Property File

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REPORT OF AN EXAMINATION OF

GIANT MINE

Spillimacheen, B. C.

To: Mr. E. A. Julian, General Manager,
Goldfield Consolidated Mines Exploration Co.,
San Francisco, California.

By: Chas. C. Starr,
Janunry 9, 1928.

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Introduction: At the time this examination was made there was two feet of snow, consequently the surface work could not be seen. I was on the property for a few hours in the summer of 1925 and saw the outcrop and surface workings somewhat superficially at that time.

Location: The Giant Mine is in the Golden Mining Division, on the N.E. side of the Spillimacheene River and about a half mile distant. It is 7 miles N.W. of Spillimacheene station (44 miles south of Golden) on the Kootenay Central Railroad. The elevation at the mine camp is approximately 3300 feet, and at the railway 2590 feet.

Transportation: The Kootenay Central Railway (a branch of the Canadian Pacific) runs two trains a week between Cranbrook and Golden.

The road to the mine is fairly good but considerably better grades and a better river crossing could be obtained by relocating on the west side of the river.

Freight on ores or concentrates, not exceeding $50.00 per ton value, from Spillimacheene to Tadanac (Smelter) is $3.40 per ton. Hauling from the mine to the railway should not exceed $2.00 per ton if in quantity and can likely be reduced to about a dollar.

Power, Timber, and Water: Power is at present developed by an internal combustion engine but there are two sites, one above and one below the mine, where water power can be economically developed to generate electric current at a distance of three or four miles from the mine.

There is a considerable amount of timber suitable for mine use and for fuel but no great amount large enough for sawing. Water for camp use and for a small milling plant is available under a small head.

Topography and Climate: The Giant Mine is situated at the base of a small mountain (Jubilee Mountain), the outcrop being on steep rough ground, while the tunnel portals are on smoother, more gently sloping ground, which becomes comparatively flat about 100 feet below the lowest tunnel. It will be necessary therefore to sink to develop the mine to a much greater depth. The region is cold with below zero temperatures for several weeks each winter, but the snowfall is not excessive and roads can be kept open by occasional plowing.

Property, etc.: There are twenty-five claims in the group, of which three are Crown granted.

The group covers nearly 1000 acres. The principal workings are on the Giant and Rothchild claims.

History: The Giant Mine was one of the first lode mines discovered in British Columbia. Some years ago a small Elmore ore concentration mill was constructed at the mine but it failed to be profitable. More recently the mine was taken over by the Pacific Mines Ltd. who have driven the No. 5 and No. 6 Tunnels, raised from No. 5 to No. 3 tunnel, and drilled ten diamond drill holes.

Equipment: The equipment consists of a 16 x 40 ft. log building at the No. 5 tunnel portal which houses a blacksmith shop equipped for hand sharpening, a Sullivan 9" x 8" single stage

compressor, Type 886, driven by a 25 HP Fairbanks, Morse Type Y, Style HB, Semi Diesel engine.

There is one Ingersoll-Rand R-72 drill, and two small Turbo drills with the usual accessories and drill steel.

The No. 5 tunnel is equipped with track and ore cars.

At the camp there is a log boarding house 40 x 18 ft., an office 12 x 18 ft. and two 12 x 18 ft. cabins; all are in good condition.

Development: A number of shallow cuts have been opened across the outcrop, and there is one large cut, the so-called Glory Hole, from which most of the ore milled has been taken. Otherwise development consists of tunnels as follows:

Tunnel	Elevation	Drift	Crosscut	Raise	Total
No. 1	3565	20	260	---	280
No. 2	3567	40	50	---	90
No. 3	3500	110	225	---	335
No. 4	3539	---	55	---	55
No. 5	3342	65	715	220	1000
No. 6	3455	---	220	---	220
		235	1525	220	1980

All workings are open and in good condition.

