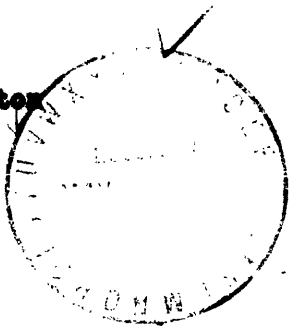
45-56

Geology and ore deposits of the

CARBO ZINC PROSPECT

Northport district, Stevens County, Washington

C. D. Campbell
April 1945



SUMMARY

The Carbo zinc prospect is located near the ridge top which slopes for 1½ miles west down toward Deep Lake in northeastern Stevens County. The ore is an aggregate of cavernous lenses of smithsonite-rich dolomite up to 12 by 35 feet in exposed cross section, elongated parallel to the bedding of low-dipping white dolomites of the Metaline limestone. The largest lens assays 20.5 percent oxidized zinc.

The ore horizon, or aggregate of such lenses, is at least 15 feet thick and is exposed for 300 feet on strike. The ore horizon is cut off obliquely by a major fault from 100 to 250 feet down its dip from the outcrop. This fault is probably pre-mineral. The bedded ore is inferred at 65,000 tons averaging an estimated 3 percent oxidized zinc. In addition, there may be ore deposits in the brecciated dolomite along the fault.

The expected fault-breccia deposits could be explored by trenching. If ore is found, it might be worthwhile to drill the bedded deposits also.

INTRODUCTION

The Carbo zinc prospect is located on the east edge of sec. 25, T. 39 N., R. 41 E., WM., about 1½ miles east of Deep Lake. It is

near the top of the main west-pitching ridge that extends from Sherlock Peak on the Pend Oreille County line to Deep Lake valley, and is best reached by blazed trail from a point two miles up the logging road which follows Currant Creek. The land is owned by the North Columbia Lumber Company of Deer Park, Washington, but the mineral rights of section 25 were leased by them in 1942 to John Colby of Northport, Washington. No development work whatever has been done.

The map (fig. 1) was made by Brunton-tape survey during two days in November 1944. The altitudes shown are based on an aneroid reading at Stake 1, the starting point of the map.

STRATIGRAPHIC POSITION

Almost the entire ridge, from the Carbo prospect west to Deep Lake is composed of dolomites and limestones of the basal part of the Metaline limestone (middle Cambrian). The Carbo deposit is in pale creamy dolomites of the middle part of the Metaline, but an outcrop of gray limestone is shown at the west edge of the map (fig. 1), and about 200 feet farther west is a limy phyllite apparently conformable below it.

At the type locality of the Metaline limestone near Metaline Falls, the lower 1200 feet of the 3000-foot formation consists of gray limestones interbedded with limy shales which become more abundant in the lower levels, to the point where they predominate and are classed with the underlying Maitlen phyllite.[1/] Above the limestone-

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1/ Park, C. F., Jr., and Cannon, R. S., Jr., Geology and ore deposits of the Metaline Quadrangle, Washington: U. S. Geol. Survey Prof. Paper 202, pp. 17-19, 1943.

phyllite basal section is a 1200-foot section of creamy dolomites locally interbedded with black dolomite. The Carbo deposit is believed to lie in this second unit.

STRUCTURE

The Metaline limestone and lower formations dip generally west and northwest away from the Flume Creek fault which lies six miles to the east, in the Metaline Quadrangle.[2/] These dips continue past the

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2/ Park and Cannon, op. cit., pp. 29-30.

Carbo prospect to Deep Lake, but are interrupted by northeast-trending folds and faults. The low westward dip of the dolomites in the Carbo area is shown by a faint banding of darker gray in the general light gray.

