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PROPERTY FILE

REPORT

- BY -

J. M. TURNBULL

REGISTERED PROFESSIONAL MINING ENGINEER

736 GRANVILLE STREET

VANCOUVER, B. C.

ON

Owen Lake Property.

F. H. Taylor.

DATE

Aug. 22. 1928.

JOHN M. TURNBULL
MINING ENGINEER
736 GRANVILLE STREET
VANCOUVER, B.C.

Vancouver, B.C.
August 22nd. 1928.

F. H. Taylor Esq.,
Smithers, B.C.

Dear Sir,

I examined the Silver Queen - Diamond Belle group of 21 claims, at Owen Lake, 22 miles South of Houston, B.C., August 11th. to 13th., 1928.

There are at least six well defined veins on the property, characteristic widths running from 3 to 5 feet, but outcrops and float indicate the practical certainty of several other similar veins, in fact a kind of network over a large area. The chief values are in Silver and Copper, with auxiliary values in Gold, Lead and Zinc. One vein, (No. 4), is partly developed by a tunnel which has continued in ore for 180 feet, to a depth of over 150 feet, with ore still in the face. The gross values in this tunnel run close to \$25.00 per ton over a width of about 4 feet. The other veins are not developed to any extent, but show some good surface values and similar character, and all indications point to strong continuity in length and depth.

The presence of strong faults, cutting the vein into blocks, in the above tunnel, and the limited width of the veins will tend to make the costs of development and stoping comparatively high. The probable lessening in the number of faults away from the tunnel gulch and the possibility of systematic development of several parallel veins, will tend towards decrease in these costs as development proceeds.

The complexity of the ore is such that a reliable net value cannot be estimated until proper treatment tests have been made. Assuming a good recovery of Gold, Silver and Copper only, which seems likely, a good chance of success remains. If all metals can be recovered to a reasonable extent, the chance of profitable operation becomes very promising indeed, as the outlook for tonnage is very good.

The question of Transportation is important, as this item will be relatively costly, involving a long haul by road to the railroad. This will be minimized by the recent cruising of a new road location, 22 miles long to the railroad, with grades not over 7 percent, and by the fact that any ore tonnage to be moved will be in the form of a high grade concentrate.

There is no water power available close by, and oil or other fuel will be required until operations become large enough to justify the development of power from a distance. Water power is reported on the Morrice river some 7 miles distant.

The remaining general and Geological conditions may be classed as quite favourable.

The proper procedure would be first to carry out preliminary treatment tests, and, if these show the probability of profitable recoveries, the mine should then be tested by driving the tunnel on No. 4 vein a further distance of say four hundred feet, followed by a raise of over 200 feet to the surface. If the ore prove reasonably continuous in width and values, this work would indicate, with some assurance, some 20,000 to 30,000 tons of ore, which would justify proceeding on a much larger scale.

The cost of plant and development, to accomplish the above, should not exceed about \$25,000, and, assuming satisfactory treatment tests, the prospects for tonnage and values fully warrant this preliminary expenditure at the present time.

On the whole, I consider the probability of tonnage to be very strong, and the recovery of values to be the critical point which should be tested as early as possible, since this can be done at comparatively small cost, to a fair degree of approximation.

Attached hereto is a small plan of the tunnels, showing assay values, and an appendix covering various points at greater length. Titles, claim boundaries and purchase agreements were not investigated by me and are not covered herein.

While the veins, at first sight, seem small, their number, continuity and strength, indicate the possibility of future operations on a much larger scale than would at first appear. This possibility of operation on a major scale, combined with promising values, makes the property unusually attractive and I believe fully warrants the recommendations made above.

The whole is respectfully submitted.



J.M. Turnbull,
Registered Professional
Mining Engineer,
Province of British Columbia.

PROPERTY AND LOCATION.

The property consists of 21 claims, including the Silver Queen and Diamond Belle groups. The whole covers a block of ground, roughly square, and considerably over one mile square. The Silver Queen group itself consists of five surveyed claims. The location is about one mile East of Owen Lake, near its South end, and about 22 miles South of the Canadian National Railway from a point near Houston, B.C. Houston is 267 miles East of Prince Rupert.

