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REPORT ON PORCHER ISLAND GOLD PROPERTY OF BANWAN GOLD MINES LTD. PORCHER ISLAND, B. C.

Montreal, Que. August 13, 1980.

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SUMMARY

Banwan Gold Mines Ltd. is the holder of the Porcher Island Gold property located 25 miles southwest of Prince Rupert, British Columbia. The property includes the former Surf Point and Edye Pass mines which produced 22,550 ounces of gold from some 78,000 tons up to 1939.

The ore occurs as auriferous quartz veins in steeply dipping shear zones or alteration zones within a quartz diorite intrusive. The mineralization found in the veins is almost entirely pyrite and the gold is intimately associated with the pyrite.

The Porcher Island Gold property is developed by adits at two levels, the 1110 level (Surf Point Mine) and the 1015 level (Edye Pass Mine). The 1015 level is located 286 feet below the 1110 level and 65 feet above tidewater. Some 65,000 tons have been mined from the 1110 level from six veins and to the writer's knowledge, there is little or no ore left on this level.

Banwan Gold Mines Ltd. has recently carried out an extensive program of exploration and development on the property. This has included limited surface drilling followed by a two phase underground program which included cross-cutting, drifting and underground diamond drilling. All of this work was carried out on the 1015 level and was designed to define and locate the various ore veins that were mined on the 1110 level.

On the basis of the underground program and the mining history above the 1110 level a tonnage potential of 134,277 tons grading 0.314 oz. gold per ton. This tonnage requires further verification on vertical continuity as there is a lack of information between levels. The tonnage is before dilution and the grade is uncut.

The ore reserves are sufficient for three years' operation at a mill rate of 100 tons per day. There is no evidence of any geological change below the 1015 level and thus one can expect additional reserves at depth.

On the basis of the present price of gold and preliminary cost estimates, a viable operation can be visualized. It is estimated that total expenditures through to production will be approximately $5 million and that the payback would be within two years.

A further program of development is recommended to

provide more definitive data for ore reserve calculations. This program will also provide some pre-production development and combined with a feasibility study will lead to a production decision.

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REPORT ON PORCHER ISLAND GOLD PROPERTY OF BANWAN GOLD MINES LTD. PORCHER ISLAND, B. C.

INTRODUCTION

Banwan Gold Mines Ltd. is the holder of the Porcher Island Gold property located 25 miles southwest of the city of Prince Rupert. The property comprises the former Surf Point Mine and Edye Pass Mine which produced approximately 22,550 ounces of gold from some 78,000 tons up to 1939.

Following a limited surface diamond drilling program carried out in late 1978, a two phased program of underground development was conducted under the management of E. & B. Explorations Ltd. of Calgary. At the request of E. & B. Explorations Ltd., the writer has carried out an evaluation of the property and the proposed additional program of underground program development.

This report summarizes the earlier development and briefly deals with the description of the property and geology of the deposits. A detailed description of these items can be found in earlier reports on the property. The emphasis in this report is on the current exploration and development, ore reserve calculations, and the economics of the deposits.

The report is based on a complete study of all data available on the development program, combined with discussions with the staff of E. & B. Explorations and other consultants involved in the programs.

PROPERTY AND LOCATION

The Porcher Island Gold Property is located on the northwest corner of Porcher Island, 25 miles southwest of Prince Rupert and 460 miles northwest of Vancouver, B. C. The property consists of six crown granted claims, four located claims and nineteen units in three claims.

The claims form a contiguous group in the Skeena Mining Division and are registered as follows:

Category	Claim Name	Claim or Units	Lot Number
	Trixie	1	L6515
Crown Grants	Western Hope	1	L6516
	Pirate	1	L6953
	Reward	1	L6955
	Jeanie	1	L7191
	Nabob	1	L7192
Located Claims	Tippy	1	38573
	Toby 1	1	38574
	Toby 2	1	38575
	Kerry	1	38576
	Edye Pass	4	210
	BR 1	12	829
	BR 2	3	830

ACCESSIBILITY AND FACILITIES

The property is well located at tidewater 25 miles southwest of the port at Prince Rupert. Servicing of the island is by boat, barge, float plane or helicopter from the terminal in Prince Rupert.

