81-1204-9981

ASSESSMENT REPORT

ON

METALLURGICAL TEST WORK

ON ORE FROM THE

BEANO CLAIM

LOCATED

3 AIR KILOMETERS NORTH-EAST OF ZEBALLOS, B.C.

LATITUDE 50°00' LONGITUDE 126°48.5'

N.T.S. 92L/2W & 92E/15W

ALBERNI MINING DIVISION

FIELD WORK: May 29 - May 30, 1981
Aug. 15 - Aug 18, 1981
Nov. 13, 1981

ON BEHALF OF

BILLIKIN ENERGY & RESOURCES INC.

Suite 14, 7375 Kingsway
Burnaby, B.C.

Date submitted:

January 27,1982

Report by:

Dr. W.D. Groves, P.Eng.
Archaean Resources Corp.
#152 - 890 West Pender
Vancouver, B.C.

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INTRODUCTION

(a) Location, Access, Physiography

The Beano property is located about 5 1/2 kilometers by road east of Zeballos, a small mining and logging community situated on the west coast of Vancouver Island (See Fig. 1) approximately 300 kilometers northwest of Victoria. A well-kept gravel road runs 48 kilometers into Zeballos from the main Island Highway turnoff south of Nimkish. Access from Zeballos itself is by foot over 5 kilometers of logging road, presently in a state of disrepair -- it will require rebuilding by catwork in order to make it passable for vehicular use.

The claim area is drained by the upper reaches of Bingo Creek, a stream which flows south into Little Zeballos River. Elevation varies from 365 m. at the terminus of the road to about 1,220 m. atop Beano mountain. The major showings in Bingo Creek canyon and on the ridge crest just above the canyon are situated around the 790 m. level.

Topography is typical of the Zeballos area, namely mountainous and rugged with numerous steep bluffs and gorges. Timber is plentiful, most prevalent wood types are red and yellow cedar, hemlock, spruce and Douglas Fir. Rainfall is said to average in excess of 500 cm. a year. Because of the proximity to the coast, winter conditions are not stringent.

Access to the showings is by a steep foot trail. A skyline built by previous operators, extending 900 m. from the road level to the showings, is inoperable. A rope used to descend into the workings in the canyon has been eaten away by small animals.

