

TERRITORY OF ALASKA
DEPARTMENT OF MINES
BOX 1391
JUNEAU, ALASKA

MI-116-01

October 23, 1953

REPORT OF GEOPHYSICAL INVESTIGATION

MAGNETIC INVESTIGATION OF CHROMITE DEPOSITS
AT RED BLUFF BAY, BARANOF ISLAND

Kx 116-8

Phil R. Holdsworth
James A. Williams

In an effort to extend the magnetic work done by the U.S.G.S. and thereby extend the reserves of the chromite deposits at Red Bluff Bay, a magnetometer survey was performed in that area during June 15 to 21, 1953, by Phil R. Holdsworth, Commissioner of Mines, and the undersigned. Equipment used were two Schmidt-Type magnetometers, one an old Wilson-Hull and one a new Askania. The old instrument was used as a base instrument adapted for recording by an attached photo-electric cell and light and a connected recording microammeter which is actuated by the fluctuating current generated by the cell as the beam of light is caused to move across it by being reflected from the moving magnetic system. The project was unsuccessful because of the magnetic country rock obscuring any possible anomalies caused by the chromite.

The chromite deposits are located at elevations of from 200 to 750 feet on a bare rocky peninsula on the north side of the entrance to Red Bluff Bay which is on the east coast of Baranof Island about 50 miles north of the southern tip of the island. This is shown in Figure 1. Red Bluff Bay is in the Port Alexander Quadrangle, Chichagof Mining District, and Petersburg Recording Precinct. The geographical coordinates are 134° 13' east longitude and 56° 51' north latitude. The bare reddish-brown bluffs of the peninsula are an outstanding landmark and undoubtedly were the cause of the name of the bay.

The U. S. Geological Survey has done considerable geological work and some magnetic work on this area. This work is covered in Bulletin 936-C and on pages 73 to 75 of Bulletin 947-D. Bureau of Mines personnel have also investigated the deposits.

The country rock is a serpentized dunite with large bands of pyroxenite running through it. Black outcroppings are seen constantly, but contrary to their appearance, they are mostly not chromite. The dunite weathers to a reddish-brown and the pyroxenite is darker. The chromite deposits are small pods, stringers, layers, and lenses, rather widely separated and distributed as shown in Figure 2. It was found by checking hand samples with the magnetometer that the dunite is quite magnetic, while the chromite is not. In traversing the pyroxenite with

the instrument, some higher anomalies were obtained than over the dunite, which would indicate that there must be concentrations of magnetite in the pyroxenite. These would probably be in zones of alteration. One could assume that these would be favorable zones for chrome mineralization, but this is not necessarily so.

Claims Denver, Chicago and Boston were staked over deposits 4, 6, and 7, respectively, by E. G. Nelson on May 22, 1942. It is not known whether these claims are being held at present, but it is quite doubtful.

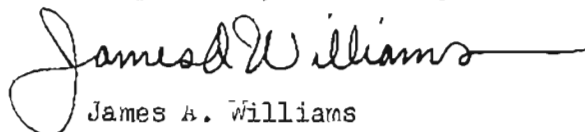
In the course of traveling from one deposit to another, a deposit was found that was not reported or mapped by the U.S.G.S. It is shown in Figure 2 as deposit No. 9. It is about 15 feet long, pinching out at both ends, 24 inches thick at center, exposed for 20 feet of depth, and is still good at the bottom where it passes from view. It is on the side of a vertical wall of a shear zone.

The magnetic survey failed to reveal any useful anomalies because of the magnetism of the dunite and the small size of the non-magnetic chromite deposits. The deposits failed to show up as lows even when the instrument was centered above an outcrop, so great was the attraction of the surrounding material. Several fairly large traverses with 25-foot stations were run over, and perpendicular to, the trend of deposits 6, 7 and 8. Then a small, closely-spaced grid of traverses spaced at 10 feet with 6-foot stations was run over several outcrops of deposit 6 with still no results. The outcrops failed to show up on the resulting magnetic profiles and map.

Anomalies obtained in the course of the survey were very erratic and extremely varied. Generally, they were terrain anomalies, caused by variations of elevation and contours of the magnetic dunite. All magnetic observations, and also sketches, are recorded in Field Book No. W-1. Since the survey failed so completely to reveal any useful indications it is not considered worthwhile to draw up any magnetic profiles or maps for this report.