TRANSPORTATION.

There is a fairly good road from Houston, (Elev. 1950) for 18 miles to Weedon's ranch, (Elev 3300), thence about 8 miles of rough up and down road to the property, with very steep grades in places. The road crosses several rises, the highest being 3800 feet Elev. above sea, or 1850 feet above the railroad. A new road has been cruised out to the property, at a lower altitude, which will have controlling grades of about 7 percent and a length of 22 miles, property to railroad. This road would serve a considerable territory, for settlers and tourists, as well as for mining, and a large share of the cost would no doubt be met by the Government, if serious operations were started.

Winter haulage particularly, over the new road, would probably be rather cheap per ton mile, and concentrates could probably be hauled over it to the railway at not over \$4 to \$6 per ton. As the concentrates would probably be quite high grade, it would appear that transportation cost to the railway would not be a vital drawback. Assuming a concentration ratio of 6 or 8 into 1, the cost of transportation to a coast smelter should not be far from \$1.50 to \$2.00 per ton of original ore.

TREATMENT.

The ore consists of Chalcopyrite, Pyrite, Galena and Zinc Blende, in a complex gangue composed of quartz, rock, and probably Siderite with a good deal of Manganese. Associated with these are low Gold and good Silver values. The Silver values, and probably the Gold, appear to be chiefly associated with the Copper less with the Lead and very little with the zinc, which is an advantageous combination. The gross values in No. 4 vein run close to \$25 per ton, of which Gold, Silver and Copper account for about \$17.

Until actual tests are run it is not possible to say just what recoveries and losses will be made in treatment. It appears that the Flotation process will be most suitable and that there will be little difficulty in getting most of the values in a bulk concentrate. The main difficulty will probably lie in separating the bulk concentrate into separate products, namely Copper, Lead and Zinc concentrates. The safest assumption is that milling will be directed towards making as clean a copper

concentrate as possible, with Lead concentrates and possibly Zinc concentrates as by-products. If possible to recover \$14 per ton of ore, in the form of a clean copper concentrate, on a ratio of 8:1, and allowing \$37.00 per ton of concentrates for transportation and treatment, (\$4.60 per ton ore), we would have a net return of \$9.40 per ton to cover mining, milling and general costs. This should leave a reasonable margin of net profit, while any profits from the Lead and Zinc would be additional. The above figures are of course assumptions and may be considerably altered as the result of treatment tests, but seem to be reasonably conservative as they allow nothing for the Lead concentrate, which in fact will very probably be made.

MINING AND DEVELOPMENT.

Mining widths of 4 to 5 feet are indicated. The walls are not sharply defined in all cases and some dilution in stoping will be probable. The presence of heavy cross faults will cause some extra expense, but the ground is not apparently heavy and heavy timbering is not indicated. It is doubtful if shrinkage stoping will be possible in all cases, as the vein dips range from 50 degrees upwards. It is reasonably certain that a moderately cheap method of stoping will be found available on long straight stops.

Development will be fairly expensive, as compared to large bulk deposits, per ton, due to the comparative narrowness of the veins. This will be offset to a large extent by the straight line parallel nature of the veins, and the apparent continuity of the ore, which will reduce crosscutting to a minimum and permit of a regular system of drifting and a minimum of blind exploratory work.

On the whole mining and development conditions may be considered as very favourable for this type of deposit, and the costs of the two together should ultimately range well under \$5.00 per ton, possibly much less. The cost of development work per foot should not be high as the rock is not hard and little timbering will be required.

ORE BODIES AND WORKINGS.

Diamond Belle Group.

