OME

UNITED STATES
DEPARTMENT OF THE INTERIOR
OFFICE OF MINERALS EXPLORATION
So. 157 Howard Street
Spokane 4, Washington
May 21, 1960

Memorandum

To: Chief, Division of Field Operations, OME

From: Acting Field Officer, Region I

Subject: Field examination report, Docket No. OME-6082 (Lead-Zinc), Northern Milling Company, Marietta Mine, Broadwater County, Montana

## INTRODUCTION, CONCLUSIONS, AND RECOMMENDATIONS

Northern Milling Company applied for OME assistance to explore for lead-zinc ore in the Marietta mine, Broadwater County, Montana, by rehabilitating 1,580 feet of crosscut, driving 3,800 feet of drifts and crosscuts, and raising 436 feet at a total estimated cost of $337,280, of which the Government's share would be 50 percent or $168,640.

The property was examined May 5, in the company of Paul Raber, President and Manager, Edward Wieglenda, Mine Superintendent, and Peter Sweeney, Geologist. About 3 hours were spent underground inspecting the No. 4 and No. 5 levels and some of the intervening stopes. The project and costs were discussed with Mr. Raber in the evening of May 4 and again with Mr. Raber and William Rogers Wade, consultant for the company, in the mine office after the underground examination and that evening in Townsend. As a result of the examination and conferences, the applicant submitted an amended application which was received May 23.

It is concluded that the chance of making a significant discovery of lead ore is good and a modified program in two stages which may be carried out simultaneously is recommended.

## LOCATION AND ACCESSIBILITY

The property is in secs. 10, 11, 14, and 15, T. 7 N., R. 1 W., P.M. about 15 miles by road from Townsend, Montana. It may be reached from Townsend by proceeding 1 mile northerly from town

on U. S. Highway 10 N, thence turn left just after crossing a concrete bridge and following a gravel surfaced road about 14 miles up Indian Creek Canyon to the mine. The roads can be kept open for year-round operation.

## PROPERTY

Of the 20 patented and 17 unpatented claims which the company controls by purchase agreement, copies of which accompany the application, only the following 8 claims will benefit from the project:

### Patented

| | | |
|---|---|---|
| Switzerland | Registered | No. 4746 |
| Gold Dust | " | No. 2824 |
| Marietta | " | No. 8226 |
| New Era | " | No. 4946 |
| Venezuela | " | No. 5203 |
| Big Jack | " | No. 10840 |
| Jack Smart | " | No. 10840 |

### Unpatented

| | | |
|---|---|---|
| Porcupine | Book 20 | Page 223 |

In the area to be explored about 12,500 feet of drift and crosscut have been driven on 4 main levels and 1 intermediate level, developing the Marietta, the Gold Dust, and the Blue veins. The Mason Tunnel, about 300 feet below the lowest working level, includes 1,693 feet of crosscut. The ground stands well and very little timber has been necessary to hold either the levels or the stopes.

A flotation mill of 200 tons per day capacity is currently milling ore being stoped on the Marietta vein from the No. 4 and No. 5 levels. The mill is located at the portal of the No. 5 level.

There is sufficient timber on the property for mine requirements. Water for the mill is presently taken from the Mason Tunnel where a 3-foot dam has been installed near the portal.

## GEOLOGY

### General

The geology of the area is described in "Geology and Mineral Deposits, East Flank of the Elkhorn Mountains," Broadwater County, Montana, by R. A. Weeks, M. R. Klepper, V. L. Freeman, and E. T. Ruppel, U. S. Geological Survey (manuscript in review). The rocks in the area comprise the lower member of the Elkhorn Mountains volcanic series. They are mainly pyroclastic rocks that have been mapped as andesite; chemically they are chiefly rhyodacite and rhyobasalt according to Weeks. The andesite has been moderately folded, faulted, and intruded by small stocks that range in composition from granitic to gabbroic. The pyroclastics are Cretaceous in age and the intrusives are late Cretaceous.

Veins contain varying amounts of pyrite, galena, sphalerite, arsenopyrite, chalcopyrite, and tetrahedrite with values in gold and silver. Gangue minerals are quartz ankerite, siderite, calcite, and dolomite. For the most part the veins are replacements and partly banded fracture fillings in silicified, sericitized, clay-altered, and pyritized rock, typically consisting of broken altered rock laced with lenses and stringers of sulfides, gangue minerals and gouge. In places the veins are clean cut fracture fillings with little or no gouge. They range to as much as several feet thick and a few thousand feet long, and have been exploited over a vertical range of 600 to 700 feet.

### Local

The Marietta mine is in an area of andesite tuffs that are intruded by a few small bodies of diorite porphyry. The one closest to the mine workings is a few hundred yards to the west, according to the applicant. As there was about 2-3 feet of snow on the surface its exact location could not be checked. Weeks reports similar intrusive igneous rock on the Venezuela claim and states that the volcanic rocks in the vicinity are slightly metamorphosed, suggesting that an intrusive body of appreciable size may underlie the area at no great depth.

On the property there are at least four veins from which ore has been mined, the Marietta, the Gold Dust, the Little Annie(?), and the Blue veins. The Marietta and the Blue veins are in a northerly trending shear zone and the Gold Dust and Little Annie veins are in an easterly trending shear zone. The veins contain pyrite, galena, sphalerite, arsenopyrite, and small amounts of chalcopyrite. Gold occurs in combination with the pyrite and arsenopyrite and also, according to tests conducted by William R. Wade, Consulting Engineer, as free gold in micro-fractures in these two minerals. Gangue minerals are quartz and carbonate probably ankerite or siderite.

The veins range in thickness from a few inches to as much as 6 feet, and are mainly fracture fillings, in part banded. The Marietta vein has been developed for a horizontal distance of about 1,000 feet and a vertical distance of more than 300 feet. The stopable area on the Marietta vein is about 340 feet long through a vertical distance of more than 230 feet. The vein has an average dip of about 25° so the stoped height in the plane of the vein is about 500 feet. Based on the widths of 80 samples taken by the applicant, 45 on the No. 5 level and 35 on the No. 4 level, the ore zone has an average width of about 4 feet. About half of the area has been stoped and much of the remaining ground appears to be of minable grade.

On the basis of only about 200 tons shipped by Al Dance in 1934 and 1936 (see "shipping records" included with the application) the average grade is 1.95 ounces gold and 6.35 ounces silver per ton, 2.93 percent lead, and 2.13 percent zinc. I took only 2 check samples, one a chip sample over 2 feet of vein on the No. 5 level and the other a chip sample over 4 feet of vein in a stope just below the No. 4 level. The assays were:

| Sample CME No. | Width (feet) | Au (oz/T) | Ag (oz/T) | Pb (percent) | Zn (percent) |
|---|---|---|---|---|---|
| 1 | 2 | 0.76 | 3.8 | 2.5 | 0.5 |
| 2 | 4 | 0.22 | 2.5 | 3.0 | Tr |
| Av. | 3 | 0.40 | 2.9 | 2.8 | |

Because of the spotty occurrence of the values the bulk samples represented by the assays of the ore shipped might give a much closer picture of the grade that could be expected. About half of the ore shipped came from above the No. 4 level which is at about the lower limit of oxidation which might account for the lower gold and silver values.

The Gold Dust vein has been developed over a horizontal distance of about 500 feet and a vertical distance of about 76 feet. On the basis of 29.6 tons shipped by Kemper and Williams in 1931 and by Dance in 1941 (see "shipping records" with application) ore on the Gold Dust vein has an average value of 1.29 ounces gold and 10.5 ounces silver per ton, 11.4 percent lead, and 3.2 percent zinc. Five samples of this vein cut on the No. 5 level by the applicant assayed:

| Sample | Width (feet) | Au (oz/T) | Ag (oz/T) | Pb (percent) |
|---|---|---|---|---|
| 1 | 1.0 | 0.97 | 12.9 | 13.0 |
| 2 | 2.0 | 1.18 | 7.9 | 7.8 |
| 3 | 2.0 | 0.64 | 5.6 | 4.2 |
| 4 | 2.0 | 0.34 | 3.5 | 3.2 |
| 5 | 1.6 | 0.33 | 4.8 | 3.2 |
| Av. | 20.8 | 0.76 | 6.33 | 5.62 |

The lower limit of oxidation on the Gold Dust vein appears to be about at the No. 5 level.

The Little Annie vein crops out about 1,750 feet almost due east of the portal of the No. 4 level. The vein strikes about N. 54° E. and dips about 25° NW. It has been explored to a vertical depth of about 200 feet by an incline shaft about 480 feet long. The shaft was inaccessible when the examination was made, but it is reported that no drifts have been driven. Three hundred fifty-six tons of ore shipped had an average grade of 0.99 ounce gold and 8.24 ounces silver per ton, and 3.38 percent lead. No other assays from the Little Annie are available.

## DISCUSSION OF THE APPLICANT'S PROPOSAL

The applicant originally proposed to rehabilitate the Mason Tunnel, about 300 feet vertically below the No. 5 level, the lowest working level on the property, by cleaning out the tunnel and installing about 1,700 feet of track and air and water lines, and from the face of the tunnel, to explore the downward extension of the Gold Dust, Marietta, and Little Annie veins by crosscutting, drifting, and raising a total of 4,236 feet at an estimated total cost of $337,280.

The applicant was advised that in no event would OME consider a rehabilitation item costing $21,100, as indicated under item 5(a) of the application. He was also asked to consider diamond drilling the target area of the Marietta vein before incurring the cost of crosscutting and drifting some 1,600 feet to the projected ore zone. As the Little Annie and the Gold Dust veins must cross before reaching their projected positions, the advisability of two or three diamond drill holes in that area was also discussed.

The applicant feels very strongly that the installation of track and air and water lines in the Mason Tunnel is necessary to explore the Gold Dust and Little Annie veins at that horizon and therefore should be an allowed cost. However, he agreed to rehabilitate the Mason Tunnel at his sole expense but was not in favor of any diamond drilling. His prime objection was that because of the nature of the ore occurrence it would be quite possible for the holes to indicate material of a grade either much higher or much lower than the true average. This could very well be. He proposed instead to eliminate crosscutting to and drifting on the Marietta vein from the Mason Tunnel and in lieu thereof, to sink on the ore from the No. 5 level to the level of the Mason Tunnel, and drift north and south from the bottom of the winze. This would explore the Marietta for an additional vertical distance of 300 feet or, in the plane of the vein, for a distance of about 700 feet, if the average dip of 25° holds. An added advantage of exploring down dip with a winze is that if the vein should pinch out its lower limit will be established. Should this be 200 feet or more below the No. 5 level, measured in the plane of the vein, drifting from that point should be considered as exploration.

The amended application proposes to explore the Gold Dust veins by crosscutting and drifting and raising a total of 936 feet. He proposes to explore the Marietta vein by sinking a 670-foot two-compartment winze in ore, starting on the No. 5 level and drifting 600 feet from the bottom of the winze. He does not propose at this time any work to explore the Little Annie.

The total distance involved in the applicant's projection of the Little Annie from its known location on the surface and in the winze is rather far, and it is questionable whether it crosses the Gold Dust vein as the applicant believes. The applicant, in lieu of diamond drilling in this area prefers to extend the northeasterly crosscut to the Gold Dust vein drift easterly along the vein and raise in a promising area to the No. 5 level. If the raise indicates that the Little Annie does indeed cross the Gold Dust and shows encouraging mineralization, then a crosscut could be driven followed by drifting on the Little Annie.

## RECOMMENDED PROGRAM

Based on the proposals in the original and the amended applications, and discussion with the applicant, a two-stage program is recommended as follows, Stage II to have the prior approval of the Government (pl. 2):

### Stage I

**Mason Level**

1. Extend the northeasterly crosscut to the Gold Dust vein and drift on the Gold Dust vein a combined total of 400 feet.

2. Raise on the Gold Dust vein at location mutually agreed upon by the operator and the Government to the intersection of the Gold Dust and Little Annie veins--not to exceed 150 feet of raising.

3. Continue drifting easterly on the Gold Dust vein, if prior drifting has been encouraging, not to exceed 300 feet.

**No. 5 Level**

4. From the approximate location shown on plate 2 winze on the Marietta vein an inclined distance of 700 feet or to the bottom of the ore, whichever comes first. If the ore extends the full inclined distance of 700 feet, drift 200 feet northerly and 200 feet southerly from near the bottom of the winze. If the ore does not continue for the 700 feet but does continue for at least 200 feet, the drifting may be done above the Mason level with the prior approval of the Government.

### Stage II

**Mason Level**

If the raise on the Gold Dust vein shows that the Little Annie vein crosses it and shows encouraging mineralization, crosscut to and drift on the Little Annie vein a combined total of 700 feet.

## TIME ESTIMATE

It is estimated that the rate of advance and cost per foot for raising will be about the same as that for drifting and crosscutting and will be 4 feet per shift, 2 shifts per day, 25 days per month or 200 feet per month. The time required for the various items of work is:

| | |
|---|---|
| Gold Dust vein: | |
| Total crosscutting, drifting, and raising | 850 feet |
| Marietta vein: | |
| 500 level back drift to pocket | 85 " |
| Drift from bottom of winze | 400 " |
| Little Annie vein: | |
| Total crosscutting and drifting | 700 " |
| Total drifting, crosscutting, and raising | 2,035 feet |

At an estimated rate of advance of 200 feet per month it will require 10.17 months to complete the drifting.

The estimated rate of advance in the winze, including mucking, timbering, advancing pipe, rails, etc., is 2.5 feet per shift, 2 shifts per day, 25 days per month or 125 feet per month. The time required to complete the winzing will be 5.6 months.

Allowing for delays, it is estimated that the project can be completed within 12 months.

## COST ESTIMATE

The applicant's estimated cost per foot for crosscutting, drifting, and raising, including all equipment, is $79.76 in the original application; in the amended application it is $65.50. Both of these estimates are too high. In the amended application his estimate of $1,250 for cutting a 24'x12'x7.5' hoist station (2,160 cubic feet at $0.58 per cubic foot) is in line with similar work allowed Clayton Silver Mines (Docket No. DMEA-4659, Contract No. I6n-L1103). His estimate of costs for widening around collar, back drift to loading pocket ($34.41 per foot compared to my estimate of $45 per foot for drifting), cutting pocket and installing chute, widening raise and installations appear to be reasonable. His cost per foot for winzing, $139.75 dry or $159.57 if pumping is necessary, also compare well with the allowed cost for the Clayton Silver shaft sinking which was $149 per foot. The Clayton costs

were based on 1937 prices and wages, so $159 per foot for sinking would probably be realistic.

The following estimate is for crosscutting, drifting, and raising costs and is based on an assumed average rate of advance of 4 feet per shift, 2 shifts per day, 25 days per month; an average rock section for drifts and crosscuts of 5x7 and of a 2-compartment raise 5x9. Little timber has been necessary in the stopes and on the No. 4 and No. 5 levels. Miners should be able to install the necessary timber, track, and pipe as work progresses; one helper will assist motorman and miners where needed.

