequacy of such data or specifications."

Futhermore, the Letter Contract stipulates that, "In view of the unusual and unpredictable hazards involved in carrying out the work under this contract, as well as the abnormal conditions now existing, suitable provisions will be incorporated in the contract providing that all work under the contract is to be performed at the expense of the Government, and that the Government shall indemnify and hold the Contractor harmless against any loss, expense (including expense of litigation) damage (including personal injuries and deaths of persons and damage to property) of any kind and for any cause whatsoever arising out of or connected with the work, ..." In addition to including this indemnification in Article XXXII of the final contract (dated November 6, 1943, effective October 3, 1942), another article, Disclaimer of Other Provisions of the Law, indicates that the contract was entered into pursuant to authority of the First War Powers Act of 1941 and, "...said provisions shall be fulfilled without regard to any other provisions of the law relating to the making, performance, ammendment or modification of contracts."

It is apparent that finalization of the Letter Contract resulted in the execution of two contracts with DuPont, Contract No. W-7412-eng-1 for design, construction and operation of the Hanford facility and Contract No. W-7412-eng-23 for design and construction of the Clinton Semi-Works in Tennessee.

Prior to May 1943, studies and investigations pertinent to the MED effort were sponsored by the Office of Scientific Research and Development (OSRD). The University of Chicago (Metallurgical Laboratory), under contract with OSRD, was a principal participant in this effort. By mutual agreement between the OSRD and the War Department that it would be in the best interest of the Government to have the University of Chicago continue this effort under the jurisdiction of the latter, OSRD contracts were terminated and Contract No. W-7401-eng-37 was entered into on 29 April 1943, effective 1 May 1943, between the Government and the University of Chicago. This contract, apparently administered by the MED Chicago Area Office, thus established the relationship between the MED, the Metallurgical Laboratory and DuPont in research, development and production projects associated with uranium metal fabrication to provide feed materials for use at the Hanford and Clinton facilities and for further research and development activities. Articles providing for contractor indemnification and the disclaimer of other provisions of the law described above that were included in the DuPont contract were also included in this contract. Indemnification of University of Chicago subcontractors was typically accomplished by inclusion on an article in subcontracts, Relation to Prime Contract, that reads as follows:

"It is understood that this is a subcontract under the prime contract hereinabove referred to, and by reason thereof subject to all the terms, conditions and limitations imposed by such prime contract, including the condition that the effectiveness of this subcontract is subject to the prior written approval of the contracting officer in said prime contract or his duly authorized representative. Inasmuch as the prime contract is a secret contract and the terms thereof have not been revealed to the Subcontractor, it is expressly understood and agreed by parties hereto that this Article does not obligate the Subcontractor financially or in accountability for property, materials, supplies, or services to an extent beyond what is specifically made the obligation of the Subcontractor in this subcontract."

The slug procurement program to supply feed materials to the Hanford and Clinton facilities was a major effort under these contracts. This program, from the first extrusion of uranium rods

from metal billets in March 1943, until its completion in the fall of 1944, was managed by DuPont in concert with the Metallurgical Laboratory. The work was performed by existing metal fabrication facilities, privately owned and operated. Information in Volume II, Design and Procurement History of Hanford Engineer Works and Clinton Semi-Works (December 1945) prepared by DuPont, hereafter referred to as the History, identifies 14 commercial contractors or vendors that performed experimental, development and production work with uranium metal. In addition to the production of the initial feed material (uranium slugs) for the Hanford and Clinton facilities, many of these contractors played a significant role in the development of manufacturing processes and specifications to be used at government facilities that would ultimately assume responsibility for future production of these feed materials.

ORGANIZATIONAL RESPONSIBILITIES

According to the History, DuPont's Engineering Department, War Construction Division, " ... was responsible for the determination and contracting of suitable fabricators for processing the uranium, the over-all planning and scheduling of the work at the various vendors, the development of manufacturing methods, the procurement of all necessary component parts, procurement of any special equipment required for loan to the fabricators in executing their contracts, the maintenance of accountable records, the checking and supporting of vendors' invoices, and, in short, for all matters relating in any way to the slug program." The U.S. Army Corps of Engineers (MED) was responsible to procure the uranium and to deliver it to the metal fabricators. The MED was also responsible for shipment and recovery of metal scrap accumulated at metal fabricators' plants. DuPont was responsible for transforming the cast uranium billets into finished slugs and delivery of the finished slugs to Clinton and to Hanford. The Metallurgical Laboratory acted as the central group for those involved in the experimental and developmental programs to determine the extrudability, machinability and other physical characteristics of the metal, and furnished basic design and qualitative requirements to DuPont.

As design criteria and qualitative and quantitative requirements were established for each step in the fabrication process, DuPont set out to locate commercial fabrication shops with equipment and manpower available to perform each task. With the decision to start the production of slugs from extruded material, DuPont placed an order with B&T Metals Company of Columbus, Ohio, for the extrusion of cast uranium billets into rods. The first extrusion at this plant was performed on March 31, 1943. A subsequent order was placed with Revere Copper and Brass, Inc. in Detroit, Michigan to expand the capability to handle future requirements. As the program progressed and additional metal fabricating requirements were established, DuPont placed orders with 12 other commercial firms to roll, draw,

swage, straighten and out-gas uranium rods and to do the machining, grinding, bonding and canning required for production of finished slugs for the Hanford and Clinton facilities, and to the Metallurgical Laboratories for analytical and additional developmental work.

According to the History, the Metallurgical Laboratory assumed responsibility for determining toxic hazards attendant to the fabricating operations. Personnel of their Medical Group were assigned to study potential health problems, visit the fabrication contractors' plants and provide definite recommendations to DuPont for safeguarding the health of contractor employees working with the metal. DuPont was responsible for implementation of remedial measures in line with these recommendations, with assistance in the form of follow-up investigations at certain of the fabricating plants by the Metallurgical Laboratory personnel. Other records have been obtained that indicate visits and inspections of contractor plants were made and that these visits and inspections were primarily oriented toward the establishment and maintenance of a system to monitor the work environment (by air sampling) and the health of plant workers (by physical examinations). Again, according to the History, DuPont was responsible for directing the activities concerning physical examinations. All examinations and follow-up were conducted under its supervision and all medical records ultimately were turned over to the DuPont Medical Division.

COMMON FACTORS IN PROGRAM EXECUTION

A number of common factors prevalent in the execution of the early metal fabrication activities that facilitate consolidation of contractor sites for the purpose of determining DOE's authority for remedial action are presented below.

a. The University of Chicago (Metallurgical Laboratory) and DuPont were the government's prime contractors responsible for carrying out the initial research, development and production programs involving uranium metal under the direction of the MED - primarily the Chicago Area Office.

b. The prime contractors were specifically indemnified by the Government. University of Chicago subcontractors were specifically indemnified. Indemnification of the DuPont subcontractors is implied in the prime contractor.

c. Metal fabrication and other services were procured through subcontracts and/or purchase orders initiated by the University of Chicago and DuPont and approved by a government contracting officer if the value of the order was equal to or greater than \$2000.00. In most instances, information on the service purchased was limited, probably to prevent classification of the document. In at least one instance, uranium metal was identified only as "special metal" and in other instances simply as metal rods or tubes.

d. To comply with security requirements, orders were placed before the nature of hazards associated with uranium metal could be disclosed; and in some instances, potential hazards were never discussed with the contractors. As an example, the following are excerpts from a letter from a representative of the Chicago Operations Office dated April 22, 1943.

"The Metallurgical Laboratory has already made a contract with the subject firm for machining some of the metal. Work is to start this morning. No classified information is being revealed, but, of course, the firm will be working with classified material. This is a short job and should not take more than a week."

"At present, the work is not being given special emphasis in the hope of attracting as little attention to it as possible..."

e. Although the method of procurement and nature of the work were like unto "job shop" operations, there are indications that DuPont representatives were assigned to the major plants and DuPont, MED, or Metallurgical Laboratory personnel were present during all metal fabrication operations.

f. Except for some government furnished special equipment, facilities and equipment were contractor owned and operated.

g. Uranium metal was provided by the government. Both the finished product and scrap (residue) remained the property of the government. Accountability was such that every effort was made to balance the amount of metal received with the finished product delivered and scrap recovered.

h. Under the slug development program, the cost of medical surveillance and services required to monitor the hazards associated with uranium metal fabrication operations was included in the purchase order or provided by DuPont at no cost to the contractor. In most instances, it is apparent that the contractors were totally dependant upon DuPont and/or the Metallurgical Laboratory for these services.

i. Visits or inspections of contractors' plants were conducted by personnel of the Metallurgical Laboratory's Medical Division. These inspections included air sampling in the work place to determine metal content, observing operations, and reviewing the reports of physical examinations of workers. It is apparent that corrective action and suggested changes in procedures in the interest of health and safety of the workers were made during these visits, and that the reports of these visits included specific recommendations to plant management and government representatives regarding health and safety.