Two major high-angle faults, probably normal, striking north and northeast, have been recognized in the general vicinity of the Carbo area. They cause a repetition in the succession of the west-dipping Metaline limestone because in each instance the east block of the fault has dropped several hundred feet, bringing the middle Metaline white dolomites down against the lower Metaline gray argillaceous limestones. One fault crops out about a quarter of a mile west of the Carbo prospect. The other is on the Carbo map-area (fig. 1), between the gray limestone at the west and the white dolomites of the rest of the area. (Sections AA' and BB'). The dolomites exposed nearest to the fault, at the south end of the area, are shattered along shear zones dipping eastward at steep angles. These shear zones are believed to be branches

of the main fault, but the displacement which they have caused is not known, as they are wholly in white dolomite.

Several faults and minor shear zones striking west and northwest also occur in the Carbo area. One of these forms the south limit of the largest ore lens.

ORE DEPOSITS

The principal ore mineral, and the only one identified, is smithsonite (zinc carbonate, $ZnCO_3$) which forms thin tan to gray crusts lining cavities in coarse-grained dolomite. Where most abundant, these crusts interlock to form cellular masses.

The deposit is an aggregate of small bedding lenses of various sizes up to an observed maximum of 12 feet thick and 35 feet along the strike, the dip extension being concealed. Most lenses are a few inches thick and a few feet long. The best of the mineralization occurs in a low bluff extending 300 feet northeast from the wide shear zone exposed at the south end of the area. Beyond this the bluff runs north, and the ore zone may continue northeast beneath the overburden. However, the last exposures of ore are too small and scattered to offer much hope for a hidden extension in this direction, and none is assumed to be there.

The assumed limit of the ore horizon down dip from the outcrops is the main fault (MS p. 3). The position of this fault is assumed to be along the center line of the shallow gully which separates white dolomite from gray limestone. The fault thus runs approximately north, veering slightly west in the north part of the area. It therefore cuts across the northeast strike of the ore horizon at an angle of about 30

degrees (fig. 1). The dip length of the ore horizon, measured along its base, is then about 100 feet at the south end of the area, and 250 feet where the ore disappears to the northeast.

The thickness of the ore horizon is arbitrarily set at 15 to 20 feet, although the base is covered by talus and the top is hard to fix. A conservative value of 15 feet is used in the reserve calculations.

The zinc mineralization is believed to be post-faulting because a few small smithsonite lenses are cross-cutting replacements in the shear zones outside the main ore body. As these shear zones, with north strikes, are thought to be branches of the main fault (MS p. 3), the latter is possibly mineralized, and may have been the access channel for the ore solutions which supplied the main ore body.

The visible 12-foot thickness of the largest ore lens was sampled (Sample C-1); it assayed 20.5 percent zinc in oxidized form. Comparable values are shown in assays made from grid, channel, talus and grab samples collected by others. The individual small lenses appear to contain a similar grade of ore of similar type. The aggregate of exposed ore lenses and interbedded waste is estimated to average 3 percent zinc for a thickness of 15 feet and a strike length of 300 feet, and should be at least that good for a dip extension of 100 to 250 feet, down to the main fault.

RESERVES

From the dimensions of the ore horizon summarized in the preceding paragraph, the ore body is thought to contain about 65,000 tons (at 12 cubic feet per ton) of inferred ore averaging 3 percent zinc. No attempt is made to estimate tonnage of ore along the main

fault. The ore cannot be classed as "indicated" unless drilling proves its continuity.

Additional deposits of zinc ore, not included in the reserve figures, may occur along the main fault; for it seems likely that this fault, if it was the channel for the ore solutions (MS p. 5), and if it is as highly brecciated as its supposed branches, would offer conditions favorable to mineralization. The extend and grade of this supposed breccia-zone ore body cannot be guessed unless some trenching is done.

EXPLORATION

Two types of exploration are possible; trenching for ore suspected along the main fault, and diamond drilling for continuity of the bedded ore. Trenching should be done first; for only if important mineralization is shown by trenching across the main fault would it be worthwhile to drill the dip extension of the exposed bedded ore. It is doubtful if the bedded ore by itself would be a profitable deposit to mine, but supplemented by ore along the fault it might be so.

