800228

THE BAYONNE GROUP
(BAYONNE MINE)
THE ECHO GROUP
(49° 116° SW)
NELSON MINING DIVISION
B.C.

March 13, 1979

George L. Mill, P. Eng.

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INTRODUCTION :

This report is written at the request of Mr. Ralph Sostad, 1012 - 470 Granville Street, Vancouver, B.C. It has reference to two contiguous groups of mineral claims, namely the Bayonne Group and the Echo Group, located in the Nelson Mining Division of British Columbia. The Bayonne Group, comprising a total of six Crown-granted claims, covers the acreage commonly referred to as the Bayonne Mine, a former gold producer. The contiguous Echo Group lies along the southern boundary of the Bayonne Group and comprises a total of nine reverted Crown-granted claims. Mr. Sostad is the beneficial owner of both groups.

The purpose of the report is to compile all pertinent information relative to the past history and productive performance of the Bayonne property and to investigate the economic feasibility of resuming operations by mining and processing its known reserve tonnage under the more favourable transportation facilities and metal prices existing at the present time. In conjunction with, or subsequent to, the above, an exploratory program would then be implemented on one, or both, groups and directed primarily towards certain favourable locations as indicated in this report.

SUMMARY

In summary, the writer is of the opinion that, at current gold, silver and lead prices, the ore contained in the reserve blocks reported in the existing underground workings of the Bayonne Mine can be beneficiated at an operating profit. However, the feasibility study will probably show that this operating profit will be offset by the capital outlay required to provide production facilities. It seems apparent that this indicated reserve will have to be increased substantially to ensure an adequate return after allowance for the capital outlay. As noted in this report, the writer believes that the chances of increasing this reserve are favorable, especially through exploratory work eastward between No. 4 Level and No. 8 Level horizons.

Taking all these factors into account, this report suggests that consideration be given to the implementation of a 3-stage program. Individually, these stages call for:

STAGE 1

The compilation of all necessary data to permit the preparation of a feasibility study.

STAGE 2

Exploration work within the existing working horizons directed to the increase of ore reserves.

STAGE 3

If results obtained in Stages 1 and 2 so warrant, the driving of a low-level crosscut to intersect the down-dip projection of the ore below No. 9 Level horizon.

In addition, the writer suggests that the ground lying within the boundaries of the adjoining Echo Group be prospected and outcrops mapped.

PROPERTY :

The subject groups comprise a total of fifteen (15) contiguous mineral claims identifiable as follows:

Crown-granted Claims

Bayonne	Lot No. 5083
Columbus	Lot No. 5961
Ohio	Lot No. 5962
New Jersey	Lot No. 5967
Virginia	Lot No. 6887
Skookum	Lot No. 9360

Reverted Crown-granted Claims

Oxford	Record No. 725
Delaware	" No. 726
Illinois	" No. 727
Echo	" No. 728
Echo Fraction	" No. 729
Ontario	" No. 730
Portland	" No. 731
St. Elmo Fraction	" No. 732
Idaho	" No. 733

In addition, Mr. Sostad holds certain surface rights on the Ohio Claim which contains approximately 51 acres.

LOCATION :

The claim groups lie in the Bayonne - Midge Creek area of the Nelson Mining Division of British Columbia. They are located on the South-westerly slope of John Bull Mountain, north of Bayonne Creek, a tributary of the West Fork of Summit Creek. The former producing gold mines of the Sheep Creek district lie approximately eight miles to the west.

ACCESSIBILITY :

Between the years 1925 and 1930, a wagon road was built from Tye Siding, up Cultus Creek for about six miles and, from this, a pack trail extended through a low pass to Canyon Creek and up from Canyon Creek to the Spokane Mine on Wall Mountain. This trail was later extended to the Bayonne Mine. The Bayonne road, carried through to the mine in 1935, followed the same route from the end of the wagon road. Tye Siding is on the Kettle Valley branch of the Canadian Pacific Railway running along the west shore of Kootenay Lake. This wagon road, approximately 23 miles in length, was used by trucks in summer and caterpillar tractors during the winter. As can be evidenced, transportation was undoubtedly the major problem encountered by the former operators. Since the completion of the Salmo-Creston Southern Provincial Highway in 1963, this handicap has been eliminated in great part. This new highway crosses Bayonne Creek approximately 24 miles from Creston. From this point a logging company holding timber limits in the area built four miles of road to within 1.5 miles of the Bayonne Mine. In 1964, a local mining company optioned the Bayonne Group of claims and extended the logging road to the property but dropped its option after a very limited diamond drilling program. From a transportation standpoint, this places the Trail Smelter within 60 miles of the property, mostly via paved highway.

