Docket

UNITED STATES
DEPARTMENT OF THE INTERIOR
OFFICE OF MINERALS EXPLORATION
So. 157 Howard Street
Spokane, Washington 99204
January 17, 1964

Memorandum

To: Chief, Division of Field Operations

From: Acting Field Officer, Region I

Subject: OME-6307 (Silver-Gold)
Ruby Silver Mines, Inc.
Hancock, et al., Claims
Silver Bow County, Montana

The subject property was inspected the afternoon of July 25, 1963, accompanied by Walter E. Bauer, geologist for the applicant. Prior to visiting the property certain points raised in your referral memorandum of July 11, 1963, were discussed.

Bauer thinks that he might be able to secure the Snow Bird Claim, but that there is little chance of getting the Hyde Park and no chance whatsoever of getting Anna, Haxby Fraction, or American Claims. However, the total lengths of the four veins that lie within Hyde Park Extension, Hancock, Montana, and Manhattan Claims excluding 200 feet measured at 90° from each end line (pl. 1) are:

| | | | |
|---|---|---|---|
| No. 1 vein | about | 520 | feet |
| No. 2 vein | " | 500 | " |
| No. 3 FW vein | " | 700 | " |
| No. 3 HW vein | " | 720 | " |

If the excluded 200 feet is measured along the vein, the above lengths that could be explored would be greater.

The geophysical survey indicates that there may be favorable mineralization on each of the veins west of the Anna and north of the American Claims. However, the ground in which the geophysical surveys suggest the most promise is that in which the tensional components are strongest -- that is, within the Hyde Park Extension, Hancock, Montana, and Manhattan Claims.

On the ground the No. 1 vein crops out in several places as a hard quartz ridge. The other three veins are exposed in trenches as soft iron-oxide-stained zones between highly altered wall rock. The

See Map 1
in Envelope

existence and potential of the veins at depth can only be inferred from the results of the geophysical work and from the fact that there has been a limited recorded production from the Anna, Ardsley, and Agnes mines from one or more of these veins.

The regional and local geology has been described by various geologists in reports listed in the application and the application gives a summary to which I can add little.

However, the salient known facts pertinent to an appraisal of this application may be resummarized as follows:

1. Veins in the Southwest Butte area belong to the group classified by Reno Sales as peripheral and comprise most of the best silver-producing veins in the district.

2. The Ardsley mine has a reported production of 29,442 tons with an average grade of 25.7 ounces silver per ton and a value of $32.90 per ton from the No. 1 vein. The Anna mine has produced 404 tons with an average grade of 0.69 ounce gold and 42.2 ounces silver per ton and a value of $74.79 per ton from the No. 2 and the No. 3 FW vein. The Agnes mine has produced about 1,000 tons with an average grade of 17.0 ounces silver per ton and a value of $23.00 per ton from the No. 3 HW vein. The production from these mines came from depths of approximately 520 feet, 320 feet, and 220 feet, respectively, which suggests that the silver values increase to the vicinity of 300 feet of depth and start to decrease somewhere between 300 and 500 feet. The base metal content of all production is insignificant (application - page 2).

3. The four veins have been traced across the applicant's property by geophysical survey. Trenches showed No. 3 HW and No. 3 FW veins as bands of iron oxide, iron-stained clay, and small bits of broken quartz between walls of highly altered quartz monzonite, which is typical of the surface expression of many productive veins of this system.

Within the applicant's claims the geophysical survey suggests that the chance of finding significant amounts of ore is perhaps greatest on the No. 3 FW and No. 3 HW veins but that the No. 1 and No. 2 veins are only a little less promising.

It is concluded, after excluding those vein segments within 200 feet of outside boundaries, that there is sufficient length on each vein and sufficient promise of finding one or more ore shoots to justify additional exploration. However, I agree with your statement regarding the flamboyant program as it is presented in the application. Before embarking on the proposed or any other underground work, the veins certainly should be probed by more than two diamond drill holes from the surface. Still to be demonstrated are such points as: which vein or veins offer the best target areas; what is the best

shaft location with respect to those target areas; what is the best depth at which to do the underground work; and finally, how much drifting and crosscutting within reason will be required to explore the target areas.