SUMMARY OF SITE SPECIFIC OPERATIONS

1. American Chain & Cable Company. The only known work done with radioactive metal by this firm at its plant in Bridgeport, Connecticut, was the swaging of eight uranium rods from a 1.46 inch diameter to a 1.39 inch diameter. The work performed under Purchase Order RPG-3199 1/2 placed by DuPont on March 17, 1944, was in support of a program to reclaim oversized rods. Reclamation of oversized rods by this method was abandoned. No further indications of work performed by this firm for the MED has been found.

2. Baker Brothers, Inc. This firm was one of approximately eight metal fabricators involved in machining operations on uranium rods to produce finished slugs. The original site, located at the intersection of Harleau and Post Streets in Toledo, Ohio, contained four buildings. At the time work was done for MED, the facilities and equipment were owned and operated by Baker Brothers. The site is currently occupied by RMS, Inc., a division of Siemens-Allis. A complete chronology of ownership from 1944 to present has not been developed. However, it has been established that Baker Brothers' assets were liquidated and the machinery/equipment was sold at auction.

After the developmental work to determine the machining characteristics of uranium metal got underway, DuPont initiated a search for additional machining facilities so that the fabrication of 100 tons of slugs for the Clinton Semi-Works could be completed by September 1, 1943. Baker Brothers was the only one of approximately 40 metal fabrication shops contacted that appeared capable of handling the work to satisfy developmental, production and security requirements. Purchase Order XPG-528 1/2 was placed with Baker Brothers on May 29, 1943, for a portion of the total machining required. However, there are indications that operations under this purchase order did not begin until early June 1943. Another purchase order (XPG-1768 1/2) was apparently placed with Baker Brothers to provide for medical support costs.

According to a Metallurgical Laboratory Health Division report of a visit to the Baker Brothers facility on June 21, 1943, four lathes were being used to machine uranium rod. The report also indicated that operations at the facility were expected to continue for no longer than 6 to 8 weeks. Although documentation describing specific quantities of material handled has not been found, it is apparent that they machined most of the initial 100 ton requirement for Clinton slugs, and a part of an additional 30 ton requirement for slugs machined to the standard Clinton specification, before completion of the work under these purchase orders in October 1943. However, prior to completion of this work, DuPont placed Purchase Order RPG-800 1/2 with Baker Brothers for approximately 500 hours of machine work in connection with the slug development program for Hanford. And, in early 1944, two more purchase orders were accepted.

The first, XPG-1795 1/2, was for grooving and refacing 15 tons of rejected Clinton slugs; and the second, RPG-4014 1/2, was to conduct 24-hour-per-day operations, along with two other machining contractors, to fabricate 48,000 unbonded Hanford slugs. The former was completed in April 1944, and the latter, initiated in May 1944, was completed by July 1944. Purchase Orders placed with Baker Brothers (RPG-1907 1/2) and a Dr. H. Holmes (RPG-5390 1/2) were apparently to provide for the cost of medical services in connection with the work done in support of the Hanford slug program.

By April 1944, the slug procurement program for the Clinton Semi-Works was completed, and by July 1944, facilities had been completed at Hanford to produce their own feed materials. No evidence has been found that would indicate a continuation of Baker Brothers' participation in MED programs beyond July 1944. Records are available that indicate several visits or inspections of this contractor's facilities by the medical staff of the Metallurgical Laboratory. However, no record has been found of the final inspection and cleanup of these facilities when the work described above was completed.

A preliminary radiological assessment of three buildings on the site was conducted on April 22, 1981. Radioactive anomalies were found in two of the buildings. However, it was determined that there was no immediate radiological hazard under current use.

3. B&T Metals Company. In February 1943, DuPont placed an order with B&T Metals (XPG-123 1/2) to extrude rods from uranium metal billets. The first test of the horizontal extrusion press at the facility apparently took place on February 21st. Extrusion operations on a production scale were apparently initiated on March 31, 1943. By mid-June 1943, a considerable tonnage of uranium metal had accumulated at the plant. Three hundred rods were stored awaiting shipment and 730 billets (approximately 50 tons of uranium metal) were on hand for fabrication. During the life of this contract 168.054 tons of uranium billets were extruded into rods. Production under this order was completed on 3 August 1943.

DuPont also placed Purchase Order XPG-753 1/2 with B&T Metals for machining uranium slugs. However, their equipment was not sufficiently accurate to hold the required tolerances without extreme difficulty. This resulted in the diversion of the work at this plant to reclamation, by grinding, of a small quantity of slugs used by the Grasselli Research Laboratory in its experiments. After completion of this reclamation work, the order was closed out. The period of the operation and the quantity of material handled is unknown.

The History indicates that DuPont placed a companion order with a Dr. D. L. Mahanna to provide medical support incident to the work done under XPG-123 1/2.

Metallurgical Laboratory correspondence assembled to date indicates that:

a. A DuPont representative was assigned to provide general supervision of the extrusion operations at the B&T Metals plant.

b. Several visits to the plant were made by Metallurgical Laboratory Medical Division staff and recommendations for protective measures and medical controls were provided to plant personnel and to the DuPont representative at the plant.

c. By letter dated November 26, 1943, MED headquarters was advised of the procedures of the final step in the completion of the project at B&T Metals. These procedures appear to represent a visual inspection by MED and DuPont representatives to verify that the facilities and equipment had been cleaned and that all sweepings, turnings, solid scrap, oxides and wet residue had been shipped to destinations prescribed by MED.

4. Carpenter Steel Company. Purchase Order RPG-4671 1/2 was placed with this company to develop a rolling process for fabricating rod from uranium metal billets at their plant in Reading, Pennsylvania. According to the History, two rolling runs were made under this purchase order. The first was on Saturday, August 27 and September 3, 1944. Carpenter Steel was apparently selected for this work because of their technical staff and ability to do developmental work. They were also a supplier of stainless steel for the Hanford project and the rolling of uranium was believed to be quite similar to that of stainless steel. However, after examination of samples from these runs, the rolled rods were found to be inferior and it was concluded that rolling would not prove favorable in comparison to the extrusion process previously used to fabricate rods from uranium metal billets. The History also indicates that, in addition to the cost of the rolling operations, \$465.00 was paid for medical support in conjunction with this work.

A draft document reflecting the results of the examination of these samples and the History are the only sources of information discovered to date on the work done by Carpenter Steel under this purchase order. In all probability, due to the method of contracting and the limited scope of the operation, it is unlikely that additional documentation will be found.

Recollections of a former Carpenter Steel employee interviewed were that the plant's 16 inch mill was used, that the rolling took place only on one weekend, and that the mill was cleaned before and after the operation.

5. Copperweld Steel Company. The services of this company, located in Warren, Ohio, were procured under Purchase Orders XPG-492

1/2 and RPG-705 1/2 to out-gas and straighten uranium rods for both the Clinton and Hanford projects. Under the first order, Copperweld out-gassed and mechanically straightened approximately 3000 Clinton-sized rods.

Work to straighten uranium rods was apparently underway by mid-May 1943. At that time it was estimated that it would only be necessary to operate approximately one day a week to perform the work required under the initial purchase order, scheduled for completion in early July. According to an MED memorandum to file concerning the protective security program at the contractor's plant, these operations were apparently conducted on weekends. Material to be processed was shipped to the plant in freight cars and brought into the building on a railroad siding, was processed and shipped out on the same day received. A guard was stationed near the equipment to keep unauthorized persons away from the area. Requirements to out-gas the uranium rods were subsequently added to the work performed under the initial purchase order. Although documentation describing this operation has not been found to date, it is possible that operations at this plant became more complex and the residence time of the material at the plant may have been extended beyond one day. However, 25,000 pounds of metal could be out-gassed in less than 24 hours, thus allowing continuation of weekend operations involving uranium metal when the plant was shut down for normal operations.

Reports of visits to the Copperweld plant by Metallurgical Laboratory medical personnel indicate that operations at this plant continued into August 1943. However, a decision by DuPont to conduct the out-gassing and straightening operations at the plants where the metal was extruded into rods would indicate that operations at Copperweld may not have been extended beyond the fall of 1943.

Based upon cost information contained in the History, it is apparent that work under Purchase Order XPG-492 1/2 was completed, but little was done under Purchase Order RPG-705 1/2.

A list of University of Chicago subcontracts dated 15 November 1944 includes Subcontract No. 7401-37-94 for research by Copperweld. However, a subsequent list dated 3 July 1946 indicates that this subcontract was cancelled. Information on the specifics of this subcontract have not been found.

Few documents describing the operations at Copperweld Steel Company have been found. Due to the method of contracting and the limited operations conducted at this site, it is unlikely that additional documentation that would add to or alter the information currently available will be found.

6. McKinney Tool and Manufacturing Company. This firm, located at 1688 Arabella Road in Cleveland, Ohio, was one of three metal

fabricators involved in a priority (24-hour-per-day) operation (Project 1553) to fabricate 48,000 unbonded Hanford slugs. DuPont placed Purchase Order RPG-4021 1/2 with McKinney in the spring of 1944, probably during May 1944. This order was for machining finished slugs from uranium metal rods. According to information contained in the History, the scope of work of this order originally contemplated machining the slugs to finished diameter and length. However, to increase production, the slugs were rough-turned, then centerless ground to finished diameter. The centerless grinder used by McKinney was provided by the government and was apparently moved to Hanford when work under this purchase order was completed. Based upon the cost information in the History, and assuming comparable rates charged by the fabricators involved in the project, it appears that McKinney accomplished approximately 25 percent of the machining/grinding for this project. There are indications that the work was completed by July or August 1944.