There are no usable roads in the vicinity of the mine and at present there are no docking facilities available. There is no electrical power supplied to the island and thus any mining operation must depend on diesel electric power.

HISTORY

The first activity on the property was in 1916 and during the period from 1916 to 1932, sporadic work was carried out by various owners. There are only incomplete records of sorted ore shipments during this period.

In 1931 an evaluation was made of the Surf Point Mine by N. A. Timmins Corp. and on the basis of this evaluation a 25 ton per day flotation plant was constructed. N. A. Timmins operated the mine until 1937 when the mine was sold to Reward Mining Company which company also owned the Edye Pass Mine.

Operations continued during 1938 until fire destroyed the mill. Following the fire, a new company Porcher Island Mines Ltd. was formed to take over the Surf Point Mine and Edye Pass Mine. A new 50 ton per day mill was completed and a limited amount of development and mining was completed during the year.

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At the outbreak of World War II, Porcher Island Mines Ltd. was unable to raise funds necessary to develop the mine and the mines were closed in October 1939.

In 1975, Tombill Mines Ltd. optioned the Porcher Island Property and carried out a limited underground diamond drilling program. Tombill Mines dropped their option and in 1976, Carolin Mines Ltd. optioned the ground and evaluated the potential for large tonnage low grade deposits. This company terminated its option in April 1976.

Banwan Gold Mines Ltd. next optioned the property and in late 1978, a limited surface diamond drilling was carried out. This was followed by an extensive underground exploration program carried out from October 1979 to June 1970. The results are presently being evaluated in preparation for the next phase of development.

GEOLOGY

The geology of the property is well described in earlier reports which are listed under references. As a result of this, the geology is only briefly outlined in this report with the emphasis on vein formation and mineralization.

The property is located within a circular quartz diorite boss that intrudes the Jurassic metavolcanics. The intrusive consists of an outer peripheral hornblende quartz diorite about 1,000 feet wide and an inner core of quartz diorite.

Auriferous quartz veins occur in both the outer hornblende quartz diorite and the inner quartz diorite but the majority of the ore bearing veins are found within the quartz diorite. The veins in the quartz diorite occur in steeply dipping shear zones or alteration zones and are generally concentrated near the contact of the hornblende quartz diorite and the quartz diorite. In the Surf Point Mine there are some 30 separate quartz veins but most of the production came from only six veins.

The quartz veins have two principal strike directions, N 65^{o}E and east-west to S 30^{o}E. The general dip is 80^{o} to 85^{o} to the north. The mineralization found in the veins is largely restricted to pyrite with occasionally some chalcopyrite. The gold appears to be intimately associated with the pyrite and the gold content is almost directly related to the percentage of pyrite.

DEVELOPMENT

The Porcher Island Gold Property includes the former Surf Point Mine and the Edye Pass Mine, both of which were developed by adits. The Surf Point Mine was developed by 8 adits, all at about the same elevation. This is referred to as the 1110 Level which is situated approximately 100 feet below surface and some 350 feet above sea level. The development work which is all within the inner quartz diorite consists of 1,245 feet of crosscutting and 2,445 feet of drifting as shown on Fig. 1. This was followed by mining from six veins of approximately 65,000 tons.

The adit in the Edye Pass Mine referred to as the 1015 level is 286 feet below the 1110 level and 65 feet above tidewater. Early development here consisted of 3,015 feet of crosscutting and 1,915 feet of drifting, most of which was in the outer hornblende quartz diorite (See Fig. 1). About 13,000 tons were subsequently mined from this level.

More recent development includes a program of 8 diamond drill holes by Tombill Mines Ltd. in 1975 from the 1015 level and a three phase program by Banwan Gold Mines from 1978 to 1980. The results of these programs are discussed below.

Tombill Mines Ltd. drilled 8 horizontal holes totalling 2,416 feet from the 1015 level to explore the downward projection of the Surf Point veins mined above on the 1110 level. These holes are shown on Fig. 8 and are numbered 75-1, 75-2 etc. Although the drill holes did not outline any ore shoots, they did obtain ore grade intersections over narrow widths and numerous sub-ore intersections. From subsequent work it appears that these intersections are east of the downward extension of the ore veins. However, at some later date, more exploration is warranted along strike of the veins indicated in the drilling.