In my opinion at least two stages of diamond drilling from the surface should be completed before any underground work can be reasonably set up. I have indicated by plan and section on plate 1 three preliminary holes for a possible first stage. However, the acceptability by the Government of this recommendation depends in part upon the manner of measuring the 200 feet to exterior boundaries which will be excluded. Where appropriate, this will be brought out following the description of the intercepts of each hole with each vein.

Stage I

Establish 2 drill stations, 1 about 130 feet S. 15° W., the other about 520 feet S. 40° W. from the northeast corner of Manhattan Claim as shown on plate 1. Diamond drill Holes 1 and 2 from Station 1 and Hole 3 from Station 2 as follows:

| Hole No. | Bearing | Inclination | Depth (feet) |
|---|---|---|---|
| DDH 1 | N. 42° W. | -55° | 1,100 |
| DDH 2 | N. 23° W. | -60° | 1,200 |
| DDH 3 | N. 40° W. | -60° | 1,100 |

DDH 1 (Sec. A-A') should intersect the veins at approximately the following points:

| Vein No. | Hole depth (feet) | Vein depth (feet) |
|---|---|---|
| 3 HW | 540 | 430 |
| 3 FW | 625 | 500 |
| 2 | 890 | 770 |
| 1 | 1,050 | 900 |

DDH 2 (Sec. B-B') should intersect the veins at approximately the following points:

| Vein No. | Hole depth (feet) | Vein depth (feet) |
|---|---|---|
| 3 HW | 585 | 500 |
| 3 FW | 680 | 580 |
| 2 | 1,010 | 925 |
| 1 | 1,120 | 1,025 |

Measured at right angles to the Montana No. 1 east end line this hole will intersect Veins No. 3 HW and No. 3 FW, respectively, at 120 and 150 feet, but if measured along the vein, which would appear to be more reasonable and proper, the respective distances are 200 feet and 245 feet. The intercepts with Vein No. 2 and No. 1 present no problem.

DDH 3 (Sec. C-C') should intersect the veins at approximately the following points:

| Vein No. | Hole depth (feet) | Vein depth (feet) |
|---|---|---|
| 3 HW | 540 | 465 |
| 3 FW | 680 | 580 |
| 2 | 870 | 790 |
| 1 | 1,030 | 945 |

There is no problem regarding the distance of the vein intercepts from exterior boundaries. However, if the limit of exploration is considered as being a point at the surface projected vertically in the plane of the vein, this hole could only be drilled to 750 feet to pass through Veins No. 3 HW and No. 3 FW. If the intercept with Vein No. 2 is acceptable but that with Vein No. 1 is considered unacceptable because the vein vertically above the intercept apexes on the Anna Claim, then this hole could only be drilled to a depth of 950 feet.

Considering the diameter of the holes and the distances on each vein between the hole intercepts, about all that could be expected from Stage I would be an indication of the vein width, that it contained silver and/or base metal minerals, and the relative amounts of each. If one or more strong veins containing silver minerals in amounts relatively large in comparison with those of the base metals should be indicated, from 2 to 5 shorter Stage II holes should be drilled successfully before underground work could be justified. However, the location, bearing, inclination, and depth of these holes cannot be specified until the Stage I holes have been drilled and unless they provide evidence of a potentially favorable target area. Probably a total of 2,400 to 3,000 feet of hole would be needed for this stage, but whether 4 to 5 holes averaging 600 feet deep or 2 to 3 holes averaging 1,000 feet deep will be required cannot be predicted.

To recommend a reasonable Stage III without the results of the prior drilling is essentially impossible. It is possible that a 1,000-foot shaft may be too deep to justify as a silver project and it is just as possible that a 500-foot shaft may not be deep enough.