WPH

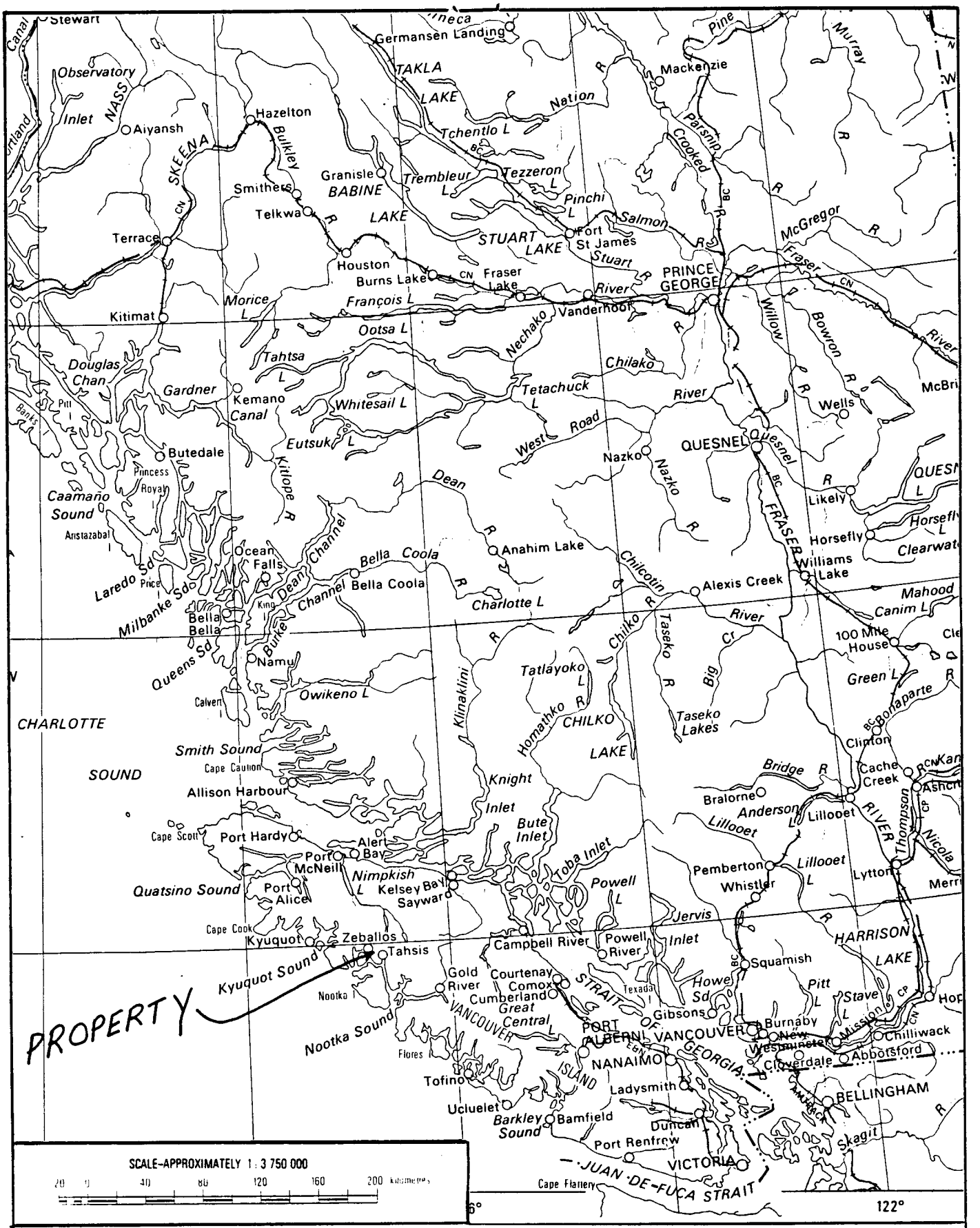


FIG. 1—LOCATION MAP

BRITISH COLUMBIA

WPG.