Vein No.1, at Coles cabin, is stripped for over 200 feet in length, showing a well defined width of 3 to 4 feet. It is decomposed and stained with manganese to a black colour. Sample No.11 across 8 inches showing the most Lead, assayed Gold .02 oz., Silver 11.3 oz., Copper 1.6%, Lead 26.1%, Zinc 13.3%. Sample No.12 taken across a 3 inch streak of pyritic material Gold .02 oz., Silver 3.7 oz., Copper Trace, Lead 1.5%, Zinc 4.1%. This vein can only be developed by sinking. The surface is too decomposed to show primary values, but the vein is very strong and warrants development.

Vein No.2 is about 500 feet West of No.1. It has one shaft 15 feet deep showing much decomposition with

remnants of very good ore. It has been traced some 700 feet by cuts, appears strong and definite and warrants further development. A third vein, and two small cross veins have also been found by open cuts.

Silver Queen Group.

Four veins have been definitely proved to exist on this group, about one mile West of the Diamond Belle showings. Brinch creek cuts a gorge about 200 feet deep across these veins. No.1 vein shows about 5 ft. width in a 10 ft. tunnel in the bottom of the gorge, with open cuts on the West bank. It is strongly mineralized but somewhat zincy. Across the gulch an open cut shows a similar vein, which appears to be a cross vein. No.2 vein is about 200 feet up the gulch from No.1, and parallel to it. It is exposed in a couple of cuts and appears to be similar to No.1. These two veins warrant future development and may prove important sources of ore. They can readily be developed by means of tunnels from the gulch, on their strike, to a depth of 200 feet.

Vein No.3 is about 150 feet up the gulch from No.2 and is less well defined. It is developed by a tunnel about 130 feet long, on the West side of the gulch. The Federal M and S. Co. plan shows ore in this tunnel for a length of 85 feet, width 2.5 feet, assay Gold .031 oz., Silver 5.5 oz., Copper 1.3%, Lead 1.2%, Zinc 4.7%. A check sample, No.10, taken by me, assayed Gold .01 oz., Silver 4.2 oz., Copper 1.9%, Lead 0.4%, Zinc 6.2%. Open cuts prove the continuity of this vein for 400 feet to the West. Samples were taken by me from two cuts, respectively 150 ft., and 175 ft., above the tunnel level, which assayed as follows:-

	Width	Gold oz.	Silver oz.	Copper %	Lead %	Zinc %
150' out, copper band	1.1'	.06	48.1	5.7	1.3	3.5
" " lead "	2.1'	.02	5.0	0.9	3.2	3.6
175' " Best 3 ft.	3.0'	.04	17.6	1.6	3.4	7.2

This vein is supposed to be cut off in the face of the tunnel by a flat sill of rhyolite dyke rock, which is given as the reason for abandonment of the property by the Federal M. and S. Co. and is so shown on their plan. A close examination shows that the cutoff is associated with faulting and it is very doubtful if the rhyolite is a true sill. In any case the fissuring plainly continues through the rhyolite, which is only a temporary interruption, with no evidence of permanent cut off of the vein. No.1 and No.2 vein showings are below the level of the supposed sill and form a rather effective answer to the cutoff theory. The surface assays on No.3 vein promise well for values in depth. An open cut on the East side of the gulch shows No.3 vein in place 75 ft. above gulch level. There is a tunnel on this side which shows on the plan and appears to have been an attempt to crosscut No.3 vein. It is entirely off the vein and in country rock.

Vein No.4 is about 75 feet above vein No.3 and parallel to it. It is developed by a tunnel from creek level, driven Easterly about 240 feet, with a number of crosscuts. This is shown on the attached plan, together with widths and assays of ore. Ore shows in this tunnel for a total length of 180 feet, in three

sections, divided apart by faults. The face of the tunnel, in ore, is about 150 ft. below the surface. Values and widths are as follows:

	Length.	Width.	Gold, oz.	Silver,	Copper,	Lead,	Zinc,
F.M. and S. samples	100'	3.8'	0.12	10.5	2.5%	1.5%	6.3
My samples 4, 5, 6.	100	4.5	0.03	10.1	2.6	1.4	5.7
F.M. and S.	50	4.8	0.077	10.9	3.6	0.7	3.6
My samples 7, 8.	50	3.0	0.07	17.3	5.3	0.7	3.3
F.M. and S.	30	2.4	0.047	12.1	2.9	2.2	7.6
My sample 9.	30	5.0	0.04	7.8	1.6	0.9	6.2

The throw of the faults is about 6 to 8 feet.