Geology: Since it was impossible to see any of the surface, no very good idea of the general geology was obtainable at first hand; The following is a brief abstract of the report made by Dr. C. S. Evans for the owners in September 1927. I have no

criticism to make regarding Dr. Evans' conclusion and nothing to add to it.

General Geology

Goodsir (footwall slates) Ordovician

Slates and intercalated thin limestones

Ottertail - Upper Cambrian

Silicious dolomitic limestone

Dogtooth - (or Lower Slates) Lower Cambrian

Dark slates with sandy limestones etc.

Structure: A N.W. pitching syncline on Jubilee Mountain (the mine is on the S.W. flank of this mountain) is cut by a thrust fault.

On the Giant the hanging wall slates have been upthrust to the N.E. against Ottertail and Goodsir. The Ottertail limestone is cut off in a sharp nose which follows down the big barite outcrop and into the orebody of the raise. This trends about N 85° W and plunges about 50°.

Mineralization: In general barite replaces the Ottertail limestone and galena replaces barite not far from the base of the overlying Goodsir strata. It is thought that the barite and galena are later than the faulting.

The heavy mineralization appears to follow closely the crest of the Ottertail limestone along its contact with hanging and footwall slates (Dogtooth and Goodsir respectively). It is presumed that the inverted V of this contact may have hemmed in the mineralizing solutions.

Ore:

The ore is a replacement of Ottertail limestone by barite, which in turn is in part replaced by galena. There is also considerable silicification of the limestone in place, and, rarely, a little sphalerite accompanies the galena. Barite occurs from specks scattered through the limestone to widths of many feet comparatively pure. The galena is fine grained and occurs irregularly distributed through the barite. The ore contains from one to three ounces of silver per ton and generally less than 1% of zinc.

Sampling: Records are available of 150 samples, more or less, taken by the owners of the mine. In addition, certain averages are given purporting to be those obtained by the Federal Lead Co. from their own sampling.

In view of this the entire orebody was not sampled, but only a sufficient part to serve as a check on former work, 22 samples in all (see map).

A comparison of averages follows:

Place		Lgth.	Width	Oz.Ag.	%Pb	%Zn
Outcrop	P.M.Ltd.	?	9.0	1.7	7.0	?
	Federal	320	10.2	1.3	10.0	0.3
	Starr		none			
#3 Tunnel - xcut at SE end	P.M.Ltd.		15.3	3.6	20.4	4.2
	Federal		?	?	?	?
	Starr		11.0	0.9	1.8	—

Place		Lgth.	Width	Oz.Ag.	%Pb	%Zn
Main Raise	P.M.Ltd.	195	-	2.7	11.6	-
	Federal	180	4.9	3.3	12.0	0
	Starr Calculation of P.M.Ltd. Assays	195	4.9	2.5	10.9	-
Main Raise - 40-100' down from #5 Tunnel	P.M.Ltd.	60	4.7	2.1	12.7	
	Starr	60	4.7	2.4	6.2	
	Federal	0-	---	---	---	
Intermediate Level	P.M.Ltd.	--	25.0	1.9	9.3	
	Federal	--	16.5	1.8	9.5	0.1
	Starr Calculation of P.M.Ltd.Assays	40.	16.2	2.4	10.1	--
No. 5 Tunnel Main Crosscut	P.M.Ltd. (East Side		36.	0.3	4.8	
	(West Side		37.6	1.1	13.8	
	(Both Sides		36.7	0.7	9.6	
	Federal (Both Sides		?	1.4	12.0	0.3
	Starr (West Side		29.3	1.0	6.1	---
No. 5 Tunnel Drift	P.M.Ltd.	6.7	6(±)	0.7	5.4	---
	Federal	---	----	----	---	---
	Starr	---	----	----	---	---
No. 5 Tunnel Crosscut at S.E. End	P.M.Ltd.	---	11.0	3.5	11.6	
	Federal	---	----	----	---	
	Starr	---	9.0	1.9	3.8	
Averages of Outcrop, Raise, &#5 Tunnel x-cut	P.M.Ltd.		10.1	2.3	9.6	
	Federal		10.5	2.1	10.5	