As noted on pages 73 to 75, Bulletin 947-D, some magnetic work was done by the U.S.G.S. over a very small area in the vicinity of deposit 2. It was thought that this work could be extended, but upon arrival at the site, it was found that the area covered was a small relatively level bench along a nearly vertical bluff. Thus it was physically impossible to carry the work further in this location, though it was not so stated in the report on the work.

Respectfully submitted,



James A. Williams
Associate Mining Engineer



DEPARTMENT OF THE INTERIOR

INFORMATION SERVICE

NOT

MAY 16 1942

B. D. STEWART
Mineral Director of Alaska

GEOLOGICAL SURVEY

For Immediate Release

CHROMITE DEPOSITS OF RED BLUFF BAY, BARANOF ISLAND, ALASKA

During the field season of 1941 the Geological Survey, United States Department of the Interior, through its geologists P. W. Guild and J. R. Balsley, examined the chromite deposits of Red Bluff Bay, Baranof Island, southeastern Alaska. Eight deposits are known, of which five contain ore of shipping grade and three contain larger quantities of material that may be of concentrating grade. There is little prospect that reserves of any consequence can be developed in the Red Bluff Bay area, but the few, high-grade ore bodies afford a small, readily available source of a few hundred tons of chromite.

Chromite is a black, hard, heavy mineral with a submetallic luster and a brown streak. It is not uniform in composition but contains varying proportions of chromium, iron, magnesium, and aluminum oxides. The principal considerations from an economic standpoint are the percentage of chromic oxide and the ratio of the chromium to the iron. Analyses of ore from Red Bluff show a wide range in these factors; but all the samples were too rich in iron to be classed as ore of metallurgical grade, which should contain at least 48 percent of chromic oxide and have a ratio of chromium to iron of 3 to 1 or better.

Geology

At Red Bluff Bay, which is about 26 miles southeast of Sitka on the opposite side of Baranof Island, a body of ultrabasic rocks, composed principally of dunite and pyroxenite, intrudes older metamorphic rocks which include phyllite and greenstone schist. The ultrabasic rocks crop out over an area of about $1\frac{1}{2}$ square miles. Younger dikes cut both the metamorphic and the ultrabasic rocks.

Chromite deposits

The chromite is present as small lenses, thin layers, and disseminated grains in the ultrabasic rocks, principally in the dunite.

Maps given to
J. Williams
Age
5/19/42

(over)

The three deposits of lower-grade material available at Red Bluff Bay are not described here because their exploitation would require a relatively large investment with little prospect of adequate return.

The higher-grade deposits, numbered 2, 3, 5, 6, and 7, are very small, and even if they were mined out could scarcely be expected to contribute significantly to the Nation's supply of this strategic material. Several factors, however, make these deposits attractive for development on a small scale. The area is easily accessible by water, and the ore bodies are not more than a quarter of a mile from the beach. Little mining equipment would be necessary—a compressor could be set on the beach, and air piped to the deposits—and mining costs would probably be low. A small outfit could mine out the known deposits quickly, perhaps by men and equipment from some intermittently active mine during a slack period.

Deposit No. 2.--The best deposit in the area is at the south end of a chromite-bearing zone about 600 feet long, the northern part of which has been designated deposit No. 1. Deposit No. 2 consists of two masses of high-grade ore, apparently segments of one vertical northward-trending body that is cut by a fault striking east and dipping 30° S. The southern segment has moved relatively east and south. This segment is 50 feet long and 1 to 2.5 feet wide and is cut off at the bottom by the fault. The northern segment is exposed for 40 feet horizontally and 42 feet vertically and is from 1.6 to 3.9 feet wide; it lies beneath the fault plane, so that the possibilities of a southerly continuation and of a greater depth are increased.

A sample cut from the northern segment of this deposit contained 40.13 percent of chromic oxide and had a chromium-iron ratio of 2.16 to 1. The estimated reserve, based on the assumption that the deposit extends to a depth equivalent to half its outcrop length, is about 230 tons of ore.

Deposit No. 3.--Three small pods of high-grade ore crop out at an altitude of 560 feet on the crest of the ridge in the center of the exposed dunite mass. The largest and southernmost of these pods is a mass of chromite 4 feet high and 4 feet long, exposed in a low cliff. The deposit pinches out at the top but is 2 feet wide at the base of the exposure. About 50 feet to the north, a semispherical body of chromite 3 feet in diameter crops out, and a still smaller body lies 30 feet farther north. A sample from deposit No. 3 contains 50.56 percent of chromic oxide with a chromium-iron ratio of 2.18 to 1.