Unfortunately, I did not have an opportunity to study the application carefully before making the inspection of the property. Therefore, I had not thought this counter proposal through and could not discuss it with Bauer at that time. I would be inclined to recommend a project limited to the two drilling stages with the understanding that if they were successful, the contract would be amended to authorize additional funds for the underground work, but before writing the applicant to find out if this would be acceptable, I would appreciate your comments.

Before digging into this, I had expected to recommend a denial but considering the geophysical evidence, the known habit and mineralogy of the veins in this area, and the fact that three limited operations on these veins have produced silver from the area, possibly a staged program as outlined above might be worthwhile.

D. R. MacLaren

Enclosure

Director's Reading File
Resources Rearch Branch Chief

DRMacLaren:mls

We believe that this is the major structure in this area and that its ores will have a dollar dominance of gold and silver with minor base metals that will increase with depth.

The four veins of this lode from north to south are the No. 1, or Ardsley; No. 2, No. 3, F.W. and No. 3, H.W. or Agnes.

Additional details are itemized in 3e below.

There are no production facilities.

b. Present company's activity in the area

In 1960, geological and geophysical programs were initiated to determine the extent and potential of mineralization in the south-western Butte area. The results of this three-year program are shown on the enclosed maps.

Backhoe trenching over high anomalous areas was used to expose the veins where the cover was extensive.

All of this work was done under the direction of Mr. Bauer, formerly chief geologist and geophysist, New Park Mining Company, Salt Lake City, Utah.

c. Past production

The production records on the Anna Mine were obtained from the U.S. Bureau of Mines, Albany, Oregon. The Ardsley production was tabulated from the owners' settlement records. The Agnes grade and production was estimated from dump samples, the size of the dump and conversations with the person who supervised the Agnes work

Past production: Hancock lode

| Mine | Depth | Vein Mined | Tons | Grade Au | Ag | Pb | Cu | Zn | $/ton | Gross $ |
|---|---|---|---|---|---|---|---|---|---|---|
| Agnes | 220' | No. 3,H.W. | ± 1,000 | .08 | 17.0 | .08 | .01 | .35 | 23.00 | 23,000.00(est) |
| Ardsley | 520' | No. 1 | 29,442 | .06 | 2.57 | .03 | .02 | .05 | 32.90 | 968,641.80 |
| Anna | 320' | No.2,No.3's | 404 | .69 | 42.2 | .20 | .02 | .25 | 74.79 | 30,215.16 |
| | | Total: | 30,846 | .07 | 3.56 | | | | 33.13 | 1,021,856.96 |

The base metals are more or less estimated and are not included in the gross dollar production. The latter is calculated at $35 gold and $1.20 silver.

The Agnes Mine was prospected through an inclined shaft with about 100 feet of drifting on the 200 level. The first 120 feet was low-grade leached vein; the last 100 feet was ore by present standards. That portion of the ore free of zinc was shipped

to the Timber Butte Mill in Butte. The rest of the ore is still in the dump. Assays from the dump are as follows:

| Date | Remarks | Au | Ag | Pb | Cu | Zn | Sampler |
|---|---|---|---|---|---|---|---|
| 1958 | Select ore from dump | .11 | $54^{5}$ | $1^{2}$ | $0^{2}$ | $4^{1}$ | Bauer |
| 1962 | E. side, 50% quartz, 50% alt. monzonite | .03 | $2^{2}$ | -- | -- | $3^{6}$ | Bauer |
| 1962 | W. side, 50% quartz, 50% alt. monzonite | .03 | $4^{6}$ | -- | -- | $3^{5}$ | Bauer |
| 1962 | E. side, low grade qtz. vn. | .04 | $7^{8}$ | $2^{1}$ | -- | $3^{6}$ | Bauer |
| 1962 | W. Side, " " " " | .05 | $11^{0}$ | $0^{8}$ | -- | $3^{5}$ | Bauer |

Work at the Agnes stopped when the Ardsley ore body was found. The Agnes probably had a 4,000 ton ore reserve when abandoned in 1926.