PHYSICAL FEATURES :

The area forms part of the Selkirk Mountain Range with claim elevations ranging from 5000 to 7000 feet above sea level. The present Bayonne Mine workings lie in the 5200 to 6000 foot range. As oxidation extends to 450 feet below the surface, as indicated in the underground workings, the ice field covering the area could not have been very thick.

Bayonne Creek, which flows through the property, will supply sufficient water to meet requirements and ample timber is available on the lower claims to sustain mining operations.

Climatic conditions are not excessively severe and the total snowfall - estimated locally at about 16 feet - should not interfere too greatly with winter operations.

HISTORY OF THE PROPERTY :

The fifteen claims originally comprising the Bayonne and Echo groups were acquired under option agreement by Bayonne Consolidated Mines Limited in 1935. The Bayonne Group was staked in 1901 and the claims Crown-granted in 1904. The Echo Group was staked a few years later but the claims were not brought to crown-grant until 1935. Prior to the year 1915 the vein system was explored on three horizons but the property remained relatively inactive from that time to the year 1929. From 1929 to 1935 work was done intermittently but it was during this period that the road to the Spokane Mine was completed and eventually

extended to the Bayonne in the summer of 1935. In the Fall of that year, a 36 ton shipment of high grade ore was made to the trail smelter and control of the property then passed to Bayonne Consolidated Mines Limited.

Construction of a 60 ton cyanide plant and an underground development program was initiated in 1936 and the property brought into production in November of that year. Production was relatively continuous throughout the years 1937 and 1938 but was curtailed in 1939 in favour of an extensive exploration and development program. This program proved up sufficient ore to maintain continuous production from April 1940 to August 1942 at which time labour and material shortages forced cessation of operations for the duration of the war. The property remained inactive throughout 1943 and 1944 but was reopened and renovated in the late summer of 1945. From that time to July 1946 development work was concentrated on the "A" vein. A shaft was sunk from No. 8 Level of the "A" vein and No. 9 Level developed. Milling operations were resumed but, once again, shortage of labour and materials forced closure in July 1946. Between the years 1947 and 1951 various lessees removed some 1,000 tons of ore from the workings.

In 1964 local interests rehabilitated the access road between the Highway and the property, retimbered both No. 8 Level portals, carried out a check sampling program in accessible underground areas and did

a limited amount of diamond drilling. On the basis of results obtained in the course of this sampling program, it was concluded that:

1. The implementation of an exploration and development program on the property was fully justified.

2. To defray, at least in part, the cost of the above program the immediate construction of an ore beneficiation plant should be undertaken.

3. In order to ensure continuity of production an active exploration and development program would have to be maintained. The indicated reserve tonnage at mining grade was considered adequate to maintain the operation of a 50 ton per day plant for one year.

Plans were then formulated to proceed immediately with the provision of production facilities. Damage to the old cyanide plant and crusher house was so severe that no consideration was given to renovation. The old buildings were removed and the site prepared for the installation of a prefabricated building to house a flotation plant. Two new ore bins - each of 300 ton capacity - were constructed, the main haulageway (#5 Level) was widened to allow the change from 18" track gauge to 24" and a surface contour survey carried out to determine the suitable portal locations for two new adits below No. 8 Level. Work on the program was apparently then suspended and the option agreement terminated.

It is estimated that, throughout its productive life, the Bayonne

processed or shipped a total of 85,000 tons of ore for a recovery of 40,000 ounces of gold and 95,000 ounces of silver. A single dividend in the amount of $25,000.00 was paid in the year 1942. It should be noted that this production was achieved despite severe transportation prices, prevalent labour and material shortages and the prevailing gold prices.