The results of the Federal Company's sampling checks well with that of the Pacific Mines Ltd. but the samples taken in connection with the present examination show less than half as much lead as the others. These latter samples were taken with ordinary care and the assays have been checked. There

seems to be no reasonable explanation of the discrepancy between the average samples from 40 to 100 feet down in the raise; in the crosscuts, where fewer samples were taken, one possible source of considerable variation is the tendency of the ore to be much better at one point than another, - as an example of what is meant, it would not be unusual for a crosscut to show good ore near the bottom and lean ore at the top or vice versa both at the same distance from the walls.

As a result of the failure of these samplings to check, doubt is thrown on the value of the whole mine until such time as the discrepancy is cleared up by further sampling.

In the meantime the remainder of this report will be written on the assumption that the Federal and Pacific Mines average value is the correct one. If the true value of the ore is half this, as indicated by the latest sampling, the mine is practically worthless.

Ore Reserves:

In the first place it must be thoroughly understood that the amount of ore fully developed, or blocked out, is negligible.

Ore has been opened on the outcrop, in No. 1 Tunnel, in No. 3 Tunnel, in the raise between #5 and #3 Tunnels, in the #5 crosscuts and drift, and in No. 5 and No. 9 drill holes. These points are too scattered to allow any accurate estimate to be made. If it were assumed that the ore is continuous between these points, and of the observed widths, there would be approximately 220,000 tons, but it is probable that

there are breaks in the continuity.

If it be assumed that the orebody as opened by the raise from #5 to #3 tunnel continues of the same value and width for 100 feet in length - a conservative assumption - it will contain about 50,000 tons.

If the ore on the outcrop be assumed to go down 130 feet, also conservative, it will add another 50,000 tons.

In my opinion there is a "reasonable expectation" of a minimum of 100,000 tons of ore which may be classed as "probable Ore" from the area now partially developed, and a good possibility of 50,000 tons more which might be classed as "Possible Ore".

Net Value:

As now exposed the ore has an average content by Federal and Pacific Mines sampling of about 2 oz silver and 10% lead per ton.

On the basis of the following test, said to have been made at the Trail Smelter, and their lead smelting schedules, the following results were obtained:

Metallurgical Test on Giant Ore

	% Wt.	Oz. Ag.	%PB	%Zn	% Extraction Ag.	% Extraction Pb
Heads	100	2.3	11.2	0.3		
Conc	15.	13.5	68.7	1.2	88.1	92.0
Tails	85.	0.45	1.0	0.15		

On a head value of 2 oz. silver and 10% lead,

assuming the same grade of concentrate, the weight of concentrate would be 13%, - thus:

Lead Concentrate

Silver	@ 58¢		$ 7.42
Lead	@ £22 per long ton		43.68
			$ 51.10
Treatment	$6.00		
Zinc	.24		
Sulphur	2.00		
Freight, Spilli-macheno to Trail	3.40		13.64
Value of 1 ton concentrate at Railway			$ 37.46
		Per ton ore	5.06

It seems probable that a higher grade concentrate with an equally good saving of lead could be made by finer grinding and careful work.

Future of Mine:

If the "pitching nose" theory of the ore formation is correct, as seems probable, the thickness of the Ottertail limestone, which contains the ore, and the varying susceptibility of its beds to replacement is extremely important in reference to the downward continuation of the ore.

The Ottertail formation has a very considerable thickness at some points far distant from the mine, but so far as I am aware its thickness near the Giant has not been estimated. Dr. Evans gives nothing on this point in his geological report.

If the "pitching nose" theory is not correct, the next most probable theory would seem to be that the ore occurs rather erratically in a NW-SE zone through the Ottertail limestone, ending to the NW against the thrust fault. In either case the data of #7 Diamond Drill Hole are not what would be expected.

The possibilities through extensive development are great and thorough exploration of the property is advisable under the proper terms of purchase.