Deposit No. 5.--At an altitude of 280 feet on the east slope of the main ridge, a zone 1 foot wide containing lenticular chromite masses strikes north and dips 75° W. A fault cuts the deposit off at the south end; 10 feet to the north, the northernmost outcrop of the deposit is exposed in a vertical cliff. The ore body apparently has a depth of 10 feet, for it pinches out toward the top and bottom. The analysis of a sample from this deposit indicates a chromic oxide content of 47.66 percent and a chromium-iron ratio of 1.78 to 1.

Deposit No. 6.--Cropping out on a high bench at the top of the large cirque south of No. 5 is deposit No. 6, a single layer of good chromite 100 feet long and 1 to 18 inches wide. This passes northward into a wider, leaner zone that extends

about 200 feet farther north and attains a maximum width at its north end of about 5 feet. The deposit pinches out to the south. A sample from the layer of good ore contained 46.38 percent of chromic oxide and had a chromium-iron ratio of 2.03 to 1.

Deposit No. 7.--Small stringers of chromite are found in a northward-trending zone about 600 feet long that is exposed on the crest of the main ridge at its south end. The best deposit seen in this zone, designated as No. 7, is at the north end and consists of good ore in narrow layers striking N. 10° E. and dipping 65° E. The individual layers are from 1 to 6 inches wide, the two thickest layers being 4 and 6 inches wide, and the zone has a total width of about 2 feet. Deposit No. 7 is exposed at the south end in a steep outcrop, from which it can be traced northward continuously for 20 feet and intermittently for 30 feet more. Several small faults offset the deposit 1 to 6 inches. A sample of the ore from deposit No. 7 contained 43.10 percent of chromic oxide with a chromium-iron ratio of 1.41 to 1.

Maps available

In order to make available specific information on these deposits, a map has been prepared showing the ultrabasic mass and the locations within it of the deposits. A larger scale map of deposit No. 2 has also been prepared. Photostat copies of these maps may be obtained by those directly interested upon request to the Director of the Geological Survey, Washington, D. C.