Information in the History also indicated a companion purchase order for \$76.00 provided for medical costs associated with the work done by McKinney. A Clinton Laboratories letter dated March 28, 1945 indicates that an inspection of the McKinney plant was conducted on 19 & 20 May 1944 and that pre- and post-employment examinations of McKinney employees were conducted by the full time physician for a neighboring plant (Graselli Chemical Division). This document and the History are the only sources of information discovered to date on the work done by McKinney and, due to the apparent limited involvement of this contractor with MED operations, it is unlikely that additional meaningful information will be discovered in the near future.

A preliminary site visit to the former McKinney facility was conducted in April 1981. The site is currently owned by KCF Industries and Meister-Matic, Inc., and occupied by two commercial firms, Parker Rust Proof and Meister-Matic, Inc. Little if any activity above natural background was measured. According to a former McKinney Tool & Manufacturing Company employee, the company's equipment was sold at auction.

7. William E. Pratt Manufacturing Company. This firm, a subsidiary of Joslyn Manufacturing and Supply Company in the early 1940's, performed metal fabrication tasks (machining and grinding) for the University of Chicago beginning in the spring of 1943. A Metallurgical Laboratory memorandum dated April 22, 1943, indicates that the purpose of the machining done by Pratt was to speed up delivery of pieces for the exponential pile and to learn all that could be learned about handling the metal in turret lathes and automatic screw machines. At that time, four bars had been turned and additional bars for machining were expected. This document also indicates that material (uranium rod) was shipped back and forth between the University of Chicago and the plant in Joliet daily - one

days supply of rod sent to Joliet and the day's production returned to the University the same day. The material was handled by the same workman at the plant. A guard and a representative of the Metallurgical Laboratory were on hand at all times during the machining operations. Technical supervision of the operation was provided by Metallurgical Laboratory personnel. Documentation describing the method of procurement and specific provisions of the purchase order or subcontract for this work has not been found.

On 15 April 1944, under Subcontract No. 7401-37-52 with the University of Chicago, Pratt agreed to finish "short metal rods" by centerless grinding to specifications supplied by the Contractor (the University) at a specified hourly rate which included the cost of facilities, supplies, labor and supervision supplied by Pratt. There are indications that this work was primarily to relieve pressure on the Metallurgical Laboratory Site B shop, to handle large pieces beyond the range of Site B equipment and to centerless grind short rods. This subcontract was continued through supplemental agreements until termination on 30 June 1946. The subcontract contains the indemnification article, Relation to Prime Contract, quoted above in the Background section of this paper.

The History indicates that in April 1944 DuPont placed order RPG-4291 1/2 with Pratt to finish rough-turned slugs by centerless grinding for the priority project to provide 48,000 unbonded Hanford slugs. DuPont also provided Pratt with medical support under separate purchase orders.

The former William E. Pratt Company property, located at 18 Henderson in Joliet, IL, is owned by Neal Elens and William Maichen. The tenant of the building where the MED uranium metal fabrication work was done is the Klassing Handbrake Company. The property owners have not been contacted. A radiological survey of the property has not been conducted.

8. Quality Hardware & Machine Corporation. During the period February 1944 and June 1945, Quality Hardware entered into two subcontracts with the University of Chicago. The first, Contract No. 7401-37-93, was to furnish the necessary personnel, facilities and equipment required to produce special tools, dies, fixtures, etc., from materials furnished by the University. This subcontract, entered into in 1 February 1944, was terminated on 30 December 1944. The second, Contract No. 7401-37-146, similar in scope to the first, was entered into on 28 February 1945 and was terminated on 30 June 1945. The second indicated an understanding that the subcontractor's working schedule provided for shop operations on alternate Sundays during the term of the subcontract. Both subcontracts include the indemnification article, Relation to Prime Contract, quoted above in the Background section of this paper. Documents describing specific tasks or work accomplished by Quality Hardware under these subcontracts have not been found.

The History indicates that Quality Hardware was one of the several contractors involved in Project 1553 to produce 48,000 unbonded Hanford slugs. DuPont placed Purchase Order RPG-4040 1/2 with this firm for canning the entire quantity of slugs for the project. The purchase order was probably placed in May 1944 for this highly specialized canning operation. DuPont furnished the special equipment that was purchased specifically for this order or diverted from some other source. Experimental canning of steel slugs to perfect the operation began on May 30th. By the latter part of July or early August this canning operation was terminated after production of 28,913 acceptable slugs. The equipment for the canning operation that had been installed were dismantled and moved intact to Hanford and set up as a stand-by line for future use if required.

The DuPont purchase order, although short in duration, apparently constituted the most significant effort by Quality Hardware in support of MED activities. A large quantity of uranium metal was handled. However, the nature of the operation was such that the propensity for contamination of the facilities and equipment was considered much less than metal fabrication operations involving machining and grinding. The primary potential for contamination and hazards associated with the canning operations were the handling and cleaning of the uranium slugs through mechanical and chemical process.

Although documentation describing the actual operations at Quality Hardware during the period February 1944 through June 1945 is limited, it is apparent that both Metallurgical Laboratory and DuPont personnel were involved. The Metallurgical Laboratory was involved in the research, development, and medical support activities. Both DuPont and Metallurgical Laboratory personnel were involved in production activities associated with the slug canning operations. Documents indicating inspections of facilities and supervision of medical support activities, particularly during the period May through August 1944, have been obtained.

The former Quality Hardware and Machining Corporation property located at 5849 North Ravenswood in Chicago, IL is owned (July 1981) by the Ravenswood Venture and occupied by Marden Manufacturing Company. Both were advised by letter of the MED activities that took place on the property in January 1981. However, neither apparently responded to requests for information and assistance contained in the letters.

9. C. H. Schnorr & Company. DuPont placed Purchase Order RPG-4018 1/2 with this firm in May 1944 to machine unbonded slugs from uranium metal rod. This priority task (Project 1553) was accomplished on a 24-hour-per-day schedule and was completed by the end of July 1944. Judging from cost data contained in the History, Schnoor machined about half of the total 48,000 slug requirement. Medical support was provided by DuPont under separate purchase orders.

Except for the limited information contained in the History, little is currently known of the operations conducted by Schnorr for the MED.

The former C. H. Schnorr & Company property is located at 644 Garfield Street in Springdale, Pennsylvania. The current owner of the property is Premier Manufacturing Company, a clothing and material manufacturer. A member of the Schnorr family and the present owner were contacted in September 1980. The former recalled the "secret operations" and confirmed the location of the site. The latter had purchased the property from a coat hanger manufacturer in 1967 and was apparently not aware of the MED work that took place on the property.

A screening survey of the property was conducted in October 1980. Except for one small area, no detectable contamination above background was found.

SUMMARY OF MED URANIUM METAL FABRICATION OPERATIONS

The period pertinent to this Authority Review began in early 1943 when research and development activities were initiated by OSRD to define the physical characteristics (extrudability and machinability) of uranium metal to facilitate production of slugs and other special shapes for use in production piles; and continued into the summer of 1944 when the Hanford metal fabrication facilities were considered adequate to provide feed materials for all MED activities.

The formerly utilized sites pertinent to this review are those metal fabrication contractor facilities that perform tasks under subcontract or purchase order with OSRD, the University of Chicago (Metallurgical Laboratory) and DuPont during the period described above. These commercial metal fabrications provided the manpower and facilities to perform research, development, and production involving uranium metal until the facilities at Hanford were adequate to produce the feed materials (uranium slugs) for production piles at Clinton and Hanford and the experimental work at the University of Chicago. The facilities at Hanford were completed and operational by the summer of 1944 and most of the work done by commercial fabricators was terminated. Work continued after July 1944, pertinent to this review, was under subcontract with the University of Chicago to accomplish those tasks that were beyond the capability of Metallurgical Laboratory facilities.

The University of Chicago and DuPont were indemnified against liabilities that might arise in the performance of work under contracts with MED. Extracts of these contracts, W-7401-eng-37 and W-7412-eng-1, are attached. University of Chicago subcontracts also contained provisions for indemnification of their subcontracts. An example, extract from Subcontract 7401-37-52, is attached.

The majority of the work done by commercial metal fabricators pertinent to this review was done under purchase order placed by DuPont from the spring of 1943 through the summer of 1944. A microfilm file of the DuPont purchase order has been located and reviewed. This file contains only one purchase order, RPG-3199 1/2 with American Chain and Cable Company, pertinent to this review.

This purchase order, apparently for security reasons, does not specifically indicate the involvement of uranium metal. The material furnished by DuPont is referred to as "special metal". The information contained in this one page document is limited to specifications, price, and delivery instructions. The primary source of information on work done under these purchase orders are Volume II, Design and Procurement: History of Hanford Engineer Works and Clinton Semi-Work, prepared by DuPont; Manhattan District History, Book IV (Pile Project) Volume 6 (Operations); and Metallurgical Laboratory correspondence describing plant inspection and suppression of medical support provided these DuPont subcontractors. Because of the lack of knowledge of uranium metallurgy in the private sector and the necessity for stringent inventory and security controls, it is apparent that both DuPont and Metallurgical Laboratory personnel exercised considerable control over these subcontractor operations.