Since the value of the ore per ton is low there must be a large tonnage developed - several times the minimum now indicated - before the construction of a mill is justified.

Costs:

Costs of development (1194 ft.) by the Pacific Mines Ltd. from November 1, 1926 to June 30, 1927, are as follows:

Mining - per foot	$ 9.90	
Overhead - office-truck-general	2.19	
Surface - per foot - Power, Blacksmith, supervisor, etc.	3.59	$ 15.68
Construction - road - camp & mine		3.89
Boarding House		.63
		$ 20.20

Equipment, amounting to $10,815. not included in above.
Fuel oil by carload 11½¢ per Imperial gallon at Spillimacheene
Diamont Drilling was contracted at $3.25 per foot.

Equipment:

Estimate of cost of equipment of property, on basis of 200 tons per day production, using hydro electric power

Mine equipment	$ 35,000.	
Installation and putting mine in shape for production	25,000.	
		$60,000.
Mill, equipment and construction		60,000.
Power, dam, equipment, etc.		50,000.
		170,000.

Operating:

Mining	$ 1.25
Development	.65
Milling	.90
Power	.25
Overhead, taxes, interest, etc.	.65
Total operating cost per ton	$ 3.70

Profit & Loss:

Value of ore 100,000 tons at $5.06	$506,000.
Operating cost 100,000 tons at $3.70	370,000.
	$ 136,000.

There is an indicated operating profit of $1.36 per ton which would necessitate the working of 125,000 tons of ore to return the estimated cost of plant, and beyond that 3/4 of a ton of ore is required per dollar of purchase price of the property before any true profit can be made.

Favorable and Unfavorable Features:

Some of the most apparent unfavorable features of the mine are: -

(1) Comparatively low grade of the ore.

(2) Lack of sufficiently intensive development in the area opened.

(3) An element of uncertainty as to the geological conditions involved.

(4) The necessity of sinking for deeper development, with water to contend with and miners unaccustomed to shaft work.

The Favorable Features Are:

(1) Large orebodies.

(2) Ore cheaply and easily treated.

(3) Heavy gangue, making for low per ton costs.

(4) Little timbering required.

(5) Possibility of developing very large tonnage.

(6) The possibility of shipping the barite gangue at a profit.

Conclusion:

It must be noted that the following conclusions are based on the assumption that the ore developed carries 2 oz. silver and 10% lead, but that this value has to be proven by careful re-sampling before it can be taken as true.

The low net value of the ore makes it necessary that a large tonnage be developed in order that equipment and purchase costs may be repaid and still leave a profit. Up to the present a small amount of development has put in sight a large amount of ore and if the mine develops as is reasonable to expect the same should hold true in the future.

There is not as yet sufficient ore developed to justify the construction of a mill, which should have at least 200,000 tons of ore ahead of it.

The need of the mine at present is more intensive and thorough development between the No. 5 Tunnel level and the outcrop, as well as deeper development along the "nose".

The Giant is simply a prospect which may reasonably be expected to respond to development that it will become a low-grade large tonnage mine.

However, before any money is spent on the property it is essential that a thorough sampling be made. This I believe should be done by taking a large number of large samples, in order that a proper average of the rather spotty ore be gotten and that the proper relative proportions of the varying textures of rock in each cut may be obtained.

Respectfully submitted,

Chas. C. Starr

COPY OF REPORT ON GIANT MINE.

BY DR. C. S. EVANS (GEOLOGICAL SURVEY OF CANADA)

Golden, B. C.
Sept. 3, 1927.

GIANT MINE

General Geology - shown on map.

Goodsir (footwall slates). Ordovician

In general alternations of blue crystalline limestone in slates. - Nodules of limestone in slate. Edgewise conglomerates. - Irregularly banded limy beds.

Ottertail. Lower Upper Cambrian.

Usually fine grained, light gray, light weathering, silicious dolomite limestone. Irregular silica outweatherings.