Banwan Gold Mines Ltd.

Phase I - Surface Diamond Drilling

In 1978 Banwan Gold Mines Ltd. drilled 4 surface holes totalling 2,047 feet. The object of the program was to test the area below the old Surf Point 1110 level where the former stoping operations were conducted. The results of the limited program were sufficiently encouraging to proceed with the second phase of the program. The most significant intersection was in S-3 consisting of 0.55 oz. gold per ton over an estimated true width of 5.1 feet slightly below the 1015 level.

Phase II

This phase was started in October, 1979 and finished in March, 1980. The program consisted of mobilization, camp set-up, underground development and diamond drilling on the 1015 level.

The object of this program was to extend the Edye Pass crosscut to the south into the quartz diorite and intersect the downward extension of the Surf Point veins. The Edye Pass crosscut was extended for a distance of 809 feet and 297 feet of drifting was carried out along seven veins as shown on Fig. 1. In addition an equivalent of 236 feet of advance was made from slashing the veins. From the drifting and slashing, a total of 1,304 tons was stockpiled grading 0.167 oz. gold per ton.

The crosscut intersected a number of veins and a small amount of drifting was carried out on some of them. Chip samples were taken across all veins and the averages of these are shown on Table I. The veins are numbered as shown on Fig. 1 but it is difficult to correlate the veins intersected in the crosscut with those mined on the 1110 level as there is a lack of information between levels.

TABLE I

Vein No.	Length (ft.)	Width (ft.)	Average Grade oz. Au/ton
1911 N	23	4.0	0.026
1910 N	7	4.0	0.276
1908 N	3	4.0	0.09
1907 N	12	5.05	0.015
1906 N	75	4.03	0.273
1903 N	12	4.09	0.216
1899 N	21	4.0	0.27
1898 Fault	30	4.3	0.16
1897 N	26	4.0	0.19
1896	164	4.27	0.44

From the above table, it can be seen that seven of the ten veins show ore potential with a combined length of 336 feet. The weighted average grade of these veins is 0.337 oz. gold per ton over a width of 4.08 feet.

In Phase II, 17 holes were drilled on the 1015 level and this was followed by some detailed drilling in Phase III.

Phase III

This latter program consisted of 33 holes and the total footage drilled was 11,384. The object of the drilling was to delineate the veins intersected in the crosscut and to explore for additional veins.

Table II lists all of the drill holes from Phase II and III with significant intersections. The table shows the hole number, dip of the hole, the core length over which the values were obtained, followed by the value in ounces gold per ton for the core length. The last column in the table is the value in ounces gold per ton expanded to a 4 foot width where the core intersection is less than 4 feet.

It will be noted that some of the intersections shown in the table are below ore grade but the description on the drill log indicates a good structure with pyrite so they have been included as significant intersections. There are 44 intersections shown in the table from the 50 holes drilled and these are broken down in relation to grade over a minimum core length of 4 feet as follows:

15 intersections average less than 0.10 oz. Au./ton
12 intersections average between 0.11 and 0.20 oz. Au./ton
17 intersections average over 0.20 oz. Au./ton.

There are numerous other narrow intersections that obviously represent typical gold-bearing veins but only underground development or very close drilling will determine if they will make ore along strike or dip.