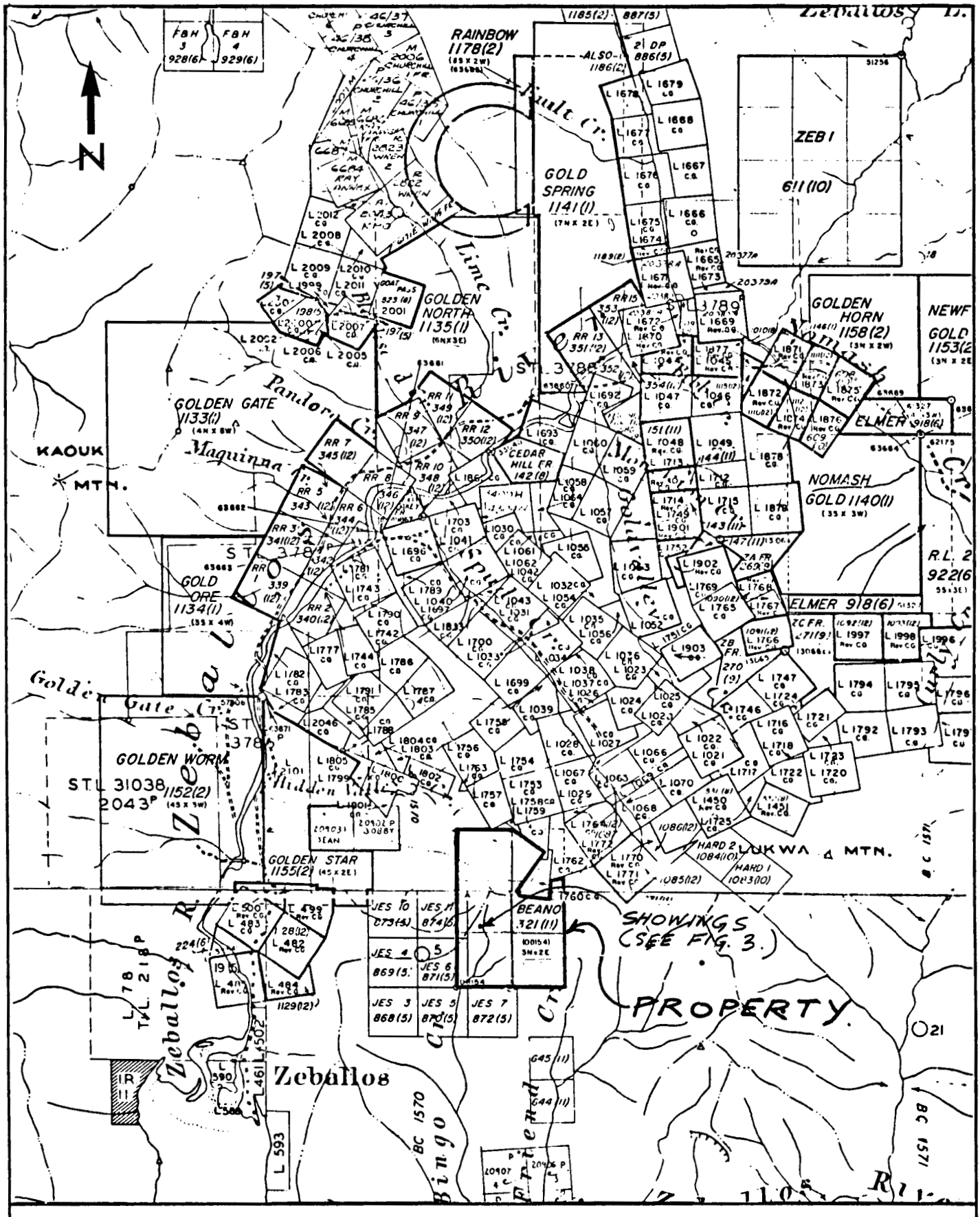


FIG. 2 CLAIM MAP

SCALE 1 : 50,000
N.T.S. 92 L/2 W
92 E/15 W
ALBERNI MINING DIVISION

(b) Claims Information

Claim boundaries of the Beano property are outlined on Figure 2. The claims consist of six 500-meter square units located by the modified grid method. Information on file with the Gold Commissioner in Vancouver as of June 23, 1981 was as follows:

CLAIM	RECORD NO.	CLAIM HOLDER
Beano	321(11)	Merl Cloutier

The claims are in good standing at the present time.

(c) History

Like so many of the gold mining camps in British Columbia, initial interest was fostered by the discovery of placer gold. In the case of Zeballos this occurred about 1907, yet it was not until 1924 that a lode deposit was located. After the discovery of the high grade gold-bearing vein on the Privateer property in 1936, gold mining and prospecting activities in the Zeballos area flourished. But the heyday was not long-lived. In 1938, 400 men were engaged in development and production of 30 properties, and by 1942 shortage of supplies and labor were such that only two operations remained. After the end of the war, unsuccessful attempts were again made to revive the camp. Increasing costs of production, as opposed to the fixed price of gold, rendered further operation uneconomic. Thereafter, desultory activity aimed mostly at exploration took place. However, the recent price surge of precious metals has once again sparked interest in the Zeballos gold mining camp.

The Beano property, the subject of this report, was first staked in 1936 and 1937. Major development work occurred between the years 1943 and 1946; 6.5 km of tractor road access was constructed, ore bunkers erected at the road terminus and a 900 m. long skyline was strung from the bunkers to the upper workings.

(d) References

A comprehensive summary of the early history of the Beano property is contained in J.S. Stevenson's 1950 report, "Geology and Mineral Deposits of the Zeballos Mining Camp", (Bulletin No. 27, B.C. Dept. of Mines). Stevenson carefully describes the location and grade of various samples taken from workings examined on the property which include two adits and four open cuts. Assays from samples taken from pyrrhotite-rich lenses were reported to range from 1.60 oz/ton to 6.06 oz/ton in gold.

