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

BUREAU OF MINES
R. R. Sayers, Director

War Minerals Report 40

MOLYBDENUM DEPOSITS
MUIR INLET, ALASKA

WASHINGTON: 1943

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WAR MINERALS REPORT

UNITED STATES DEPARTMENT OF THE INTERIOR - BUREAU OF MINES

W.M.R. 40 — Molybdenum January 1943

MOLYBDENUM DEPOSITS

Muir Inlet, Alaska

SUMMARY

The Muir Inlet molybdenum deposits can be seen over a large part of the northwest side of a small mountain about 1,150 feet high, which lies between Muir Inlet on the west and a large field of stagnant ice, formerly part of Muir Glacier, on the east.

The mountain was climbed from the south by Reed[1] in 1936, when the locality where better molybdenite showings were seen in 1941 was much less accessible because the ice of Muir Glacier then lay against the western and northwestern base of the mountain. In 1941 Reed again visited the area and found molybdenite-bearing deposits much in evidence. Although results of preliminary surface sampling indicated material with low molybdenum content, the Bureau of Mines[2] plans to do further sampling and limited diamond drilling.

1 Reed, J. C., Some Mineral Deposits of Glacier Bay and Vicinity, Alaska: Econ. Geol., vol. 33, No. 1, Jan.-Feb. 1938, pp. 56,57.

2 R. S. Sanford, district engineer.

The deposits are covered by 24 mineral lode claims that were located in 1941. The area was photographed first in 1929 by an aerial surveying expedition conducted by the United States Navy for the Geological Survey and other Government agencies. Additional surveys, by the Coast and Geodetic Survey, were completed in 1940.

INTRODUCTION

The area is 78 miles in an air line N. 53° W. of Juneau, Alaska, latitude 58° 59' 30" and longitude 136° 06' 30." The water distance from Juneau is 129 nautical miles. A steamship line passes the mouth of Glacier Bay at a distance of about 40 nautical miles from the deposit; the water is navigable the entire distance. There is no timber near the mineral deposits. All fuel for heating and cooking must be transported to the site. A limited supply of fresh water is available for camp purposes. Considerable water flows from beneath the stagnant portion of Muir Glacier less than a mile north of the mineralized zone. A dam across a small creek and 500 feet of pipe would provide enough water for drilling. Should mining and milling be undertaken, it might be difficult to obtain a supply of water.

HISTORY

The mineral claims covering this ground were staked in 1941 by three groups of men. John Johnson and Tom Smith were the first locators. S. H. P. Velvelstad and George Comstock located two claims. Later Carl Velvelstad located a number of claims. None of the claims has been surveyed.

PHYSICAL FEATURES AND COMMUNICATIONS

Glaciers and ice fields occupy a considerable proportion of the immediate vicinity. Temperature drops nearly to freezing every night, even in summer, and heat has to be provided for living quarters at all seasons.

Muir Glacier is very active and is almost continuously discharging icebergs, which may have an important effect upon water transportation, though it does not constitute a major hazard. When in Glacier Bay and Muir Inlet, the navigator must always be on the alert for icebergs.

LABOR AND LIVING CONDITIONS

There is no human habitation in this area, and all buildings would have to be constructed of material brought from a great distance. All fuel and supplies must be shipped in by water. It would be difficult to obtain labor even in ordinary times.

DESCRIPTION OF THE DEPOSIT

The best report on the geology and other features of these deposits was written by Dr. J. C. Reed, of the Federal Geological Survey, from which the following is quoted:

> A large body of molybdenite-bearing rock lies on the east side of Muir Inlet near its head. This deposit was found by a geological survey party in 1941, and in the brief time that was spent there the party saw no evidence of any mining-claim markers. However, it was later reported that the body had been discovered previously and was covered by claims at the time of the examination by the survey party. John Johnson is said to be one of the claimants, but the names of others, if any, are not known.
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> The mineralized body occupies a considerable amount of the northwest part of a small mountain which lies between Muir Inlet on the west and a large field of stagnant ice, formerly part of Muir Glacier, on the east. The mountain is about 1,150 feet high.
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> The mountain was climbed from the south by Reed in 1936 when the vicinity of the better molybdenite showings seen in 1942 were much less accessible, because at that time the ice of Muir Glacier lay against the western and northwestern base of the mountain. Molybdenite was not recognized in 1936.
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> Practically the whole mountain appears to be in a contact zone between intrusive granitic rock and limestone. Such contact zones are common in the Glacier Bay area. According to

Reed, the country rock is principally hornfels; its general strike is N. 40° E. and its dip about 50° NW. Granitic dikes up to more than 100 feet thick are common in the hornfels and are particularly abundant near the top of the mountain.

The two days available for work in the vicinity in 1941 were not enough to permit the distribution of the molybdenite deposits to be worked out in any but the most general fashion. The following statements therefore reflect field impressions that were fairly definite but which without further work cannot be stated with confidence.