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TABLE II

Hole No.	Dip	Footage	Core Length (ft.)	Oz. Au/ton	oz. Au/ton over 4 ft.
1015-5	0°	32.6-38.6	6.0	0.095	
1015-6	0	51.44-52.85	1.41	0.21	0.07
1015-6	0	176.6-177.3	0.7	1.44	0.25
1015-7	0	70.24-70.60	0.36	0.62	0.06
1015-7	0	203 - 203.1	0.1	4.66	0.12
1015-9	0	11.1-11.9	0.8	2.61	0.52
1015-10	0	65.9-68.20	2.30	0.15	0.08
1015-10	0	-73.69-76.02	2.33	0.16	0.09
1015-10	0	113.4-114.3	0.9	0.39	0.09
1015-11	0	204.9-211.1	6.2	0.16	
1015-12	0	67.8-72.2	4.4	0.37	
1015-14	0	161.0-167.1	6.1	0.25	
1015-14	0	27.7-27.9	0.2	5.42	0.27
1015-16	0	94.3-99.8	5.5	0.17	
1015-17	0	16.14-16.5	0.36	0.40	0.036
1015-18	0	193.2-200.1	6.9	0.69	
1015-20	+1°	40.94-44.5	3.56	0.19	0.17
1015-20	+1°	69.1-72.5	3.4	0.50	0.43
1015-23	+1°	190.8-192.3	1.5	1.20	0.45
1015-25	+30°	236.7-243.2	6.5	0.85	
1015-26	+2°	4.5-12.7	8.2	0.20	
1015-29	-1½°	11.1-12.4	1.3	0.35	0.11
1015-29	-1½°	135.8-142.0	6.2	0.05	
1015-30	+28°	104.6-107.1	2.5	0.51	0.32
1015-31	+1°	68.5-73.8	5.3	0.09	
1015-32	+1°	51.5-52.9	1.4	1.28	0.45
1015-33	+24°	63.16-64.0	0.84	2.21	0.46
"		100.3-106.1	5.8	0.17	
"		223-224.5	1.5	0.25	0.09
"		292.3-292.6	0.3	0.82	0.06
1015-34	0°	76.60-78.9	2.3	0.82	0.47
1015-35	+1°	86.45-88.71	2.26	1.0	0.56
1015-35	+1°	118.0-127.1	9.1	0.15	
1015-38	-2½°	12.6-17.5	4.9	0.79	
"		41.1-43.0	1.9	1.88	0.89
"		64.7-68.9	4.2	0.15	
"		134.25-134.74	0.49	0.64	0.078
"		213.9-217.9	4.0	0.078	0.078
1015-38		377.16-380.5	3.34	0.09	0.078
1015-40	0°	129.6-131.3	1.7	0.30	0.127
1015-43	+½°	8.76-12.60	3.84	1.01	0.97
		137.8-140.8	3.0	1.49	0.98
1015-42	-25°	281.5-282.8	1.3	0.50	0.16
		755.2-756	0.8	0.72	0.15

ORE POTENTIAL

The data available for ore calculations consists of the following:

1. Previous data on mining from the 1110 level (Surf Point Mine)

2. The sampling of veins intersected along the 1015 - 1914 S crosscut.

3. Sampling of the drifting and slashing, most of which was confined to the 1896 vein.

4. Diamond drilling on the 1015 foot level which consists almost entirely of flat holes.

Since almost all of the data is on the 1015 level and there is very little information between the 1015 level and the 1110 level, it is difficult to correlate and project the various veins up dip. This is further complicated by the fact that it is obvious from the development carried out on the 1015 level that the veins pinch and swell both along strike and dip. It is therefore the writer's opinion that the ore potential should be stated in tonnage per vertical foot rather than attempt to categorize tonnage in proven, probable, etc.

The writer has used all available data to determine the tonnage per vertical foot on each level. The method and criteria used are discussed below.

For the 1110 level (Surf Point Mine) the same figure has been used as was discussed in the report by C. Dearin. There was a total of 65,000 tons mined from this level to the surface with an average grade of 0.30 oz. Au/ton. This works out to approximately 500 tons per vertical foot.

On the 1015 level, each vein is treated separately using the chip samples and drill holes to determine the length, width and grade of the ore shoot. All widths used are estimated true widths and the grade of intersections have been adjusted accordingly. The grade has also been adjusted to a minimum mining width of 4 feet.

There are a number of the drill intersections in the ounces but no cutting has been done at this time and the average grade used is an uncut grade. It is difficult to know at this time whether cutting is required, particularly since there appears to have been some core ground which would probably be pyrite. However, some consideration should be given to this matter when final calculations are made. The writer' experience with this type of gold-bearing vein is that cutting to 2 ounces would probably be ample.

In determining the length of each ore shoot, the vein has been projected half the distance between drill holes with a maximum of 30 feet beyond the last drill intersection. The tonnage per vertical foot (TPVP) has been calculated for each vein by multiplying the length by the true width and dividing by the tonnage factor of 12. The results of the calculations are shown on Table III and the veins are shown on Fig. 8.