NOTE: In "Geology of Field Map Area", by the Canadian Geological Survey, the Ottertail formation 25 miles north of the Giant Mine is given as Upper Cambrian and as lying immediately below the Goodsir shales (Ordovician). (C.G.S.)

Dogtooth. (or Lower Slates) Lower Cambrian

Some of these darker slates resemble closely the slates in Goodsir, but the strata as a whole may be distinguished from Goodsir by the presence of limy sericitic sandstone, sandy limestones and silicious sericitic argillites as interbands in slate.

Structure

The major structure of Jubilee Mountain. is a N.W. pitching syncline of which the west limb is the steeper. This structure is cut (truncated) along the western base of Jubilee Mountain by a major thrust fault that brings late Pre-Cambrian strata against the various members of the major syncline. The strike of the Ottertail, Goodsir contact, and

of the Goodsir beds near the Giant Mine, lies between 290° and 300° with steep dips. N70W N60W

The strike of the Pre-Cambrian is from 315° to 320°. N45W N40W

On the Giant property the hanging wall slates have been upthrust to the N.E. against Ottertail and Goodsir. The inferred trace of this fault at the surface is shown on map, the fault dips 45 to 55° to S.W. This fault does not appear to be the major fault referred to above, but rather one marginal to it.

The Ottertail limestone is cut off in a sharp nose which follows down the big barite exposure and into the ore body of the raise.

The trend of this nose appears to be about 275° N85W plunging about 50°, this checks up between sections #5 and #2, but even if the small amount of limestone found in diamond drill hole #7 be Ottertail, it is seen that there is a marked deviation from the attitude given above, else much more Ottertail would have been found. I cannot say just what has happened here.

Mineralisation.

Regional examination shows that the Ottertail limestone forms a favorable host for barite, none of the purer limestone of the interbeds in Goodsir strata were found to have been so replaced.

In general the barite occurs in Ottertail, not far from the base of the overlying Goodsir (shale at contact) strata. In detail the barite is not found confined immediately below this contact, but as bedding replacements and irregular replacements in Ottertail within several hundred feet of contact.

On the Giant it is noted that Barite replaces the limestone, PbS replaces barite (very rarely limestone).

The Ottertail limestone shows the most pronounced fracturing and the barite has been later than much of the fracturing, though in some places (near Tunnel 4) and on the Hidden Treasure, the barite is disturbed and fractured itself.

Conclusive proof cannot be given but the absence of many fragments of barite caught up in hanging wall fault in No. 5 and Raise would indicate that the barite was later than the fault. So far as seen the Barite alone is host for ore.

Possible Plan of Mineralization.

The heavy body of barite occurs from the end of tunnel #5 to the old open cut and in continuation up the nose from open cut. Here the metallization is good.

Southeast from this, barite with PbS is found in No. 1 and 4 tunnels and in open cuts at Sta. 21 and 23 (my stations marked on map). It is noted that these bodies lack the massiveness and regularity of the body in No. 5, Raise and open cut. A projection of any apparent altitude found in these S.E. bodies carries one into limestone in a short distance.

Further to the S.E. along the cliff very little PbS is seen and the barite appears to occur in isolated small pockets. The heavy mineralization thus appears to follow closely the crest of Ottertail limestone along its contact with hanging and footwall slates (Dogtooth and Goodsir respectively), or close under the projection of these contacts where they are now eroded. It thus seems possible that the inverted V of this contact may have hemmed in the mineralizing solutions. The crest of this inverted V rises more steeply than the slope of the nose up from the old open cut, and the barite is seen to disappear near my sta. 17. During such a mineralization Barite and PbS would also follow favorable beds, joints and fractures, and along the Dogtooth and Goodsir contacts with the Ottertail. This would explain isolated deposits and some of the apparent "plasterings" is near Sta. 21, which is not far below the thrust plane projected. I am not so sure of this plan of mineralization that I would suggest any expensive exploration based on it. Drill Hole #7 either negates this plan or is the result of a minor irregularity - which?

(signed) Chas. S. Evans.