AUTHORITY ANALYSIS

The determination of authority for remedial action at a candidate FUSRAP site is based upon an evaluation of the specific terms of the contracts between MED/AEC and their contractors; confirmation that the residual radioactive contamination at the site did occur during the performance of work sponsored by the MED/AEC; and the working relationship between MED/AEC and their contractors. The latter considerations specifically address ownership of facilities and equipment, control of contractor operations, and MED/AEC involvement in matters pertaining to health and safety at the facilities.

The results of this review of available documentation of factors cited above to determine DOE's authority for remedial action at facilities used during the initial metal fabrication operations involving uranium metal are addressed in response to the questions that follow:

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

Response: All metal fabrication facilities and operations that did work for the Metallurgical Laboratory and DuPont were privately owned and operated. Hanford facilities were under construction during this period and the limited research and development facilities of the Metallurgical Laboratory were not

adequate to accomplish the priority production requirements. The MED did provide special equipment, particularly in the area of health and safety. MED and its prime contractors did have significant control over these metal fabrication operations. DuPont representatives were assigned to the plants and Metallurgical Laboratory and DuPont personnel provided technical supervision over plant operations.

b. Was a DOE predecessor agency responsible for maintaining or insuring the environmental integrity of the site (i.e., were they responsible for cleanup)?

Response: No document has been found that specifically stipulates DOE predecessor agency responsibility for cleanup of the sites. However, the nature of the subcontractor operations, i.e., stringent controls over the uranium metal inventory, strict security requirements, and knowledge of the unusual and unpredictable hazards involved in working with uranium metal, was such that cleanup of facilities at the completion of each metal fabrication operation could reasonably be expected to be included under the technical supervision of the MED or its agents.

c. Is the waste, residue, or radioactive material on these sites the result of DOE predecessor related operations?

Response: Yes.

d. Are the sites in need of further cleanup and were the sites left in nonacceptable condition as a result of DOE predecessor related activity?

Response: Unknown. Little or no information has been found that would indicate the final radiological status of the sites pertinent to this review upon completion of purchase orders or termination of subcontracts. There are indications that visual inspections were made to ensure that the sites were clean, i.e., that all scrap and residues of the operations were removed.

Preliminary screening surveys and site visits have been made to some of the sites and some radioactive contamination above background has been found. Comprehensive radiological surveys to determine if further cleanup is required have not been conducted.

e. Did the present owner accept responsibility for the site with knowledge of its contaminated condition and that additional remedial measures would be needed to make the site acceptable for unrestricted use by the general public?

Response: The present owner of all of these sites have not been contacted. However, in view of the response to question d. above, the nature of the operations at most of these sites (tight

security and intermittent use) and changes in ownership since 1944, it is unlikely that the present owners are aware of the sites' involvement with MED activities.

REFERENCES

Volume II, Design and Procurement History of Hanford Engineer Works and Clinton Semi-Works, by the Engineering Department, E.I. DuPont De Nemours and Company (Inc.), December 1945.

MED Contract No. W-7412-eng-1, with E.I. DuPont De Nemours and Company, entered into on November 6, 1943, effective October 3, 1942.

MED Contract No. W-7401-eng-37, with the University of Chicago, dated April 29, 1943, effective May 1, 1943.

Manhattan District History, Book IV - Pile Project, Volume 6 - Operations.

University of Chicago, Subcontract No. 7401-37-52, with Wm. E. Pratt Manufacturing Company, dated April 15, 1944.

University of Chicago, Subcontract No. 7401-37-93, with Quality Hardware & Machine Corporation, dated February 1, 1944.

University of Chicago, Subcontract No. 7401-37-146, dated February 28, 1945.

Metallurgical Laboratory memorandum from John Chipman to A.B. Greninger, Subject: Machining of Rods at the William E. Pratt Company, dated April 22, 1943.

Metallurgical Laboratory memorandum from John Chipman to R.L. Doan, List of Commercial Firms, dated April 23, 1945.

Metallurgical Laboratory letter from Dr. W.D. Norwood to W.B. Klee, Jr., of Copperweld Steel Company, dated August 9, 1943.

MED Chicago Area Office letter to the District Engineer, Oak Ridge, Tennessee, from Captain C.L. Karl; Subject: Subcontracts - Chicago Area Office, dated November 15, 1944.

MED Chicago Area Office letter to the District Engineer, Oak Ridge, Tennessee, from Colonel Arthur H. Frye, Jr., Subject: Subcontractors - Chicago Office.

ARMY SERVICE FORCES
UNITED STATES ENGINEER OFFICE
Manhattan District
Oak Ridge, Tennessee

TYPE TS
PREPARED D
APPROVED

✓ Contracts
H-571-10

[DuPont W-7412-1]

25 July 1946

RETURN TO
CONTRACT SECTION

E. I. du Pont de Nemours and Company,
Wilmington, Delaware.

Attention: Mr. W. H. Ward, General Manager
Explosives Department

Subject: Notice of Termination of Work under Contract No. W-7412 Eng-1,
as amended.

Gentlemen:

As you know, the Government has made arrangements with General Electric Company for the continued operation of Hanford Engineer Works which will permit your withdrawal from the project as originally contemplated. Therefore, pursuant to Article XVIII of the above contract, you are hereby notified that you are to terminate all your work of construction and operation of said plant in accordance with the terms and conditions set forth hereinafter and in Article XVIII of said contract. Under the circumstances it is understood that you have no objection to the accomplishment of such termination at the time provided for hereinafter rather than subsequent to the six months period referred to in Section 1 of said Article XVIII.

You will arrange for the assumption by General Electric Company, upon a date not later than September 15, 1946 to be mutually agreed upon between you and General Electric Company subject to the approval of the Contracting Officer, of control of the operation of Hanford Engineer Works and any incidental construction work which you may be performing at the plant.

The Government has completed arrangements for a survey of all property acquired by you for Hanford Engineer Works under the above contract and you will be given an appropriate release of responsibility in connection with such property at the time of the transfer to General Electric Company.

Classification Cancelled

Or Changed To _____
By Authority Of DOC
By Jed Davis Date 8-28-85

~~SECRET~~

CERTIFIED A TRUE COPY

BY W. W. Lester
W. W. Lester, Major, U. S. E.

25 July 1946

Immediately upon said transfer to General Electric Company you are directed to discontinue all placing of subcontracts, purchase orders and other commitments in connection with the construction and operation of the Hanford Engineer Works except such as may be necessary to carry out the work under this Notice and under Article XVIII of Contract No. W-7412 Eng-1, as amended. Subject to the foregoing exceptions, all uncompleted subcontracts, purchase orders and other commitments entered into by you prior to said transfer shall be terminated, or assigned to the Government as directed by the Contracting Officer, or assigned to the General Electric Company subject to (1) the consent of General Electric Company, (2) the consent of the other party or parties to such subcontracts, purchase orders or commitments and (3) the approval of the Contracting Officer.

It is recognized by the Government that it will be necessary for certain of your personnel to remain at Hanford Engineer Works for an indefinite period subsequent to the said transfer for the purpose of assisting General Electric Company and in order to perform certain accounting, clerical and other services incident to the termination of your work at said plant.

It is understood that you will advise the Contracting Officer of the date of the prospective transfer as soon as it has been agreed upon with General Electric Company.

This Notice of Termination is sent you in triplicate. It is requested that two copies thereof bearing your executed acceptance in the place indicated below be mailed or delivered to the undersigned. The other copy is for your retention.

Very truly yours,

/s/ E. E. Kirkpatrick

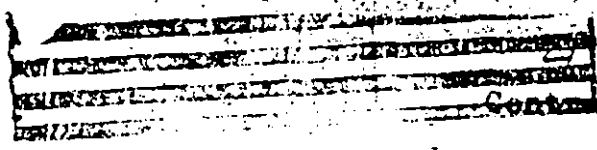
E. E. KIRKPATRICK,
Colonel, Corps of Engineers,
Authorized Representative of
the Contracting Officer.

ACCEPTED: 29 July 1946

E. I. du Pont de Nemours and Company

/s/ CAR BY /s/ W. H. Ward

~~SECRET~~



Contract No. W-7412 eng-1

APPROVED: Nov. 22 1943

/s/ Robert P. Patterson
Secretary of War

**COST-PLUS-FIXED-FEE
DESIGN, ENGINEERING, CONSTRUCTION, EQUIPPING,
TRAINING PERSONNEL AND OPERATION CONTRACT**

TYPED
RECEIVED
APPROVED
"
"
"

WAR DEPARTMENT

CONTRACTOR:

E. I. DU PONT DE NEMOURS AND COMPANY
Wilmington, Delaware

CONTRACT FOR:

Design, construction and operation
of a plant for the manufacture of a
secret product.

Classification cancelled or changed to
By authority of A. E. C. By T. J. H. 4/8/43 to
Roger I. Harris from Bennett Bradley
DR

Estimated cost of designing,
engineering, constructing and
equipping the plant - \$329,407,283.

