UNITED STATES DEPARTMENT OF THE INTERIOR
Harold L. Ickes, Secretary

BUREAU OF MINES
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War Minerals Report 31

FIDALGO-ALASKA COPPER MINE

ALASKA

WASHINGTON: 1942

The War Minerals Reports of the Bureau of Mines are issued by the United States Department of the Interior to give official expression to the conclusions reached on various investigations relating to domestic minerals. These reports are based upon the field work of the Bureau of Mines and upon data made available to the Department from other sources. The primary purpose of these reports is to provide essential information to the war agencies of the United States Government and to assist owners and operators of mining properties in the production of minerals vital to the prosecution of the war.

WAR MINERALS REPORT

UNITED STATES DEPARTMENT OF THE INTERIOR - BUREAU OF MINES

W.M.R. 31 — Copper December 1942

FIDALGO—ALASKA COPPER MINE

Alaska

SUMMARY

The Fidalgo—Alaska copper mine is on an inlet of Prince William Sound, on the southern coast of Alaska, about 25 miles by air south of Valdez. About 21,434 tons of 9.71-percent copper ore was shipped to the Tacoma smelter from 1907 to 1920. A considerable tonnage of lower-grade copper ore probably is in stopes, stope fills, and dumps.

The property has never been equipped with a mill, and resumption of shipments of the 9-percent ore to the smelter probably would not be economical at this time owing to greatly increased mining and transportation costs.

The Bureau of Mines plans to explore this property by diamond drilling at an estimated cost of $20,000 if justified by preliminary work now in progress. This work, comprising surveying, mapping, and surface and underground sampling, is estimated to cost $16,000. Funds have been allotted to the Bureau of Mines through the Office of Emergency Management.

If the exploration should indicate adequate ore reserves, metallurgical tests will be made to determine a flow sheet and to designate ore-dressing equipment. The total expense before production could begin, including mine development and construction of a mill, would be $284,000, and the minimum time required would be 1 year.

INTRODUCTION

The Alaska Copper Corporation's property is on the south side of Fidalgo Bay, in Prince William Sound, southern Alaska. The property was visited in June and July 1942 by an engineer of the Bureau of Mines.* Company records were inspected, and information was obtained from former employees of the Alaska Copper Corporation.

Fidalgo Bay is about 25 miles by air south of Valdez and 55 miles by water north of Cordova. Before the war, ocean-going steamers from Seattle visited these coast towns about once a week. Fidalgo Bay is open to navigation the year round, and the Seattle boats docked at the mine wharves.

HISTORY

The deposit was discovered by Charles Schlosser in 1907 and was first named the Fidalgo-Alaska. It has since been owned by the Alaska Mines Corporation but now belongs to the Alaska Copper Corporation. From 1907 to 1916 three levels were opened and more than 3,000 tons were shipped. In the fall of 1915 Byron Wilson, superintendent, and Angus McDonald, as mine foreman, undertook active development, and between 1916 and 1920

* Stephen P. Holt, mining engineer.

the mine produced 16,601 tons of ore assaying 9.67 percent copper. Gross smelter returns for this period were $514,726.43, from which the following expenditures were made:

Mining operations	$ 217,437.07
Purchase price	125,000.00
Repayments of debt	20,000.00
	362,437.07

This indicates a profit of $9.17 per ton of ore shipped. During this period a tunnel on the 900 level was driven 1,800 feet without encountering ore. Operations were suspended in 1920, and only annual assessment work has been done since.

PHYSICAL FEATURES

Rugged hills extend steeply from the beach. Narrow benches can be noted at an elevation of 45 feet, which suggests recent uplift of the shore line. Timber line is 1,200 to 1,500 feet, and a forest of spruce and hemlocks with dense undergrowth extends from the beach to the upper extremity of the deposit, which makes examination of the surface difficult. The hemlocks provide mine timber and piling. A small creek carrying one second-foot of water supplies camp requirements throughout the year. Other nearby sources could be tapped for water for milling purposes.