TABLE III

Vein	Average True Width (ft.)	Average Grade oz./ton	Length (ft.)	TPVF
1910N	4.0	0.17	17	6
1906 Branch	5.35	0.32	56	25
1906N	4.03	0.27	82	28
1904N & S	4.0	0.27	20	7
	4.0	0.56	33	11
	5.55	0.13	55	26
	4.0	0.24	56	19
	4.0	0.23	40	13
1903N	4.09	0.21	15	5
1900N	4.6	0.46	110	42
1899N	4.0	0.27	21	7
1898N-Fault	4.3	0.16	30	11
1898N	4.56	0.34	235	89
1897.5N	4.0	0.70	21	7
1897N	4.0	0.17	58	19
1896	4.27	0.44	164	58
1892N	4.0	0.34	197	66
	4.4	0.33	1,211	439

TONNAGE CALCULATIONS

From Table III, a tonnage per vertical foot of 439 has been established for the 1015 level with a grade of 0.33 oz. gold per ton. This compares with the 500 TPVF grading 0.30 oz. gold per ton for the 1110 level. The distance between the levels is 286 feet and thus by applying each TPVF to 143 feet we arrive at the following figures.

	TPVF	Height	Tons	Grade	Total oz. gold
1110 Level - 143 feet	500	143	71,500	0.30	21,450
1015 Level - 143 feet	439	143	62,777	0.33	20,716
Total			134,277	0.314	42,166
20% dilution factor			161,132	0.26	42,166

There is no evidence of any change geologically at the 1015 level and hole 1015-42 has intersected veins below the level with one at a vertical depth of 320 feet below the level. It is thus a reasonable assumption that there is "Geologically Inferred" ore below the level. If we use the TPVF of 439 from the 1015 level and assume continuity to a vertical depth of 250 feet, there is an additional 109,750 tons grading 0.33 oz. gold per ton containing 36,217 ounces of gold. The diluted tonnage is 131,700 with a grade of 0.27 oz. per ton.

PROFIT POTENTIAL

In January, 1979, Mining Corporation of Canada provided preliminary estimates to operate the mine should the exploration program prove successful. Certain assumptions were made and cash flow models developed. On the basis of the above tonnage potential and the present price of gold, it seems advisable to update these previous estimates. The writer has not made a detailed study of the mine site and operating conditions and thus the present estimates are largely an update of the earlier estimates, allowing for continued inflation.

The estimates are based on the following assumptions.

1. The mine would be placed in production using a portable flotation plant with a capacity of 100 tons per day.

Ore from the mine would be upgraded by sorting waste prior to grinding. The flotation concentrate would be dried and barged to Tacoma for smelting.

2. Ore reserves - 161,132 tons grading 0.26 oz. gold per ton upgraded to 105,400 tons grading 0.40 oz. per ton.

3. Mill Recovery - 94% recovery producing a concentrate grade of 8 oz. per ton. (These figures are based on results obtained at the Surf Point Mine).

4. Operating costs - $86.00 per ton milled.

5. Gold price - The present price of gold is approximately $700 Cdn. per ounce and estimates are made using prices of $600, $650 and $700.

6. Net Smelter returns is assumed at 86% of the concentrate value. This takes into consideration freight and smelting charges. No allowance is made for the silver content in the concentrate.

Based on the above assumptions, the following profit figures have been calculated.

	Gold at $600/oz.	Gold at $650/oz.	Gold at $700/oz.
Recoverable value per ton milled	$225.00	$244.00	$263.00
Net smelter return	194.00	210.00	226.00
Less Operating costs per ton	86.00	86.00	86.00
Operating Profit before interest, taxes, etc.	$108.00	$124.00	$140.00
Assume 25,000 tons milled for first full year of operation Operating Profit	$2,700,000	$3,100,000	$3,500,000

The ore reserves as indicated above the 1015 level are good for approximately three years operation.

COST ESTIMATES

The following expenditures have been made on the three phase program of development covered in this report.