The tunnel started as a crosscut, and struck the vein at a point where it is broken into stringers, probably due to its proximity to the gulch, which corresponds with a wide broken outcrop immediately in the gulch, which is probably local and confined to the gulch. On drifting easterly, a cross vein above a flat fault branches to the northeast, the junction giving the impression of a wide low grade deposit due to mineralization in the angle of intersection. This cross vein seems to be parallel to the one noted opposite the short No. 1 vein tunnel. These suggest interesting possibilities.

From the junction to the face the No. 4 vein is strong and continuous, except for the faults noted, fairly even in width and in ore all the way with no diminution in values as depth is gained. There seems to be every prospect for the ore to continue for an unknown distance in advance of the face. This tunnel, if continued would reach and maintain a fairly uniform vertical distance of over 200 feet below the surface, for a length of about 1500 ft, but would eventually come out to daylight again.

While tonnage estimates are merely tentative at present, some idea of the possibilities may be gained by estimating the tonnage for a length of say 600 feet, a depth of 200 feet and a width of 4 feet, which gives over 40,000 tons. Actual vein outcroppings occur along the line of the tunnel up to 1600 feet.

In general, outcrops and float indicate with some assurance the occurrence of other veins, a kind of open network in fact, over a large area. The rolling surface of the property lies largely at an average elevation of 200 to 250 feet above the Wrinch creek gulch. A long crosscut tunnel from nearer Owen Lake would develop a large area to a depth of 400 feet or more. The total possible tonnage of vein material is therefore remarkably large and the critical point is rather the question of what proportion will be profitable - that is of values rather than tonnage.

I would recommend starting work by driving on the ore in No. 4 tunnel. If the ore prove continuous for a few hundred feet, in width and values, it will greatly increase the assurance of success at a comparatively small cost in comparison to results. I consider that this constitutes an excellent mining risk, in view of the large possibilities which may be opened up at a relatively small cost.

GEOLOGY.

Nadina mountain, 4 miles to the West, is reported to be granite, and so appears from a distance. If so its intrusion is a very favourable geological feature and suggests the origin of the ores from this intrusive source and a possibility of deep seated origin. The rocks on the property seem to belong to a single series, but show local variations. Porphyritic dyke rocks, intrusives of the gabbro type, undoubted volcanic breccias and in places rocks resembling sedimentary quartzites all occur. They may be classed generally as a favourable combination. A close geological study will eventually be necessary to guide development to the more favourable zones, as some rocks will no doubt be more favourable for values than others. The veins seem to be true and strong fissures, which probably extend to depth and appear to have great length.

The chief practical difficulty so far exposed is the presence of strong cross faults, which so far seem to be associated with Wrinch creek gulch, and probably will not be universal. In any case they do not seem to throw the veins very far nor to affect the continuity or values, though they will add somewhat to the costs and problems of mining and development.

There is apparently a good deal of replacement along the vein fissure walls, but not extending far into them, so that the veins are generally rather clearly defined and easy to follow. The presence of much manganese in the gangue is interesting and agrees with a deep seated origin from hot solutions, i.e. hydrothermal action which is quite liable to be widespread and may be considered a favourable form of origin, particularly in view of the number of fissures in which ore may have been deposited or actually is known now to be deposited. On the whole the geological features are very favourable.

POWER.

There is no power source on the property, except firewood, of which there is plenty. Oil fuel is probably the most desirable or cheapest power to start on. Oil will cost about \$12 per drum on the ground. Water power is reported on the Morrice river, 7 or 8 miles away. It is a considerable stream and should be investigated. Reports indicate that it might be an important power for mining purposes.