THE DEPOSIT

The ore occurs in narrow, irregular lenses 3 to 10 feet wide and 20 to 80 feet long in a shear zone transverse to the general trend of the beds of slate and graywacke. The dip of the ore bodies becomes steeper with depth. On the upper level the dip is about 50° to the north, increasing to 75°

on the fourth level. Other small and irregular ore shoots occur on cross shear zones. Seams and minor faults cut the ore, and the walls of ore bodies are indefinite. The shear zone is approximately 50 feet wide, strikes northeast, and dips 70° to the southeast.

The average width of the high-grade ore bodies that have been mined is as follows:

Level	Feet
Surface	3.5
First	5.3
Second	4.9
Third	No data.
Fourth	8.0

A geophysical survey using electrical resistivity methods was made by Schlumbarger in 1930. His interpretations indicate an ore zone 40 to 100 feet southeast of the higher ore bodies, at the level of the lower tunnel.

MINE WORKINGS

Workings comprise five tunnels driven in from the steep slope of the hill. Length of tunnels, elevations, approximate tonnage extracted, and grade of ore are shown below for the period 1916 to 1920, during which the mine was in continuous operations.

Mine level	Altitude, feet	Length, feet	Ore extracted, tons	Copper, percent
1	1,000	50	1,000	9.0
2	925	250	2,000	9.0
3	796	410	7,000	9.1
4	658	540	6,600	9.5
5	158	1,800	--	--
		3,050	16,600	9.2 +

Other development consists of limited exploration at the south end of the outcrop 60 feet above No. 1 tunnel. The first 1,465 feet of No. 5 tunnel progressed due south without reaching the expected ore body. A drift was

extended 220 feet 570° west and then 90 feet due south without locating the ore shoot. Operations ceased in 1920 when the price of copper declined.

THE ORE

The ore occurs in lenses. The principal ore mineral is chalcopyrite accompanied by iron pyrites in solid bands and stringers interleaved with slate. Sorting, mostly underground, enabled the operators to ship ore uniformly averaging between 9 and 10 percent copper. Minor quantities of gold and silver are present.

ORE RESERVES

No positive ore is developed. A former official of the company estimated that 3 tons of 3-percent copper ore was mined for every ton of ore shipped. Based upon this, 64,000 tons of ore averaging 3 percent may be on the mine dump, in stopes, and in stope fill.

Possible ore amounting to 160,000 tons averaging 3-1/4 percent copper may be developed in a downward extension of the ore from the fourth level.

DISPOSITION OF PRODUCT

Current transportation costs are considerably higher than formerly, and with greater working and smelter costs shipment of 9-percent ore probably would not be profitable. A flotation concentrator therefore should be considered. Such a plant might produce a product assaying approximately 27 percent copper on a concentrating ratio of about 10 to 1. Some additional values in gold and silver might be recovered at the smelter.

PROPOSED EXPLORATION BY BUREAU OF MINES

If results of preliminary mapping and sampling are encouraging, the Bureau of Mines plans to explore by diamond drilling to indicate the tonnage and grade of the ore reserves.

To determine the extension at depth of the ore body, a diamond-drill station will be located on the fourth level, and the first holes will cut the shear zone at approximately 50 feet below that level. If the ore extends to this depth, other holes should be drilled to prove the ore body at greater depth.

This exploration program will require at least 2,000 feet of core drilling. Sampling now being done by the Bureau, at an estimated cost of $16,000, will delineate the exposed ore and thus lay the foundation for better knowledge of the deposit.

CAPITAL EXPENDITURES

If exploration should successfully develop adequate ore reserves, the estimated additional expense before production could begin will be as follows:

	Approximate cost
Metallurgical tests	$ 3,000
Additional diamond drilling	20,000
Mine development	75,000
Flotation mill (100 tons a day)	100,000
Power plant and miscellaneous facilities	50,000
	248,000

On the basis of mining 100 tons of ore a day, the total preproduction expense, including the Bureau's exploration, would be $284,000.

CONCLUSIONS

The Bureau of Mines plans to explore this property by diamond drilling at an estimated cost of $20,000 if justified by preliminary work now in progress. If adequate ore reserves are indicated, metallurgical tests will be made to determine a flow sheet and to designate ore-dressing equipment.

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