In June 1968 the property was held under option by Liberty Mines Limited (NPL) and was then re-examined by the writer. No work was done under this option and it was later terminated.

GEOLOGY :

The Bayonne property lies near the southwest corner of a large area of intrusive rocks known as the Bayonne batholith. Rice, in Memoir 228, Geological Survey of Canada, comments on the highly variable nature of this batholith but classes its average composition as that of a fairly alkaline granodiorite. A striking feature of the rock in the immediate vicinity of the Bayonne property is the variation in grain size and colour even within the confines of a single exposure.

The Bayonne vein system is a zone of fracturing striking North 60 to 80 degrees East in the case of the Main Vein and North 10 to 30 degrees East in the case of the "A", South and North veins. Rice describes the wallrock as "fine-grained, light-coloured biotite hornblende granodiorite altered to a talc-carbonate rock for a distance of two to three feet on

either side of the vein". The fracture zone tends to split into branches at various points with the branches following the general strike or diverging at considerable angles. Generally speaking, however, it is fairly regular as to strike and, depending on its width, is filled in whole or in part, with quartz. Where the zone is two feet or less in width it is usually filled with quartz but, where wider, the quartz appears in two or even three veings separated by granodiorite. Where branches diverge, however, the zone may be as much as ten feet wide and still filled, across its total width, with quartz.

Referring again to Memoir 228 published in 1941, Rice states: "The bulk of the ore milled was mined from the oxidized zone which extends down the vein to a maximum depth of 450 feet. In this zone the sulphides have largely disappeared, their place being taken by limonite and minor amounts of secondary lead and zinc minerals. The bottom of this zone is characterized by a rather abrupt transition from highly oxidized and leached material to primary sulphides with little or no trace of oxidation or leaching."

Again Rice states: "The oxidized ore consists of an unattractive looking mass of limonite and rusty, honeycombed quartz. Yet this ore 150 feet from the surface averaged 1 to 2 ounces of gold a ton and assays as high as 12 ounces a ton have been obtained. Below the oxidized ore shoots there is a zone, apparently in primary ore, which assays from 0.5 to 1 ounce of gold a ton. This zone extends to a depth of 50 feet

below the limit of oxidized ore. Below this zone again there is little or no change in the appearance of the ore, but the values drop to about 0.40 ounce gold a ton. The most plausible explanation of this rich zone is that some of the gold has come from the zone above and has been deposited in some form not yet recognized. The sulphide content of each ore shoot, however, appears to be decreasing at depth. Indeed, little or no commercial ore was encountered in No. 8 adit under productive shoots in the levels above. The change in gold content may, therefore, be due to zoning in the primary ore rather than enrichment of the sulphides."

At the present time there are four known veins on the Bayonne holdings, namely the Main Vein, the "A" Vein, the South Vein and the North Vein. All four veins appear to converge in the vicinity of No. 2 Level Portal of the Main Vein as shown on the attached print. Prior to 1937 all mining activity was confined to the so-called Main Vein and, as far as can be ascertained, development of the "A" Vein was initiated in 1938 from crosscuts driven from the Main Vein. As Memoir 228 is based on field work done during the seasons 1936, 1937 and 1938, Rice's statement that "little or no commercial ore was encountered in No. 8 adit under productive shoots in the levels above" has reference to No. 8 Level on the Main Vein. As indicated on the attached print, ore blocks of substantial grade remain to be extracted on both the No. 8 Level and No. 9 Level of the "A" Vein.

Dr. Warren of the University of British Columbia has identified

the auriferous values as being obtained from native gold and minor tellurides. The tellurides are present in the forms of hessite and petzite which forms suggest that they are primary in character and not resulting from a breakdown of the telluride, calaverite. If one accepts this observation as to the primary nature of the gold values, Rice's assumption relative to sulphide enrichment at depth from the oxidized zone must be rejected.

Gold and silver, which constitute the principal metals of economic value in the ore, appear to be associated with sulphides, principally pyrite, galena and sphalerite.