Government records show that 23 tons were shipped from the Beano property in the period 1948-49, and that the ore averaged 4.6 oz/ton gold and 1.96 oz/ton silver.

(e) Summary of Work Done

The author examined the property on May 29 and 30, 1981 in the company of Mr. Merl Cloutier, prospector and property owner. Two samples were taken of typical pyrrhotite-actinolite gold-bearing mineralization from the showings area and assayed for precious metals content (gold and silver) as well as for lead, zinc, copper, iron and sulfur content in order to provide a basis for an optimum metallurgical test program. Three samples of float from various points on the property were also taken as a matter of geological interest. During

this visit the author designated two sites from which a bulk sample for metallurgical test work could be taken: the pyrrhotite-rich section of Cut No. 4 and the ore shipment dump at the terminus of the skyline (see Fig. 3).

Mr. Merl Cloutier returned to the property on August 15, along with assistant Mr. C. Louey. From August 15 to August 19 they managed to backpack out 120 kilograms of mineralized material collected from the designated sites. Severe rainstorms hampered this effort. Mr. Cloutier visited the property again on November 13, 1981 and backpacked out another 30 kilograms. The alternative to backpacking, helicopter transport, requiring erection of a "crows-nest" helicopter pad, was considered too costly at this stage.

A representative sample from this material was submitted to Spalding Research Ltd., 3171 East 6th Avenue, Vancouver, B.C. for metallurgical testing. (see Appendix III - Letter by George Spalding). Purpose of this program was to examine the possibility of using a standard float-roast-cyanide process for extraction of gold values from the Beano property ore. Finished work includes a preliminary roast of a pulverized sample of the ore, a preliminary flotation test of a 100% minus 80 mesh sample of the ore and a roast of the float concentrates in a laboratory-scale downdraft roaster.

DATA AND INTERPRETATION

(a) Background

Pods of high-grade pyrrhotite-gold mineralization in actinolite gangue occur on the crest of a knife-edge ridge between two 60 meter deep "slot" canyons (Bingo Creek canyon is the easterly of these) about 3 air kilometers northeast of Zeballos, Vancouver Island. Showings are at the 550 meter elevation level. Location of the showings with respect to the boundaries and legal post of the BEANO claim is given on Figure 2 (body of report).

The pods partly conform with and partly transgress a lime member or lens in a tuff-lime sequence in the base of the Bonanza volcanics, which locally strike north-northwest and dip steeply to the northeast. The ore is also exposed on the vertical side of Bingo Creek canyon below the ridge crest workings. Workings on the ridge crest and in the canyon expose both these lenses and quartz-pyrrhotite veins invading the lime-tuffs. At the canyon mouth, 300 meters lower in elevation, a fine-grained granodiorite tongue with gradational contacts invades the lime-tuff band. Strongly epidotized shears striking north-northwest steep may be seen at this point. The showings were detailed mapped by Stevenson in 1950 (B.C. Dept. of Mines Bulletin # 27, pp. 135-137).

Although the gold values and tonnages indicated in the pods are certainly high enough to warrant a small-scale mining operation, problems with extraction of the values have proved a hindrance to development in the past. Pyrrhotite-rich ores are not readily welcomed by smelters. Of two smelters contacted by the author, one, a copper smelter, said they would not be prepared to accept a float con from the Beano ore because it would not contain enough gold, the other,

a lead-zinc smelter, would not take it because of the high iron content, in spite of the gold values. Another route, direct sale to a large-scale concentrate producer (to blend with their concentrate to raise gold values) is unattractive due to shipping costs, smelter penalties, (for iron content) and discounted gold price for gold content. For this reason it was decided to investigate possible avenues whereby the property owner or affiliate could treat the ore directly and to this end representative samples of the ore were submitted to Spalding Research Ltd. to undergo a variety of metallurgical tests.