An intensely contact-metamorphosed zone several hundred feet wide crosses the mountain diagonally in a direction about N. 30° E. from Muir Inlet to the field of stagnant ice. This zone is now made up almost entirely of quartz, which has replaced the earlier rock materials. Both northwest and southeast from this siliceous zone the metamorphism is not so intense, or at least the replacement is not so complete and the rock consists of hornfels, largely epidote and quartz, cut by an intricate net of small quartz veinlets. Still farther from the highly siliceous central zone the quartz veinlets decrease in abundance, and garnet, as well as epidote and quartz, becomes a noticeable constituent of the hornfels.

Molybdenite is present as joint facings, in veinlets and irregular patches, throughout the contact-metamorphosed zone from the central siliceous zone outward at least as far as the outer part of the zone in which the network of small quartz veinlets is conspicuous. Much of the molybdenite lies along the edges of the quartz veinlets, between the quartz and the hornfels remnants. The molybdenite is much less abundant toward and in the central siliceous zone, but some is present throughout. Chalcopyrite in small amounts is locally associated with the molybdenite but, unlike molybdenite, the chalcopyrite, together with some pyrite, appears to be more abundant in the central siliceous zone.

The molybdenite-bearing zone is probably more than a thousand feet wide and is several thousand feet long. One end, the southwest, is apparently concealed under Muir Inlet, and the other end disappears under the stagnant ice field. Whether or not the zone appears farther southwest across Muir Inlet or farther northeast on the other side of the ice field is not known. A zone, lean in molybdenite, the siliceous zone, extends through the middle of the molybdenite-bearing zone.

The determination of even the order of magnitude of the molybdenite content of the zone would involve a large amount of sampling. The amount of molybdenite readily apparent in the rock is large enough to indicate that much sampling possibly should be done, particularly in view of the large tonnage of material in sight.

Field work by the Geological Survey in the summer of 1942 indicated certain modifications in the preliminary observations quoted above. Of these possibly the most important is that the country rocks are now known to be largely chert rather than a silicified limestone affected by contact metamorphism. A contact-metamorphic zone is present, but it was developed in the chert.

The beach mineralized zone lies in a fractured chert. The molybdenite occurs in thin plates and small blebs in quartz stringers, which occupy closely spaced fractures. The mineralized zone was observed over a length of 1,200 feet at a width of 10 to 30 feet.

THE ORE

Sampling began just above high-water level at the south end of the mineralized zone, where molybdenite mineralization ceases quite abruptly but without evidence of faulting. From that point, sampling proceeded north along the minor bluffs just above high-water line. Samples 1 to 6 abutted, each covering 100 feet along the shore. Assays were as follows:

Sample	Molybdenum, percent	Copper, percent
1	0.09	0.02
2	.09	.01
3	.06	.01
4	.18	.01
5	.04	.01
6	.05	.01

A major fault strikes northeasterly and dips steeply to the southeast; its shear zone, 10 to 30 feet wide, contains rock material locally silicified and epidotized and mineralized with molybdenite for a length of at least 1,200 feet. Assays on three samples cut from the more accessible places on the mineralized fault zone were as follows:

Sample	Length, feet	Molybdenum, percent	Copper, percent	Remarks
7	15	0.06	0.01	Near center.
8	15	.05	.01	Near north end.
9	10	.09	.02	Near south end.

ORE RESERVES

The beach molybdenite-bearing zone, calculated as a cone with depth of 500 feet, contains about a million tons of rock.

The fault deposit, with a length of 1,200 feet and width of 10 to 30 feet, contains about 2,000 tons of mineralized rock per foot of depth.

EXPLORATION BY BUREAU OF MINES

Although surface sampling indicated ore low in grade, the Bureau of Mines believed it desirable to test the downward extension of the deposit by a limited amount of drilling. Diamond-drill hole No. 1 was started near the south end of the beach deposit, just above high-water mark, to intersect that body within 650 feet. Drilling of this hole had to be suspended late in August 1942 because ice floes interfered with arrival of replacement equipment. Hole No. 2 was to supply similar information respecting the north end of the same deposit. Meanwhile, attention has been concentrated on more complete and systematic channel sampling of surface exposures. Estimated costs of this exploration are:

Camp buildings	$ 1,000
Moving drill equipment to and from Muir Inlet	500
Diamond drilling, 1,500 ft. at $6.50	9,000
Drill sampling, 1,500 ft. at $1.50	2,250
Channel sampling, 3,000 ft. at $1.00	3,000
Stand-by boat, 2 months at $1,050	2,100
Engineering	2,700
Contingencies	3,000
	23,550

CONCLUSIONS

Results of the preliminary sampling were disappointing but, owing to the magnitude of surface mineralization, it was thought desirable to explore

the downward extension of the deposits. Two drill holes should determine whether the area is to be abandoned or a more extensive exploration program inaugurated. Surface sampling and geological examination were still in progress late in the summer of 1942.

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