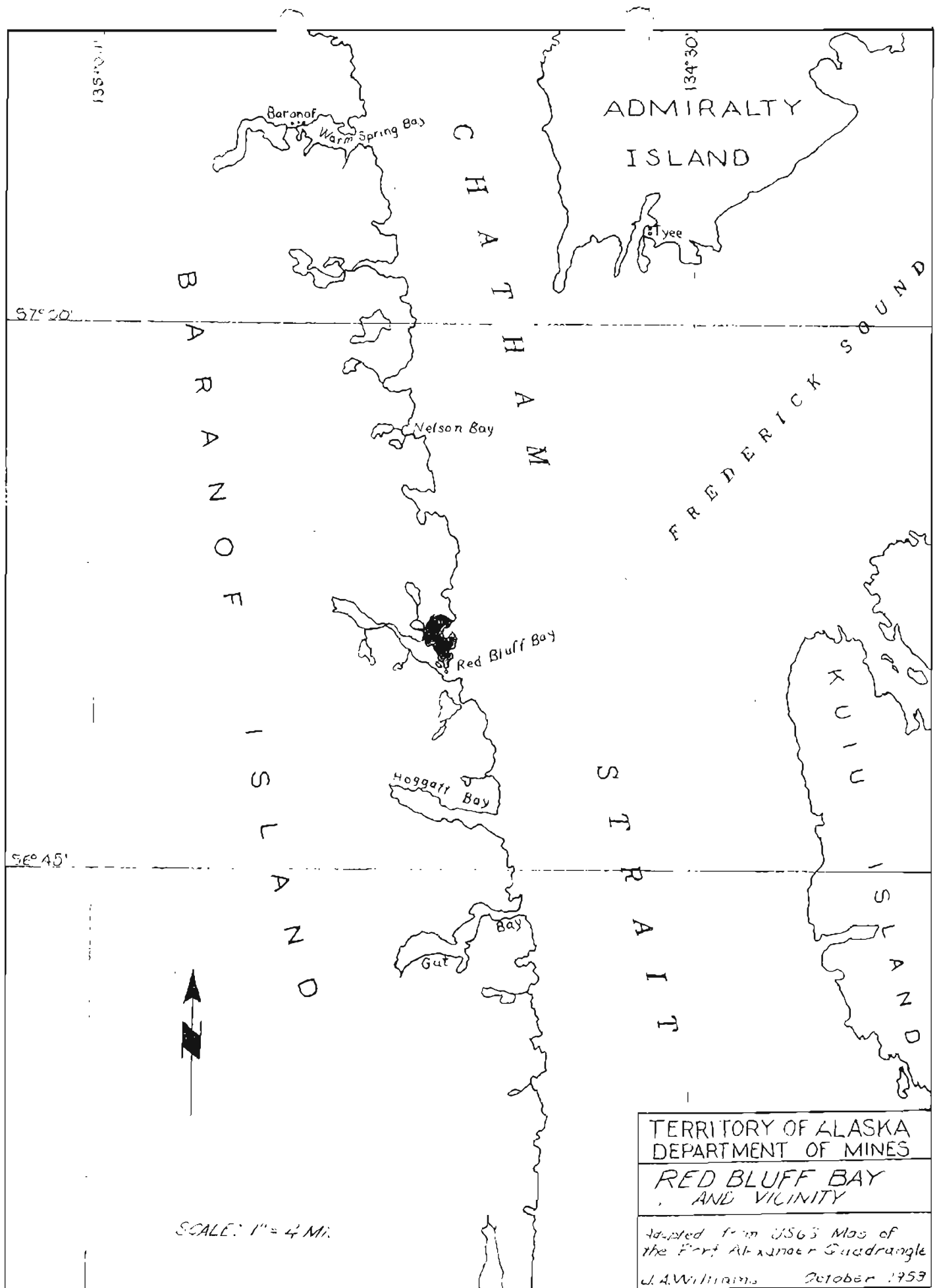


Figure 1.