(b) Observations and Test Results

The ore from the Beano property is of two types, both carrying values in gold: pyrrhotite-actinolite and quartz-pyrrhotite. Most of the ore is of the former type. Assays returns from samples ZEB-3 and ZEB-4 (values given in Appendix, locations Fig. 3) confirmed prior mineralogical analysis. The actinolite sheath around the mostly massive pyrrhotite pods, which also contained interleafed and disseminated pyrrhotite is an indication of a natural "slagging" process that converted the original quartz-pyrrhotite veins in the lime, concentrating gold by slagging iron and sulfur. Base metal values are insignificant for either recovery value or cyanide interference. Silver values are also insignificant, but would be largely recoverable in any case.

Information at hand suggested that the Beano ore could be treated by a conventional float-roast-cyanide process. A bulk sample of Beano pyrrhotite-actinolite ore was taken to Spalding Research Ltd.'s laboratory in Port Moody, B.C. where Mr. George Spalding, after discussions with the author, worked out a test work program for the ore,

as outlined in his letter of November 29, 1981 (see Appendix III)

The sequence of tests carried out to date is as follows:

(1) A sample of 1,000 grams of the ore was crushed and pulverized, and roasted in the lab's tube roaster to assess roasting feasibility. Weight loss of 10% indicates sulphur loss. It was observed that by this process about 80% of the charge had roasted. Some coarse unroasted sulphide was left in the charge.

(2) Preliminary flotation test. Another 1,500 gram sample of the ore was ground, then reground to 100% minus 80 mesh. The preliminary float test had shown some pyrrhotite in the tails. The fine-ground sample produced a good flotation. Float tails, however, were shown to contain a small amount of coarse oxidized pyrrhotite, and some very fine pyrrhotite middlings. The pulp was conditioned with dilute sulphuric acid to ph 4.5, and with copper sulphate.
Collector aerofloat 15 was used, and MIBC as a frother.

Heads	1,500 grams
Float Cons	600 grams
Flotation Tails	890 grams

(Estimated Slime Loss = 10 grams)

Visual observations were that a good froth was produced, and there were some gangue slimes. No free gold was noted in the panned float concentrate. There was still some minor coarse oxidized pyrrhotite noted in the tails, but no free gold.

(3) The float cons were then roasted, the preliminary roast test having demonstrated that this was feasible. They were roasted in a laboratory downdraft design roaster. Fifty grams of +10 mesh brick was laid over the roaster screen, followed by 75 grams of -10+35 mesh

crushed brick. This was overlain by 200 grams of damp ore (pressed gently into place). Pieces of coke were pressed into the ore surface and ignited coke added to the centre of the charge. Bonnet was clamped onto the test roaster and 5 psi air blown through the bed. To get the weight loss due to roasting, coarse and fine brick plus roasted cinder had to be weighed. A net loss of 20% dry weight occurred in the roast showing sulphur loss. The cinder (ore clinker= roast product) was then ground and test-panned, No free gold was observed in the sample.

From the flotation test, samples of float cons, float tails and heads ground to -80 mesh were assayed at Min-En Laboratories Ltd. in Vancouver, for gold at 2.62 oz/T Au, 0.397 oz/T Au and 1.288 oz/T Au, respectively. After grinding and panning (to eliminate most of the crushed brick and coke residues in the charge) the ground clinker from roasting the flotation concentrate assayed at 1.713 oz/T Au. Thus the first float test gave an 81% recovery of gold into the float, an 18% tails loss and .3% loss into slime water overflow. The observation of some fine pyrrhotite as middlings with actinolite in the flotation tailings of the test correlates with the rather high value of gold in the tailings for the flotation test. It is planned to regrind and refloat these tailings to improve the recover. The fact that gold assay in the clinker is lower than in the flotation is probably due to dilution by brick and coke residues, but the possibility of volatilization loss is being looked into. It is evident that another round of test work will be needed to optimize conditions on the float-roast stage of refining. Cyanide and/or thiorea extractions on the roasted float cons are underway, but results are not yet available. Another $1,000 is budgeted for tests. No free gold was

observed in the various products during the test work. Free gold in the earlier sample of the pyrrhotite once burned, crushed and panned was observed under the binocular microscope in the lab, as fine exsolution shapes. The tenure of gold in the Beano pyrrhotite ore is thus fairly variable above the exsolution level.