The initial trench could be dug for 100 feet westward along the line of Section BB' from the westernmost outcrop on that line. Such a trench should furnish enough information about the main fault, whether with or without mineralization, to allow better placement of the next trenches.

Diamond drilling of the bedded deposit should be undertaken only if supplementary ore is indicated by trenching. A row of short vertical holes may be drilled along the flat ridge above the ore outcrops. The first, or south hole could be placed 120 feet S. 60° W. of Stake 1,

and the remaining holes at 50-foot intervals along a line running N. 11° E. of Hole 1. These holes are expected to be 60 to 100 feet deep, and to indicate a dip length of 60 to 115 feet for the base of the ore body. Discovery of ore in these holes would guide further drilling.

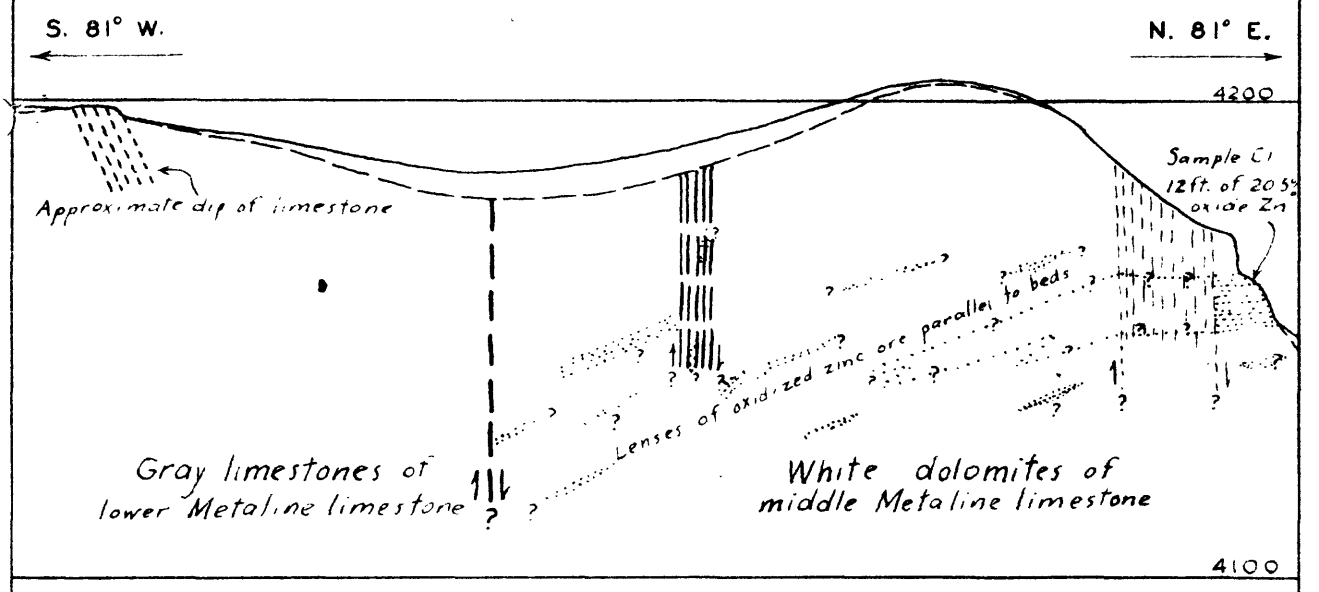
Water for the drill would have to be taken from the north fork of Currant Creek, about 3000 feet south and 500 feet lower, or from a higher point on the same creek 1 mile to the east and at the same elevation as the prospect.

April 22, 1945.