Estimated cost of training
personnel - 1,048,000.

Estimated cost of operation of
the plant (for initial period
of one year) - 45,097,384.

Fixed-fee: - \$1.00

PAYMENT:

To be made by Finance Officer, U. S. Engineer
Office, Manhattan District, Oak Ridge, Tenn.

The equipment, services and supplies to be obtained by
this instrument are authorized by, are 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 PA30-07 A-0905-23.
- ENG 31110 PA30-08 A-0905-23.
- ENG 31110 PA30-09 A-0905-23.
- ENG 31110 PA30-10 A-0905-23.

This contract is authorized by the
First War Powers Act of 1941, approved
December 18, 1941 (Public Law No. 354,
77th Cong.)

Approval Recommended:
November 12, 1943

/s/ Thos. M. Robins
Acting Chief of Engineers

A TRUE COPY

[Handwritten signature]

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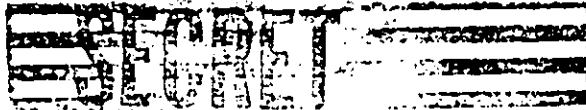
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COST-PLUS-FIXED-FEE
DESIGN, ENGINEERING, CONSTRUCTION, EQUIPPING,
TRAINING PERSONNEL AND OPERATION CONTRACT

IN ORDER TO UNDERSTAND THOROUGHLY THE REASONS
AND CIRCUMSTANCES LYING BEHIND THIS CONTRACT,
IT IS NECESSARY TO CONSIDER WITH THIS CONTRACT
THE FOLLOWING DOCUMENTS:

1. THE SECRET LETTER (SEE ARTICLE LXXVIII)
2. THE RECORD OF NEGOTIATIONS CONSISTING OF
 - A. PRELIMINARY NEGOTIATIONS
 - B. ADMINISTRATIVE NEGOTIATIONS
 - C. MEMORANDUM COVERING TECHNICAL BASIS
FOR WORK UNDER THE CONTRACT

THIS CONTRACT entered into this 6th day of November,
1943, effective as of the 3rd day of October, 1942, by the
UNITED STATES OF AMERICA (hereinafter called the "Government"),
represented by the Contracting Officer executing this contract,
and E. I. DU PONT DE NEMOURS AND COMPANY, a corporation organized
and existing under the laws of the State of Delaware (hereinafter
called the "Contractor"),



WITNESSETH THAT:

WHEREAS the Government believes that the performance of certain work, hereinafter described, is necessary in facilitating the prosecution of the war; and

WHEREAS there is involved an entirely new scientific field and there are available only data from theoretical calculations and limited experimental information upon which this work must be based; and

WHEREAS the Government believes it essential that the assistance of an existing organization experienced in the interpretation of experimental data and in the design and construction of commercial manufacturing plants be secured to the end that available data and information may be used to the best advantage; and

WHEREAS the Government recognizes that no commercial organization in the United States of America possesses experience or special knowledge in the field involved, but believes that the Contractor, because of its broad experience in the chemical field, is best fitted to render this assistance, and urgently requests the Contractor to undertake such assistance; and

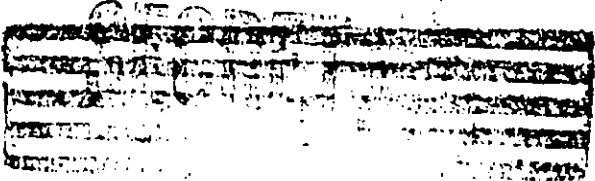
WHEREAS, under the foregoing circumstances, the Government desires to have the Contractor design, furnish engineering services for, construct, equip, train personnel for operation of, prepare to operate and operate a plant, more particularly described in Article I hereof, for the manufacture of a secret product; and

WHEREAS the accomplishment of the work by the Contractor under a cost-plus-a-fixed-fee contract, entered into after negotiations approved by the Secretary of War and without advertising for proposals, is authorized by law; and

WHEREAS, as a result of such negotiations, the Secretary of War has directed that the Government enter into such a contract with the Contractor for the accomplishment of the work hereinafter described;

NOW, THEREFORE, the parties hereto do mutually agree as follows:

SECRET



inquiry, this contract and the Record of Negotiations and all other documents, memoranda, correspondence and information concerning the undertaking or performance of the work under the contract; provided that the Contracting Officer shall first be given a reasonable opportunity, if he so desires, to consult with the highest official of such Government branch, agency or instrumentality and to inform said official that the investigation, examination or inquiry will involve the disclosure of secret matters; and, provided, further, that if in connection with a proposed or current investigation, examination or inquiry the Secretary of War deems that the disclosure of all or part of such information by the Contractor to any representative or representatives of the Government engaged in the investigation, examination or inquiry, would be inimical to the prosecution of the war or the national defense, and so notifies the Contractor by written directive signed by the Secretary of War, or the Acting Secretary of War, personally, the permission herein given to the Contractor to make disclosure shall be suspended with respect to that investigation, examination or inquiry to the extent set forth in such directive.

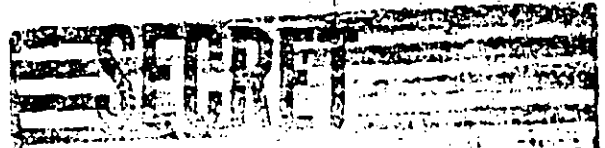
ARTICLE XXXI - EMPLOYMENT OF ALIENS

1. The Contractor will not permit any alien employed or to be employed by it to have access to the drawings, specifications and accompanying inclosures relating to the performance of this contract, or to the models or material referred to therein, or to engineering principles, composition, subassemblies, or assemblies which are vital to the functioning or use of the article or articles forming the subject matter of this contract, without the written consent beforehand of the Secretary of War.

2. The Contractor shall cause a like provision to be inserted in all subcontracts under this contract where classified information will be disclosed to the subcontractor.

ARTICLE XXXII - RESPONSIBILITY OF CONTRACTOR - CONTINGENCIES

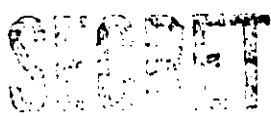
The Government deems the work to be performed under this contract to be in the interest of the prosecution of the War and has urgently requested the Contractor to undertake such work. It is recognized that the Contractor has no



experience or special knowledge in the field of this project, that the Contractor will depend wholly on basic data and specifications furnished by the Government or by third parties at the instance of the Government, and that the Contractor, therefore, cannot assume responsibility for the correctness or adequacy of such data or specifications, or for results obtained through the use thereof. In view of the fact that the Contractor is undertaking the work for a fixed fee of one dollar (\$1.00) and in view of the unusual and unpredictable hazards involved in carrying out the work under this contract, as well as the abnormal conditions now existing, it is agreed that all work under this contract is to be performed at the expense of the Government, and that the Contractor shall not be liable for, and the Government shall indemnify and hold the Contractor harmless against, any delay, failure, loss, expense (including expense of litigation) or damage (including personal injuries and deaths of persons and damage to property) of any kind and for any cause whatsoever, arising out of or connected with the work, and whether or not any employee or employees of the Contractor is or are responsible therefor, unless such delay, failure, loss, expense or damage should be established by the Government to have been caused directly by bad faith or wilful misconduct on the part of some corporate officer or officers (i.e., the Chairman of the Board of Directors, President, Vice Presidents, Secretary, Assistant Secretaries, Treasurer, Assistant Treasurers) of the Contractor acting within the scope of his or their authority and employment; that the Government shall assume and carry on the defense of all claims, suits, or legal proceedings which may be asserted or instituted against the Contractor on account of acts or omissions in the performance of the work; and that the Government shall pay directly and discharge completely all final judgments entered against the Contractor in such litigation and all claims which may be settled by agreement approved by the Contracting Officer. The assumption of these obligations on the part of the Government has been approved and authorized by the President of the United States acting in exercise of the powers conferred upon him by the First War Powers Act of 1941.

ARTICLE XXVIII - EMPLOYEES BENEFIT FUND

1. Recognizing that the performance of manufacturing operations at the Plant will subject employees to serious and unusual hazards with respect to which it is impossible to provide adequate protection, and that the Contractor has been



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3. The Contractor shall promptly notify the Contracting Officer in writing of any and all claims of infringement that may from time to time be brought to the attention of the Contractor, and in the event of litigation on account thereof, the Contractor shall assist the Government at the Government's expense, in furnishing such evidence as to the use of the patents and other matters of fact as may be required by the Government in such litigation.

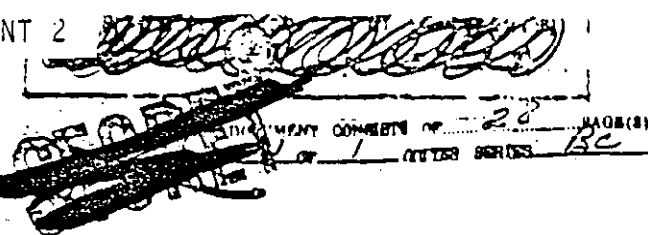
4. The Contractor hereby grants to the Government a perpetual, royalty-free license to practice in the Plant, but not elsewhere, and then only for purposes of National Defense, all patented inventions, secret processes, technical information and know-how of the Contractor which are incorporated in the construction or operation of the Plant by the Contractor. This license shall not be assignable to any transferee of the Plant or any part thereof, and the Contractor reserves the privilege of asserting any and all legal rights in and to such patented inventions, secret processes, technical information and know-how against any person, firm or corporation; provided, however, that the provisions of this Article shall not supersede or modify any existing agreements between the Contractor and the Government applying to any such inventions, processes, information or know-how.