(c) Interpretation/Conclusion

To summarize work to date, it would appear that the standard float-roast-cyanide route will turn out to be feasible from a metallurgical point of view. A very small roaster-sulphur absorber design will have to obtain environmental clearance in connection with the circuit, but the grade of ore allows expenditure of up to $20/ton of concentrate in quicklime to be used for the absorption step, which allows for essentially 100% sulphur aborption in a properly designed absorber. This will also be tested in the lab before production plans are completed for the processing operations. It is evident from assays of representative samples of the ore that copper, lead and zinc values are too low to cause cyaniding problems or be worth recovery. Most of the silver present in the ore, though of minimal value, would turn up in the cyanided product.

Respectfully submitted,

for ARCHAEAN RESOURCES CORP.

William D. Groves.

W.D. Groves, P.Eng.
B.A.Sc. Geologist Engineering
Ph.D. Chemical Engineering

January 27, 1982

APPENDIX I

WORK COST STATEMENT

PERSONNEL

1. Field Trips

Dr. W.D. Groves, P.Eng., geological and chemical engineer, May 29, 30, 1981 2 days @ $300/day	$ 600
Merle Cloutier, prospector May 29,30, 1981 - assist Dr. Groves Aug. 15, 16, 17, 18, 1981 - Backpack sample Nov. 13, 1981 - Backpack sample 7 days @ $150/day	1,050
C.Louey , prospector Aug. 15, 16, 17, 18, 1981 - Backpack sample 4 days @ $150/day	600

2. Engineering & Technical

Dr. W.D. Groves, P.Eng. Report preparation, supervision testwork 4 days @ $ 350/day	1,400
George Spalding, Technician, assayer Metallurgical testwork, $ 2,000 contract $ 1,000 paid for completed work	1,000

TRANSPORTATION

- Truck rental 7 days @ $50/day (all-found cost)	350

CAMP SUPPORT

- 13 man-days @ $35/man-day	455

ASSAYS

Bondar-Clegg:	Report No. A-21 502 5 Au, Ag, Cu, Pb, Zn, Fe, S assays 5/6 of $ 136.50	114

REPORT COSTS

Drafting: 4 hrs. @ $12/hr.	48
Typing	100
Maps - Blow-ups/Copies	50
TOTAL:	$ 5,767

WDG.

APPENDIX II

CERTIFICATE

I, WILLIAM D. GROVES, do hereby certify:

1. THAT I am a consulting engineer with an office at 152-890 West Pender Street, Vancouver, B.C.

2. THAT I am a graduate of the University of British Columbia with a B.A.Sc. in Geological Engineering (1960) and a Ph.D. in Chemical Engineering (1971). I am a graduate of the University of Alberta with a B.Sc. in Chemical Engineering (1962).

3. THAT I am a registered Professional Engineer in the Province of British Columbia.

4. THAT I have practiced my profession since 1960.

5. THAT I have visited the Beano claims and sampled the actinolite-pyrrhotite gold showings May 29 and 30, 1981 accompanied by Mr. Merl Cloutier. In the setting up of the test procedures I worked closely with Mr. George Spalding, a retired assayer who owns Spalding Research Ltd., and Mr. Dino Cremonese, an engineer who holds a B.A.Sc. in metallurgy.

Respectfully submitted,

William D. Groves.

W.D. Groves, P.Eng.

27 January 1982

APPENDIX 3

SPALDING RESEARCH LTD.,
3171 East 6 th. Ave
Vancouver B.C.

Nov 29/81

BILLIKEN RESOURCES INC.
Mr. Merl Cl outier.