Labor and supervision - per 4-foot shaft

| | |
|---|---|
| 2 miners at $2.50/hr. - $20/shift | $ 40.00 |
| 1 motorman at $2.50/hr. - $20/shift | 20.00 |
| 1 helper at $2.25/hr. - $18/shift | 18.00 |
| ½ shift boss at $650/mo. | 13.00 |
| | $ 91.00 |
| FICA and other insurance at 20% | 18.20 |
| | $109.20 |
| | or $ 27.30/ft. |

Supplies - per 4-foot round

| | |
|---|---|
| Powder<br>30 lbs. at $25/100 lbs. | $ 7.50 |
| Caps, 14 at $0.03 | 0.42 |
| Fuse, 112 ft. at $0.02 | 2.24 |
| Bits, 300 ft./bit at $20 - 75 ft./round | 5.00 |
| Steel, 1 steel replaced/300 ft. at $16 - 75 ft./round | 4.00 |
| Rail, 24# plus fish plates, bolts, spikes at $1.60/ft. (discount at 50% - no salvage) | 3.20 |

Supplies - per 4-foot round (cont'd.)

| | |
|---|---|
| Ties, 4x6x36 3 ea. at $0.40 | $ 1.20 |
| Gas, oil, diesel fuel | 8.00 |
| Air pipe and fittings, 2" at $1/ft. (discount at 50% - no salvage) | 2.00 |
| Water pipe and fittings 1" at $0.40/ft. (discount at 50% - no salvage) | 0.80 |
| Repair parts at $1/ft. | 4.00 |
| Ventube 16" at $1.50/ft. | 6.00 |
| Timber at $0.70/ft. | 2.80 |
| Total | $47.16 |
| | or $11.79/ft. |

Engineering and consulting

| | |
|---|---|
| Engineer and helper (surveying, sampling, etc.) 5 days/mo. at $1,000/mo. | $200.00 |
| Consulting engineer-geologist 3 days/mo. at $100/day | 300.00 |
| | $500.00/mo. |
| | at 200 ft./mo. $ 2.50/ft. |

## OPERATING EQUIPMENT

Much of the operating equipment will be furnished by the applicant, but some items will have to be bought. In the amended application there is listed one rental item, a compressor at $10 per day. This will be for drifting on the Mason Tunnel level, a possible maximum of 1,750 feet if the Little Annie work is authorized. At 200 feet per month, the work will require 8.75 months, say 9 months or 270 days. Thus, the rental would total $2,700. A 400-cubic foot compressor could be bought for about $8,000 or about 3 times the rental. The applicantwill need all other purchased items after completion of the contract and therefore they are listed as furnished by the applicantand he will be allowed the usual 6-year

amortization rate. Estimates of the value of most of the items have been secured from suppliers in Spokane and checked with the Bureau of Mines and two local consulting engineers. In the case of a few items the applicant's estimate has been accepted.

| Furnished by applicant | Estimated cost or value | Depreciation allowance |
|---|---|---|
| 2 jackhammers | $1,800 | $ 30.00 |
| 2 jackleg drills | 2,120 | 35.33 |
| 1 Eimco mucking machine | 2,200 | 36.67 |
| 8 mine cars, used, at $200/car | 1,600 | 26.67 |
| 1 Mancha 5T electric trammer | 2,000 | 33.33 |
| 2 batteries (1 new, 1 used) | 1,500 | 25.00 |
| 1 Bertner electric battery charger | 1,000 | 16.67 |
| 2 blowers, used | 800 | 13.33 |
| 1 - 20 hp pump | 500 | 8.33 |
| 2 sump pumps at $150 | 300 | 5.00 |
| 1 - 75 hp single drum Ottawa hoist with motor (used) | 4,000 | 66.67 |
| Hoisting cable, 19 wire, 7 strand, 3/4" | 350 | 5.83 |
| Electric cable | 4,000 | 66.67 |
| Transformer, etc. | 600 | 10.00 |
| | | $379.50/mo. |
| | at 200 ft./mo. | 1.89/ft. |

Rented

| | | |
|---|---|---|
| 1 - 400 cu.ft. compressor - 270 days at $10/day | | $2,700.00 |
| | at 1,750 ft. | 1.54/ft. |

Recap. per foot for crosscutting, drifting, and raising:

| | |
|---|---|
| Labor and supervision | $27.30 |
| Supplies | 11.79 |
| Operating equipment supplied by applicant | 1.89 |
| Operating equipment rented | 1.54 |
| Engineering and consulting | 2.50 |
| Total | $45.02/ft. |
| say | $45.00 |

ACTUAL COST

Assaying - 100 determinations for:

| | | |
|---|---|---|
| Lead at | $1.50 | |
| Zinc at | 1.50 | |
| Gold and silver at | 2.00 | |
| | $5.00 | $500.00 |

## COST OF RECOMMENDED WORK

**Stage I**

| | | |
|---|---|---|
| 1. | Crosscutting to and drifting on Gold Dust vein 400 ft. at $45/ft. | $ 18,000.00 |
| 2. | Raising on Gold Dust vein 150 ft. at $45/ft. | 6,750.00 |
| 3. | Additional drifting on Gold Dust vein 300 ft. at $45 | 13,500.00 |
| 4. | Cut hoisting station on Marietta vein, No. 5 level 2,160 cu.ft. at $0.58/cu.ft. | 1,252.80 |
| 5. | Widening around winze collar | 350.00 |
| 6. | Cut pocket and install arc gate chute | 500.00 |
| 7. | Widening and straightening raise, install track, sheave wheel, etc. | 1,500.00 |
| 8. | Sink 11x7½, 2-compartment winze complete 700 ft. at $159/ft. | 111,300.00 |
| 9. | Back drift 85 ft. to pocket on No. 5 level | 2,925.00 |
| 10. | Drift 400 ft. from bottom of shaft at $45/ft. | 18,000.00 |
| 11. | Assaying 100 samples for lead, zinc, gold, and silver | 500.00 |
| | Total - Stage I | $173,477.80 |

**Stage II**

| | | |
|---|---|---|
| 1. | Crosscut to and drift on Little Annie vein 700 ft. at $45/ft. | $31,500.00 |
| 2. | Assaying - any funds remaining from Stage I | -- |
| | Total - Stage II | $31,500.00 |

| | |
|---|---|
| Stage I | $175,477.80 |
| Stage II | 31,500.00 |
| Total cost of project | $206,977.80 |
| Government's share | $103,488.40 |

Enclosures
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CMC(3)
(SRO)
Docket
MacLaren

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So. 157 Howard Street
Spokane 4, Washington
January 17, 1961

Memorandum

To: Chief, Division of Field Operations

From: Acting Field Officer, Region I

Subject: Interim inspection report, OME-6082 (Lead-Zinc), Northern Milling Company, Inc., Marietta Mine, Broadwater County, Montana, Contract No. 2121

The Marietta mine was visited January 10, 1961, and the project work was reviewed with Edward F. Wieglenda, Mine Superintendent. The last inspection was made November 16, 1960.

The crosscut has been advanced 98 feet to a total of 116 feet from the starting point. (See attached map.) Work has been somewhat slowed by ribs of very hard andesite that have been tough to drill and hard to break. However, at the present time the rate of advance is about 5 feet per shift.

Work was suspended during Christmas week and has been on a one-shift-per-day basis since early in December. The company has been financed by assessment of a small group of share owners but is presently seeking authorization to raise money by selling stock. When this change in financing policy becomes effective, it is planned to add a second and possibly a third shift.

Mining above the No. 5 level has been discontinued and the mill is shut down.

D. R. MacLaren

Enclosure
Distribution:
OME (3)
Docket
MacLaren

So. 157 Howard Street
Spokane 4, Washington
September 19, 1961

Mr. Paul Raber, President
Northern Milling Company, Inc.
Box 361
Townsend, Montana

Re: OME-6082 (Lead-Zinc)
Marietta Mine
Broadwater County, Montana
Contract 2121

Dear Mr. Raber:

We thank you for your letter of September 13 enclosing your check in the amount of $79.03 covering royalty due the Government on concentrates shipped to the American Smelting & Refining Company, East Helena, Montana.

However, it is necessary that we have two legible copies of all settlement sheets and related information or one reproducible copy for processing these royalty payments. We would appreciate receiving another oxalid copy of the settlement sheet for Mine Lot No. 1.

Sincerely yours,

Mary L. Smelser
For: D. R. MacLaren
Acting Field Officer, OME
Region I

MLSmelser:mls
cc: OME(2)
Reading copies to:
Nolan
Hobbs
Guild

| EXTRA COPY O. M. E RECEIVED JUN 6 1960 | | |
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| | | |

So. 157 Howard Street
Spokane 4, Washington
June 3, 1960

Memorandum

To: Chief, Division of Field Operations, OME

From: Acting Field Officer, Region I

Subject: OME-6082 (Lead-Zinc)
Northern Milling Co.
Marietta Mine
Broadwater County, Montana

Enclosed are two copies of an amended application from the subject applicant. The proposed changes are the result of discussions with the applicant and his consulting engineer before, during, and after the examination of the property.

Also enclosed are three copies of my examination report and recommendations. I have recommended a program which I believe to be justified in order to explore fully the indicated target areas. Possibly a less extensive program could be worked out but only at the expense of doing an incomplete job. I do not know whether the applicant would find a lesser program acceptable.

D. R. MacLaren

Enclosures

cc: SRO
MacLaren
DRF

April 15, 1960
Re: OMS 006 (Lead-Zinc)
Northern Milling Co.
Marietta Mine
Broadwater County, Montana

Memorandum:

To: W. R. Griswold, Office of Minerals Exploration

From: Harold Kirkham, U. S. Geological Survey

Subject: Review of application for exploration assistance

An underground exploration program estimated to cost $37,000 is proposed.

A geologic map and a description of the Marietta mine are included in a Geological Survey report (manuscript in review) by M. R. Klepper and R. A. Weeks. They note that the mine has had the most continuous record of operation of any mine in the area during recent years. Principal production has been from a north-trending zone which includes the Marietta and Blue veins. Most of the ore is valuable mainly for gold which apparently is in auriferous pyrite and arsenopyrite in unoxidized ore. Lead and silver are important locally but zinc and copper are not quantitatively abundant to be paid for by the smelter.

They also note that "Because of the fracturing and displacement and the lenticularity and variable but generally low dip of the veins, correlation of the veins in the north-trending zone is uncertain and the cost of exploration and mining is relatively high."

In view of the uncertainties of projecting lenticular, gently-dipping, faulted veins over a vertical range of nearly 300 feet, I suggest that a first stage of diamond drilling be considered prior to reopening the adit and driving underground crosscuts and drifts. A moderate exploration program may be justified here, but the applicant's proposal seems to be overly ambitious.

I recommend that the application be referred to the field. I suggest that the field examiner study the geologic map (Figure 2) in the Klepper-Weeks report. A copy of this map may be in the Spokane office.

cc: OMS (3)
H. M. Calloway, 3000
Director's reading
Chron. file

Harold Kirkham
Branch reading
Docket file

HKirkham/mm
G-15-4-15-60

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So. 157 Howard Street
Spokane 4, Washington
November 23, 1960

Memorandum

To: Chief, Division of Field Operations

From: Acting Field Officer, Region I

Subject: Interim inspection report, OME-6082 (Lead-Zinc), Northern Milling Company, Inc., Marietta Mine, Broadwater County, Montana, Contract 2121.

Edward F. Wieglenda, mine superintendent of the subject property, was met in Townsend the evening of November 15, 1960. He stated that widening of the Mason Tunnel and other work preparatory to the actual advancing of the crosscut began October 21, and crosscutting was started November 9. The widening was done by one shift per day, but as soon as the crosscut was started, work was on a two-shift basis; a third shift will be put on in about 2 weeks. The ground has proven to be exceptionally tough to break; the first four shifts made a total advance of only 6 feet. The total advance as of the morning of the 15th was 18 feet.

Paul Raber, General Manager, had some questions regarding preparation of the voucher form so the mine was visited November 16. Some additional information regarding the breaking difficulties was gained at that time. The time required to drill a 24-28-hole round has been about 6½ hours. Powder used was Trojan EX SLD, equivalent to about 40 percent gelatin. A 32-hole round and the equivalent of about a 60 percent gelatin will be tried.

The beds dip rather flatly in the direction of the crosscut advance and this could contribute to the difficulty in breaking, particularly if the face is presently in a tougher bed.

D. R. MacLaren

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So. 157 Howard Street
Spokane 4, Washington
April 11, 1961

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Memorandum

To: Chief, Division of Field Operations

From: Acting Field Officer, Region I

Subject: Transmittal of inspection report

Enclosed are the original and two copies of the following interim inspection report:

| Case | | Date |
|---|---|---|
| 6082 | Northern Milling Co., Inc., Marietta mine, Broadwater County, Montana | 4/11/61 |

D. R. Maclaren

Enclosure - in trip.

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So. 157 Howard Street
Spokane 4, Washington
April 11, 1961

Memorandum

To: Chief, Division of Field Operations

From: Acting Field Officer, Region I

Subject: Interim inspection report, OME-6082 (Lead-Zinc), Northern Milling Company, Inc., Marietta Mine, Broadwater County, Montana, Contract 2121

The Marietta mine was visited April 5, 1961, and the work in the tunnel was inspected and mapped in the company of Paul I. Raber, President. The last inspection was made January 10, 1961.

Since the last inspection, which was made January 10, 1961, the crosscut has been advanced 200.5 feet for a total advance of 316.5 feet. The crosscut was driven on a bearing of N. 5° E. for about 175 feet. At 157 feet it cut the Robidoux vein which had a strike of N. 20° W. As the ground had been extremely difficult to break authorization was requested by telephone to follow this vein to the Gold Dust vein. This request was approved by a Work Authorization dated February 10, 1961. However, the Robidoux vein soon swung toward the west and rather than risk following it any further in that direction, the crosscut was kept on a bearing of N. 20° W. Except for a few hard ribs near the face the ground is breaking better and stands well requiring no timber.

The position of the Gold Dust vein as projected at 45° from the No. 5 level has been passed with no sign of the vein. However, Mr. Raber has located and talked with one of the men who worked in a winze on the Gold Dust vein. He reported that "a short distance" below the level the vein steepened considerably, although he could not recall how far below the level or how much the vein steepened.

A second shift was put on March 13, 1961.

D. R. MacLaren

Distribution:
OME(Orig.&2)
Docket
MacLaren

Docket File

So. 157 Howard Street
Spokane 4, Washington
April 14, 1961

Mr. Paul Ruber, President
Northern Milling Company, Inc.
Box 361
Townsend, Montana

Re: Work Authorization
OME-6082 (Lead-Zinc)
Marietta Mine
Broadwater County, Montana
Contract 2121

Dear Mr. Ruber:

I was glad to learn from your letter of April 10, 1961, that you have cut the Gold Dust vein and that the gold and silver assays are so promising; I am most anxious to see the lead and zinc assays.

In accordance with your request and to get a good look at the vein you are hereby authorized to do a total of 100 feet of drifting on the Gold Dust vein. Although I am inclined to favor drifting to the east, you may drift either way or both as long as the total drifting does not exceed 100 feet, measured from the sides of the crosscut. Channel samples should be cut across the significantly mineralized parts of the vein at intervals of not more than 10 feet. When this drifting is completed and the samples have been assayed, we will be better able to decide how much more drifting should be done and in which direction.

If feasible, I urge that the crosscutting be continued but on a bearing of N. 45° W. to intersect the projected positions of the Little Annie and the Marietta veins while you are drifting on the Gold Dust vein.

Sincerely yours,

D. R. MacLaren
Acting Field Officer, OME
Region I

Reading copies to:
Nolan
Guild
Hobbs

DRMacLaren:mls
ec: OME(3) w/cys incoming
MacLaren do.

Files

EXTRA COPY
O. M. E
RECEIVED AUG 7 1961

| DATE | INITIALS | CODE |
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| | | |
| | | |

So. 157 Howard Street
Spokane 4, Washington
August 3, 1961

Memorandum

To: Chief, Division of Field Operations

From: Acting Field Officer, Region I

Subject: Interim inspection report, OME 6082 (Lead-Zinc), Northern Milling Company, Inc., Marietta Mine, Broadwater County, Montana, Contract 2121

The Marietta mine was visited July 18, 1961, and the workings were inspected in the company of Paul I. Raber, President. The last inspection was made May 18, 1961.

During past inspections mapping was brought up-to-date starting each time with what were indicated as survey stations. However, when the Operator's monthly report and voucher for May was received, it was obvious that something was wrong as the map he submitted did not check the one made by the examiner. The difference was in the distance between M-7 and M-9. It developed that an unmarked plug between M-8 and M-9 had been indicated to the examiner as being M-9. Mr. Tan Lee, the company engineer, had left the company's employ and his notes were not all they should have been. Also there was a question as to which of two unnumbered and unmarked plugs was the starting point. Accordingly, about 6 hours were spent on the property during which time the starting point was established by measuring from station M-3, at the intersection of the Mason Tunnel and the original crosscut to the northeast, to the face as shown on the 50-scale map prior to the start of contract work. The entire OME advance was remeasured and remapped from that point. The accompanying sketch is correct and up-to-date as of the date of the inspection.

The total crosscutting was 446.9 feet and the total drifting was 319.5 feet of which only 150 feet had prior authorization, 52 feet in the drift east and 98 in the drift west. In past vouchers the Operator had reported as crosscutting part of the drift turnouts. For his own account the Operator advanced the west drift 104 feet beyond the 98 feet authorized, and the east drift 65.5 feet beyond the 52 authorized. In the drift east he slabbed some of the north wall, put in a diamond drill station north of the drift about 35 feet from the drift face and drilled three diamond drill holes

easterly from the face; a fourth hole was about to be started northerly from the drill station. From the breast of the east drift one horizontal hole was drilled S. 88° E. for 184 feet without encountering any sulfide mineralization. If the average dip of the vein below the No. 5 Level flattened, it could still be beyond this hole. Two holes, one horizontal for 64 feet and one at +15° for 83 feet, were drilled S. 74° E. The +15° hole did not encounter any sulfide mineralization, but from the lower hole a sample of the sludge taken from 8 to 12 feet assayed 0.15 ounce gold and 0.50 ounce silver per ton. Another sample of sludge from this hole, taken from 16 to 20 feet assayed 0.13 ounce gold and 0.10 ounce silver. Although the driller reported the presence of some sulfides in sludge pannings, no assays for lead or zinc were made. The Operator has also started two raises from his own account, one in the east drift and one in the west. The raise in the east drift, about 35 feet high followed the fault which contained no sulfides; that in the west drift was about 30 feet high but was inaccessible. It followed a sulfide-bearing vein up to 1½ or 2 feet wide.

The fault in the east drift has very little clay developed and was formerly recognized only as a zone of shearing. However, in the crosscut driven since the last inspection a strong clay up to 2 inches thick was cut. Its projection lines up perfectly with the "shear zone" in the drift east. The previously reported swing in the Gold Dust vein is undoubtedly due to the vein being offset by the fault and the mineralization in the fault is now recognized as drag. This interpretation would also partly account for the Gold Dust vein in the drift west being about 130 feet north of its position as projected from the No. 5 Level. The 64-foot flat S. 74° E. drill hole may have cut the offset portion of the vein, if the dip steepened, but the bearing of the hole so nearly parallels the fault that the two samples could have come from drag mineralization in the fault. Moreover, had the dip steepened, the vein would have been cut by the S. 88° E. hole. The Operator will drill another flat hole between the S. 74° E. and S. 88° E holes. If that cuts sulfide mineralization, I will authorize additional drifting to the east to explore the offset portion of the vein.