Phase I	-	Surface drilling	$78,000
Phase II	-	Diamond drilling & underground development	831,698
Phase III	-	Diamond drilling	262,800
Total expenditures to date			$1,172,498

ESTIMATED EXPENDITURES FOR PRODUCTION AT 100 TONS PER DAY

Proposed Phase IV (Dearin's Phase III)	1,026,300
Capital equipment	1,130,000
Portable Mill (100 ton)	500,000
Preproduction development	120,000
Working capital	700,000
Inventory	175,000
Total estimated expenditures	$3,651,300
Total actual and estimated expenditures	$4,823,798

The above estimated expenditures are approximate and make use of an updating of Mining Corp.'s estimates combined with those in the proposed development program by C. Dearin. From the above it can be seen that expenditures will approximate $5 million to attain production at a rate of 100 tons per day. On the basis of the potential profit there should be a payback within two years.

CONCLUSIONS

An evaluation of the earlier mining data and the results of the recent underground development and drilling indicates a tonnage potential to the 1015 level of 161,000 tons containing approximately 42,000 ounces of gold. There is, however, additional development work required to prove continuity of the veins and ore values between the 1015 and the 1110 level. This is particularly essential as the individual veins are inconsistent and tend to pinch and swell along strike and down dip. The above mentioned tonnage may well be increased by further lateral development and there is an additional "geologically inferred" tonnage below the 1015 level.

Previous milling data indicated that the ore could be readily upgraded by sorting and that 94% recovery was obtained by flotation to produce a concentrate grading 8 ounces gold per ton. If this can be duplicated under present conditions, it is estimated that a profitable operation can be attained at a milling rate of 100 tons per day based on the present price of gold. It should be emphasized that due to the narrow nature of the veins, it will be necessary to upgrade the ore as much as possible by sorting and selective mining. This report has assumed an upgrading to 0.40 oz. gold per ton but it is hopeful that this can be bettered.

Preliminary cost estimates indicate that $5 million will be required to place the property in production at a rate of 100 tons per day. This figure includes the expenditures on exploration and development work carried out to date. A payback can be expected within two years of the start of production.

On the basis of the underground results and the initial cost estimates, a further program of development is warranted to more accurately determine if production plans are justified.

RECOMMENDATIONS

1. Initially, an underground development program is required to prove up the indicated ore potential between the two adits. This program would also provide some pre-production development. The writer has studied the recommended program of development by C. Dearin in his report of June 25, 1980. This program would meet the above mentioned requirements and is endorsed by the writer. It is recommended that the drilling program be almost entirely devoted to angle holes to determine continuity on dip. The entire program should be flexible and dependent on the results obtained.

2. Metallurgical test work should be carried out immediately to determine a positive flow sheet and recoveries. The possibility of recovering the gold by cyanidation of the flotation concentrate instead of shipping the concentrate to the smelter should be investigated.

3. During the development program information should be gathered for a feasibility study.

4. At the completion of the development program, ore reserves should be recalculated and this, combined with a feasibility study, will determine the viability of the operation.

Respectfully submitted,

Montreal, Que.
Aug. 13, 1980.

H. J. Bergmann, P. Eng.

References

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Irvine, W. T., P. Eng.	April 10, 1980 - Report on Development of the Porcher Island Gold Property .
Dearin, C.	June 25, 1980, Mine Geologist - E. & B. Explorations Ltd. Report on Underground Exploration Work on the Porcher Island Project.
Armstrong, C. M.	Diamond drill logs 1015-1 to 1015-50.

CERTIFICATE OF QUALIFICATION

I, H. J. Bergmann, of the City of Montreal, in the Province of Quebec, hereby certify:

1. That I am a Consulting Mining Engineer and reside at 3518 Vendome Ave., Montreal, Que.

2. That I am a registered Professional Engineer of the Provinces of Ontario and Quebec.

3. That I am a graduate of the University of Alberta and hold a Bachelor of Science degree in Mining Engineering.

4. That I have been practising my profession as a Mining Engineer since 1938 and during the past twenty-five years as a Consulting Engineer.

5. That I have no interest, either direct or indirect, in the property described in this report, nor do I expect to receive, either directly or indirectly, any interest in the property or securities of the company.

6. That the accompanying report is based on a study of all reports and data pertaining to the property.

Dated at Montreal this 13th day of August, 1980.

H. J. Bergmann, P. Eng.