PRESENT POTENTIAL OF THE PROPERTY :

The Bayonne Mine has been developed primarily along the strike of two of the four known veins, namely, the Main Vein and the "A" Vein. All four veins appear to converge in the vicinity of the portal of No. 2 Level of the Main Vein. The enclosed map - prepared by C. Rutherford, P.Eng., R.B. King, P.Eng. and staff following the cessation of operations in 1946 - shows a plan of the mine workings and longitudinal sections of the Main, South and "A" Veins. Originally these sections showed stoped areas and eighteen reserve blocks as outlined by Rutherford and King (Nos. 1 to 18). An additional four reserve blocks - Nos. 19 to 22 - were added by Hainsworth following completion of the check sampling program carried out under his supervision in 1964. A detailed tabulation

of these twenty-two reserve blocks follows:

"A" VEIN

Block No.	Tonnage	Width	Grade
1	600	28"	0.42
2	700	21"	0.52
3	600	12"	0.75
4	100	10"	1.35
5	300	9"	1.13
6	1000	22"	0.54
7	400	38"	1.10
8	300	12"	1.04
9	900	24"	1.13
10	900	21"	0.47
11	500	18"	0.59
19	450	12"	0.67
20	300	15"	0.72
21	250	11"	0.45
22	450	12"	1.71
SOUTH VEIN			
12	500	14"	1.56
13	1300	22"	0.93
14	900	18"	0.52
15	600	16"	0.48
MAIN VEIN			
16	700	18"	0.75
17	400	18"	1.11
18	300	14"	0.80

TOTAL RESERVE - 12,450 tons @ 0.79 oz./ton gold

In assuming a practical mining width of 24" Hainsworth increases the tonnage figure to 17,400 tons and reduces the grade to 0.58 oz./ton gold. On the basis of an 80% stope recovery, a grade dilution of 10%, an 85% plant recovery and including an allowance for the partial recovery of the silver and lead content, he estimates that a gross profit of $100,000.00

can be gained from the processing of this reserve tonnage. His calculations are based on a $7.50 per ton mining, $1.50 per ton milling cost, $1.30 per ounce for silver and 5 cents per pound for lead.

The writer is of the opinion that the chances of increasing substantially this reserve tonnage figure are good as there are numerous locations, both underground and on surface, where exploration is fully warranted. Some of these locations are enumerated herewith:

1. The area lying above No. 6 Level of the Main Vein below the 4-5 stope.

2. The easterly extension of No. 5 Level on the Main Vein - or of No. 6 Level. This would allow testing for the down-dip continuation of the 4-5 stope as well as that of the 3-2 stope. The latter, which terminates on No. 3 Level at present, shows three down-dip holes drilled from that horizon but results are not available. Access to No. 3 Level is not possible due to caving.

3. The area between the surface and the western boundary of the 7-A-1 and 8-A-3 stopes on the "A" Vein.

4. The easterly, westerly and down-dip projection of the "A" Vein from the 9-A drift.

5. The North Vein which appears to strike westerly from its points of intersection with the other three veins and on which a very minor amount of surface trenching has been done.

6. The area lying south and southeast of the 8-A Portal. This is considered as potential ground for the discovery of another vein or veins.

Other potential locations will undoubtedly be added to the above list in the course of an exploration program. The cost factor will determine the proper approach to the testing of each location. An appreciable amount of diamond drilling was done between 1936 and 1941 but, unfortunately, the records are not available. Most of these holes were drilled horizontally in an effort to locate parallel veins.

Referring again to the reserve tabulation it is interesting to note that the reserve blocks lying between the 8-A and 9-A drifts within the outline of the stoped-out areas show a greater average width at an average grade not too far below many of the reserve zones at higher elevations.

At this point attention should be drawn to the low gold recovery per ton of ore processed as indicated by existing records. If one accepts the production figure of 40,000 ounces of gold from 85,000 tons of ore - a recovery of 0.47 ounce per ton - it follows that one must also accept one or more of the following conditions:

1 - The ore <u>in place</u> was not as high in grade as indicated.

2 - Excessive dilution in stoping operations.

3 - Poor sorting facilities.

4 - Low gold recovery by cyanidation.

The writer is inclined to the acceptance of a combination of the last three points for the following reasons:

1 - Stoped areas at present accessible are very wide when compared to vein width. This may be due, in whole or in part, to wall caving after stoping operations were completed.