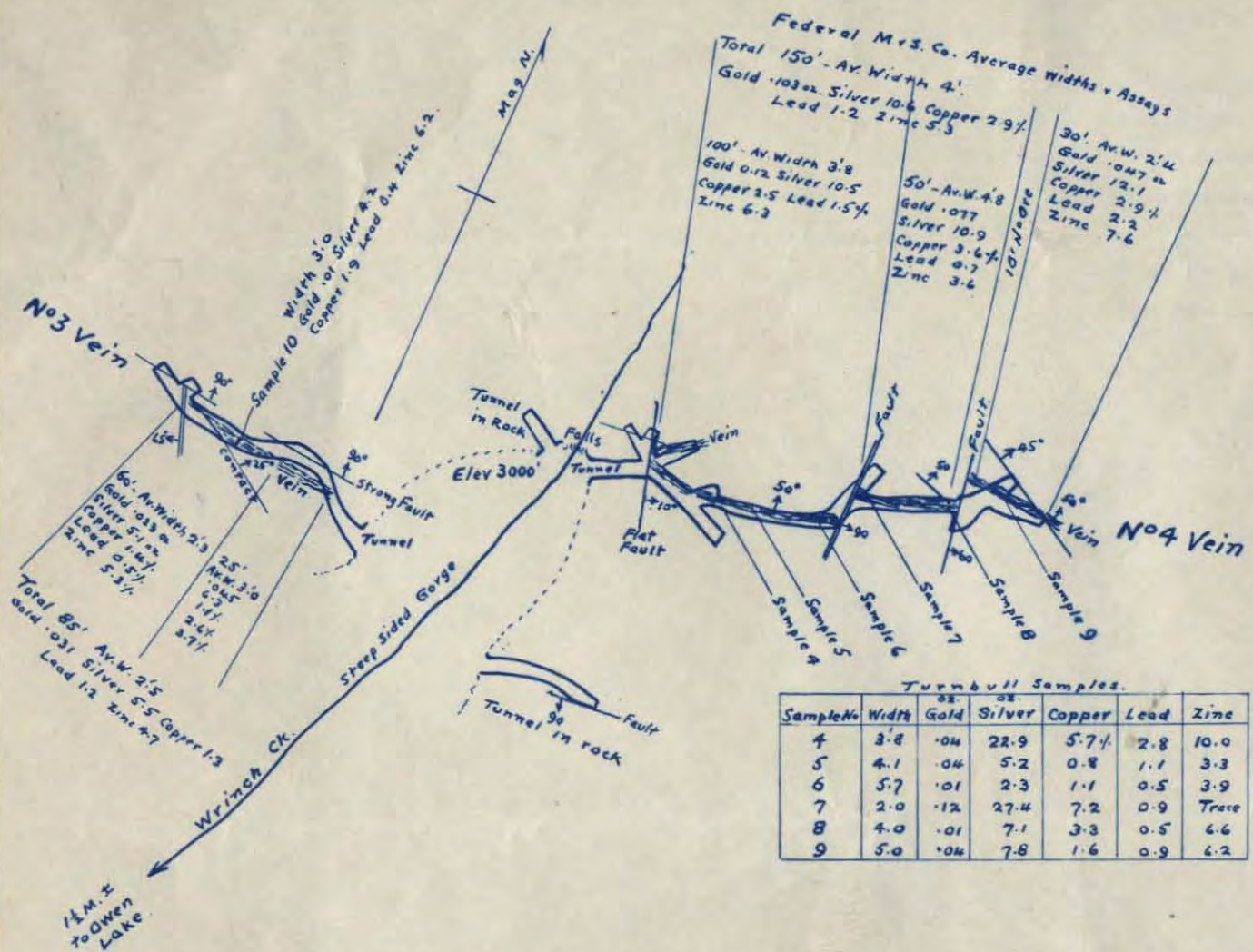
GENERAL CONDITIONS.