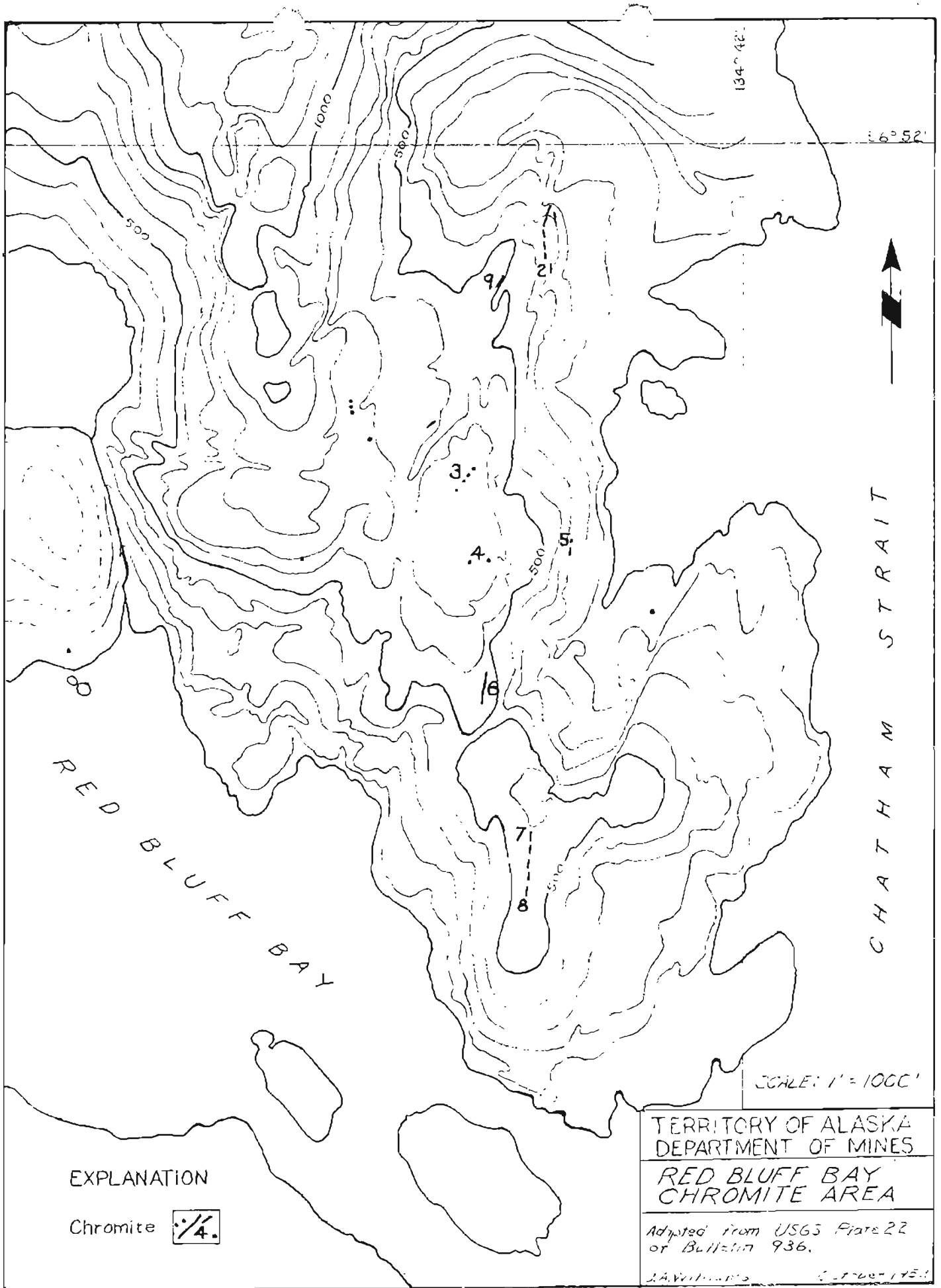