D. R. MacLaren

Enclosure
Distribution:
OME(Orig.&2)
Docket
MacLaren

HK

| EXTRA COPY D. M. E RECEIVED JUN 5 1961 | | |
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So. 157 Howard Street
Spokane 4, Washington
May 31, 1960

Memorandum

To: Chief, Division of Field Operations

From: Acting Field Officer, Region I

Subject: Interim inspection report, OME-6082 (Lead-Zinc), Northern Milling Company, Inc., Marietta Mine, Broadwater County, Montana, Contract 2121

The Marietta mine was visited May 18, 1961, and the workings were inspected and mapped in the company of Paul I. Raber, President. The last inspection was made April 5, 1961.

Since the last inspection the crosscut was advanced 76 feet northwesterly. At about 40 feet, the drive cut a narrow quartz stringer striking about N. 76° E. and dipping 47° SE. At 50 feet a shear zone up to 5 feet wide containing stringers and veinlets of siderite and ankerite with some pyrite, galena, and quartz was cut. In the crosscut this structure had an apparent strike of N. 74° E. and a dip of 58° SE. Seven samples cut by the Operator from one channel across the structure had an average grade of 1.05 ounces gold and 1.24 ounces silver per ton and 2.46 percent lead.

The Operator reported the intersection, attitude, and grade of this structure in a letter dated April 10, 1961, and requested authorization to drift along it easterly and westerly. By a work authorization dated April 14, 1961, the Operator was authorized to drift a total of 100 feet. By the time of inspection he had drifted westerly 48 feet and easterly 114.5 feet.

In the west drift the structure continues to be a strong shear zone, but the gold, silver, and lead values are spotty and the galena is noticeably less abundant to the west. Near the breast the Operator cut a sample 14 inches wide near the drift back that reportedly assayed 0.31 ounce gold and 0.76 ounce silver per ton--the sample was not assayed for lead. The examiner cut a sample 12 inches wide from the face. It assayed 0.07 ounce gold and 0.10 ounce silver per ton, no lead, and a trace zinc.

Where the turnout for the drift east cut the structure, the latter was striking more easterly than where it was intersected in the crosscut and followed to the west, and after about 20 feet the strike of the mineralized structure swung to S. 72° E. From the point of swing, apparently unmineralized weak shearing continued in an easterly direction. The Operator was told to discontinue, at least for the present, the drift which was now following a southeasterly striking structure and was advised to slab the wall into which the unmineralized shearing continued. He was also told that he could continue the west drift unless it too changed course markedly or the values decreased and that he should resume cross-cutting on a bearing of N. 45° W.

D. R. MacLaren

Enclosure
Distribution:
OME(2)
Docket
MacLaren

MME, Form 40
Dec. 1958

UNITED STATES
DEPARTMENT OF THE INTERIOR
OFFICE OF MINERALS EXPLORATION

Budget Bureau No. 42-R1368
Approval expires Dec. 31, 1963

# APPLICATION FOR FINANCIAL ASSISTANCE IN MINERALS EXPLORATION

Pursuant to Public Law 85-701 (72 Stat. 700; 30 U.S.C. 641)

NAME OF APPLICANT *(Full legal name and mailing address as they should appear on contract if one is executed.)*

Northern Milling Co.
Box 361
Townsend
Montana

RECEIVED
APR 4 1960
U. S. G. S.
SPOKANE, WASH.

APPLICANT DO NOT USE THIS BLOCK

DOCKET NUMBER: OME-6082

DATE RECEIVED: 4-11-60

REGION: I

DIVISION CODE: 500

BUSINESS ORGANIZATION *(Check one)*

- INDIVIDUAL [ ]
- CORPORATION [X]
- PARTNERSHIP [ ]
- OTHER *(Specify)* [ ]

STATE IN WHICH IS ORGANIZED: Montana

LIST CORPORATE OFFICERS OR PARTNERS HERE, IF APPLICABLE

| NAME | ADDRESS | TITLE |
|---|---|---|
| Paul Baber | Townsend, Montana | President |
| Loren Anderson | Bismarck, N.D. | Vice President |
| Palmer C. Bakken | Bismarck N.D. | Treasurer |
| Alfred Ophus | Big Sandy, Montana | Secretary |

MINERAL(S) FOR WHICH YOU WISH TO EXPLORE: Lead and zinc

ESTIMATED COST OF PROJECT: $ 337,280.00

PROPERTY NAME: Marietta Mine

LOCATION — COUNTY: Broadwater County, STATE: Montana

## GENERAL INSTRUCTIONS

Before filling out this application, please read the *OME Regulations for Obtaining Federal Assistance in Financing Explorations for Mineral Reserves* (30 CFR Chap. III). To assure prompt action, your application must provide all applicable material and information specified on the back of this application form. Avoid unnecessary correspondence and delays by submitting complete and accurate information. *Please submit four copies of this application and all accompanying papers* except as otherwise noted. Place your name and address on each sheet. Each item of information, maps, and reports required as a part of this application is described on the back of this form. Identify each attached statement by the item number to which it applies. If an item does not apply to your application, show the item number on your statement and after it write "not applicable." Maps or sketches should be used to supplement narrative descriptions of the property location and boundaries in item 2, existing mine workings and geology in item 3, and the proposed exploration work in item 5. When this information is not too complex, all of it may be shown on one map or sketch. All documents and other attachments submitted as a part of this application, except those in item 3(g) which you mark to be returned, become the property of the Government and will not be returned to the applicant. Send true copies, *not originals*, of leases, contracts, and other documents which are an essential part of your business records. *File this application with the Office of Minerals Exploration, Department of the Interior, Washington 25, D. C., or with the nearest OME Field Office.*

## CERTIFICATION

The undersigned, whether as an individual, corporate officer, partner, or otherwise, both in his own behalf and acting for the applicant, certifies that the information set forth in this form and accompanying papers is correct and complete, to the best of his knowledge and belief, and that he would not ordinarily undertake the proposed exploration under current conditions and circumstances at his sole expense.

March 16, 1960
DATED

Northern Milling Co.
BY *(Signature)* Paul Baber
President
TITLE

A wilfully false statement or certification to any Department or Agency of the United States Government is a criminal offense. U. S. Code, Title 18, Sec. 1001.

# INFORMATION REQUIRED WITH THIS APPLICATION

## 1. Financial Eligibility:

(a) Submit evidence of efforts made within 90 days preceding the filing of this application to obtain credit from your bank of account and at least one other banking institution or other private source of credit. Such evidence shall include true copies of correspondence which show: (1) date of loan request, (2) amount and terms requested, (3) proposed use of loan funds, and (4) the replies from credit sources. If the loan was offered under terms which you consider unreasonable, state why you consider them so.

(b) List names and addresses of affiliated, parent, or controlling companies or organizations and state extent and nature of their interest.

(c) State how you propose to furnish your share of the cost of the exploration work.

## 2. Applicant's Rights in Land:

(a) State your interest in the land and mineral rights, whether owner, lessee, purchaser under contract, or other. If you are not the owner, submit one true copy of the lease, contract, or other document (with address of owner) under which you control the property. Describe all liens, mortgages, or other encumbrances on the land and state book and page number and official place where recorded.

(b) State the legal description (section, township, and range; metes and bounds; patent number of claims) of the land upon which you wish to explore and all adjacent land which you own or control. Describe any part of the land or workings which should not be subject to Government royalty and liens. If the land consists of unpatented claims, state book and page number for each recorded location notice, including amended locations, and official place where recorded. State all the names by which you know the property.

(c) For all land or mineral rights encumbered or not owned, submit five copies of Lien and Subordination Agreements on MME Form 52. If the agreements cannot be obtained, state reasons and provide copies of letters of refusal.

## 3. Physical Description:

(a) Describe in detail and illustrate with maps or sketches all mining or exploration operations which you know have been or are being conducted upon the land. Include existing mine workings and all production facilities.

(b) State your interest, if any, in operations described in (a).

(c) State, if you know, the past and current production, supporting your statement with copies of settlement sheets, mine records, or published data if available.

(d) Describe known ore reserves, giving quantities and grades and sampling methods used. Support your statement with copies of assay certificates and assay maps if available.

(e) Describe by narrative and maps or sketches the geologic features of the property, including ore minerals, geologic formations if known, and type of deposit (vein, bedded, etc.).

(f) State your reasons for expecting to find ore, and if you have sampled the area you propose to explore, show where the samples were taken, describe sampling methods used, and provide copies of assay certificates.

(g) Send with your application at least *two* copies of all geologic or engineering reports, assay maps, or technologic information which you have, indicating whether you require their return.

## 4. Accessibility of Property:

(a) To aid the OME representative who may examine the property, state name and address of person who will meet him; give directions for reaching the property; and describe accessibility of property and of any mine workings.

(b) Name the shipping and supply points and state the distances to the property.

## 5. Exploration Work:

(a) Describe fully the proposed exploration work giving individual footages and sizes of openings *for each item of work.* Use narrative, maps, plans, and sections as necessary. Show location of the proposed work as related to geologic features such as veins, ore-bearing beds, contacts of rock formations, etc. Show also the relation of the proposed work to any existing mine workings and to *land boundaries* or to the closest identifiable corner.

(b) If an access road must be built, show the proposed location on the property map and state the length, type and construction methods proposed.

(c) If an OME contract is executed, state how soon thereafter work would be started and finished. State your anticipated average daily or monthly rate of progress for each type of work.

## 6. Experience:

State your operating experience and background to conduct this exploration work and also that of the person who will supervise the work.

## 7. Estimate of Costs:

Furnish detailed estimates of the necessary costs *for each item of the work proposed in 5(a)* under the headings listed below with a total for each heading and the estimated total cost of the work. Costs for any work to be performed by an independent contractor should be listed separately under category (a) below. Costs for any work that is not to be performed by an independent contractor should be listed under categories (b) through (g).

(a) Independent contracts. State the total cost of any proposed independent contract for all or any part of the work, and the number of units and the unit cost for each type of work, such as per foot of drilling, per foot of drifting, per hour of bulldozer operations, or per cubic yard of material moved. Cost estimates should be supported by bids from three contractors if possible. (*Note*—If none of the work is to be contracted, write "none" after this item.)

(b) Personal services. The cost of supervision, engineering and geological services, outside consultants, and labor should be itemized by numbers and classes of employees; rates of wages, salaries or fees; and periods of employment. State whether these services are available.

(c) Operating materials and supplies. List items of material and supplies giving quantity and cost of each. Include under this heading power, water, and fuel, and units of equipment and tools costing less than $50 each.

(d) Operating equipment. List items of equipment and tools costing $50 or more per unit. Give specifications and indicate how each item is to be acquired—i.e., rented, purchased or provided by the applicant. If rented or purchased, state the estimated rental or purchase price. If furnished by the applicant, state condition and present fair market value.

(e) Initial rehabilitation and repairs. Describe the type and the cost of *initial* rehabilitation or repair of existing buildings, fixtures, installations (exclusive of mine workings), and movable operating equipment now owned by the applicant which will be used in the exploration work.

(f) New buildings, fixtures, installations. Describe each building, fixed improvement, and installation to be purchased, constructed, or installed for the exploration work, stating specifications and cost including labor, materials, and supervision.

(g) Miscellaneous. Describe the type and estimate the cost of repairs and maintenance of the operating equipment listed in 7(d). Do not repeat initial repairs listed in 7(e). Show also the costs of analytical work, accounting, workmen's compensation and employees' liability insurance, payroll taxes, and other required costs that do not fall within the previous categories. [*Note*—The Government will not contribute to costs incurred before the date of the contract, or to costs of or incident to: (1) acquiring, using, or possessing land and any existing improvements, facilities, buildings, installations, and appurtenances, or the depreciation and depletion thereof; (2) general overhead, corporate management, interest and taxes (other than payroll and sales taxes); (3) insurance (other than employees' liability insurance); and (4) damages to persons or property (other than authorized repair to or replacement of equipment or other property used in the work).]

INT.-DUP. SEC., WASH., D.C. 50399

## APPLICATION FOR FINANCIAL ASSISTANCE IN MINERAL EXPLORATION

1. FINANCIAL ELIGIBILITY

   a. (1) Letters from: Northern Montana State Bank, Big Sandy, Montana

   The State Bank of Townsend, Townsend, Montana

   Union Bank and Trust Company, Helena, Montana

   (2) Sum - $400,000.00; terms 4% ten (10) years

   (3) Use of funds

   (4) Reply refusal

   b. Affiliates or parent or controlling companies - None; not applicable.

   c. Applicant proposes to furnish its share of the cost of the proposed exploration work from earnings derived from the Marietta Mine production.

2. APPLICANT'S RIGHTS IN LAND

   a. Applicant holds a purchase contract on the Marietta Mine consisting of twenty (20) patented claims and seventeen (17) unpatented claims. The total price is four-hundred-ninety-three-thousand-five-hundred dollars ($493,500.00) of which seventy-five thousand dollars ($75,000.00) has already been paid, with fifty-thousand dollars ($50,000.00) due each year on July 29th until paid in full. The veins to be explored are covered by certain of these claims.

   Four true copies of this contract are submitted herewith. The names of the patented claims

and their patent survey numbers are given in this contract. The names of the unpatented claims and the Book and page of Record in Broadwater County, Montana, are given in this contract.

b. The Marietta claims are situated approximately thirteen (13) miles west northwest of Townsend, Montana, at approximately Latitude 46°20' North and Longitude 111°40' East, in the park or Hassel District, sec. 10, 11, 14, 15, T7NR1W. The accompanying claim map gives names and patent survey numbers of the patented claims and a graphic description to scale of the unpatented claims, also the Township, Range, and Sections.

The Claims patented and unpatented to be explored under the loan are: New Era 4946; Marietta 6226; Gold Dust 2824; Big Jack 10840; Switzerland 4746; Venezuela 5205; and the unpatented porcupine.

b. (continued) All other claims shown on the map are to be excluded and all now-existing mine workings on these claims above the Number 5 level.

c. MMB Form 52 submitted herewith covers production from these claims of ore found by the exploration work from this loan assistance below the Number 5 level (elevation 7145 feet) with the exception of ore from a winze now being sunk near the north end of Number 5 about one-hundred feet (100') more or less south of section line between Section 15 and Section 10.

3. PHYSICAL DESCRIPTION

a. The Marietta group has been mined intermittently for sixty (60) or seventy (70) years; this includes

the Marietta vein (Lead, Zinc, Gold and Silver), the Gold Dust vein (Lead, Zinc, Gold and Silver), the Bullion King (Lead and Zinc), the Venezuela (Lead, Zinc, Gold and Silver), East Etta (Lead, Zinc, Gold and Silver), Little Annie or Anna (Lead, Zinc, Gold, Silver), New Era, and several others. About Nine-thousand feet (9000') of drifting has been done, the large portion of which is on the Marietta. The estimated production is about One-million dollars ($1,000,000.00) for the group. Active mining is being carried on at this time in the Mine working on Number 4 and Number 5 levels, mainly under the Switzerland, Jack Smart and Mountain Queen claims. The Two-hundred Ton (200T) flotation mill is running. The mine is equipped with a modern, first-class selective Two-hundred Ton (200T) per day mill, electrically driven, two electric and one diesel haulage locomotives, 600 cubic foot electric-driven compressor, may air drills, two (2) large diesel bull-dozers, diesel drag line, dump trucks, both side and end dump cars, several electric and air slushers, modern assay office, arc welders and gas welders, electric water pumps and other equipment needed for a first-class mining and milling operation. The accompanying mine maps marked 3a show the major workings, and the proposed exploration work from the Mason Tunnel level Elevation 6844 feet.

b. All equipment and operations described above are owned by the applicant except, of course, the claims which are held under the purchase contract

shown in 2a, and on which payments are up to date.

c. This loan application is to explore the lead and zinc ores in the Gold Dust, Marietta and Little Annie veins below the Number 5 level, that is below Elevation 7145 feet above Sea Level. The accompanying sheets marked 3c show copies of a few of the Smelter returns, 1st. Goldpust, 2nd. Little Annie, 3rd. Marietta. They also show some shipments from the Bullion King and Venezuela - shipments from these last two, while not in this program, are shown as supporting evidence of the lead content from the area. These are only a very few returns of the great number of shipments made over the long period of time. Several hundred shipments have been made, for example, from the combined Marietta and Gold Dust veins.

d. There are some known ore reserves in the Marietta and Gold Dust above the Number 5 level, and these are now being milled. However, the important exploration in both veins is downward to the Mason Tunnel level, as they both show increasing lead in depth between the surface down to the Number 5 level.

e. The country rock at the property is andesite. The rock is older than the Boulder Batholith, which is a quartz diorite. Tongues and cupolas, off shoots from the Boulder Batholith, intruded the andesite and brought lead, zinc, gold, silver, copper and other minerals into favorable fissures and beddings in the andesite.

The sulphides of lead, zinc, iron, copper and silver were introduced first and at a higher temperature than the gold which came later. The iron occurs

A. V. TRENT,
Owner-Manager

# GOODALL BROTHERS

## ASSAYERS AND METALLURGICAL CHEMISTS

46 South Main Street, Helena, Montana

TEL. HI 2-3770
P. O. BOX 537

Date Mar 26-1960

UMPIRE ASSAY_____ CONTROL ASSAY_____ HAND SAMPLE_____

ASSAYED FOR: Northern Milling Co.