Dear Sir;;;

Dr. W.D. Groves P. Eng. the consultant for Billiken Resources Inc. for the Beano property project, has asked us to carry out the following tests on a bulk sample of Pyrrhotite Gold Ore supplied from the B eano property.

Initial tests were comenced in the first week of October 198 Further tests as follows will be completed and results sent to D Groves approximately the 15th. of December 1981.

In itial tests indicate that the following will be required.

(1) Optimium grind size for separation of Pyrrhotite and Gold from gangue- (Actinolite).

(2) Bulk floatation of Pyrrhotite and Gold, with screen size of float products.

(3) Roasting of Floatation and Jig comcentrate, Pebble grind of roasted product- Screen size of Pebble grind.

(4) Graviety concentration of roasted and ground Pyrrhotite and extraction of freed Gold by amalgamation.

(5) Leaching of Graviety Tails with cyanide or Th io Urea.

(6) A complete set of weights, screen size, assays of all products required for evaluation. Assays for Gold only.

Costs.

Projects tests costs are estimated to be in the $ 1500--$ 2000 range, this encludes assay charges.

Yours very truly

SPALDING RESEARCH

Geo. Spalding

Geo. Spalding

APPENDIX 3

Spalding RESEARCH
3171 East 4th Ave.,
Vancouver B.C.

January 15th 1982

Costs covering Metallurgical testing of ore supplied by Billikin Resources.

Sample preparation consisting of grinding screening prelimenary concentration and microscope examination of ore.

$ 250.00

Prelimenary floatation tests and workable tests, with examination of products.

$ 300.00

Roasting tests by down draft and rotating type roasters examination of products and acid leatch for examination.

$ 300.00

Assay costs and report to this point.

$ 100.00

Total	$ 950.00
Received on account	$ 1000.00
Credit	$ 50.00

Cyanide and Thiourea leach tests will commence on completion of leadh unit.

Yours Truly

Geo. Spalding
SPALDING RESEARCH LTD.

Geo. Spalding

WDH

MIN-EN LABORATORIES LTD.
705 WEST 15TH STREET, NORTH VANCOUVER, B.C. V7M 1T2
PHONE: (604) 980-5814 OR (604) 988-4524

APPENDIX 4.

Certificate of Assay

TO: Spalding Research,

PROJECT No.

Assays of Beano pyrrhotite-actinolite (gold) ore float-roast test work. WDG.

DATE: Dec. 23/81.

File No. 1-1171

SAMPLE No.			Au oz/ton			
Float Tails			.397			
Float Cons			2.620			
Clinker			1.713		PANNED CONS	
Heads ground to -80 mesh			1.288			

WDG

MINE-EN Laboratories Ltd.

CERTIFIED BY:

To: Arc[illegible]n resources Ltd.

PAGE No. 1

REPORT NO. A21 - [illegible]-502

DATE: May 29, 1981

152 - 890 West Pender
Vancouver, B.C. V6C 1J9

BONDAR-CLEGG & COMPANY LTD.

CERTIFICATE OF ASSAY

Sample submitted: May 25, 1981
Results completed; May 29, 1981

PROJECT: Billikin Resources Ltd.

APPENDIX IV BEANO.

I hereby certify that the following are the results of assays made by us upon the herein described Rock samples.

MARKED	GOLD		SILVER		Cu	Pb	Zn	Fe	S			
	Ounces per Ton	Grams per Metric Ton	Ounces per Ton	Grams per Metric Ton	Percent	Percent	Percent	Percent	Percent	Percent	Percent	
ZE B-1	0.23		-		-	-	-	-	-	QTZ-PYR. FLOAT LOWER BINGO CANYON		
-2	<0.02		0.05		0.17	-	-	-	-	not from property.		
-3	1.98		0.13		0.11	0.05	<0.01	32.73	15.61	ORE STOCKPILE TOP OF SKYLINE		
ORE FACE → -4	2.44		0.15		0.23	0.01	<0.01	35.94	18.14	8' WIDTH, CHIP. ORE FACE.		
-5	0.50		0.08		0.27	-	-	-	-			
→ ZE -7	2.61		0.34		0.64	-	-	-	-	MASSIVE PYRR-ACT FLOAT, BANDED BINGO CR CANYON		
										QTZ-PYR FLOAT. 50% WT PYR. CANYON MOUTH		