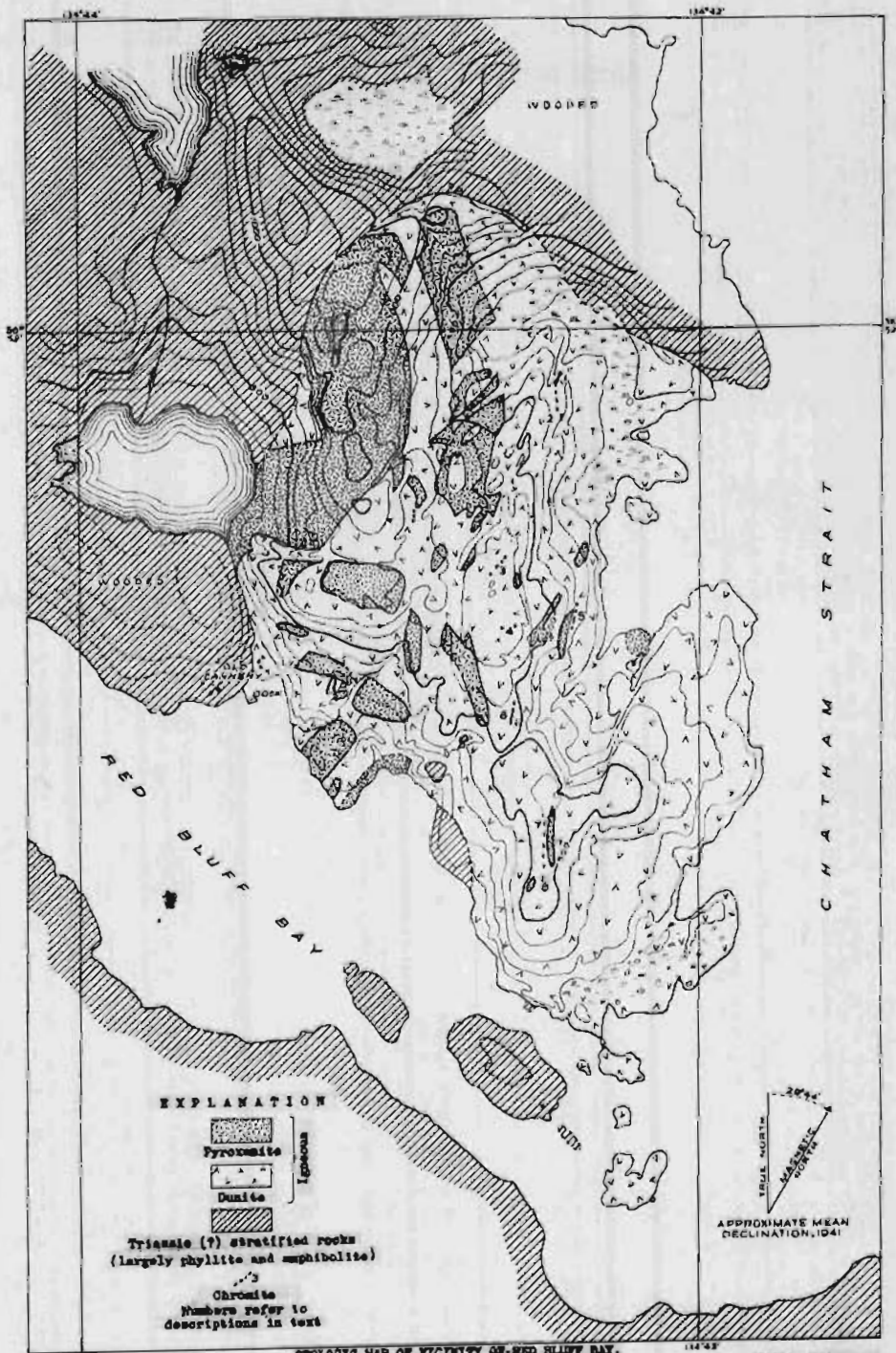