5. The Patent Adviser attached to the Office of Scientific Research and Development, Washington, D.C., will act as the representative of the Contracting Officer for the purpose of administering the provisions of this Article, unless another representative is appointed in writing by the Contracting Officer. It is understood, however, that such Patent Adviser shall not be considered a representative of the Contracting Officer for the purpose of making any financial commitments or incurring any financial obligations hereunder.

ARTICLE XXIV - DISCLAIMER OF OTHER PROVISIONS OF LAW

The Secretary of War having found that in his judgment the prosecution of the War is thereby facilitated, since the Contractor would otherwise be unwilling to assume the risks or undertake the work hereunder, the provisions of this contract are entered into pursuant to the authority conferred by Section 201 of the First War Powers Act of 1941 (Act of December 12, 1941, Public No. 354, 77th Congress) and delegated thereunder by the President of the United States; and said provisions shall be fulfilled without regard to any other provisions of law relating to the making, performance, amendment or modification of contracts.

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Contract No. W-7401 eng-37

THIS CONTRACT entered into this 28th day of April, 1943, effective as of the first day of May, 1943, by and between the UNITED STATES OF AMERICA (hereinafter called the "Government") represented by the Contracting Officer executing said contract, and THE UNIVERSITY OF CHICAGO, a corporation not for pecuniary profit, organized under the laws of the State of Illinois, located at Chicago, Illinois (hereinafter called the "Contractor"),

WITNESSETH THAT:

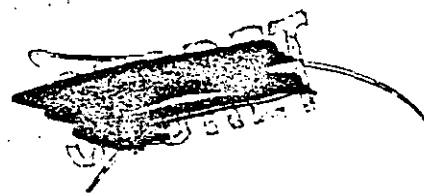
WHEREAS, the Contractor heretofore has conducted certain studies and experimental investigations for the Office of Scientific Research and Development, Washington, D. C., pursuant to Contract #ONR-410 (including all supplements thereto) and contracts Nos. NDRC-36, NDRC-101, ONR-117 and ONR-170; and

WHEREAS, a report was submitted on December 16, 1942, to the President of the United States by a Committee, including within its membership certain outstanding scientists, which report outlined the proposed scope and objectives of the project, and he approved the proposed procedure for obtaining those objectives; and

WHEREAS, this Committee has been authorized by the President to review from time to time the development of the program as it progressed and to recommend changes in its scope and objectives; and

WHEREAS, the Office of Scientific Research and Development and the War Department have determined by mutual agreement that it would be in the best interest of the Government to have the Contractor continue the aforesaid studies and experimental investigations under the jurisdiction of the War Department; and

Classification Cancelled

~~Changed To~~By Authority Of DCFiled Down Date 8-9-85

~~SECRET~~

WHEREAS, the Office of Scientific Research and Development has elected to terminate the aforementioned contract, together with all supplements thereto, effective as of May 1, 1943, and to cause the transfer to the War Department of all of its property rights as of that date in and to the unexpended property for which the Contractor has been reimbursed or by virtue of the provisions of said termination agreement is entitled to claim reimbursement under said contract OMLor-810 (including all supplements thereto) and Contracts Nos. HDCro-56, HDCro-101, OMLor-117 and OMLor-170; and

WHEREAS, the Contractor is willing to continue such studies and experimental investigations for the War Department upon the terms and conditions hereinafter set forth:

NOW, THEREFORE, the parties hereto did mutually agree as follows:

~~SECRET~~

L.C.



Rec of this letter and return
to Officer.

Sincerely yours,

UNITED STATES OF AMERICA.

By /s/ E. D. Nichols
E. D. NICHOLS,
Lt. Col., Corps of Engineers,
Contracting Officer.

1942.

~~CONFIDENTIAL~~

~~SECRET~~

ARTICLE III - TERMINATION OF CONTRACT

1. The Government may terminate this contract at any time by notice in writing from the Contracting Officer to the Contractor by registered mail addressed to the Business Manager of the Contractor. Such termination shall be effective in the manner and upon the date specified in said notice and shall be without prejudice to any claims which the Government may have against the Contractor or the Contractor may have against the Government. Upon receipt of such notice the Contractor shall, unless the notice directs otherwise, immediately discontinue all work and the placing of all orders for materials, facilities, and supplies in connection with the performance of this contract, and shall proceed to the best of his ability to terminate promptly all existing contracts of employment and all orders and all subcontracts insofar as such contracts of employment, orders and subcontracts are chargeable to this contract; and, subject to the approval of the Contracting Officer, shall proceed to an equitable adjustment of all claims arising thereunder.

2. Upon the termination of this contract, full and complete settlement of all claims of the Contractor arising out of this contract shall be made as follows:

a. The Government shall assume and become liable for all obligations, commitments and claims, including those arising out of contracts of employment, that the Contractor may have theretofore in good faith undertaken or incurred in connection with said work and the cost of which would be reimbursable in accordance with the provisions of this contract; and the Contractor shall, as a condition of receiving the payments mentioned in this Article, execute and deliver all such papers and take all such steps as the Contracting Officer may reasonably require for the purpose of fully vesting in the Government the rights and benefits of the Contractor under such obligations or commitments.

b. The Government shall reimburse the Contractor for all expenditures not previously reimbursed.

c. The Government shall reimburse the Contractor for such further expenditures, made after the

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effective date of termination, for the protection of Government property and for services in connection with the settlement of this contract as are required or approved by the Contracting Officer.

d. The obligation of the Government to make any of the payments required by this Article shall be subject to any unsettled claims in connection with this contract which the Government may have against the Contractor.

e. No settlement hereunder shall prejudice the Contractor's rights to reimbursement with respect to claims subsequently found or determined by the Contractor to have been incurred in the performance of this contract and not known or determined at the time of such settlement.

ARTICLE IV - INSPECTION - The Contracting Officer shall be permitted at all reasonable times to make such inspections, as he may deem necessary, of the work being conducted by the Contractor and of the premises and facilities being utilized by it in its performance hereunder.

ARTICLE V - SUBCONTRACTS - The Contractor shall not enter into any subcontracts involving the performance, in whole or in part, of research or development work in fulfillment of the Contractor's obligations hereunder, without the prior written approval of the Contracting Officer both as to substance and as to form thereof. To this end the Contractor shall refer to the Contracting Officer any and every contract or agreement proposed to be entered into by the Contractor which might involve such research or development work, for his determination as to whether such contemplated contract or agreement falls within the foregoing restrictions. It is understood that contracts or agreements entered into by the Contractor covering the employment of personnel to perform the work hereby undertaken by the Contractor, shall not be construed as a subcontract within the meaning of the foregoing provisions. The Government further specifically ratifies and approves as authorized subcontracts under this contract all outstanding approved subcontracts heretofore entered into by the Contractor pursuant



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services of employees of the Contractor, in furnishing such evidence as to the use of the patents and other matters of fact as may be required by the Government in such litigation.

d. The Patent Advisor attached to the Office of Scientific Research and Development, Washington, D.C., will not act as the representative of the Contracting Officer for the purpose of administering the provisions of this Article XIII, unless another representative is appointed in writing by the Contracting Officer.

ARTICLE XIV - RESPONSIBILITY OF CONTRACTOR-
CONTINGENCIES

The Government deems the work to be performed under this contract to be in the interest of the prosecution of the War and has urgently requested the Contractor to undertake such work. In view of the fact that the Contractor is undertaking the work without profit, and in view of the unusual and unpredictable hazards involved in carrying out the work under this contract, as well as the abnormal conditions now existing, it is agreed that all work under this contract is to be performed at the expense of the Government, and that the Contractor shall not be liable for, and the Government shall indemnify and hold the Contractor, its Trustees, and Officers, employees, representatives and agents, jointly and severally harmless against, any delay, failure, loss, expense (including expense of litigation) or damage (including personal injuries and deaths of persons and damage to property of any kind and for any cause whatsoever, arising out of or connected with the work, and whether or not any employee or employees of the Contractor is or are responsible therefor, unless such delay, failure, loss, expense or damage should be established by the Government to have been caused directly by bad faith or wilful misconduct on the part of some corporate officer or officers of the Contractor (i.e., Chairman or a Vice Chairman of the Board of Trustees, President, Vice President, Secretary, Assistant Secretary, Treasurer, Assistant Treasurer, Business Manager or Assistant Business Manager); that the Government shall secure and carry on, at its own expense, the defense of all claims, suits, or legal proceedings which

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may be asserted or instituted against the Contractor on account of acts or omissions in the performance of the work; and that the Government shall pay directly and discharge completely all final judgments, including assessed costs, entered against the Contractor, its Trustees or Officers jointly or severally, in such litigation and all claims which may be settled by agreement approved by the Contracting Officer. The assumption of these obligations on the part of the Government has been approved and authorized by the President of the United States acting in exercise of the powers conferred upon him by the First War Powers Act of 1917.