The Ardsley ore was a high silica, low zinc, silver ore body. Almost all of the production came from one ore shoot on one level (the 365'). This ore shoot had a strike length of 235' and an average width of 20'. The ore shoot raked westward at about 35 degrees.

Additional details are shown in Fig. B.

The Anna claim is not leased by Ruby Silver Mines, Inc. This shaft is shown in Fig's. A, B & C. The mine was developed by two levels (150' and 300') and produced some ore from the No. 3 F.W., No. 3 H.W. and a small amount from the No. 2 vein.

The ore was an argentite-gold ore with minor base metals. When the mine was closed by government order L-208, the mine operator had 4,800 tons of .77 Au, $45^{4}$ Ag. ore blocked out. Examples of the better ore are:

| Au | Ag | Pb | Cu | Zn |
|---|---|---|---|---|
| .38 | $47^{5}$ | $2^{5}$ | $0^{2}$ | $3^{0}$ |
| .95 | $67^{5}$ | $3^{3}$ | $0^{2}$ | $7^{4}$ |

d. Ore reserves and ore potential

There is insufficient data for a formal ore reserve.

By assuming that the veins average 5 feet wide and that the limits of metalization are confined within the dash-dot lines of Fig. 3, the following crude potential can be calculated to 2,000 feet below the zero reference line from the G.P. data:

| Vein | Tons |
|---|---|
| No. 3 H.W. | 2,157,000 |
| No. 3 F.W. | 1,671,000 |
| No. 2 | 1,641,000 |
| No. 1 | 1,042,000 |
| | 6,511,000 |

This OMS project will investigate the most favorable portion of this area with 3,000 feet of diamond drilling, a 1,100 foot shaft, 1,000 feet of drifting and 1,875 feet of long hole drilling. The ore potential to be investigated by this underground work is tabulated in the following table:

| Vein | L x h x w | Tons |
|---|---|---|
| No. 3 H.W. | 500 x 540 x 8 | 220,000 |
| No. 3 F.W. | 560 x 700 x 8 | 320,000 |
| No. 2 | 730 x 280 x 8 | 165,000 |
| No. 1 | 650 x 440 x 5 | 143,000 |
| | | 848,000 |

The above table represents the portion lying over the proposed 1,000 feet of drift, with an inferred sulphide content of over 5%. It is also in the area of strongest tensional contortion in the Hancock lode. The widths shown are conservative estimates.

e. Mining geology and geophysics

The mining camp at Butte, Montana, has been active since 1864 when gold was first discovered in the area. From 1864 through 1882, gold and silver were the principal metals produced. Copper was discovered in 1876 and has dominated the production to the present time. Total metal value produced to date is in excess of 3½ billion dollars.

The country rock is predominantly quartz monzonite with minor dykes of aplite, rhyolite porphyry and granite porphyry.

The ores occur in the east-west (Anaconda) vein system and are generally south dipping. Two other vein systems are present but are not productive outside of the area of major copper production. As a group, the Anaconda veins are very persistent at depth.

Present mining is now more than a mile below the surface.

Mining Geology: References

The most important of these are:

U.S.G.S. Professional Paper 74 (1912), W.H. Weed

A.I.M.E. Transactions, Vol. 46, 1914, Reno H. Sales

A.I.M.E. Transactions, Vol. 58, Billingsley and Grimes

Mineral Deposits, Lindgren, pp. 161-162, 615-618

Economic Geology, Vol. 44, No. 6, Reno H. Sales

Points of interest from the above are as follows:

1) W. H. Weed believed that the Butte silver-quartz veins somewhat predated the copper veins and that the Jessie May vein was later than the copper veins. Paul Billingsley held that almost all of the Butte veins were later than the (hypothermal) aplite stage veins. Reno Sales was positive that the quartz veins in the central area were all related to the copper veins.