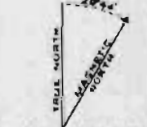


Figure 2.



EXPLANATION

-  Pyroxenite
 -  Igneous
 -  Dunite
 -  Triassic (?) stratified rocks (largely phyllite and amphibolite)
 -  Chromite
- Numbers refer to descriptions in text

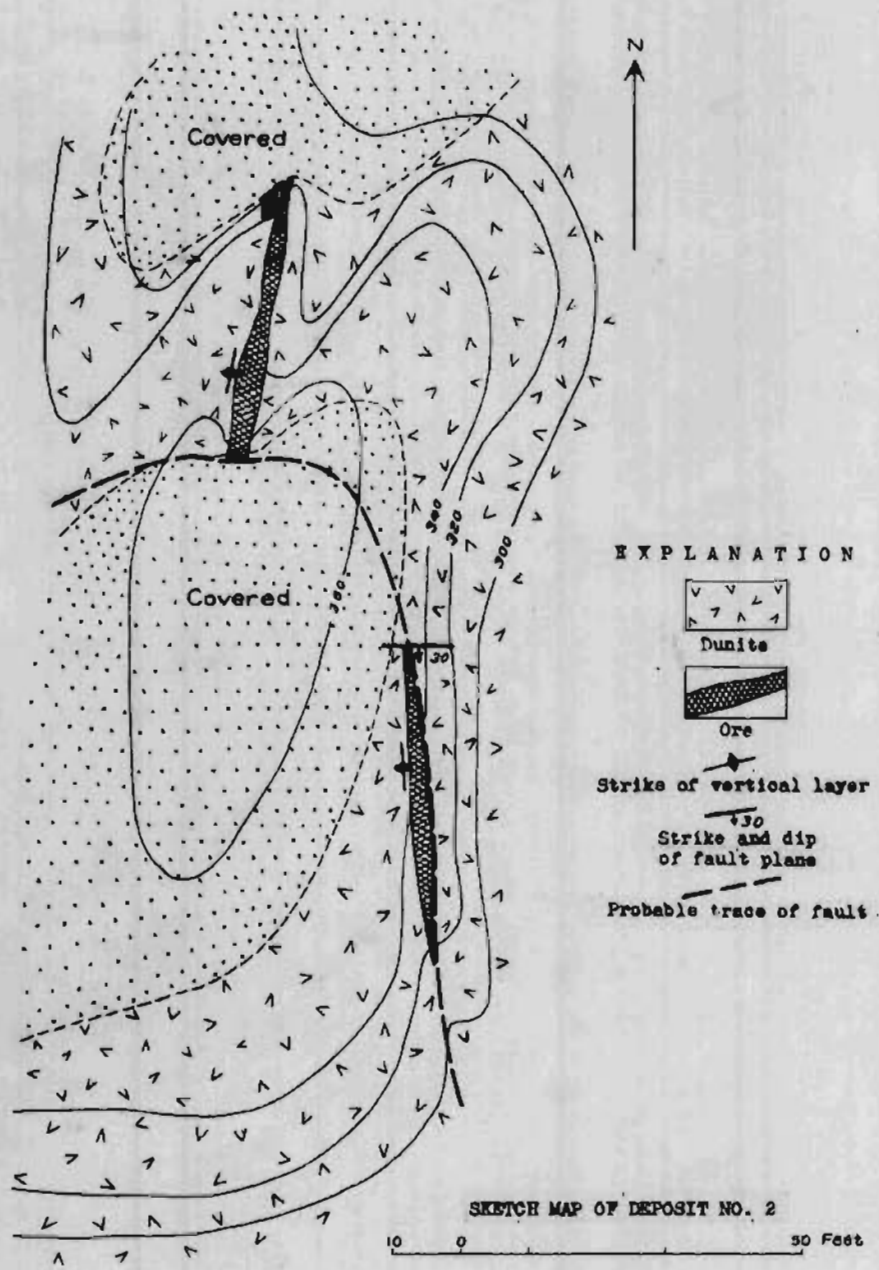


Surveyed by Philip W. Guild, J. R. Balsley, Jr., and R. E. L. Rutledge, 1941

GEOLOGIC MAP OF VICINITY OF RED BLUFF BAY, BARANOF ISLAND, SOUTHEASTERN ALASKA.

Geology by Philip W. Guild and James B. Balsley, Jr.

Contour interval 100 feet
 Shoreline traversed at mean high water
 Datum is approximate mean sea level



← Reduce to $\frac{1}{8}$ →

Juneau, Alaska,
October 16, 1935.

Mr. J. C. B. Hawkes,

Juneau, Alaska.

Dear Sir:

Pursuant to your request I examined the property which you have under bond situated near Red Bluff Bay, Baranof Island, Southeast Alaska. I will not go into a detailed account of the extent of the claims, ownership, geology of the district, history of the property, etc., as you already have this information.

I left Juneau the evening of October 9, 1935 and arrived at Red Bluff Bay at 8 a.m. on October 10, 1935. Leaving Red Bluff Bay immediately after arrival I proceeded to the property which is situated about 2 miles north of Red Bluff Bay. Landing was made in a small cove immediately adjacent to the property. This cove provides an excellent landing place for ocean-going vessels should future developments necessitate deep-water transportation.

After landing at the cove a trail was followed to the foot of the bluff, a distance of approximately 1,500 feet and at an elevation of approximately 300 feet above sea level. At this point the hillside rises steeply and the first outcrops are encountered at an elevation of approximately 500 feet.

The geology of this section is very simple. A mass of dunite of considerable extent occurs in this particular locality. It is easily discernible by the marked reddish cast of the mass as differentiated from the gray of the other rocks.

An area some 1,500 feet long and 600 feet wide was examined by me in the short time I had available. Chromite occurs throughout this area. Apparently there are three bands or zones in this particular area where mineralization by chromite is more intense than elsewhere. This chromite mineralization occurs as stringers, scales, and disseminated mineralization. Some of the stringers are of good width and length and of a grade of 50% Cr₂O₃ or better. Some chromite occurs everywhere in the area. The zone adjacent to a canyon on the west limit of the area shows the most intense mineralization. The underlying beds would indicate that at least the horizontal depth of 1,000 feet of dunite would occur at this locality.

The salient features of the property are: Favorable mining conditions, favorable transportation facilities, and the visible presence of chromite of an exceptionally good commercial grade.

In view of these facts it is my opinion that if suitable marketing contracts can be made, the property warrants further investigation. It is also my opinion that this investigation should be in the form of extensive sampling with a view of determining whether or not the bands or zones which show the most mineralization could be mined as a mass. Should investigation prove that such mining is feasible, an immense tonnage, which could be mined very cheaply, would result.

Yours very truly,

J. C. SHEPARD.

A. Y. 8/14-26

Chrome Ore Is Found By Hill on Baranof Is.

Joe Hill, well-known prospector and trapper, on a visit to Juneau last week, told of finding a hitherto unknown chrome deposit on Baranof Island behind Silver Bay. Hill stated that there are two miles of ore in the deposit.

Commissioner J. F. Mullen, J. J. Meherin and Dr. W. W. Couper have sent samples of the ore south to be assayed. If assays prove that the ore is high grade without too much magnetic iron in it, engineers will be sent to the site of the deposits.

Hill left later last week for Taku, where he is doing assessment work on some mining property.