Wrinch creek will furnish domestic water, and possibly water for milling. Otherwise water is scarce except in Owen Lake. There is ample timber and firewood for a long time to come. The surrounding country includes much good ranch land and offers ample facilities for town or camp sites etc. A number of mines are being opened up in this region, which facilitates labor supply. The climate is cold in winter, but snowfall is not excessive and is in fact an advantage for hauling purposes. There seems to be no striking adverse condition.

Silver Queen Workings, Owen Lake, B.C.
 From Federal M & S Co Plan, Dept Mines Report 1924.
 Check Samples and Geology by J.M. Turnbull
 To accompany report by J.M. Turnbull Aug 22, 1928

Scale 1" = 80'

J.M. Turnbull



Federal M & S Co. Average widths & Assays

Total 150' - Av. Width 4'
 Gold .103 oz. Silver 10.6 Copper 2.9%
 Lead 1.2 Zinc 5.3

100' - Av. Width 3.8
 Gold 0.12 Silver 10.5
 Copper 2.5 Lead 1.5%
 Zinc 6.3

50' - Av. W. 4.8
 Gold .077
 Silver 10.9
 Copper 3.6%
 Lead 0.7
 Zinc 3.6

30' - Av. W. 2.4
 Gold .047
 Silver 12.1
 Copper 2.9%
 Lead 2.2
 Zinc 7.6

No. 3 Vein

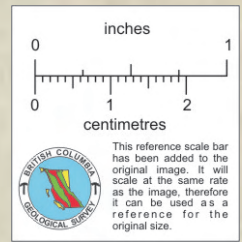
60' - Av. Width 2.3
 Gold .033 oz.
 Silver 5.1%
 Copper 1.4%
 Lead 0.5%
 Zinc 5.3%

25' - Av. W. 3.0
 Gold .03
 Silver 14.1
 Copper 2.4%
 Lead 0.7%

Total 85' - Av. W. 2.5
 Gold .031 Silver 5.5 Copper 1.3
 Lead 1.2 Zinc 4.7

Turnbull Samples.

Sample No.	Width	Gold	Silver	Copper	Lead	Zinc
4	3.8	.04	22.9	5.7%	2.8	10.0
5	4.1	.04	5.2	0.8	1.1	3.3
6	5.7	.01	2.3	1.1	0.5	3.9
7	2.0	.12	27.4	7.2	0.9	Trace
8	4.0	.01	7.1	3.3	0.5	6.6
9	5.0	.04	7.8	1.6	0.9	6.2



Silver Queen Workings, Owen Lake, B.C.