2) The leached oxidized zone is usually 300 to 400 feet deep and is a generalized plane in spite of surface irregularities. In the central zone, the top of the sulphides varied from the bottom of the oxidized zone to about 1,000 feet below the surface.

3) Some of the veins outcrop as iron-stained quartz and vein matter. However, the outcrops are more often soft and consist of either altered monzonite with some quartz and iron oxide or bands of iron-stained clay and crushed monzonite. The vein outcrops at Butte are partly covered by an alluvial wash from 5 to 20 feet thick. The Butte veins do not outcrop as ore.

4) The Butte deposits are a type example of both vertical and horizontal zoning. Outward and upward from the central core, the predominant metals are copper, zinc, lead, manganese, silver and gold. The first three minerals predominantly occur as mesothermal deposits. The last two are epithermal deposits (excluding Weeds quartz-silver veins).

5) Reno Sales divided the ore deposition at Butte into central, intermediate and peripheral. The first two are copper zones;

the last covers all remaining deposits. The first two zones and the lower part of the third are mesothermal deposits. The remaining ores of the peripheral zone are lower epithermal.

f. Ore expectations or potential

The southwest Butte area is in the peripheral zone of Butte as defined by Sales. W.H. Weed has some of the quartz veins in this area shown as quartz-silver veins. The No. 1 vein has a resistent quartz vein outcrop from the Ardsley area westward to the Hyde Park claim that was mapped as a quartz-silver vein and in barren underground. The Ardsley Butte oreshoot, although in the No. 1 vein, does not have a prominent outcrop and we are quite sure that the oresof the Hancock lode are later than the quartz-silver veins and may be later than the copper veins.

The surface expression of these oreshoots is a marked increase in wall rock alteration, light buff, tan and dark reddish-brown stained iron oxides and a somewhat friable milky quartz with occasional specks of pyrite, tetrahedrite and galena in it.

The values begin to increase in these oreshoots at from 100 to 200 feet below the surface as a thin sulphide band widening downward (i.e., the Anna Mine).

The silver ores of the Hancock lode are probably of the same age as the ores of the Jessie May vein described by W. H. Weed. It is also quite likely that these ores are similar to those mined from the Bluebird, Nettle and Hibernia Mines (See Fig. A). Each of these mines was a large silver producer in the 1890's.

Tension vs. shear veins

Fig. A. is a 1,000 scale map showing the position of the known veins in the Southwest Butte Area. The veins mapped by Weed are combined with the veins located by geophysics, backhoe trenching and underground workings. The favorable areas are enclosed by dashed lines.

Note that there is a decided north-south increase in the inferred sulphides along the G.P. lines 15W and 10E in that portion of the veins with the strongest tensional components.

Sequence of deposition of peripheral zone

The probable sequence of deposition in this area is as

follows:

1) Weed's quartz-silver veins formed in the east-west veins. Locally strong influx of quartz with moderate wall rock alteration and modest silver potential.

2) Additional wall rock alteration from the spent solutions of the copper stage. Peripheral ore deposition was probably manganese - base metal with locally important gold-silver. The Isele, Orphan Girl, Norwich and Black Hawk areas are examples.

3) A reopening and contortion of the veins from a southwest compressional force followed by the deposition of the argentite-tetrahedrite gold ores of the southwest areas. In the main, the major portion of these ores were probably deposited in the veins of the Hancock lode. The Bluebird, Jewel and Big Bend veins were also involved in the metalization as were lesser intervening veins.

Geophysical survey:

The extent is indicated in Fig. A. There were 8 lines, usually 500 feet apart with 100-foot stations. A total of 67,500 feet of lines was run.

We considered using I.P. and E.M. surveys until we noted the presence of an induced field much stronger than we could hope to produce. All of our surveys took advantage of this induced potential and the secondary field resulting.