ARTICLE IV - DISCLOSURE OF INFORMATION

(a) It is understood that disclosure of information relating to the work contracted for hereunder to any person not entitled to receive it, or failure to safeguard all secret, confidential and restricted matter that may come to the Contractor or any person under its control in connection with the work under this contract, may subject the Contractor, its agents, employees, and subcontractors to criminal liability under the laws of the United States. (See Title 1 of an Act approved June 15, 1917, 40 Stat. 217; 50 U.S.C. 10-62), as amended by an Act approved March 23, 1940 (56 Stat., Chap. 72); and the provisions of an Act approved January 12, 1950, (58 Stat. 3; 50 U.S.C. Supp. V 45-45a), as supplemented by Executive Order No. 8381, dated March 22, 1940, 5 F.R. 1147, D.I. It is understood that State and Federal Administrative Officials to whom disclosure must be made in the performance of this contract, shall be considered as persons entitled to receive such information within the meaning of this section (a).

(b) The Contractor shall immediately submit a confidential report to the Contracting Officer whenever for any cause it has reason to believe that there is an active danger of espionage, or sabotage affecting any of the subject work.

(c) The Contractor shall not employ any alien or permit any alien to have access to the subject work or any plans, specifications or records relating to its undertakings hereunder without the written consent of the Contracting Officer as to each such alien.

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ARTICLE XXII - AVAILABILITY OF FUNDS

Notwithstanding any other provisions hereof, when and if the allowable costs of and agreed compensation for the work performed hereunder, including expenses incurred and obligated hereunder, shall equal the amount set forth in Article IX, Section 2, the Contractor shall not be expected or required to incur or obligate further expenses hereunder unless and until the Government shall first agree in writing to reimburse the Contractor for such further work. The Contractor will promptly advise the Contracting Officer when it is discovered that additional funds will be needed and shall estimate the amount of such additional funds and time when they will be needed.

ARTICLE XXIII - DISCLAIMER OF OTHER PROVISIONS OF LAW

The Secretary of War having found that in his judgment the prosecution of the war is thereby facilitated, since the Contractor would otherwise be unwilling to assume the risks or undertake the work hereunder, the provisions of this contract are entered into pursuant to authority conferred by Section 201 of the First War Powers Act of 1941 (Act of December 18, 1941, Public No. 354, 77th Congress) and delegated thereunder by the President of the United States; and said provisions shall be fulfilled without regard to any other provisions of law, relating to the making, performance, amendment or modification of contracts.

ARTICLE XXIV - RENEGOTIATION

Pursuant to subsections (1) (2) of Section 403 of the Sixth Supplemental National Defense Appropriations Act, 1942, as amended by Section 601 of the Revenue Act of 1942, this contract is exempt from renegotiation under said Section 403, as amended.

ARTICLE XXV - APPROVAL REQUIRED

This contract shall be subject to the written approval of the Secretary of War or the Under Secretary of War personally, and shall not be binding unless so approved.

ARTICLE XXVI - REPRESENTATIVE - The term "Contracting Officer" as used herein shall mean the Contracting Officer who executed this contract and shall include his duly appointed representative.

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SJS contract No 52
Contract No. W-7401-4-37

Drawn H-566-7
Contract P. Lee

METALLURGICAL LABORATORY Form MP-73
The University of Chicago

This document consists of 1 pages and 4 figures
No. 5 of 11 copies, Series A

NOTICE OF TERMINATION OF SUBCONTRACT

Contract No. 7401-37- 52

To: Wm. E. Pratt Mfg. Co., Subcontractor
Att. Mr. F. E. Clark, Pres.
18 Henderson Street
Joliet, Illinois

Dear Mr. Clark:

You are hereby notified that by reason of normal expiration, the certain subcontract between you and The University of Chicago dated April 15, 1944, and bearing descriptive number above indicated, is terminated as of the 30th day of June, 1946.

According to our records, all financial obligations have been paid.

Drawings, data, memoranda, etc. as stipulated in Article XII remain to be submitted.

Dated at Chicago, Illinois, this 29th day of June, 1946.

THE UNIVERSITY OF CHICAGO

By [Signature]
Business Manager

MUC. SC. 200
This document consists of 7
pages and 0 figures
No. 2 of 10 copies, Series a

~~SECRET~~

SERVICE
CONTRACT NO. 7401 - 37 - 52

This subcontract entered into this 15th day of April, 1941,
and between the University of Chicago, a corporation not for pecuniary profit
organized under the laws of the State of Illinois, of Chicago, Illinois (here-
after called the "Contractor") and Wm. E. Pratt Manufacturing Co.
corporation organized under the laws of the State of
Illinois, of Joliet, Illinois
hereinafter called the "Subcontractor").

WHEREAS, the Contractor has heretofore entered into a contract with the
United States of America (represented by its duly designated contracting officer)
under contract designated as No. W-7401 - Eng. 57 and supplements thereto to
perform certain work as therein specified; and

WHEREAS, the Contractor desires the Subcontractor to furnish certain
services, said services being within the scope of the aforesaid contract,

NOW, THEREFORE, the parties hereto agree as follows:

- HEREBY: Confirming negotiations, the Subcontractor agrees to furnish the
services as listed below at the rates and terms specified, and in
accordance with the conditions on the continuation sheets attached
hereto:
- a. To finish short metal rods (less than ten inches in length) by centerless
grinding, to a diameter dimension to be specified by the Contractor for each
separate batch of rods processed; at a rate of Fourteen Dollars (\$14.00) per
hour, which rate is all-inclusive of facilities, supplies, labor, and super-
vision supplied by the Subcontractor.
 - b. The total obligation of the Contractor for services to be performed by the
Subcontractor hereunder shall not exceed the sum of Two-Thousand Dollars
(\$2000.00) unless the Contractor specifically consents in writing thereto.
 - c. The materials supplied by Contractor for processing hereunder are to be
transported to and returned from the Subcontractor's plant at the Contractor's
expense.

Classification Cancelled

Or Changed to

By Authority of DOC

By Jed Davis Date 8-28-85

This document contains information affecting the National
defense of the United States within the meaning of the
Espionage Act, U. S. C. Sec. 793 and 794. Its transmission
or the revelation of its contents in any manner to an
unauthorized person is prohibited by law.

The rates and terms specified above will constitute full compensation to the
Subcontractor for all work and services to be performed hereunder, except for
that compensation to which the Subcontractor may be entitled under any other
contract.

Subcontractor: Wm. E. Pratt Mfg Co
18 Henderson
 Address: Joliet Ill
F. E. Clark
 Title: Pres + G.M.

P. R. Pennington, certify that I am the
Secretary-Treasurer of the
Wm. E. Pratt Mfg. Co. named as the Sub-
 contractor herein; that F. E. Clark
 who signed this subcontract on behalf of the Subcontractor was then _____
resident and General Manager of said Wm. E. Pratt Mfg. Co.;
 that said subcontract was duly signed for and on behalf of said Corporation
Wm. E. Pratt Mfg. Co. by authority of its governing body and is within the
 scope of its authorized powers.

(Seal) P. R. Pennington
P. R. Pennington

ACCEPTANCE: The Contractor hereby accepts the offer of the Subcontractor
 hereinabove set forth.

Contractor: The University of Chicago

Address: 5750 Ellis Avenue
Chicago, Illinois

By: W. B. Harrell
 Title: Business Manager

APPROVED:

Name:

Title:

[Signature]
Contracting Officer

CONDITIONS ATTACHED TO AND FORMING A PART OF
SERVICE CONTRACT BETWEEN THE UNIVERSITY OF
CHICAGO AND Wm. E. Pratt Manufacturing Co.
18 Henderson Street
Joliet, Illinois

DATED 15 April, 1944

ARTICLE I. PAYMENTS

The Subcontractor shall be paid at the end of each calendar month, or as soon thereafter as practicable at the rates stipulated herein for services rendered, less deductions, if any, as herein provided, upon the submission of properly certified and correct invoices or vouchers prepared in quintuplicate, and bearing code description number of this sub-contract (7401-37-52).

ARTICLE II. COMPLETION OF WORK

The Subcontractor shall proceed with the services herein provided for until 30 June, 1944, or until such later date as may be authorized in writing by the Contractor and agreed to by the Subcontractor, such completion date in no event, however, to extend beyond the date of termination of prime contract No. W-7401-eng. 37.

ARTICLE III. PATENTS

It is understood and agreed that whenever any discovery or invention believed to be new is made by the Subcontractor or its employees in the course of the services called for in this subcontract, the Subcontractor agrees to keep witnessed and dated written records of all such discoveries and inventions and shall promptly furnish the Contractor with complete information thereon and the Contractor shall have the sole power to determine whether or not a patent application shall be filed and to determine the disposition of the title to and the assignment of rights under any application or patent that may result. It is further understood and agreed that the judgment of the Contractor in such matters shall be accepted as final, and the Subcontractor for itself and for its employees agrees that the inventor or inventors will execute all documents and do all things necessary or proper to carry out the judgment of the Contractor. The Subcontractor agrees it will include the provisions of this paragraph in all contracts of employment with persons who do any part of the services called for in this subcontract. Any patent applications filed on such discoveries or inventions shall be prepared and prosecuted without expense to the Subcontractor.