2 - The sorting arrangement in the crushing plant is considered to have been inadequate.

3 - Most of the tonnage processed originated within the oxidized zone and was probably not readily amenable to treatment by cyanidation. In this regard, however, it must be accepted that the grinding facilities were inadequate to expose the gold for dissolution and that dissolved losses were undoubtedly excessive.

COMMENTS RE PROCESSING CIRCUIT :

In the year 1935 ore-dressing tests on a sample of Bayonne ore were carried out at the Federal Government laboratories in Ottawa. The sample showed 0.90 oz/ton gold, 4.40 oz/ton silver and 2.2% lead. The recommended flowsheet called for fine-grinding, two-stage classification, two-stage tabling, amalgamation and cyanidation. This circuit would give three products, namely, a lead concentrate, bullion (from amalgamation) and a gold-silver precipitate.

As installed in 1936 the Bayonne flowsheet was basically a

straight cyanidation circuit of 60 ton per day capacity.

While the writer agrees fully that - at current metal prices - the investigation leading to the processing of the known reserve blocks is warranted, he is of the opinion that, on the basis of Hainsworth's reserve figure of 17,400 tons, neither of these circuits can be justified because of the high capital outlay involved. Furthermore, it should be noted that:

1 - Most of the ore processed in the past came from the oxidized zones and it does not necessarily follow that the same type of circuit will give equivalent results on ores from the primary zones.

2 - A straight cyanide circuit will give low silver recoveries, even in ths presence of a strong cyanide working solution.

3 - The Ottawa laboratory sample reported 70% of the gold as free but does not mention the host mineral regarding the remaining 30%.

4 - Dr. Warren identifies the gold values as partly free and partly contained in minor tellurides. He does not give percentages but identifies the host minerals as hessite - a silver telluride - and petzite - a silver-gold telluride - both primary in character.

The above comments may go a long way towards explaining the discrepancy between the production grade of 0.47 oz/ton and the reserve grade. However, it must be emphasized that, regardless of the circuit in use, a build-up of free gold, especially in the grinding circuit, must be anticipated.

CONCLUSIONS AND RECOMMENDATIONS :

Based on current metal prices, the writer concludes that consideration should be given to the implementation of a three-stage program with Stages 1 and 2 to be carried on as simultaneously as practical and Stage 3 to follow if warranted. An outline of each of these stages and the reasons behind their recommended adoption follows:

STAGE 1 - Processing the Known reserve

This will call for:

1 - The cutting of one or more channel samples from as many of the reserve blocks as ready access will permit. If practical, some of these samples should be cut in primary ore. They should be as representative as possible across a 4 foot width with the width of the actual vein indicated. Their number should be sufficient to ensure a total weight of approximately 150 pounds. The estimated oxidation extent of the individual samples should be indicated on their tags.

2 - A series of ore-dressing tests on the resultant block sample by a reliable laboratory with both gold and silver content

reported. Initially the possible adoption of a flowsheet calling for crushing, grinding, classification, jigging or tabling, barrel amalgamation and flotation should be stressed. This type of flowsheet gives a two-product circuit, namely, bullion and a lead-silver concentrate and it can be duplicated readily if future development so warrants. It has been noted that former production records show a recovered grade of 0.47 oz/ton gold. As a conservative estimate, on the basis of:

a) The reserve figure of 17,400 tons as developed by Hainsworth.

b) Gold at $200.00 per ounce.

c) A recovered grade of 0.40 oz/ton gold.

A 50 ton per day plant should produce 600 ounces of gold monthly - or $120,000.00 - over a period of approximately one year. Silver and lead production would increase this figure to some extent.

3 - The investigation of the availability and the pricing of the equipment requirements as indicated by laboratory tests.

4 - After all essential data are available, the development of a feasibility report covering all capital outlay requirements, together with estimated operating and overhead costs.

STAGE 2 -

This stage would be confined to exploratory work directed towards

the increase of the reserve tonnage within the existing workings. There are numerous locations along the upper horizons which have possibilities. Some of these are:

1 - The area lying above No. 6 Level of the Main Vein below the 4-5 stope.