MARKS:

| Sample No. | DESCRIPTION | GOLD Ozs. Per Ton | SILVER Ozs. Per Ton | WET LEAD Per Cent | COPPER Per Cent | ZINC Per Cent | IRON Per Cent | INSOL. Per Cent | Per Cent | Total Value Per Ton |
|---|---|---|---|---|---|---|---|---|---|---|
| Marietta WINZ muck pile | | 0.27 | 3.0 | 6.6 | | 2.4 | | | | |

Northern Milling Co. Inc.
P.O. Box 361
Townsend, Montana

#3C

Gold not deducted:_____

Charges $ 5.00

GOODALL BROS.

By A. V. Trent

STATEMENT OF SHIPMENTS
FROM
"LITTLE ANNIE"
TOWNSEND, MONTANA

| Shipper | Date | Net Weight | Gold | Silver | % Lead | Gross proceeds |
|---|---|---|---|---|---|---|
| Al Dance | 8/18/1933 | 4,946 | 1.15 | 11.7 | 9.0 | $ 56.72 |
| Al Dance | 10/28/1933 | 15,200 | 1.1875 | 13.55 | 7.5 | 239.39 |
| Al Dance | 12/27/1933 | 3,674 | 1.665 | 20.75 | 13.2 | 102.83 |
| R. J. Sarbu | 2/5/1934 | 8,546 | 1.87 | 9.1 | 7.6 | 245.90 |
| R. J. Sarbu | 4/17/1934 | 24,340 | 1.95 | 6.2 | 4.6 | 715.23 |
| R. J. Sarbu | 6/6/1934 | 30,020 | 1.215 | 19.5 | 11.4 | 714.69 |
| R. J. Sarbu | 6/20/1934 | 11,858 | 0.47 | 5.0 | 3.4 | 64.83 |
| R. J. Sarbu | 6/20/1934 | 25,940 | 0.93 | 5.3 | 3.8 | 330.02 |
| R. J. Sarbu | 7/3/1934 | 14,020 | 0.71 | 1.3 | 2.4 | 106.33 |
| R. J. Sarbu | 7/10/1934 | 23,340 | 1.08 | 15.3 | 10.0 | 466.93 |
| R. J. Sarbu | 8/4/1934 | 20,586 | 0.50 | 5.1 | 3.5 | 122.49 |
| R. J. Sarbu | 8/4/1934 | 20,586 | 0.50 | 5.1 | 3.5 | 122.49 |
| R. J. Sarbu | 8/4/1934 | 19,712 | 1.24 | 16.8 | 11.3 | 458.68 |
| R. J. Sarbu | 9/1/34 | 20,692 | 0.48 | 3.9 | 2.6 | 101.14 |
| R. J. Sarbu | 9/12/1934 | 11,340 | 1.15 | 16.9 | 10.4 | 240.82 |
| R. J. Sarbu | 10/12/1934 | 12,140 | 1.785 | 14.7 | 8.6 | 259.09 |
| R. J. Sarbu | 11/23/1934 | 12,700 | 1.625 | 6.5 | 3.3 | 332.84 |
| R. J. Sarbu | 11/28/1934 | 17,960 | 0.68 | 8.35 | 5.5 | 186.28 |
| R. J. Sarbu | 12/21/1934 | 11,529 | 0.89 | 18.6 | 10.9 | 201.90 |
| John Sarbu | 5/7/1935 | 11,649 | 1.27 | 11.6 | 7.0 | 246.08 |
| R. J. Sarbu | 5/8/1935 | 11,747 | 0.68 | 3.4 | 6.0 | 101.84 |
| R. J. Sarbu | 5/25/1935 | 24,860 | 0.52 | 5.2 | 4.3 | 179.00 |
| R. J. Sarbu | 6/14/1935 | 40,340 | 1.0075 | 13.95 | 8.0 | 785.76 |
| John Sarbu | 6/9/1935 | 18,225 | 0.78 | 10.55 | 7.0 | 218.68 |
| R. J. Sarbu | 8/21/1935 | 21,518 | 0.61 | 7.1 | 4.9 | 140.15 |
| Zimmerman & Shea | 5/18/36 | 49,240 | 0.8425 | 8.10 | 6.0 | 649.27 |
| " " " | 7/9/1936 | 47,528 | 0.68 | 6.3 | 9.5 | 491.99 |
| " " " | 8/18/1936 | 82,800 | .97 | 3.35 | 3.8 | 1051.36 |
| " " " | 11/3/1936 | 40,040 | 0.995 | 3.50 | 2.2 | 475.65 |
| " " " | 12/15/1936 | 46,340 | 1.385 | 6.10 | 3.4 | 881.66 |
| Carl Kolberg | 9/22/1941 | 7,020 | 1.36 | 11.4 | 6.6 | 131.85 |
| " " " | 11/24/1941 | 5,190 | 1.62 | 10.7 | 4.2 | 130.96 |

American Smelting & Refining Company
East Helena Plant
East Helena, Montana
June 16, 1943

#3C

Northern Milling Company, Inc.
P. O. Box 361
Townsend, Montana

East Helena, Montana

SHIPPING RECORDS - AMERICAN SMELTING AND REFINING COMPANY

GOLD DUST

| Date | Proceeds per Ton | Dry Weight | Gold | Silver | Lead | Zinc | Shipper |
|---|---|---|---|---|---|---|---|
| 8/25/31 | $242.30 | 13,295 | 1.72 | 15.0 | 16.7 | 1.0 | Kimpton-Williams |
| 9/22/31 | 205.17 | 14,541 | 1.275 | 13.2 | 18.0 | 1.0 | " " " " |
| 10/7/41 | 258.19 | 15,681 | 1.11 | 7.5 | 6.2 | 5.3 | Dance |
| 10/10/41 | 266.03 | 15,681 | 1.11 | 7.5 | 6.2 | 5.3 | " " |

* * * * * * * *

VENEZUELA

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 9/1/36 | 223.81 | 5,351 | 2.46 | 12.4 | 9.5 | - | Bish Williams |
| 4/23/38 | 211.79 | 5,840 | 2.20 | 10.9 | 8.7 | 1.0 | McFadgen |
| 6/29/38 | 362.07 | 5,026 | 4.365 | 13.2 | 10.2 | - | " " " |
| 11/15/38 | 212.77 | 7,303 | 1.62 | 15.5 | 12.3 | - | " " " |
| 12/24/38 | 281.38 | 11,371 | 1.445 | 13.65 | 9.5 | - | " " " |
| 1/24/39 | 546.78 | 11,555 | 2.38 | 31.35 | 24.3 | - | " " " |
| 3/24/39 | 670.67 | 17,020 | 2.225 | 16.3 | 13.9 | - | McFadgen-Gabisch |
| 4/8/39 | 416.72 | 9,166 | 2.47 | 19.6 | 15.9 | - | " " " |
| 4/19/39 | 116.01 | 6,694 | 1.09 | 8.1 | 7.7 | 1.0 | " " " |
| 5/13/39 | 181.04 | 5,045 | 2.04 | 14.4 | 12.3 | 1.0 | " " " |
| 7/24/39 | 476.43 | 8,800 | 3.125 | 14.0 | 11.8 | 1.0 | Penn Gray |
| 10/14/39 | 43.33 | 1,606 | 1.67 | 7.8 | 8.0 | 2.1 | McFadgen-Gabisch |
| 3/30/40 | 88.15 | 6,005 | 1.0425 | 4.45 | 3.4 | 1.0 | McFadgen-J. A. Hunt |
| 5/4/40 | 176.89 | 6,814 | 1.03 | 24.275 | 17.3 | - | " " " |
| 6/28/40 | 91.03 | 9,443 | 0.60 | 7.8 | 6.5 | - | McFadgen - L. Green |
| 8/13/40 | 225.71 | 9,014 | 1.7375 | 5.15 | 3.75 | 1.0 | " " " |
| 8/28/40 | 296.34 | 9,811 | 2.0475 | 6.55 | 4.55 | - | " " " |
| 10/21/40 | 51.49 | 4,412 | 0.8125 | 4.8 | 4.825 | 1.5 | " " " |

Northern Milling Company, Inc.
P. O. Box 361
Townsend, Montana

#3C

SHIPPING RECORDS - AMERICAN
SMELTING AND REFINING COMPANY
East Helena, Montana

Venezuela (continued)

| Date | proceeds per Ton | Dry weight | Gold | Silver | Lead | Zinc | Shipper |
|---|---|---|---|---|---|---|---|
| 10/29/40 | $ 74.95 | 4,960 | 0.925 | 6.2 | 6.7 | 1.0 | McFadgen - L. Green |
| 11/30/40 | 155.25 | 6,504 | 1.36 | 10.05 | 9.0 | 1.0 | " " " |
| 12/13/40 | 26.62 | 1,842 | 0.7875 | 9.5 | 8.2 | 1.5 | " " " |
| 1/10/41 | 170.59 | 7,393 | 1.3075 | 9.75 | 9.05 | 1.2 | " " " |
| 6/26/41 | 211.41 | 5,098 | 2.475 | 11.5 | 9.1 | 1.0 | Mike Sass |
| 7/26/41 | 357.38 | 2,025 | 10.15 | 20.1 | 16.6 | 6.2 | " " " |

BULLION KING

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 6/30/1889 | 23.34 | 11,229 | .02 | 9.002 per Ton | 46.2460 (Dry) | - | J.F.Rabdan |
| 10/2/1900 | 30.60 | 2,338 | 0.05 | 13.0 | 62.6 | Trace | Park Con. Co. |
| 8/7/1918 | 50.42 | 15,808 | 0.04 | 8.0 | 46.6 | Trace | C.S.Muffly |

Northern Milling Company, Inc.
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SHIPPING RECORDS -

American Smelting and Refining Co.
East Helena, Montana

Marietta Mine - Shipper, Al Dance

| Date | Dry Weight | Gold | Silver | % Wet Lead | Copper | % Zinc | Arsenic | Antimony |
|---|---|---|---|---|---|---|---|---|
| 1/28/54 | 55,928 | 2.240 | 6.1 | 4.8 | 0.10 | 3.2 | 10.7 | 0.49 |
| 3/2/54 | 61,310 | 1.910 | 5.2 | 3.1 | 0.05 | 2.3 | 9.90 | 0.41 |
| 6/22/54 | 90,010 | 1.930 | 5.4 | 1.4 | 0.05 | 1.4 | 8.1 | 0.65 |
| 10/13/54 | 101,752 | 2.510 | 8.6 | 2.2 | 0.10 | 1.5 | 9.2 | 0.20 |
| 2/28/56 | 93,448 | 1.235 | 5.75 | 4.1 | 0.02 | 2.7 | 7.70 | 0.16 |

Northern Milling Co., Inc.
P. O. Box 361
Townsend, Montana

#3C

about equally as pyrite and as arsenopyrite. The lead as galena, the zinc as sphalerite, the copper as chalcopyrite, the silver as antimonides of silver. While there is some gold in minor amounts locked in the pyrite and arsenopyrite, 80% to 85% of all the gold is free gold deposited in micro fractures in the pyrite and arsenopyrite. This is proved in milling these ores. Most of the arsenic and pyrite goes into the tailings, leaving a high-grade Lead and Gold concentrate with 25% to 30% lead, and 20 to 50 ounces of gold per ton of concentrate. The Lead, Zinc, Copper, Pyrite and Arsenopyrite are mesothermal and will extend downward to considerable depth. The present mine workings have only reached the top of the lead zone, and several hundred feet of depth of increasing lead values lie below Number 5 level. The Gold was deposited later at lower temperatures and is Epithermal. Its downward range will not be as far as the earlier minerals. Probably Fifteen hundred feet (1500') to Twenty-five-hundred feet (2500') down the dip will bottom the pay gold, and as the gold veins dip at 20° to 45° this will be Six-hundred feet (600') to One-thousand feet (1000') vertically below Number 5 level. There has been relatively little of the tops of the veins lost by erosion. There is good geological reason to expect a considerable increase in Lead, Zinc and Copper as depth is gained. Erosion on the Gold Dust and Marietta has just barely cut down to the top of the Lead Zone, and there should be considerable increase in Lead for the next One-thousand feet (1000') or more in depth.

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There are two major vein systems on the property. One system striking 5° to 15° west of North and the other 45° to 70° east of North. We will call the 5° to 10° west of North, the North and South System, and the other the East and West System. The Marietta belongs to the North and South System and dips 15° to 25° west. This vein varies in thickness from one (1) to eight (8) feet and averaging about four (4) feet. It has an average grade of 1 to 2 oz. in gold, 1 to 8 oz. silver, 1 to 6% lead, and about 1 to 3% zinc with .1 to .2% copper. The Marietta vein dips 15 to 25 degrees West following a bedding in the andesite and is the strongest vein as far as is now known on the property. Its past production is estimated at five-hundred-thousand dollars ($500,000.00) but it probably exceeds that figure.

Marietta Vein.

The Little Annie strikes N.E. and is the East and West System - dips N.W. at 10° to 30° averaging 26°. It is developed by a 480 foot incline shaft now caved at the collar. The vein is one (1) to four (4) feet thick. Grade - 1 to 1.5 oz. gold, 8 to 10 oz. silver, 8 to 12% lead. The Little Annie has been reported to have produced Two-hundred-thousand dollars ($200,000.00). This vein parallels the Marietta, but dips at 60° in the reverse direction. The vein is stated to vary from one (1) to three (3) feet in width averaging around one (1) foot. The outcrop of this vein is largely covered by deep soil. The partial shipping record marked 3c is from the American Smelting and Refining Company, East Helena, Montana Smelter.

The grade of ore from the Venezuela in the past has been approximately per ton: - Gold 1.5 to 1.7 oz.; Silver 10 to 12 oz.; Lead 10% and Zinc 1%. As the

Venezuela parallels the Marietta and dips toward the Marietta it is expected that below the junction they will combine as one vein following the Venezuela downward and have the quartz diorite as the footwall, with andesite as the hanging wall. The mineral solutions from the quartz diorite probably came up the Venezuela and then travelled into Little Annie, Gold Dust, Marietta, etc.

A quartz diorite intrusive plug lies west of and forms the footwall of the Venezuela and is the probable source of the ore in the veins in the district.

Gold Dust Vein. This vein belongs to the East and West System. It strikes northeasterly and dips 45 degrees to the southeast. The Mason Tunnel will intersect this vein in a comparatively short distance. The vein is from one (1) to four (4) feet wide averaging three (3) feet. An analysis of the ore from this vein taken on the Number 5 level as a general sample for metallurgical test work gave per ton; -

| | |
|---|---|
| Gold | .25 oz. |
| Silver | 6.2 oz. |
| Copper | 0.10 % |
| Lead | 6.12 % |
| Zinc | 7.78 % |
| Iron | 19.41 % |
| Arsenic | 6.21 % |
| Sulphur | 21.6 % |
| Antimony | 0.2 % |
| Insoluble | 34.6 % |

This vein was stoped from the Number 5 level to the surface many years ago and shipped to the Smelter. The only records now available to the applicant of

A. V. TRENT,
Owner-Manager

# GOODALL BROTHERS

## ASSAYERS AND METALLURGICAL CHEMISTS

46 South Main Street, Helena, Montana

TEL. HI 2-3770
P. O. BOX 537

Date MAR 23 1960

UMPIRE ASSAY _____ CONTROL ASSAY _____ HAND SAMPLE _____

ASSAYED FOR Northern Milling Co. | MARKS: Ground

| Sample No. | DESCRIPTION | GOLD Ozs. Per Ton | SILVER Ozs. Per Ton | WET LEAD Per Cent | COPPER Per Cent | ZINC Per Cent | IRON Per Cent | INSOL. Per Cent | Per Cent | Total Value Per Ton |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Gold Dust 12" sample | 0.97 | 12.9 | 12.0 | | | | | | |
| 2 | " 24" " | 1.18 | 7.9 | 7.8 | | | | | | |
| 3 | " 24" " | 0.64 | 5.6 | 4.2 | | | | | | |
| 4 | " 24" " | 0.34 | 3.5 | 3.2 | | | | | | |
| 5 | " 20" " | 0.33 | 4.8 | 3.2 | | | | | | |

Northern Milling Co., Inc.
P. O. Box 361
Townsend, Montana

Gold not deducted: _____

Charges $ 17.00

GOODALL BROS.

By A. V. Trent

4

these shipments that can be identified as Gold Dust ore are shown on sheet marked 3c. They show much higher gold, lead and zinc, namely: Gold 1.25; Silver 11.00; Lead 11.5% Zinc 3.1% as an approximate average. It is expected a considerable block of this combined lead and zinc ore can be found between the Number 5 level and the Mason Tunnel. Five samples recently cut along the side of Number 5 tunnel show .33 to 1.18 oz. gold, 3.5 to 12.9 oz. silver and 3.2 to 13% lead.

f. Little Annie. The reason it is expected to find ore exploring the Little Annie vein in depth is because ore has been shipped from surface working (see copy of American Smelting and Refining Co. returns marked 3c included in this application). Moreover, the Marietta vein should strike into and join the Little Annie at Mason level and this should increase the amount of mineralization. Moreover, the vein is credited with Two-hundred-thousand dollars ($200,000.00) production in the past.

g. There are no engineers' reports available that deal only with the veins and area the applicant wishes to explore, nor geological reports covering these veins. The maps and cross sections submitted herewith illustrate the general geological relationships. The Gold Dust Number 5 level shows assays recently taken by the applicant of this vein and copies of the assay certificates are submitted herewith.