ARTICLE IV. ASSIGNMENT OF RIGHTS HEREUNDER

Neither this Subcontract nor any interest therein or claim thereunder shall be assigned or transferred by the Subcontractor to any other party or parties.

ARTICLE V. SAFEGUARD OF INFORMATION

It is understood that disclosure by the Subcontractor or its employees of information relating to the services contracted for hereunder to any person not entitled to receive it, or failure to safeguard all secret, confidential and restricted matter that may come to the Subcontractor or any person under its control in connection with the subject services under this subcontract, may subject the Subcontractor, its agents, employees and subcontractors to criminal liability under the laws of the United States. (See Title I of an Act approved June 15, 1917, 40 Stat. 217; 50 U.S.C. 30-42), as amended by an Act approved March 23, 1940,

ARTICLE V. Cont'....

(54 Stat. Chap. 72); and the provisions of an Act approved January 12, 1938 (52 Stat. 3; 50 U.S.C., Supp. V 45-45d) as supplemented by Executive Order No. 8381, dated March 22, 1940, 5 F.R. 1147 D. I.

ARTICLE VI. ESPIONAGE OR SABOTAGE

The Subcontractor shall immediately submit a confidential report to the Contractor whenever for any cause it has reason to believe that there is an active danger of espionage or sabotage affecting any of the work hereunder.

ARTICLE VII. EMPLOYMENT OF ALIENS

The Subcontractor shall not employ any alien or permit any alien to have access to the plans, specifications, or services hereunder without the written consent of the Contractor as to each such alien.

ARTICLE VIII. EMPLOYEE ORIGIN

The Subcontractor, whenever requested by the Contractor, shall report to the Contractor the citizenship, country of birth, or alien status of any or all of its employees at the site of, or having access to, any of the services hereunder.

ARTICLE IX. EXCLUSION OF UNDESIRABLES

The Subcontractor shall not employ, or continue the employment of, any person or persons designated by the Contractor as undesirable to have access to the premises where the services of the Subcontractor are being performed hereunder, and the Subcontractor shall exclude any person or persons so designated by the Contractor from such premises.

ARTICLE X. PROPERTY ACQUIRED AND USED

In the event the rate or charges specified herein to be paid to the Subcontractor include an allowance for property to be especially acquired for the carrying out of the services herein provided for, title to all such property shall vest in the Contractor. Also, title to all materials, supplies, apparatus, equipment, or other property which may be furnished by the Contractor to the Subcontractor hereunder to facilitate the carrying out of the services herein provided for shall remain in the Contractor and all such property, etc., shall be used by the Subcontractor only for the purposes approved by the Contractor.

ARTICLE XI. VISIT, INSPECTION, AND REPORT OF PROGRESS

- a. The Subcontractor whenever requested shall permit an authorized representative of the Contractor to visit the site of the work at all reasonable hours and inspect the Subcontractor's performance hereunder.
- b. In the event the services being performed by the Subcontractor hereunder are found to be deficient, or otherwise not in conformity with specifications, requirements, and/or instructions as negotiated hereunder, the Contractor shall have the right to reject such services or require their correction without additional cost to it.
- c. The Subcontractor shall report the progress of performance hereunder from

ARTICLE XI. Cont'.....

time to time as requested by the Contractor; and shall furnish a complete report of its findings and conclusions upon completion of its undertakings herein. Such report shall be furnished in such quantities and form as may be required by the Contractor.

ARTICLE XII. DATA REGARDING PERFORMANCE

- a. All drawings, designs, specifications, data and memoranda of every description relating to the services or any part thereof are to become the property of the Contractor upon completion thereof, subject to the right of the Subcontractor to retain duplicates thereof for use as records only, and the Contractor shall have full right to use said drawings, designs, specifications, data and memoranda in any manner when and where the Contractor may designate without any claim on the part of the Subcontractor for additional compensation. A complete list of the duplicates of classified records retained by the Subcontractor shall be furnished to the Contractor.
- b. All drawings, designs, specifications, data and memoranda of every description concerning the subject services shall be delivered to the Contractor when requested by the Contractor; and, furthermore, access to such drawings, designs, specifications, data and memoranda as may contain classified information shall be restricted to trusted and duly authorized representatives of the Contractor and the Subcontractor, except as otherwise specifically authorized in writing by the Contractor.

ARTICLE XIII. INSURANCE

The Subcontractor shall take out and maintain the following insurance during the period of this contract, at his own cost and expense:

- a. Public Liability Insurance - insuring the Contractor and the Subcontractor, and the Board of Trustees of the Contractor, individually and collectively, written by a company approved by the Contractor in amounts of \$ None to \$ None
- b. Workmen's Compensation Insurance, with occupational Diseases endorsement, written by a company approved by the Contractor in unlimited amount for the protection of the Subcontractor against claims under the Workmen's Compensation and Occupational Diseases Acts of the State of Illinois.

ARTICLE XIII. Cont'.....

Before undertaking any work hereunder the Subcontractor will cause to be delivered to the Contractor certificates of the insurance companies as to the particulars of the insurance hereinabove referred to, which certificates shall contain a provision that such insurance will not be canceled by lapse of time or otherwise except upon five (5) days prior written notice to the Contractor, sent by United States Registered Mail, postage prepaid, addressed to the Contractor, attention of W. B. Harroll, Business Manager, 956 E. 58th St., Chicago, Illinois.

ARTICLE XIV. EIGHT-HOUR LAW

The Subcontractor shall compensate laborers and mechanics for all hours worked by them hereunder in excess of eight (8) hours in any one calendar day at a rate not less than one and one-half times the basic rate of pay of such laborers and mechanics.

ARTICLE XV. ANTI-DISCRIMINATION

The Subcontractor shall not discriminate in any act performed hereunder against any citizen on the ground of race, creed, color or national origin.

ARTICLE XVI. CONVICT LABOR

The Subcontractor shall not employ any person undergoing sentence or imprisonment at hard labor.

ARTICLE XVII. OFFICIALS NOT TO BENEFIT

No member of or delegate to Congress, or resident commissioner shall be admitted to any share or part of this subcontract or any benefit that may arise therefrom, but this provision shall not be construed to extend to this subcontract if made with a corporation for its general benefit.

ARTICLE XVIII. COVENANT AGAINST CONTINGENT FEES

The Subcontractor warrants that it has not employed any person to solicit or secure this subcontract upon any agreement for a commission, percentage, brokerage or contingent fee. Breach of this warranty shall give the Contractor the right to annul the subcontract, or, in its discretion, to deduct from the contract price or consideration the amount of such commission, percentage, brokerage or contingent fee. This warranty shall not apply to commissions payable by the Subcontractor upon contracts of sale secured or made through bona fide established commercial or selling agencies maintained by the Subcontractor for the purpose of securing business.

ARTICLE XIX. CHANGES

The Contractor may from time to time by written orders transmitted to the Subcontractor change the extent or amount of the services covered by this agreement.

ARTICLE XIX. Cont'....

If any of such changes cause material increases or decreases in the amount or character of the services to be rendered by the Subcontractor hereunder, the contract price herein provided for shall be increased or decreased accordingly and amendment to this agreement executed covering same.

ARTICLE XX. DISPUTES

~~All disputes concerning questions of fact arising under this subcontract which are not disposed of by mutual agreement shall be decided by the Contracting Officer under the prime contract, whose decision in writing shall be final and conclusive.~~

ARTICLE XXI. RELATION TO PRIME CONTRACT

It is understood that this is a subcontract under the prime contract hereinabove referred to, and by reason thereof subject to all the terms, conditions and limitations imposed by such prime contract, including the condition that the effectiveness of this subcontract is subject to the prior written approval of the contracting officer in said prime contract or his duly authorized representative. Inasmuch as the prime contract is a secret contract and the terms thereof have not been revealed to the Subcontractor, it is expressly understood and agreed by the parties hereto that this Article does not obligate the Subcontractor financially or in accountability for property, materials, supplies, or services to an extent beyond what is specifically made the obligation of the Subcontractor in this subcontract.

ARTICLE XXII. ALTERATIONS

The following changes were made in this subcontract before it was signed by the parties hereto:

- a. Due to the peculiar characteristics of the metal subject to the operations to be performed by the Subcontractor hereunder, unpredictable damage or breakage may result to machines used.

The Contractor agrees to reimburse the Subcontractor in an amount not to exceed \$2000.00 for such damage or breakage on the presentation of evidence satisfactory to the Contractor that such damage or breakage occurred during the course of the services being performed by the Subcontractor hereunder and also that precautionary measures were taken so that the loss that occurred was beyond the control of the Subcontractor.

It is further understood and agreed that in the event such damage or breakage occurs to the extent of \$2000.00, the services to be performed hereunder are not to be resumed until a new subcontract is agreed on and executed.

- b. Articles III, XXXI and XX were deleted.