2 - The easterly extension of No. 5 Level on the Main Vein - or of No. 6 Level. This would allow testing for the down-dip continuation of the 4-5 stope as well as that of the 3-2 stope. The latter, which terminates on No. 3 Level, shows three down-dip holes drilled from that horizon but results are not available.

3 - Little is known of the North Vein. A chip sample taken by the writer in 1962 from a small ore dump lying alongside a shallow shaft 200 feet north of No. 3 Level Portal assayed 1.42 ounces gold per ton. The down-dip projection of this vein could be tested by drilling two or three relatively flat holes northward from the vicinity of the crosscut located approximately 350 feet east of No. 4 Level Portal on the Main Vein.

STAGE 3 -

This stage would call for exploration work in two areas which can be classified as virgin ground. They are:

1 - The area east of the intersection of the "A" and "Main"

veins below the 6600 Level horizon. This would call for the eventual extension of either the No. 8 or No. 9 Level eastward.

2 - The area on and below the No. 9 Level horizon. The logical approach here would be to drive a low level tunnel as shown on the enclosed contour map prepared by the company holding the option in 1963. This would call for a 500 foot drive to intersect the vein, then a raise along the vein to break through to the 9-A drift. The necessary precautions would have to be taken to drain off the water probably trapped on No. 9 Level and in the shaft between it and No. 8 Level. Should this program be implemented the difference in elevation between No. 8 Level portal and the proposed portal location of the new crosscut shown as 6010 feet on the contour map should be checked.

Although the recommended program is centered around the Bayonne Group underground workings, it should be noted that surface mineralization has been reported at several locations on the adjoining Echo Group. This area should be prospected thoroughly and any surface outcrops mapped and sampled.

COST ESTIMATES:

Until such time as all required data are made available, the preparation of overall cost estimates is hardly practical. However, in reference to certain phases of the program, the following estimates are advanced:

STAGE 1	Mobilization, sampling, laboratory testing and feasibility studies	$25,000.00
STAGE 3 - Item 2		
	Crosscut and Raise	$110,000.00

STAGE 2 - STAGE 3, Item 1

These phases are directed to exploration and development work in existing workings. The choice of, and approach to, likely targets would have to be left to the discretion of the operating staff.

All costs involved in the choice of processing equipment, plant construction and operating costs, etc. would be developed in a feasibility study following completion of Stage 1 of the program. In all probability, due in great part to vandalism, most of the equipment left on the property by former operators will not be serviceable. It may be possible, however, to reduce substantially the capital outlay requirements through the use of old plant foundations, the rehabilitation of ore bunkers, camp buildings, etc.

Respectfully submitted,

George L. Mill, P. Eng.

REFERENCES

1 - Annual Reports of the British Columbia Minister of Mines.

2 - Geological Survey of Canada Memoir 228 - H.M.A. Rice - 1941.

3 - Mine Records and Maps
C. Rutherford, P.Eng. and
R.B. King, P.Eng.

4 - Geological Report - Bayonne Mine
R.E. Renshaw, P.Eng.

5 - Interim Report - Bayonne Mine - 1964
W.G. Hainsworth, P.Eng.

6 - Personal Reports - Bayonne Mine
July, 1962, July, 1968, November, 1973.

CERTIFICATION

I, George L. Mill, hereby certify:

1 - That I am a Mining and Metallurgical Engineer residing at 255 - 5936 Willow Street, Vancouver, B.C., V5Z 3S6.

2 - That I am a graduate of Queen's University, B.Sc., and a registered Member of the Corporation of Professional Engineers of the Province of British Columbia.

3 - That I have practised my profession for 47 years.

4 - That I have no financial interest, direct or indirect, in either the Bayonne Group or the Echo Group of Mineral Claims and do not expect to obtain any such interest.

5 - That the information contained in this report is based, in part, on my personal examination of the property in 1936, 1962, 1968 and 1973, and, in part, from discussions with engineers familiar with the property - also on data compiled from existing records and reports.

George L. Mill

George L. Mill, P.Eng.

To accompany report on
Bayonne and Echo Groups
of Mineral Claims
Nelson Mining Division
March 13, 1979