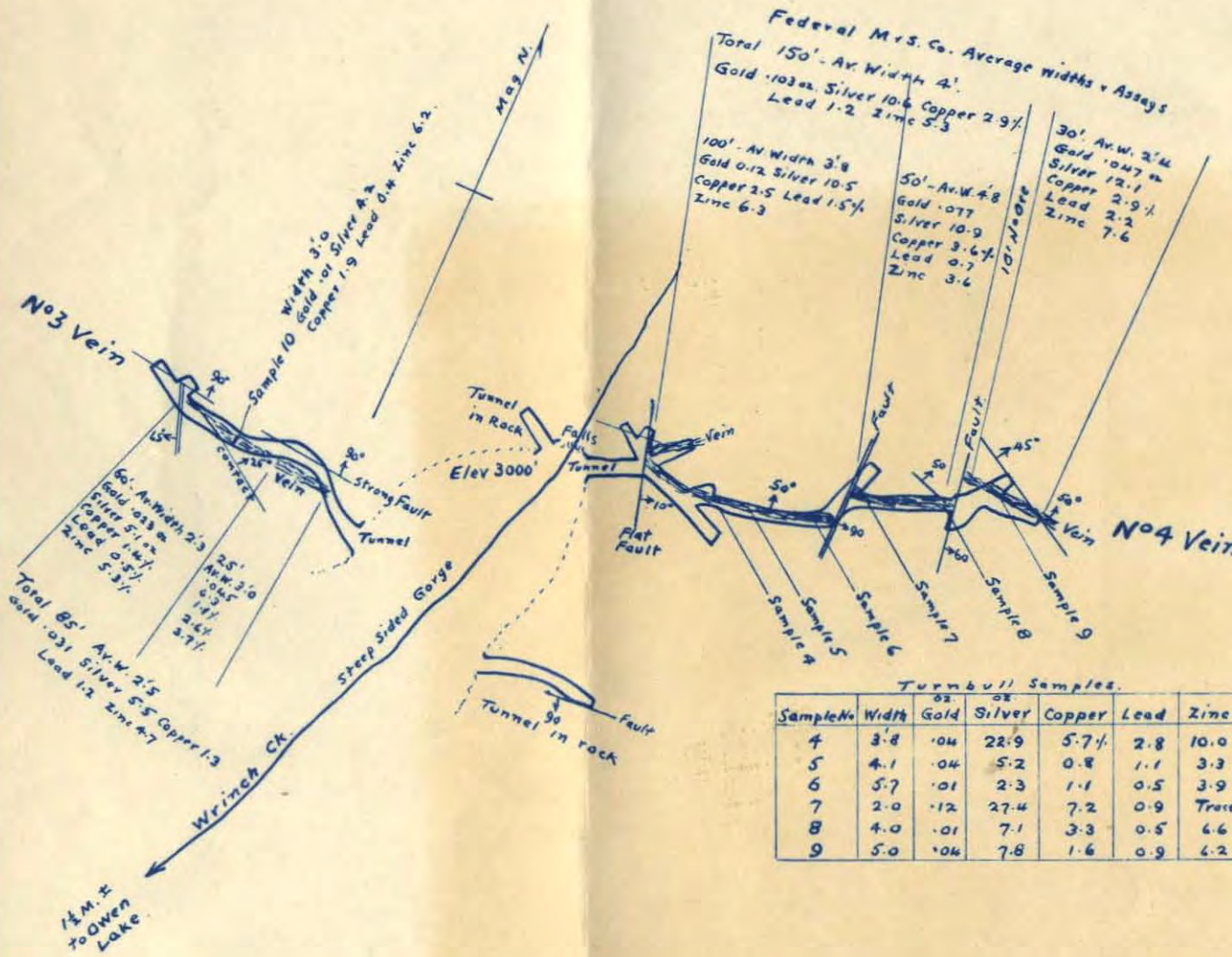
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Federal M & S. Co. Average widths & Assays

Total 150' - Av. Width 4'
 Gold .103 oz. Silver 10.6 Copper 2.9%
 Lead 1.2 Zinc 5.3

100' - Av. Width 3' 8"
 Gold 0.12 Silver 10.5
 Copper 2.5 Lead 1.5%
 Zinc 6.3

50' - Av. W. 4' 8"
 Gold .077
 Silver 10.9
 Copper 3.6%
 Lead 0.7
 Zinc 3.6

30' Av. W. 2' 4"
 Gold .047 oz
 Silver 12.1
 Copper 2.9%
 Lead 2.2
 Zinc 7.6

No. 3 Vein

60' - Av. Width 2' 3"
 Gold .023 oz
 Silver 5.1 oz
 Copper 1.4%
 Lead 0.5%
 Zinc 5.3%

25' - Av. W. 3' 0"
 Gold .045 oz
 Silver 6.5
 Copper 1.4%
 Lead 0.7%
 Zinc 3.7%

Total 85' - Av. W. 2' 5"
 Gold .031 Silver 5.5 Copper 1.3
 Lead 1.2 Zinc 4.7

1 1/2 M. N. to Owen Lake

Turnbull Samples.

Sample No.	Width	Gold	Silver	Copper	Lead	Zinc
4	3.8	.04	22.9	5.7%	2.8	10.0
5	4.1	.04	5.2	0.8	1.1	3.3
6	5.7	.01	2.3	1.1	0.5	3.9
7	2.0	.12	27.4	7.2	0.9	Trace
8	4.0	.01	7.1	3.3	0.5	6.6
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