4. ACCESSIBILITY OF THE PROPERTY

a. Automobile road goes to mine fifteen (15) miles from Townsend, Montana. Mine has a short wave radio telephone - Call Townsend number 175 for Northern Milling

Northern Milling Co., Inc.
P. O. Box 361
Townsend, Montana

company. Operator at 175 telephone will talk to Mine and arrange for someone to drive down from Mine and meet O.M.E. representative.

b. Railroad shipping point is Townsend, Montana, fifteen (15) miles by road from the property. This is also the supply point. The nearest smelter is the American Smelting and Refining Company at East Helena, Montana, forty-five (45) miles, and concentrates are now being hauled there by truck.

5. EXPLORATION WORK

a. It is proposed to reopen, repair, place track, air, water and ventilation lines in the Mason Tunnel, now fifteen-hundred-eighty feet (1580') long; drive this tunnel to cut the Gold Dust vein, Little Annie and the Marietta veins, raise and drift on these veins; The Mason Tunnel is approximately three-hundred-seven feet (307') vertically below the Gold Dust Number 5 level.

The Mason Tunnel which is a long haulage and drainage tunnel and now some fifteen-hundred-eighty feet (1580') long will be continued seven and one-half feet (7½') high, Eight feet (8) wide with a drainage ditch on one side.

<u>Proposal</u> (These distances are estimated from present known dips)

| | | | |
|---|---|---|---|
| A. | Extend East Branch Mason to Gold Dust vein estimated | 200 | feet |
| B. | Drift on Gold Dust 200 feet to Raise | 200 | " |
| C. | Raise on Gold Dust to Number 5 level | 436 | " |
| D. | Extend main Mason to Gold Dust Vein and Marietta | 400 | " |
| E. | Drift on Marietta 300 feet to Little Annie and continue 1500 more | 1800 | " |
| F. | Drift N.E. from Raise on Gold Dust | 400 | " |

| | | |
|---|---|---|
| G. | Drift S.W. on Little Annie | 400 feet |
| H. | Drift N.E. on Little Annie | 400 " |
| | | 4,236 feet |

The long raise will cost practically the same or more per foot than the drifts, as it has to be divided into two (2) compartments and require a hoist for men, supplies and forced ventilation. Cost of this footage is estimated at seventy-nine dollars and seventy-six cents ($79.76) per foot. The necessary preliminary work in the Mason Tunnel including rail, pipe, general repairs is estimated at Twenty-thousand-one-hundred dollars ($20,100.00) total. The mill water supply now comes from the Mason, but a new sump and sand settling bay will be needed. Cost - One-thousand dollars ($1000.00). The applicant will need to increase the size of the present power line capacity. Cost - Twelve-hundred dollars ($1200.00); 40 HP ventilation fan and electric motor - Cost - One-thousand dollars ($1000.00).

The applicant has large electric storage battery locomotive, and charger, mucking machine, slushers, mine cars, air drills etc. available for this job at the property.

The maps and cross sections submitted herewith show the proposed work.

b. Access road not needed. One already there. Not applicable.

c. <u>Time required</u>

| | |
|---|---|
| Repair Mason Tunnel etc. getting supplies and equipment and other preliminary work | 60 days |
| Driving tunnel and drifts average 7 feet (3½ ft. per shift) per day counting delays and about the same in raises | 605 days |
| | 665 days |

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This work time can be materially reduced by driving two headings and raising at the same time and finish the whole job in twelve (12) months to fourteen (14) months preliminary work and delay in getting equipment and building up a good crew.

6. EXPERIENCE

William Rogers Wade will be Consulting Engineer for this work. His experience is as follows: -

Graduate Harvard 1904 Cum Laude in Mining & Metallurgy

Assistant Shift-boss New Jersey Zinc Company (Franklin Mine)

Manager Azure Mining Company in New Mexico

Three (3) years with Phelps Dodge Corporation in charge of Pilares Copper Mine, Moctezuma Copper Company, Sonora, Mexico

Manager Northern Ore Company and New York Zinc Company, Edwards, New York (Now St. Joseph Lead Company)

Manager for American Metal Company, Ltd. of Vermont (Copper)

Consulting Engineer, Engineers Exploration Syndicate, New York City

Consulting Engineer and Partner John Hays Hammond, New York City

President Park City Consolidated Mines (Lead - Silver)

President Golden Charriott Mines, Idaho (Gold)

Consulting Engineer Leviathan Sulphur Company, California, (Now owned by A.C.M.)

Consulting Engineer in general practice in San Francisco, California

Partner Courageous Mining Company (Gold)

Owner Montana Rainbow Mining Company (Gold)

Consulting Engineer American Sulphur Company

Consulting Engineer Cia Minerva Buena Vista S.A. (Copper)

Consulting Engineer Northern Milling Company, Montana

General Consulting Practice, Mill and Metallurgical Plant Design

Legion of Honor, American Institute of Mining, Metallurgical and Petroleum Engineers

Member Northwest Mining Association

Member American Mining Congress

Member Montna Society of Professional Engineers

Member American Society of Professional Engineers

Registered Engineer in Montana and New York

Paul I. Kaber, President Northern Milling Company, Inc. Marietta Mine, Townsend, Montana. His experience is as follows: -

Graduate of Coyne Electrical School, Chicago, Illinois

Three year College technical education as Mechanical and Electrical Engineer

Seventeen years experience as Plant Engineer for Sweetheart Bakeries in charge of plants and all equipment in North Dakota and Montana

Six years experience as Manager of Gold Mines and Mills. Has been opening the Marietta Mine and constructing a Two-hundred Ton (200T) selective gold, silver, lead mill for the past 1½ years as President and General Manager of Northern Milling Company, Inc., and is in direct over-all charge on the ground of Marietta Mine and Mill.

Edward F. Wieglenda, Mine Superintendent at Marietta Mine has had many years underground experience as a miner, shift-boss, foreman and superintendent in various mining camps.

Peter H. Sweeney, Geological Engineer, geologist for Marietta Mine. Several years underground experience with Ruby Valley Development Company, Sheridan, Montana, as Geologist. Graduate Montana School of Mines, Butte, Montana, 1959.

Northern Milling Co., Inc.
P. O. Box 361
Townsend, Montana

Tan Lee, Mining Engineer and Assistant Superintendent of Marietta Mine. Graduate 1955 B.S. in Mining Engineering from Montana School of Mines. From that time until November, 1959, he was employed in the Mining Engineering Dept. of The Anaconda Company. Since November 1959 he has been with Northern Milling Company, Inc. at the Marietta Mine, Townsend, Montana.

7. ESTIMATE OF COSTS

a. Independent Contractors
None. Not applicable

b. Personal Services (Technical and Labor)
Time and one-half over 40 hrs. per week. 2 headings going

| | Drifting and Raising Rate per Month | 400 ft. per Mo. per Foot |
|---|---|---|
| 1. Consulting Engineer per Mo. 1 man | $ 500.00 | |
| 2. Engineering & surveying, part time, 1 man & helper | 475.00 | |
| 3. Shift bosses - 2 shifts - 2 men $850 per month | 1750.00 | |
| 4. Motormen - 2 shifts - 2 men $600 per month | 1200.00 | |
| 5. Trainman - 2 shifts - 2 men | 1000.00 | |
| 6. Pipe, track, ventilation, repairs; mechanic & helper | 1300.00 | |
| 7. Mucking machine operators - 2 men | 1200.00 | |
| 8. Machine men - 2 shifts - 4 men | 2400.00 | |
| 9. Timberman and helper - 2 men | 1200.00 | |
| Note: Rates are figured at $2.50 and $3.00 per hour. 200 hours per month with overtime. | | |
| Sub-total | $11,025.00 | $27.50 |
| Employers liability and accident insurance, old age, unemployment etc. @ 16% | 1,764.00 | 4.15 |

| | Drifting and Raising Rate per Month | 400 ft. per Mo. per Foot |
|---|---|---|
| Transporting men up and down from town to mine - 2 shifts of bus drivers | $ 900.00 | |
| Insurance, old-age, unemployment etc. @ 8% | 72.00 | |
| Bus mileage @ .15 per mile | 270.00 | |
| | $1,242.00 | 3.10 |
| Assaying | 600.00 | 1.50 |
| | | $36.25 |
| Labor & employers liability insurance per month | $14,631.00 | |
| Labor cost is based on advancing 2 headings at 200 ft. per month for each heading | | |
| Total for 4236 | $153,555.00 | |

c. and d. Based on 4236 feet: -

| Materials | Total Amount | Total Cost | per Foot |
|---|---|---|---|
| 1" water pipe @ 50¢ | 4236 ' | $ 2125.00 | .50 |
| 4" pipe @ $2.00 | 4236 ' | 8472.00 | 2.00 |
| 24 lb. rail at $250 T | 34 T | 3500.00 | 2.00 |
| 24" vent tube @ $1.98 | 4236 ' | 8388.00 | 1.98 |
| powder 25 lbs. per ft. @ 28¢ | 52 T | 29344.00 | 7.00 |
| Fuse 8 ft. per hole @ 2¢ | 160,000 ' | 3200.00 | .75 |
| 8x Caps @ 9¢ | 21,180 | 1906.00 | .45 |
| Fish plates & bolts @ 30¢ | 1,000 lb. | 300.00 | .07 |
| Track spikes @ 20¢ | 2,000 lb. | 400.00 | 110 |
| Track ties 4"x6"x36" - 18" centers @$100 per MBS 6BF per tie | 3,000 ties | 1800.00 | .43 |
| Drill steel broken @$400 T | 4 T | 1600.00 | .40 |
| Carbide bits @ $15 | 500 | 7500.00 | 1.76 |

| Materials | Total Amount | Total Cost | Per Foot |
|---|---|---|---|
| Rock drill repairs, parts Air & water hose; drill parts | | $5000.00 | $1.18 |
| Mucking machine parts; chains, bucket, gears, wheels etc. | | 2000.00 | .47 |
| Locomotive & battery repairs to batteries & replacements & electric current | | 2400.00 | .56 |
| Air compressor rental 2400 KWH per day; $15 per day | | 4500.00 | 1.06 |
| Electric power (air and ventilation) 2400 KWH per day | 720,000 KWH | 7200.00 | 1.70 |
| Mine cars upkeep & repair | | 425.00 | .10 |
| picks & shovels used and broken | | 425.00 | .10 |
| Pipe wrenches, hammers etc. | | 425.00 | .10 |
| Outside blacksmithing | | 212.00 | .05 |
| Travel, telephone & Misc. estimate | | 1000.00 | .25 |
| Mine timber @ $100 MBF | 30 MBF | 3000.00 | .75 |
| | | $100,125.00 | $23.76 |
| Unforseen conditions such as heavy water flow or running ground or caving ground add 25% for labor and material | | 63,500.00 | 15.00 |
| Track, pipe, vent. pipe etc. Mason tunnel 1700 ft. and clean up bottom - Labor $3500 & $11000 material | | 14,500.00 | |
| New pump sumps for Mill water pump | | 1,000.00 | |
| power line | | 1,200.00 | 3.90 |

e. Not applicable

f. 1. Small combination compressor house, tool house, minor repair shop - light wooden frame and siding; roof covered with 90 pound paper roofing; size - 14' x 24' with 8 foot studs 2"x4" on 18" centers and A roof with 2"x6" rafters.

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Townsend, Montana

| | | |
|---|---|---|
| four (4) windows, one (1) door | | |
| 6½' x 8' and one (1) door 6½' x 3' | | $1800.00 |
| 2. small frame house open on one side | | |
| to cover 40 HP ventilating blower. | | |
| 7' x 8' ; dirt floor | | $ 600.00 |
| 40 HP Motor Ventilation Fan | | $1000.00 |
| | | $3400.00 |
| | per ft. | .85 |

Summary of Costs

| | Total Cost | per Foot |
|---|---|---|
| Labor, engineering, employer's liability | $153,555.00 | |
| Supplies | 100,125.00 | |
| Contingencies (unforseen) | 63,500.00 | |
| Putting pipe, track etc. in present 1700 feet of tunnel | 14,500.00 | |
| Power Line | 1,200.00 | |
| Changing sump for Mill pumps | 1,000.00 | |
| New buildings | 2,400.00 | |
| 40 HP Ventilation Fan | 1,000.00 | |
| | $337,280.00 | $79.76 |

Northern Milling Co., Inc.
P. O. Box 361
Townsend, Montana

NORTHERN MILLING COMPANY, INC.
P. O. Box 361
Townsend, Montana
May 17, 1960

U. S. DEPARTMENT OF THE INTERIOR
Office of Minerals Exploration
South 157 Howard Street
Spokane 4, Washington

Att: Mr. D. R. MacLaren
Acting Field Officer
Region I

Dear Sir:

The Applicant wishes to amend his application for an exploration loan which has been assigned Docket Number OME-6082, as per the following:

1st The Applicant to pay all the opening costs, track laying, pipe etc. for the present Mason Tunnel to its present face.

2nd To get a loan assistance to sink a 670 foot Two (2) compartment winze from the Marietta Number 5 level and to do 600 feet of drifting at the bottom thereof, to explore the Marietta vein in depth. Step "A"

3rd To get a loan assistance to explore the Gold Dust and Little Annie veins on this level. Step "B" Mason level.

Northern Milling Company, Inc.
P. O. Box 361
Townsend, Montana

RECEIVED
MAY 25 1960
U. S. G. S.
SPOKANE, WASH.

Maps and sections herewith submitted illustrate this proposed work.

S T E P "A"

Winze 2 Compartments 4' x 5' timbered, outside in rock 11' x 7½'.

| | |
|---|---|
| Cutting hoist station 24'x12'x7½' | $1,250.00 |
| Widening around collar | 350.00 |
| Back drift to loading pocket in footwall | 2,925.00 |
| Cutting pocket and installing arc gate chute | 500.00 |
| Widening present raise and straightening, timbering for skip track, installing sheave wheel, cost of same, dumping horns, 100' of rail | 1,500.00 |
| | $6,525.00 |

Equipment Needed Not possessed by Applicant

| | |
|---|---|
| Electric sinking pumps and station pumps including power cable down the winze and starters - NEW | $3,800.00 |
| 75 H.P. USED single drum Ottawa hoist with grids and drum controller reversible, 5,000 lbs. rope pull speed 495' per minute with 75 H.P. slip ring motor, quoted FOB Denver | 4,850.00 |
| Freight estimated at | 300.00 |
| Hoisting cable 19 wire 7 strand ¾" non spin plow steel | 400.00 |
| 20 cubic ft. Timken roller bearing wheels skip 32" guage | 450.00 |
| 2,000 feet of 3 conductor rubber covered electric cable size of wires double ought to operate hoist, pumps and blower (needed 60 to 70 amperes continuous and 120 more intermittent for hoist). Used cable price estimate $2.00 per foot. Probably be better to purchase 4,000 feet of #2 size and parallel phase them or use 7,100 volt parkway | 4,000.00 |
| Lead covered cable and inside transformer (3) 50KVA. One 8,000 to 10,000 cu. ft. blower 12" water pressure and motor about 20 H.P. USED | 1,000.00 |
| | $14,800.00 |

Northern Milling Company, Inc.
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Other equipment needed - cars, mucker, drills, slusher, tugger hoists, steel, shovels, tools, etc., locomotive are now owned by Applicant and will be furnished by applicant.

Sinking Winze

Sinking winze if dry (and it must be hand mucked) and making a 5 foot set completed and timbered each 24 hours with air, water, vent pipes and track installed using two 8 hour shifts, 2 men in bottom and 1 man working as top man when lowering supplies but helping in bottom when mucking, drilling or timbering. One hoist man on each shift. Train crew to keep ore pocket pulled, bring in timber and supplies. Engineers, bosses, etc. only charged as a portion of their time. Figures following are cost per five (5) feet. For One (1) foot divide by Five (5) feet.

| | | |
|---|---|---|
| Timber (sawed) required per 5 foot set 500 Board feet at $90.00 per thousand | | $ 45.00 |
| 2 Hoist men at $20.00 each and insurance, S. S. etc. 20% | | 48.00 |
| (Employers Accident Insurance, Social Security Old Age, Unemployment amounts to 20% of the payroll in Montana for Mines) | | |
| BUTTE SCALE FOR WINZE SINKING: | | |
| Breaking | $14.60 | |
| Mucking | 33.30 | |
| Insurance | 9.58 | |
| Timbering | 4.00 | |
| | $61.48 per ft. | 307.40 |
| Train crew on each shift part time emptying pocket and supplies, locomotive operating costs, maintenance, depreciation | | 40.00 |
| Pipe for drill water, compressed air, pump column 18" air vent tube, skip rails, track splice plates, track spikes etc. at $8.00 per foot | | 40.00 |
| 2 to 3 rock drills, repairs, drill steel, carbide bits, compressed air, depreciation at $10.00 per shift per machine (2 machines) | | 20.00 |
| Explosives and electric delay caps, water proof low fume gelatine powder per 5' set | | 50.00 |

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Townsend, Montana

| | |
|---|---|
| Electric power per shift for hoist, blower etc. $5.00 | $ 10.00 |
| Timber framer, carpenter wages & insurance | 24.00 |
| Foremen, bosses, engineers, geologist, supervising the 2 shifts, part-time only | 25.00 |
| Sampling and assaying per set | 5.00 |
| Compressor rental per 24 hours as Applicant does not have enough compressed air | 10.00 |
| Wedges, hanger bolt rods, blocking, grease, oil, electric miners' lamps, rubber boots for shaft men, picks, shovels, air and water hose, wrenches, saws, axes, 8-pound hammers and handles, spikes and nails and other miscellaneous items | 10.00 |
| | $634.40 |
| For unforseen delays, emergencies, cave-ins, running ground, accidents to equipment, strikes, extra hard rock, increases in labor or supply costs add about 10% or | 63.44 |
| | $697.84 |

Cost per foot estimate $139.57 per foot dry or practically so.