The vertical E.M. secondary field was measured by simply using a standard E.M. search coil and measuring dip angles at the stations along the traverse. Depths to the conductors were determined by applying the depth-slope angle curves used in AFMAG data. (Geophysics, Vol. 24, No. 4, and Transactions CIMM, Vol. 61.)

The galvanic components of the induced field were measured in the other method used. R. S. Dahlberg, Jr., Geophysics, Vol. X, used a similar method in investigating a weak galvanic field induced by telluric currents in the Texas oil fields. The two methods compliment each other and the combined data are decidedly interpretative.

EM surveys are seldom effective with veins of less than

5% sulphides (personal communication, A S & R geophysists) and it is probable that the galvanic metal factor of 80 units marks this 5% combined sulphides' upper limit. Above this, the sulphides gradually decrease, topping out before surface - 200 feet. These upper areas may be silver-bearing but for the present we consider them marginal upper portions of the veins. Sphalerite is not considered in the above, since it is a non-conductor of electricity and cannot be detected.

g. Enclosed maps

Fig's. B and C are long sections of the No. 1 and No. 3 F.W. veins.

Fig's. D and E show portions of the No. 2 and No. 3 H.W. long sections.

Fig's. F, G and H are cross-sections on G.P. lines 5E, OE and 15W in the area of principal interest.

Fig. I is a 1" to 400' plan map of the immediate area of the proposed OME project.

Fig. J shows the projected position of the 4 vein on the proposed 1,000 level and the work program involved.

Fig. K is a claim map of the area. Those claims to be included in this project are colored.

None of the enclosed maps needs to be returned.

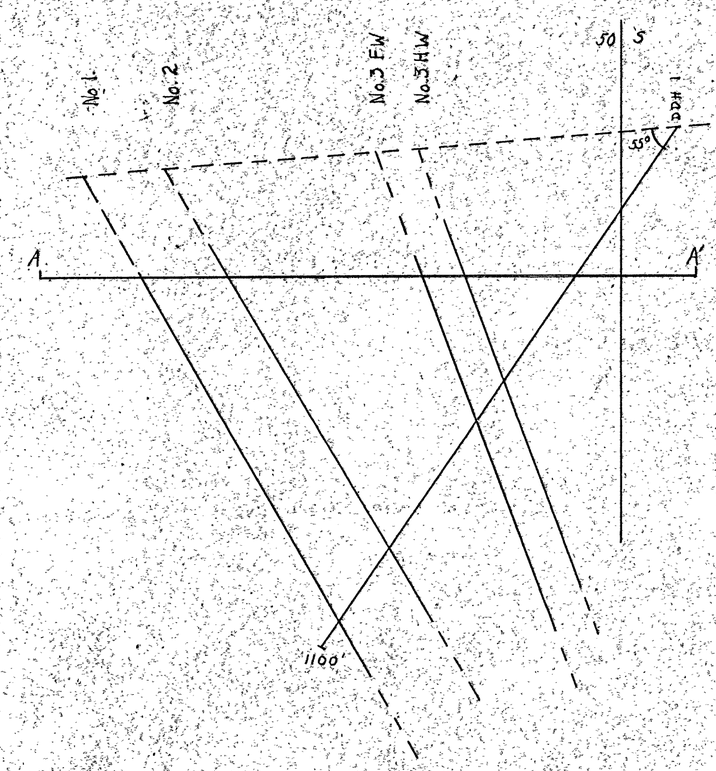
4. a. Accessibility of property

This property is on the outskirts of Butte, Montana, and west of Silver Bow creek.