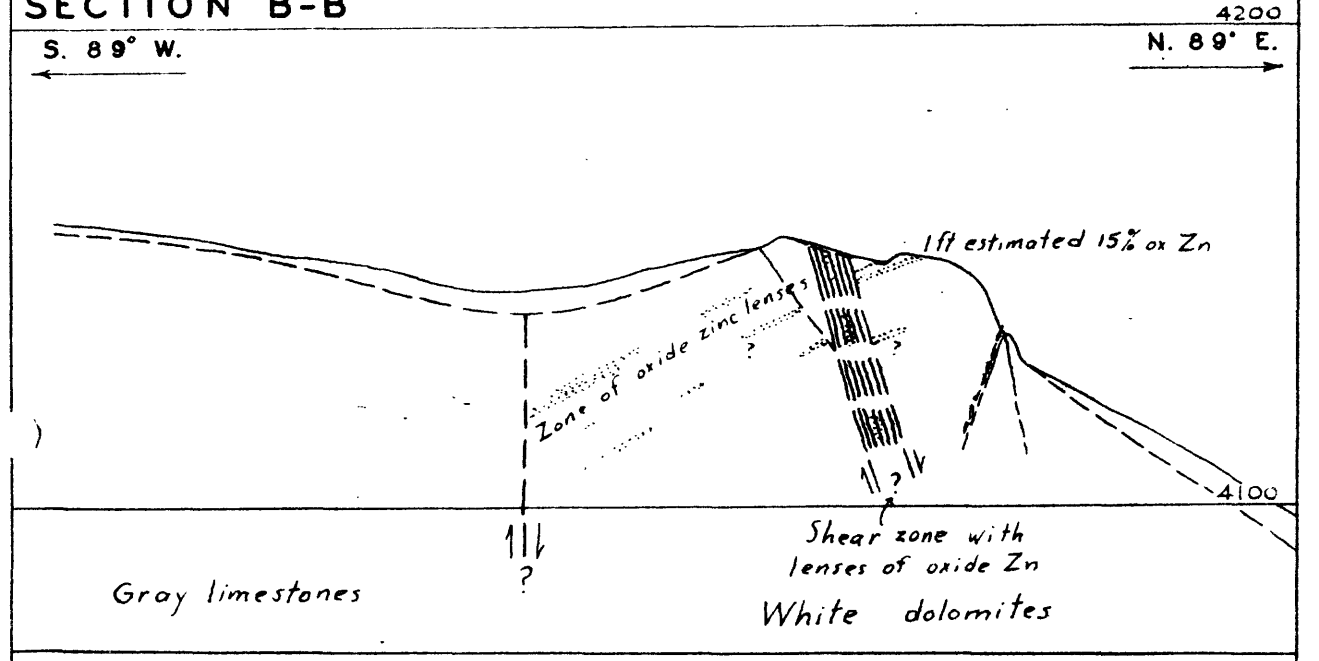
UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

STRATEGIC MINERALS INVESTIGATIONS
PRELIMINARY MAP Wn07-1

SECTION A-A'



SECTION B-B'



SECTIONS A-A' AND B-B'

CARBO PROSPECT

U. S. Geological Survey
Spokane Regional Office

NORTHPORT DISTRICT, STEVENS CO., WASHINGTON

NOTE: ALL ROCKS BELONG TO MIDDLE CAMBRIAN METALINE LIMESTONE.

SCALE IN FEET

40 20 0 40

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OUTCROP MAP

CARBO PROSPECT

NORTHPORT DISTRICT, STEVENS CO., WASHINGTON

SCALE IN FEET
40 20 0 40

CONTOUR INTERVAL = 25 FEET

NOTE: ALL ROCKS BELONG TO MIDDLE CAMBRIAN METALINE LIMESTONE.

EXPLANATION

- LIMIT OF OUTCROP
- STRIKE AND DIP OF FAULT ZONE
- STRIKE AND DIP OF BEDS
- BRECCIA
- OXIDIZED ZINC MINERALS
- STRIKE AND DIP OF JOINTS

Ridge of barren white dolomite

White dolomites

Low

4225

4200

4175

Cherty white dolomite

Stake 1

Vertical

Grooved down dip

Shattered white dolomite

4150

4125

4100

4075

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F. M. PAPARICH JANUARY 1945