If pumps are needed and the amount of water does not exceed 60 to 70 gallons per minute the cost would probably be about $159.57 per foot.

Drifting on the Vein

Drifting at the bottom of the winze on the vein will cost about $70.00 per foot, and the cost will not be much different wet or dry after the station pumps are installed and operating. At the bottom of the winze (after allowing for a sump about 12 feet)at Elevation 6,856 a station will cut in the hanging wall and a drop run each way on the Marietta vein. About 200 feet to the South and 400 feet to the North less about 15 feet consumed in cutting station, and widening out to make room for centrifugal pump.

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Drifting Cost (Including Station)

Size 6' x 7½'

600 feet at $70.00 per foot $42,000.00

"A" TOTAL COST OF STEP "A" (WINZE) SUMMARY

| | | |
|---|---|---|
| Pocket and Dump Head room, sheave, etc. | | $ 6,525.00 |
| Sinking wet winze | *Note | 106,911.90 |
| 600 feet drifting including station | | 42,000.00 |
| | | $155,436.90 |

*About $13,000.00 less cost if winze is dry

Capital investment in Equipment needed 14,800.00

"B" Step "B" MASON TUNNEL

This is to explore the Gold Dust through the Mason Tunnel. This tunnel is about 300 feet below Number 5 level. (See Map and Section). These proposed drifts are mostly in the vein structures and they are much shorter than the work proposed in the original application, therefore they do not need to be 8 feet wide with large drainage ditch to one side, but standard - 6 feet wide. They do not have as long a haul, and they do not have the more difficult problem of removing the blasting fumes. There is a raise proposed on the Gold Dust and this can be kept down in size to one and a half compartments using stulls and lagging to line of the rock chute.

The necessary percentage to be allowed for unforseen conditions can be reduced from 25 percent to 10 percent. Without going into all the details of this drifting and raising costs the total is estimated at $65.50 per foot.

Cost of Step "B" MASON TUNNEL

| | |
|---|---|
| Rehabilitation paid for by Applicant Drive cross-cut B 200 feet to Gold Dust vein and drift 200 feet to point for raise. Run raise up vein 536 feet; total 836 feet at $65.50 | $54,758.00 |

Summary

| | |
|---|---|
| Capital Investment in Equipment | $ 14,800.00 |
| Cost of Step "A" | 155,436.90 |
| Cost of Step "B" | 54,758.00 |
| | $ 224,994.90 |

If the Little Annie is cut in the Gold Dust raise we can consider cross-cutting to it later on the Mason Tunnel level. It has been suggested that some deep (about East 700 feet) vertical diamond drills be put down from the surface on the Marietta. These would cost $15,000.00 to $20,000.00, and it is the opinion of the Applicant the money can be spent to much better advantage sinking on the vein itself from the Number 5 level. The winze starts in ore, and is to follow down in the vein in the ore.

Since the first of the year the new Mill has been producing concentrate averaging from Marietta ore: -

| Low | | High | |
|---|---|---|---|
| 21 | to | 29 oz. | Gold |
| 51 | to | 64 oz. | Silver |
| 23 | to | 30% | Lead |
| 5 | to | 10% | Zinc |
| 2.69 | to | 4.8% | Arsenic |
| .1 | to | .4 | Antimony |
| .03 | to | .25 | Bismuth |
| .5 | to | 1.4 | Copper |

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The Gold is paid for at $33.03 per ounce; Silver less one (1) ounce at 95% at $.9137; Lead wet assay less 1½ percent 90% at New York price less $.02; Zinc, no pay and no penalty under 10%. Arsenic and Antimony and Bismuth penalties combined on the concentrate average from $1.42 per ton to $2.86 per ton.

Treatment $10.00 per ton with credit for lead over 20%

Trucking 3.50 " " " " " " " " "

The value of the concentrates at these settlement prices bring $800.00 up to $1,083.00 per dry ton at East Helena, Montana, after freight, treatment and deductions net. The Gold in the ore has no relationship to the lead or the pyrite or the arsenic. The Silver is about half related to the lead and the other half independent. For example, a 30.6% lead concentrate ran 46.1 oz. Silver and a 19.8% lead concentrate ran 64.4 oz Silver.

Yours very truly,
NORTHERN MILLING COMPANY, INC.

Paul Raber

Paul I. Raber, President

PR/b
Encl.

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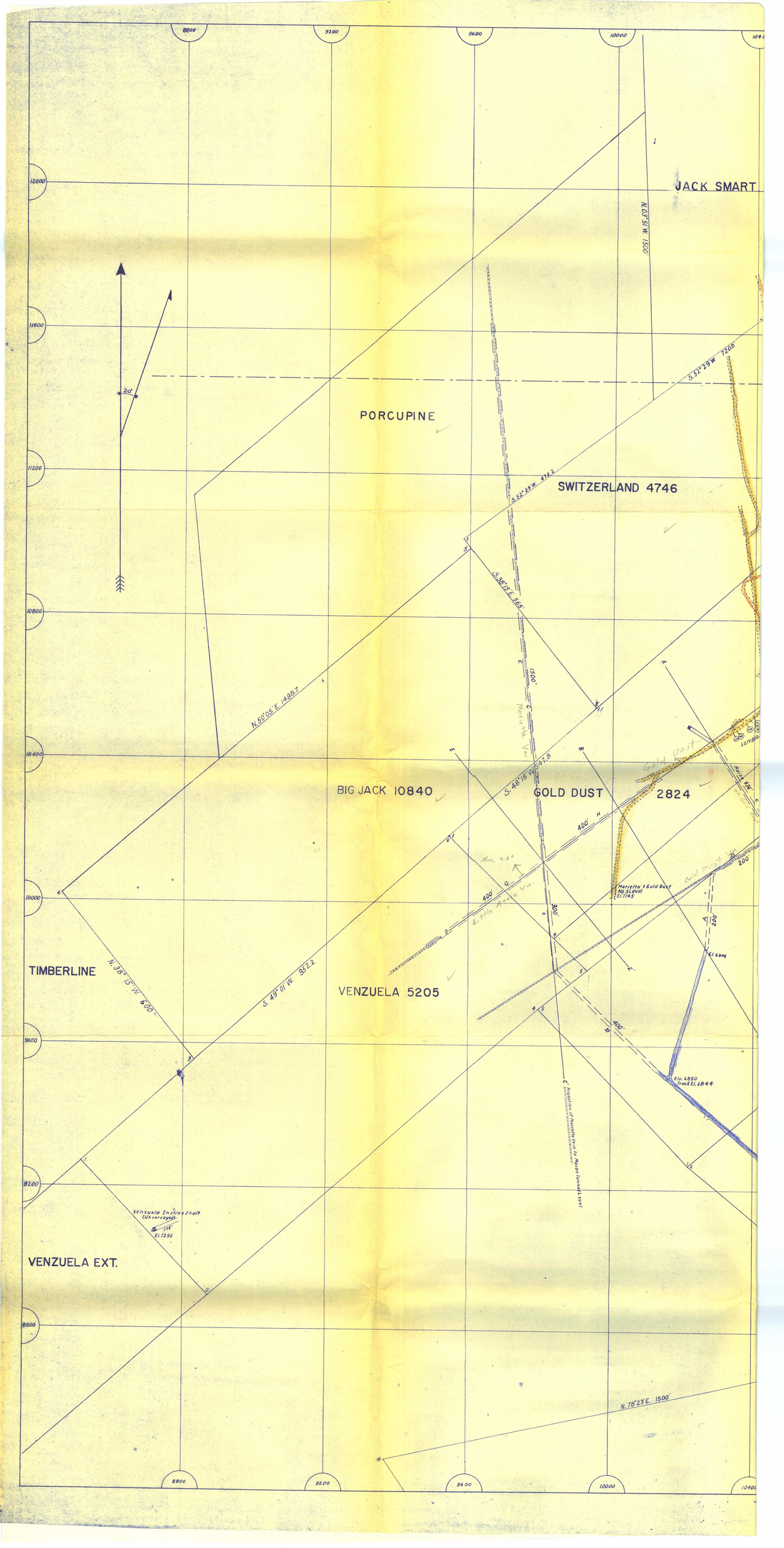
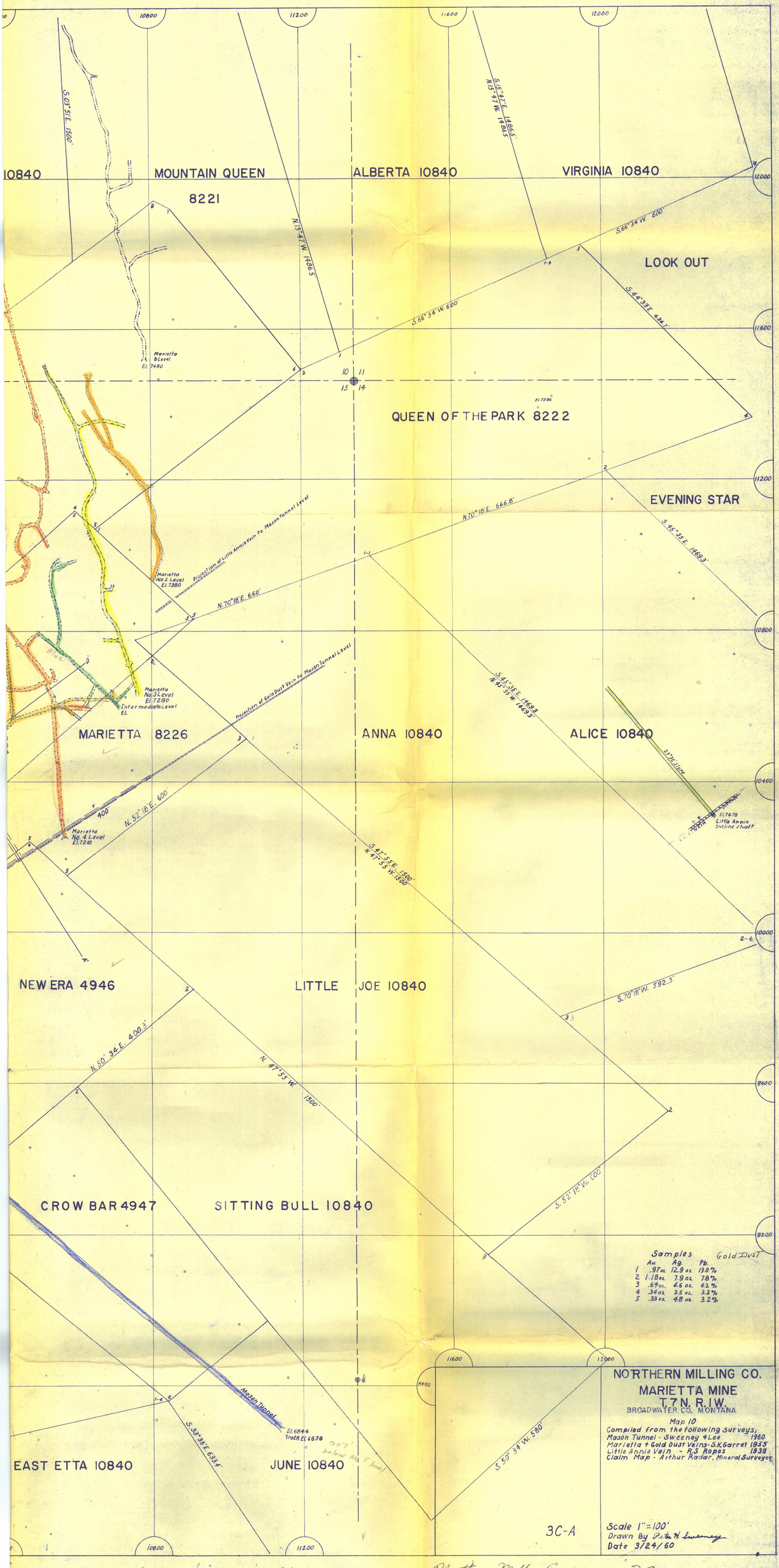
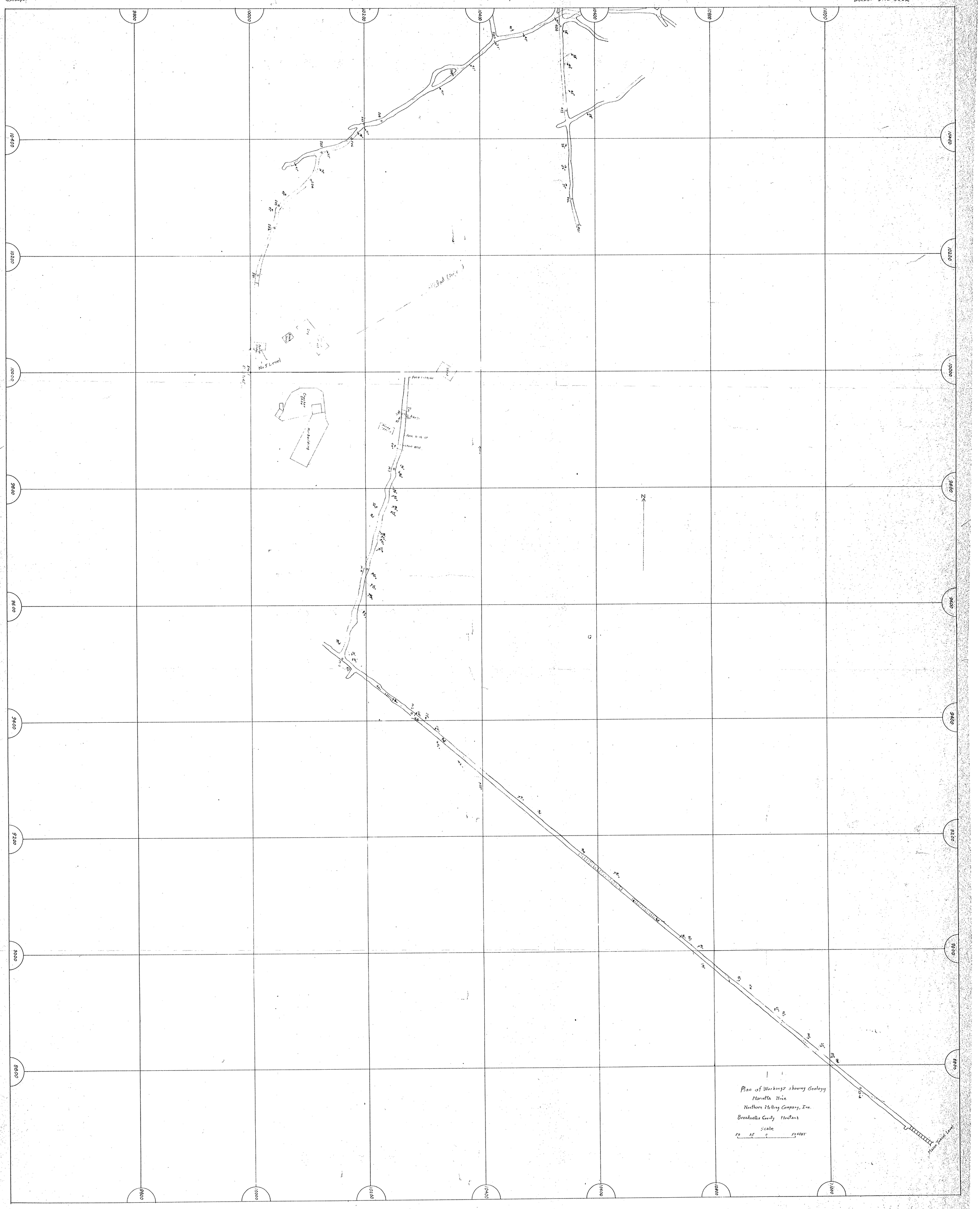
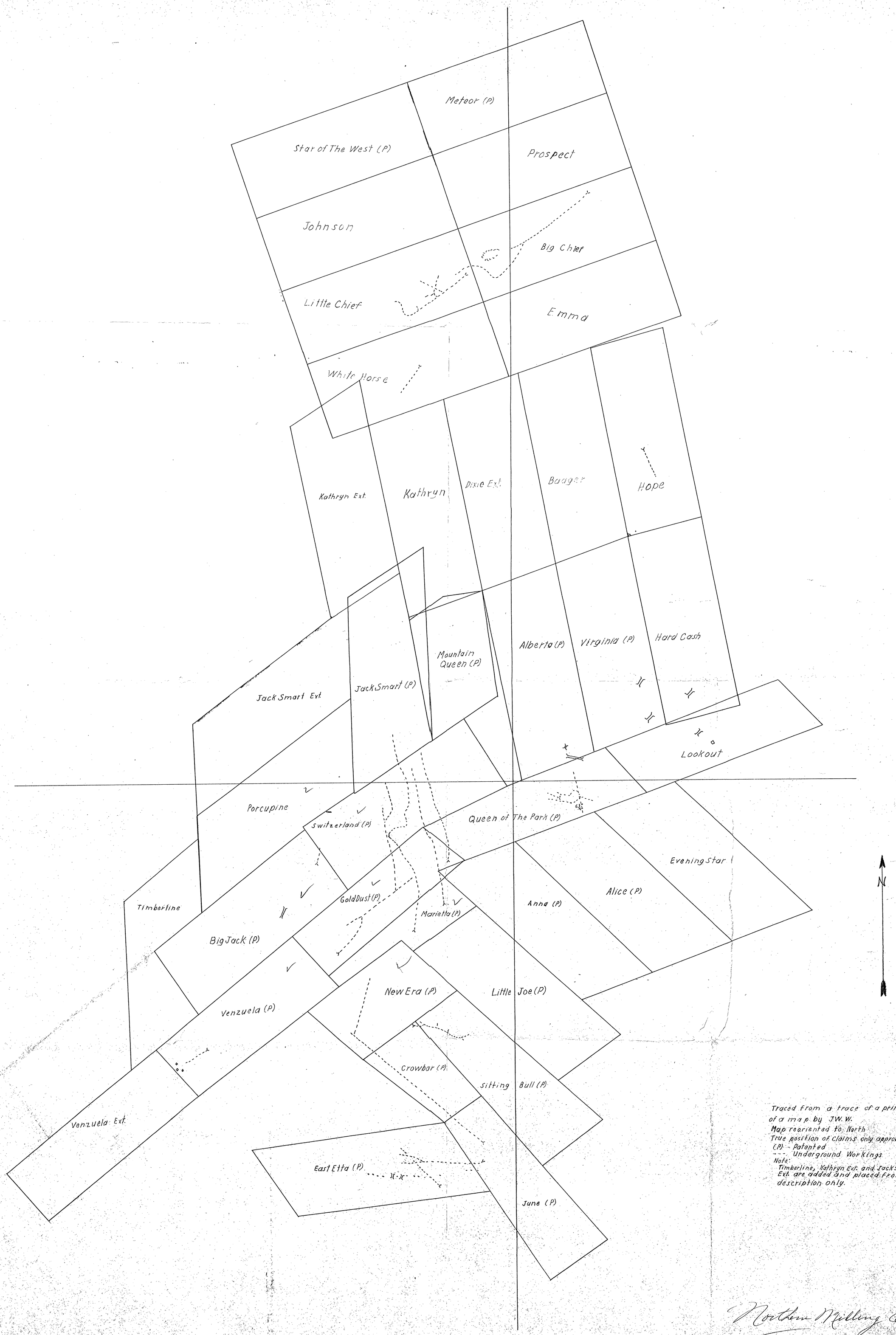