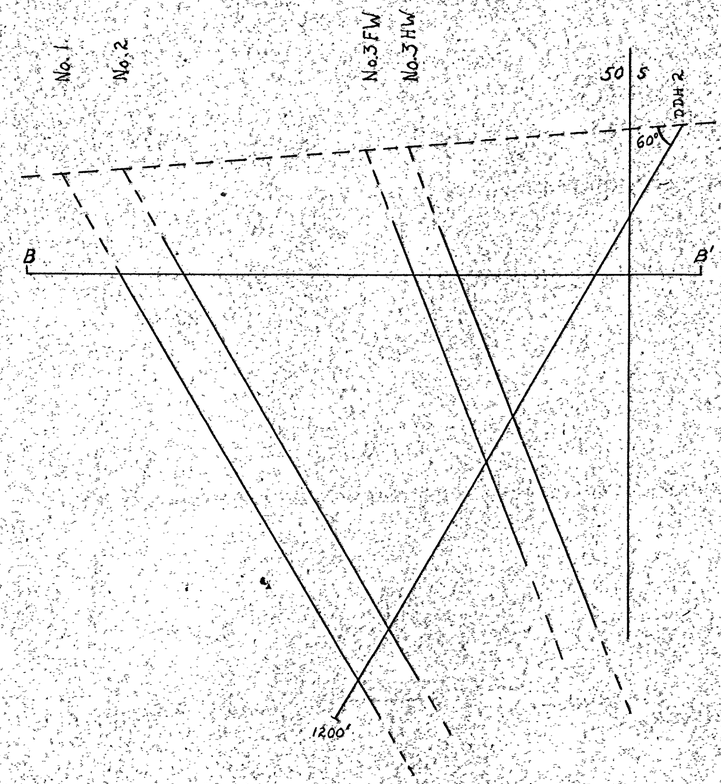
Mr. Bauer lives at 3115 Ottawa St., Butte, Montana; phone:792-7296. He will take the OME representative to the property at any time.

b. Shipping points

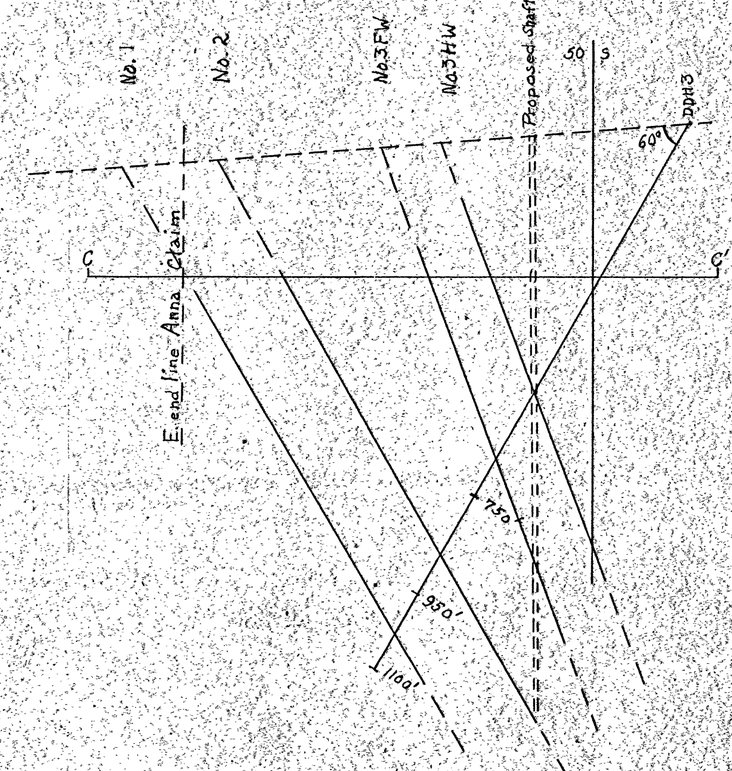
Butte is a major shipping point, has two major railroads, two main highways and an air terminal.