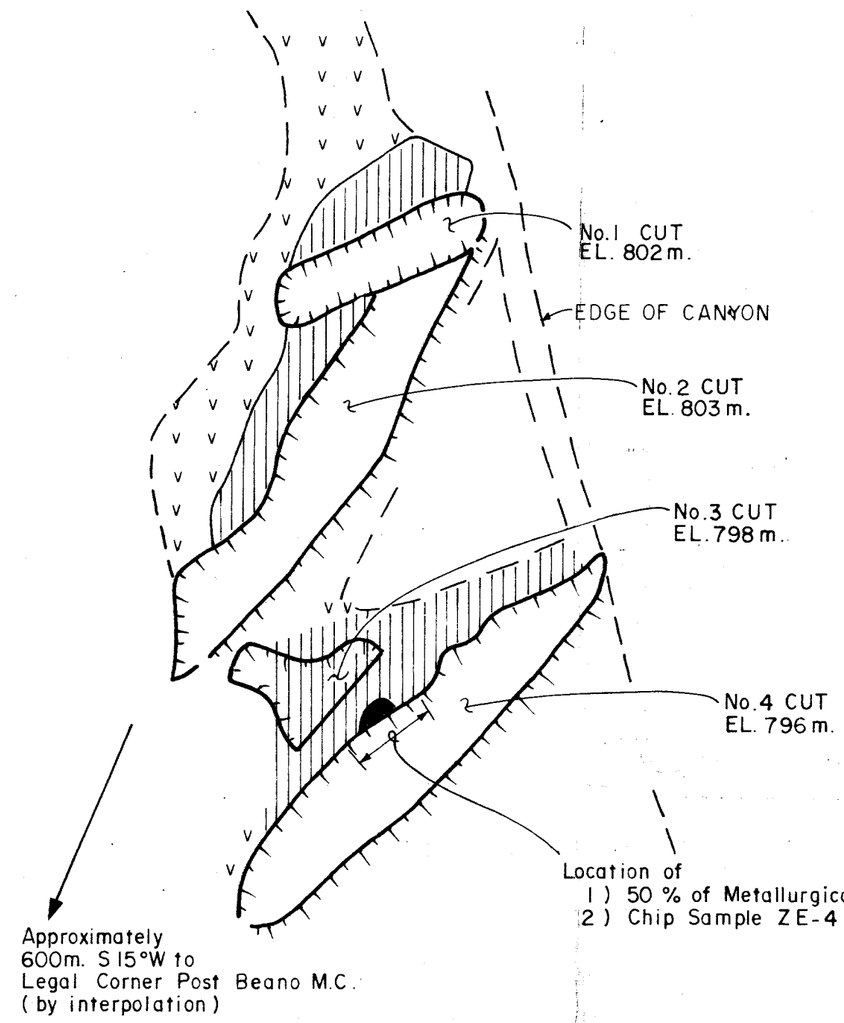
NOTES W.D.G.

ZE-3 + ZE-4
taken from metallurgical sample area.
Others for geological interest elsewhere on property W.D.G.

W.D.G.

NOTE:
Rejects retained three weeks
Pulps retained three months
unless otherwise arranged.

Registered Assayer, Province of British Columbia



Legend

OPEN CUT

MASSIVE PYRRHOTITE

V V ANDESITE TUFF

ACTINOLITE ROCK WITH PYRRHOTITE

SCALE IN METRES
3 2 1 0 3 6

BEANO PROPERTY

SHOWINGS MAP
(AFTER STEVENSON, 1950)

W.D.G.

Drawn by: G.T.	Instructions of W.D. Groves, P.Eng.	FIG. 3
Date: Jan. 1982		