JACK SMART
N.63°15'W. 1500'
S.52°29'W. 720.8'
PORCUPINE
SWITZERLAND 4746
S.52°29'W. 473.2
S.38°15'E. 565'
1500'
Marietta Vein
N.50°05'E. 1498.7
S.49°18'W. 247.8
BIG JACK 10840
GOLD DUST 2824
Gold Dust
400'
Ave. 26°
Little Annie Vein
400'
300'
Marietta & Gold Dust No. 5 Level El. 7143
Gold Dust
200'
200'
El. 6969
TIMBERLINE
N.38°15'W. 600'
S.49°01'W. 952.2
VENZUELA 5205
400'
El. 6850
Track El. 6844
Projection of Marietta Vein to Akron tunnel level
Venzuela Incline Shaft (Unsurveyed)
El. 7292
VENZUELA EXT.
N.76°23'E. 1500'
8800
9200
9600
10000
10400
10800
11200
11600
12000




Northern Milling Co
Townsend
Montana

3C-A


No. 5 Level
Building
Face 1-12-61
Face 11-16-60
Start drift
Mason Tunnel Level
N
Plan of Workings showing Geology
Marietta Mine
Northern Milling Company, Inc.
Broadwater County Montana
Scale
50 25 0 50 FEET



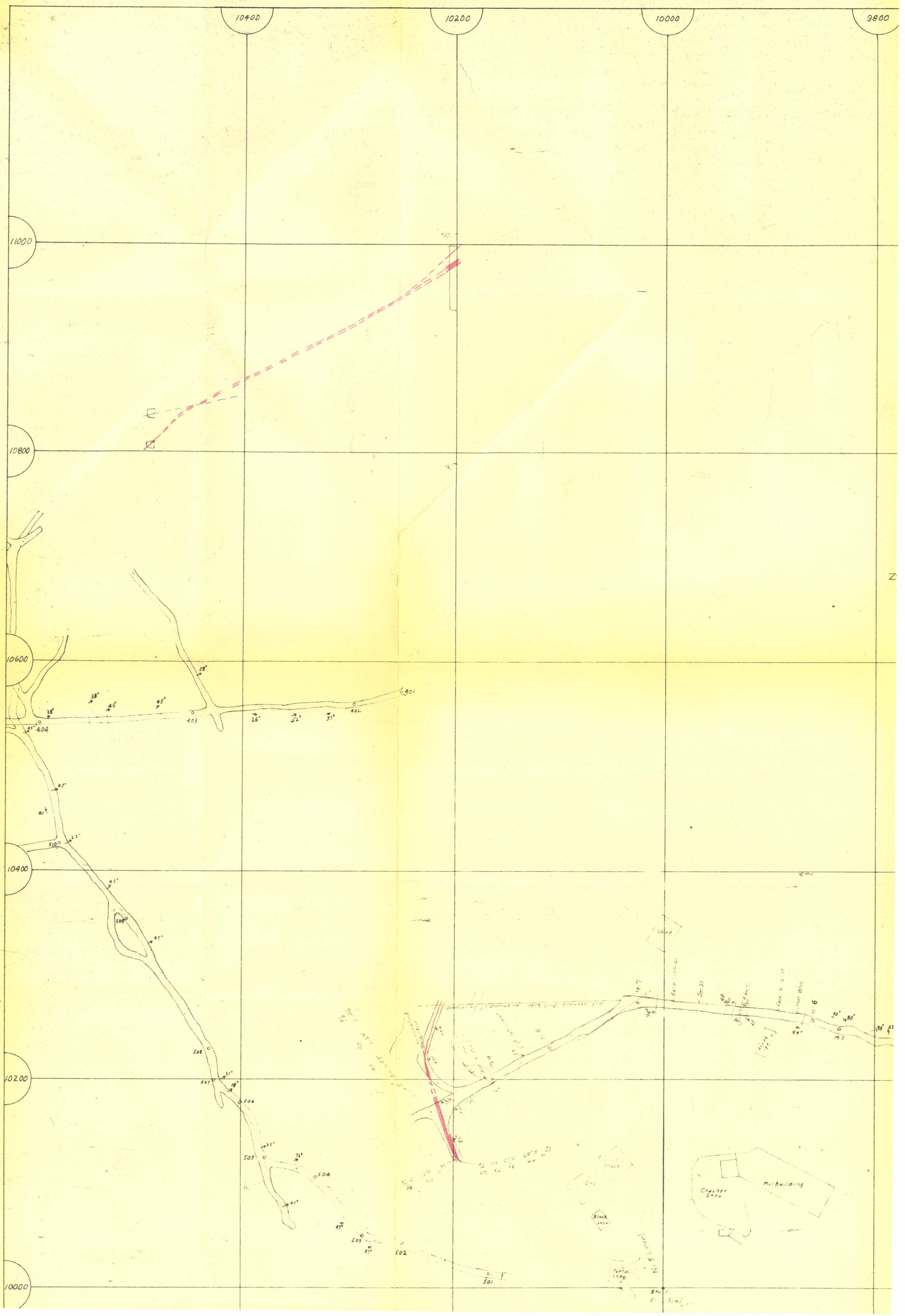

Traced from a trace of a print
of a map by J.W.W.
Map reoriented to North
True position of claims only approximate
(P) - Patented
--- Underground Workings
Note:
Timberline, Kathryn Ext. and Jacksmart
Ext. are added and placed from
description only.

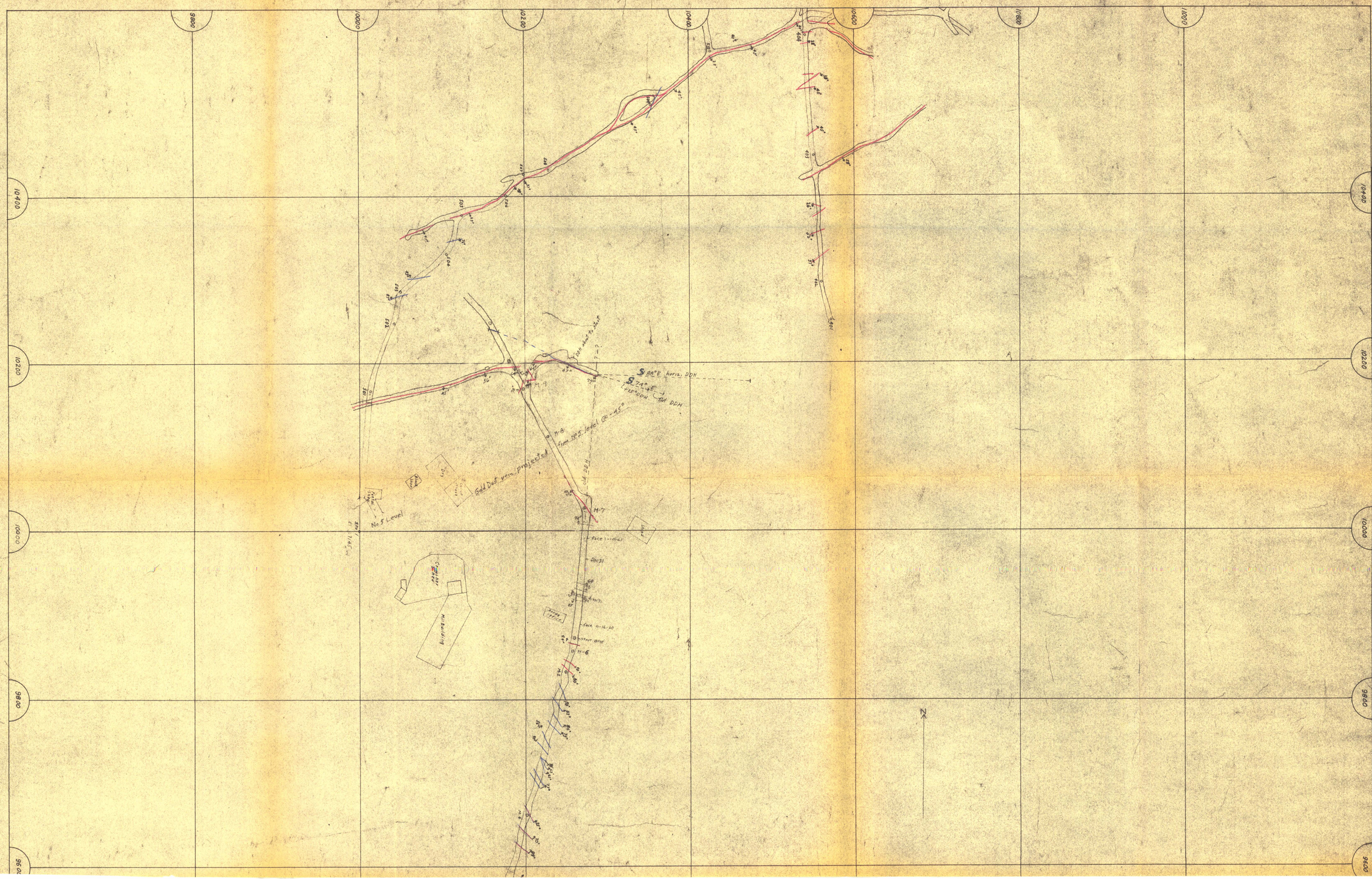
Northern Milling Co
Townsend
Montana

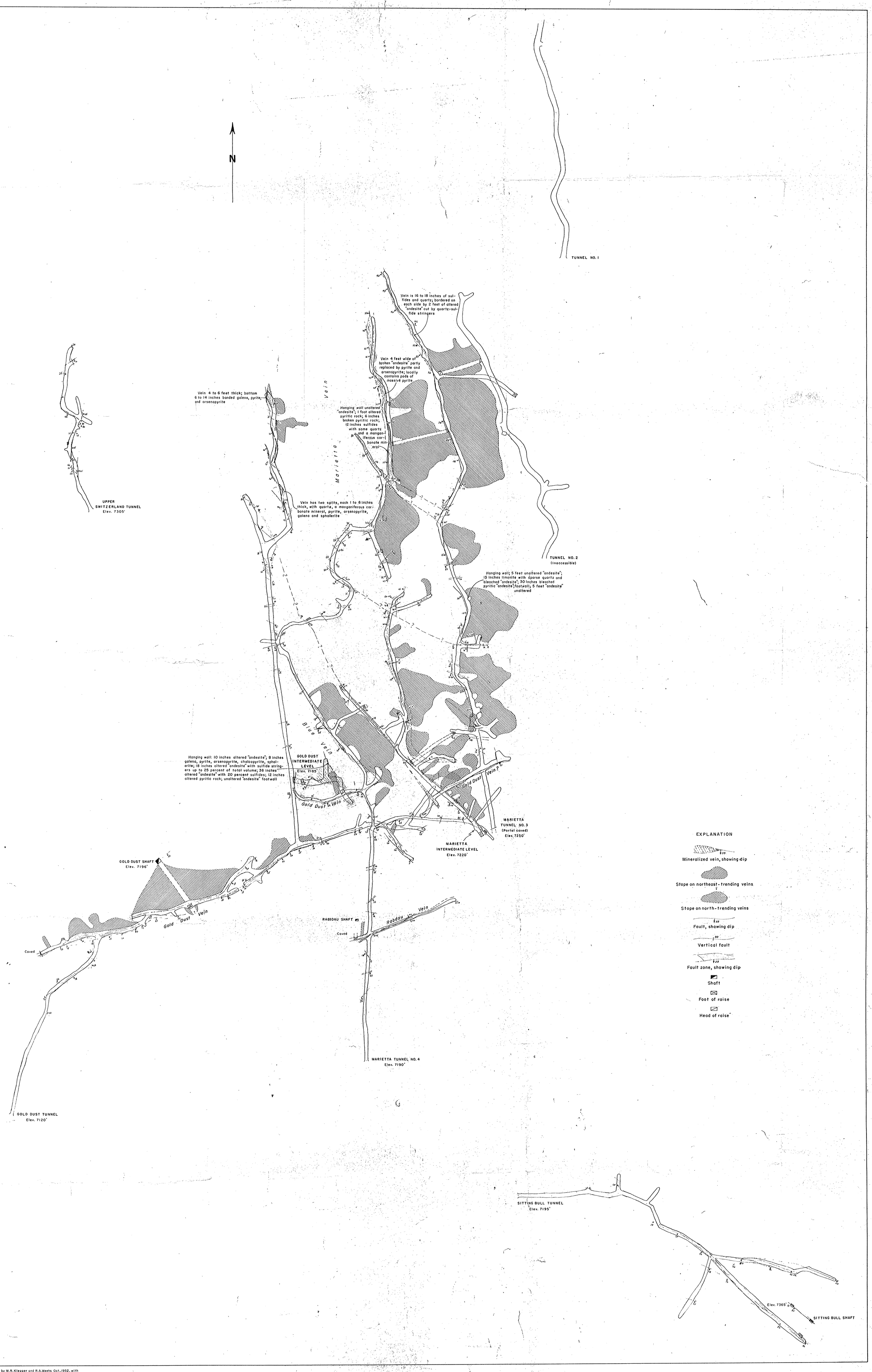
3C-A

Docket OME 6082

Interim Inspection Report




9800
10000
10200
10400
10600
10800
11000
10400
10200
10000
9800
9600
Gold Dust vein projected
No 5 Level
Building
Mill
Shaft
M-7
M-9
M-6
Face 1-10-61
Dec 31
Face 11-16-60
Stop area
Shaft down to 2nd
S 88°E horiz. DDH
S 74°E
15° DDH
2nd DDH
n-d
from No 5 level @ -45°
old DDH
N