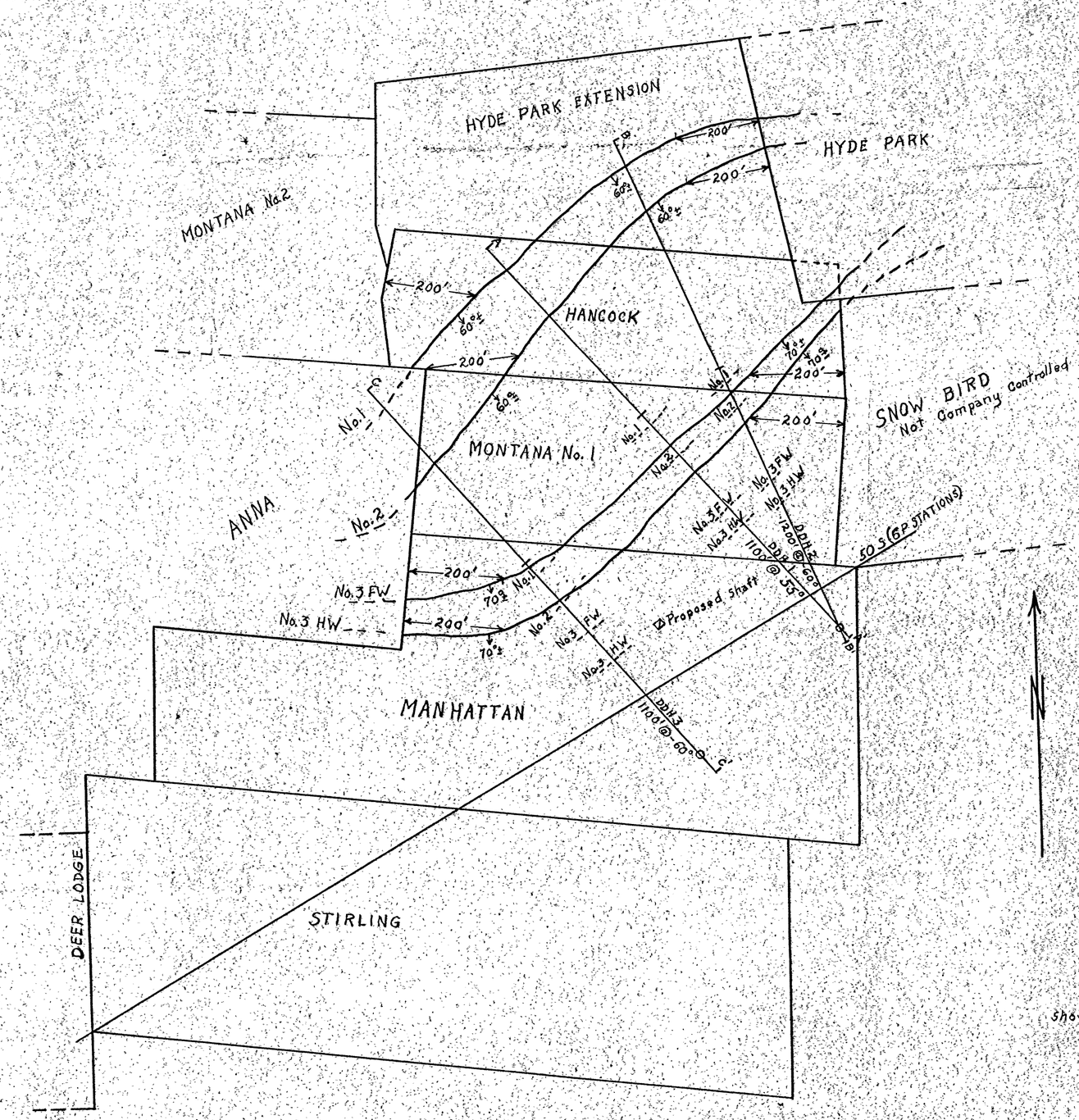

Section A-A'




Section B-B'




Section C-C'




Plan and Sections
Showing relation between veins and claim boundaries
and locations of proposed drill holes
Ruby-Silver Mines, Inc.
Hancock, et al, claims
Silver Bow County Montana

200 100 0 200 Feet

Plate 1
January, 1964

Map 1