[redacted]

IL.16

[redacted]

IL.16-1

MUC-ABG-286
This document consists of 2 pages and 0 figures. No. 11 of 12 copies. Series A.

Voucher 07385

November 6, 1944

Memo to File

A. B. Greninger

Subject: Visit to Fansteel Metallurgical Corporation, North Chicago, November 4, 1944 - Availability of Columbium Metal

Chapin, Simmons and I discussed with Dr. C. W. Balke (Research Director) and Mr. F. L. Hunter (Chief Engineer, Tantalum Division) availability, purity, and price of columbium metal. Columbium metal is of particular interest to the Project because tuballoy-columbium alloys containing about 4% or more of columbium are remarkably corrosion resistant. An order has already been placed for 50 lbs. of columbium metal, and it is certain that large quantities of the metal will be needed in order that we may make thorough studies of the properties of tuballoy-columbium alloys.

TANTALUM

Fansteel is the only producer in this country of tantalum and columbium metal. Their tantalum plant has a capacity of 5 tons of tantalum metal per month, but at present, the plant is operating at only 40% capacity. The metal is produced by the electrolysis of a double fluoride to give tantalum crystals ready for the pressing and sintering operation. The price of $143 per kilogram applies to all tantalum shapes from sintered bars to rolled sheet; discounts up to 30% are allowed for large orders. The Met. Lab. is evidently allowed 30% discount on all orders. Tantalum is still controlled by WPB allocations, although all requests for the metal are granted automatically. An amount of 3 kilograms per month may be purchased per customer without allocation. Tantalum consumption at present is 70% for electronics and 20% for chemical equipment.

COLUMBIUM

Columbium occurs in all Tantalite ore, and a columbium concentrate is produced as a by product of tantalum recovery. Fansteel has thus accumulated large quantities of columbium residues. According to Mr. Hunter, Fansteel now has a quantity of columbium residues sufficient to make several thousand tons of columbium metal!

[redacted]L

[redacted]

[redacted]

At present, there is no commercial use for columbium metal; Fansteel is just beginning to work on possible applications. The purification of columbium concentrate is a more involved process than that for tantalum. (Fansteel's process for production of pure columbium has been described in a paper "Pure Columbium," transactions of Electrochemical Society, Vol. 85, 1944). The metal is produced by heating a compressed mixture of columbium carbide and columbium oxide with temperature about 1600°C in vacuum. Normally this results in .08% carbon as carbide remaining in the metal and no oxide. The reaction can be controlled also to give small amounts of residual oxide and no carbide. All columbium produced so far by Fansteel has contained about 1% tantalum, but Balke is now processing a lot of about 400 lbs. of columbium in which the tantalum content has been reduced to about .02%. The sintered bars that are produced by the carbide-oxide reaction are treated in hydrogen and converted to the hydride; after crushing and powdering, the metal is compressed and sintered; the hydrogen is eliminated by heating in vacuum and the metal is then ready for any fabricating operation.

The sintered bars of columbium produced by the carbide-oxide reaction are sold at $62.75 per pound (the 30% discount is applicable). For obvious reasons, this figure is not a true indication of the metal's real cost. The melting point of the pure metal has recently been determined by Fansteel as 2415°C ± 15°, the density is 8.6.

TECHNICAL DIVISION
A. B. Greninger, Assoc. Director

A B Greninger

ABG/JK

dc Cooper
Foote
Chipman
Chapin (2)
McKinley
Allison
Wigner
Gore
Reading File (2)

[redacted]

[redacted] affecting the National [redacted]