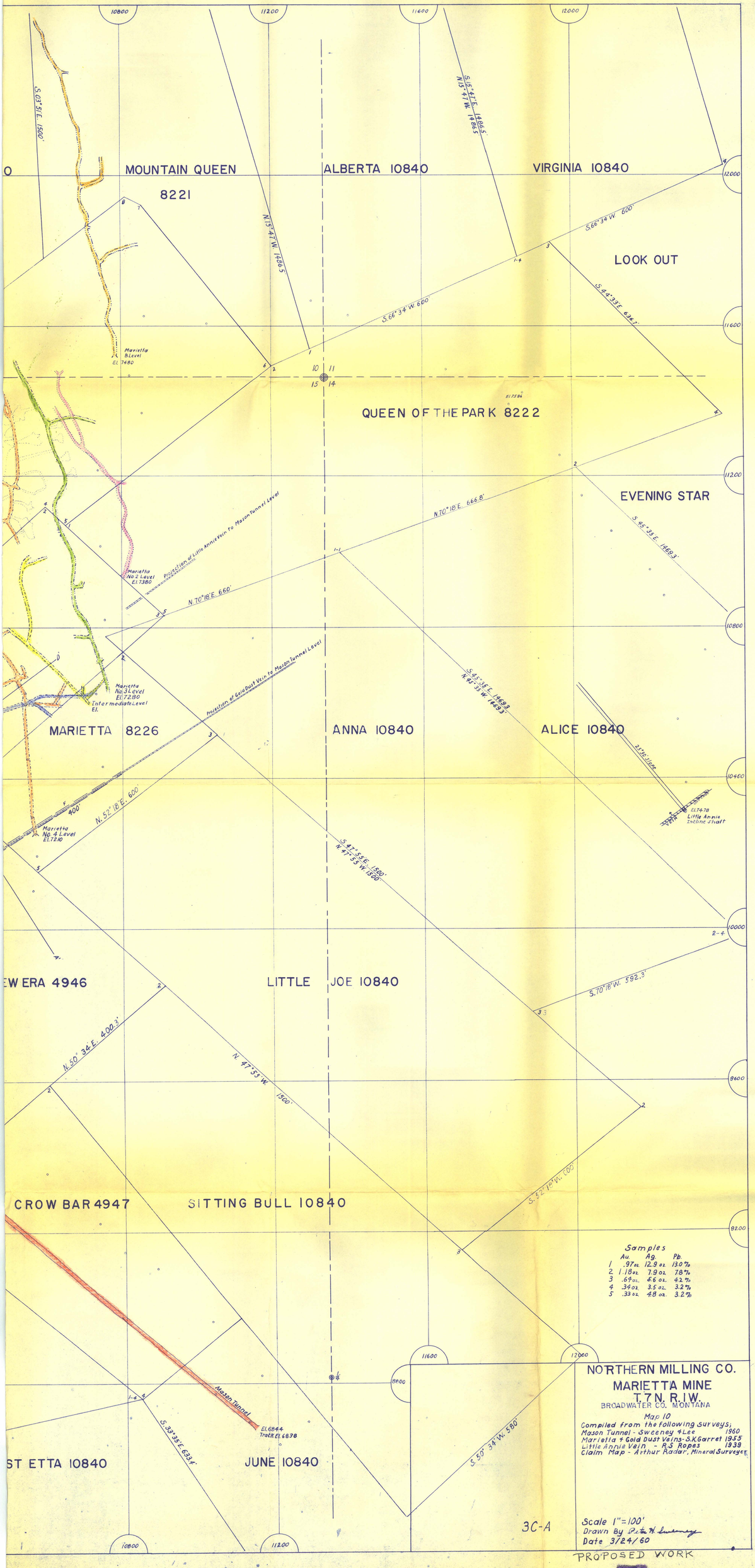


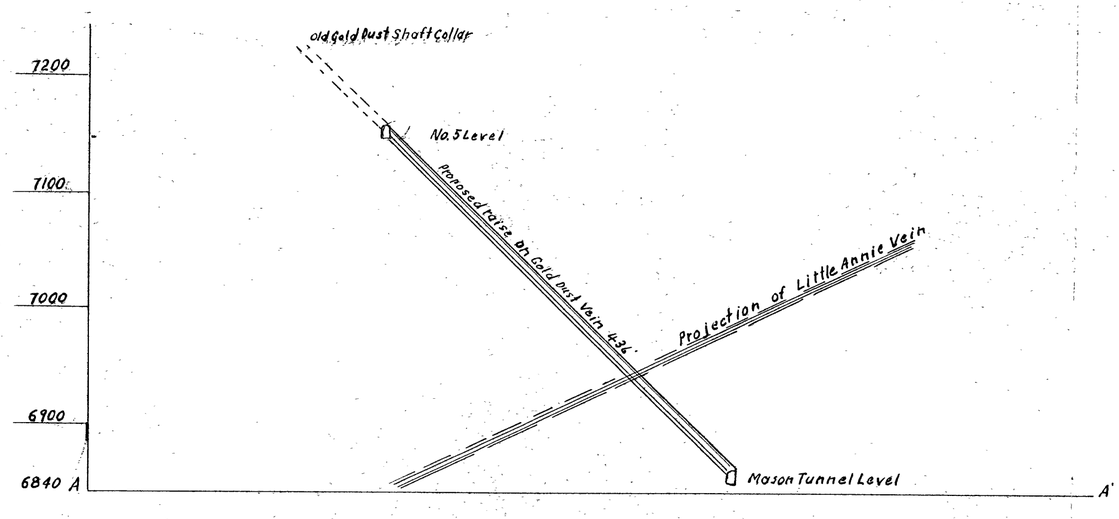

Workings and geology mapped by M.R. Klepper and R.A. Weeks Oct., 1952, with additions to July, 1953. Outlines of workings for Marietta tunnels No. 1 and No. 2 from old company records.

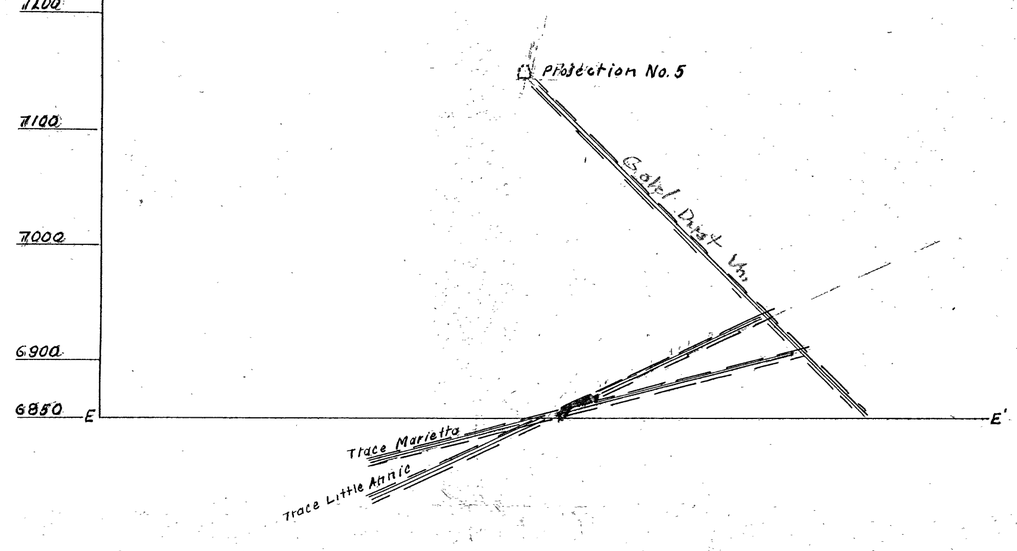
# GEOLOGY OF PARTS OF THE MARIETTA, GOLD DUST, SWITZERLAND, AND SITTING BULL MINES, BROADWATER COUNTY, MONTANA

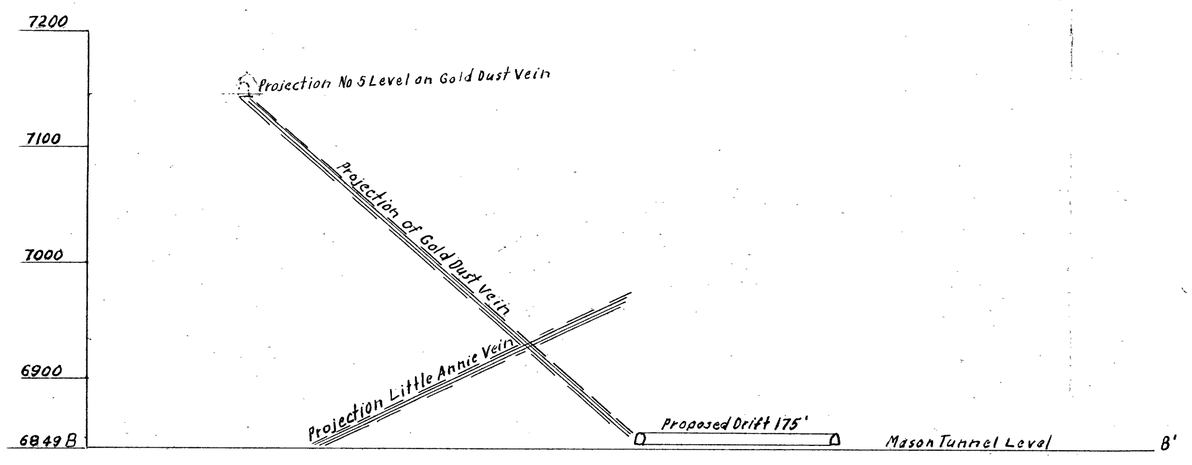
50 0 50 100 150 200 250 FEET

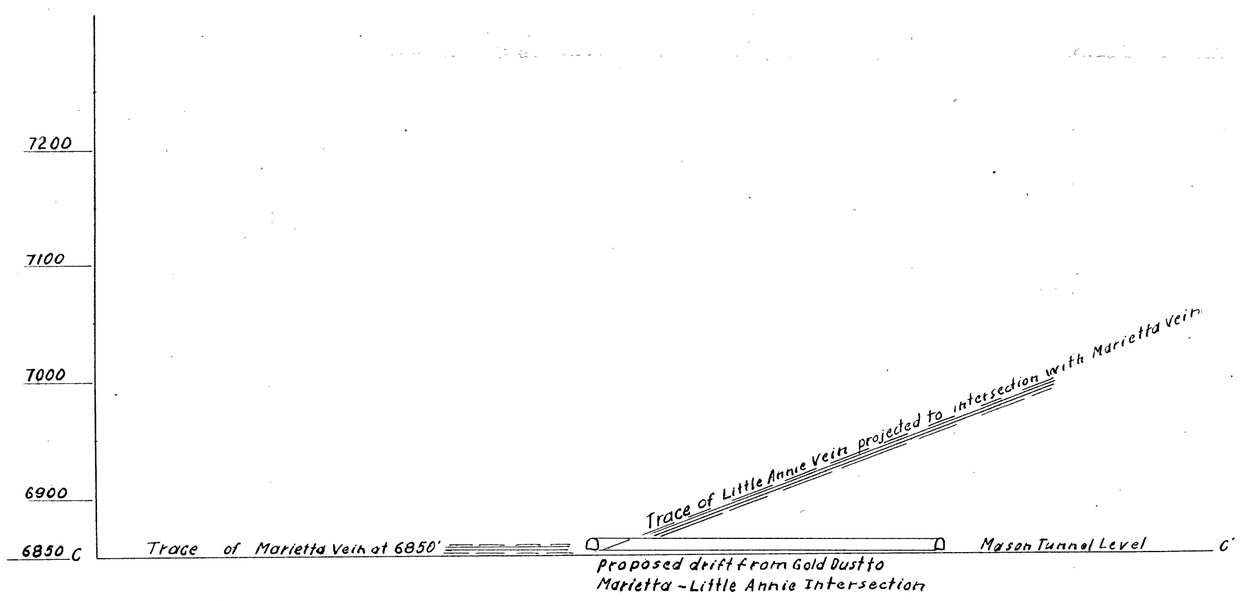
JACK SMART 1084
PORCUPINE
SWITZERLAND 4746
BIG JACK 10840
GOLD DUST 2824
TIMBERLINE
VENZUELA 5205
VENZUELA EXT.
N.03°15'W. 1500'
S.52°29'W. 720.8'
S.52°29'W. 474.2'
S.36°15'E. 565'
1500'
S.48°18'W. 647.8'
N.50°05'E. 1498.7'
S.49°01'W. 952.2'
N.38°15'W. 670'
N.78°23'E. 1500'
Marietta & Gold Dust No.5 Level El.7145
Projection of Marietta Winze to Mason Tunnel Level
Venzuela Incline Shaft (Unsurveyed)
El.7292
Jumbo
Adit 425'
El.6849
Track El.6844
8800
9200
9600
10000
10400
11200
11600
12000

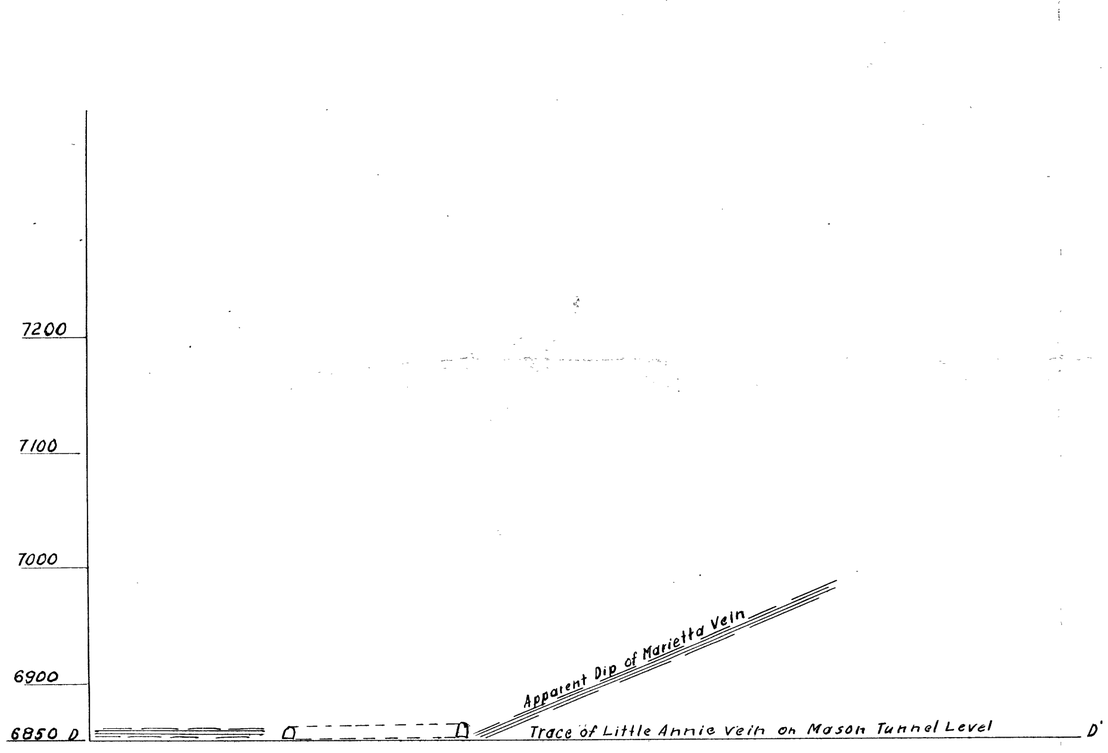

MOUNTAIN QUEEN 8221
ALBERTA 10840
VIRGINIA 10840
LOOK OUT
QUEEN OF THE PARK 8222
EVENING STAR
MARIETTA 8226
ANNA 10840
ALICE 10840
EW ERA 4946
LITTLE JOE 10840
CROW BAR 4947
SITTING BULL 10840
ST ETTA 10840
JUNE 10840
S.03°5'E. 1000'
S.66°34'W. 600'
S.44°33'E. 634.7'
N.70°18'E. 666.8'
S.45°33'E. 1449.3'
N.70°18'E. 660'
N.52°18'E. 600'
S.41°55'E. 1500'
N.47°55'W. 1500'
S.70°18'W. 592.3'
N.50°34'E. 400.3'
S.52°18'W. 600'
S.50°34'W. 580'
S.33°35'E. 623.4'
Marietta 8 Level El. 7480
Marietta No. 2 Level El. 7380
Marietta No. 3 Level El. 7280
Intermediate Level El.
Marietta No. 4 Level El. 7210
Protection of Little Annie Vein to Mason Tunnel Level
Protection of Gold Dust Vein to Mason Tunnel Level
Little Annie Incline Shaft
Mason Tunnel
Track El. 6838
Samples
Au Ag Pb
1 .97 oz. 12.9 oz. 13.0%
2 1.18 oz. 7.9 oz. 7.8%
3 .69 oz. 6.6 oz. 4.2%
4 .34 oz. 3.5 oz. 3.2%
5 .33 oz. 4.8 oz. 3.2%
NORTHERN MILLING CO.
MARIETTA MINE
T.7N. R.1W.
BROADWATER CO. MONTANA
Map 10
Compiled from the following surveys;
Mason Tunnel - Sweeney & Lee 1960
Marietta & Gold Dust Veins - S.K. Garret 1955
Little Annie Vein - R.S. Ropes 1939
Claim Map - Arthur Radar, Mineral Surveyor
Scale 1" = 100'
Drawn By Peter H. Sweeney
Date 3/24/60
3C-A
PROPOSED WORK




Northern Milling Co.
Marietta Mine
Cross Sections of Map No. 10
Scale 1" = 100'
Drawn By Peter H. Sweeney
Date 3/24/60

~~3C-B~~
3C-A

3C-A

Plan
Showing recommended exploration
Northern Mining Company
Marietta Mine
Broadwater County, Montana
Scale
100 50 0 100 Feet

D.R.M., May 1960

Plate 2

Plan
Showing No 4 and No 5 levels and geology
Northern Milling Company
Marietta Mine
Broadwater County, Montana
Scale
50 0 50 feet

D.R.M. May 1960

Plate 1

Note: workings from Company map
geology compiled from maps
by Company and Weeks et al.
U.S. Geol Survey