

MineQuest Report #121
Ref. No. RM2304

DATA REVIEW AND RECOMMENDATIONS

TEXADA ISLAND PROPERTY

Nanaimo Mining Division

N.T.S. 92F/10E, 15E

Latitude 49°44'N

Longitude 124°32'W

by

G.R. Peatfield, Ph.D., P.Eng.

of

MineQuest Exploration Associates Ltd.

for

Vananda Gold Ltd.

Vancouver, B.C.

July, 1986

GEOLOGICAL BRANCH
ASSESSMENT REPORT

15,750

PART 2 OF 2

FILMED

TABLE OF CONTENTS

	<u>Page</u>
1.0 INTRODUCTION	1
2.0 LOCATION, ACCESS AND TERRAIN	2
3.0 PROPERTY	2
4.0 REGIONAL GEOLOGY	3
5.0 MINERAL DEPOSITS	4
6.0 METAL RATIO STUDY	7
7.0 SIGNIFICANT EXPLORATION RESULTS	10
8.0 CONCLUSIONS	11
9.0 RECOMMENDATIONS	13
10.0 QUESTIONS TO BE ADDRESSED	15
11.0 BIBLIOGRAPHY	17
12.0 STATEMENT OF QUALIFICATIONS	21
13.0 USE OF REPORT	22

LIST OF APPENDICES

Appendix I - Partial Chronology, Texada
Island Mines

LIST OF ILLUSTRATIONS

	<u>After Page</u>
1. Location Map	2
2. Metal Ratio Plot, Texada Island Deposits	7
3. % of Total Worth Plot Texada Island Deposits	7
4. Plot of Gold Grade vs Copper Grade Texada Island Deposits	8
5. Plot of Contained Metal Worth, Precious Metals vs Copper, Texada Island Deposits	8

TABLES

	<u>After Page</u>
1. Production Figures for Texada Island Mines	4
2. Production Grades for Texada Island Mines	4

1.0

INTRODUCTION

The northern portion of Texada Island has been an important mining area, on an intermittent basis, since the late 19th century. The principal periods of activity were between 1897 and 1919, during which time the gold-copper-silver skarn deposits at Vananda produced about 250,000 tonnes of high-grade ore; from 1948 to 1952, when one of these mines produced 58,000 tonnes of slightly lower grade ore; and from 1952 to 1976, when the large magnetite skarn deposits on the west side of the island near Gillies Bay produced some 10 million tonnes of iron concentrate with byproduct copper, gold and silver. The sites of all these former producers lie within the present Vananda Gold Ltd. property.

The skarn deposits are contained within rocks of the Triassic "Texada group" (Karmutsen Group) and "Marble Bay formation" (Quatsino Formation), intruded by Jurassic quartz dioritic to gabbroic plugs, dykes and stocks. There are two distinct families of skarn deposits, as evidenced by their geological setting, mineralogy, and metal ratios. Those of principal interest to us at this time are the gold-copper-silver deposits at Vananda.

There is an extensive body of reporting, especially on the Vananda area deposits, most of which is listed in the Bibliography. Of this, the reports by Winter (1984, 1985) provide a comprehensive summary of the general situation and history of the property. This present report is by way of being a review and list of recommendations; much of the ground covered in previous reports is not treated in detail here.

2.0

LOCATION, ACCESS AND TERRAIN

The property lies between the villages of Vananda and Gillies Bay, on northern Texada Island, about 80 kilometres northwest of Vancouver (see Figure 1). Access is by highway and ferry to Powell River and thence by ferry to Blubber Bay at the north end of the island. Light aircraft can land at the airport near Gillies Bay. Numerous public and private roads provide ready access to most of the property.

The terrain on the property is moderate; the gently rolling hills have a total relief of the order of 250 metres. Forest cover is locally heavy, with considerable second growth. Much of the area of immediate interest lies within and adjacent to the settlement of Vananda.

3.0

PROPERTY

Texada Island is one of the oldest mining camps in the Province, and as a result the property situation is very complex. In some cases, separate ownership exists for base and precious metals; this is further complicated by the limestone quarries, which do not hold their tenure under the terms of the Mineral Act. It is beyond the scope of this brief report to describe the Vananda Gold Ltd. holdings in detail; suffice it to say that the Company controls about 120 claims of various types in a complex block some 3.5 x 8.5 km. Mineral rights are held by way of located claims, Crown-granted claims, and Mining Leases.

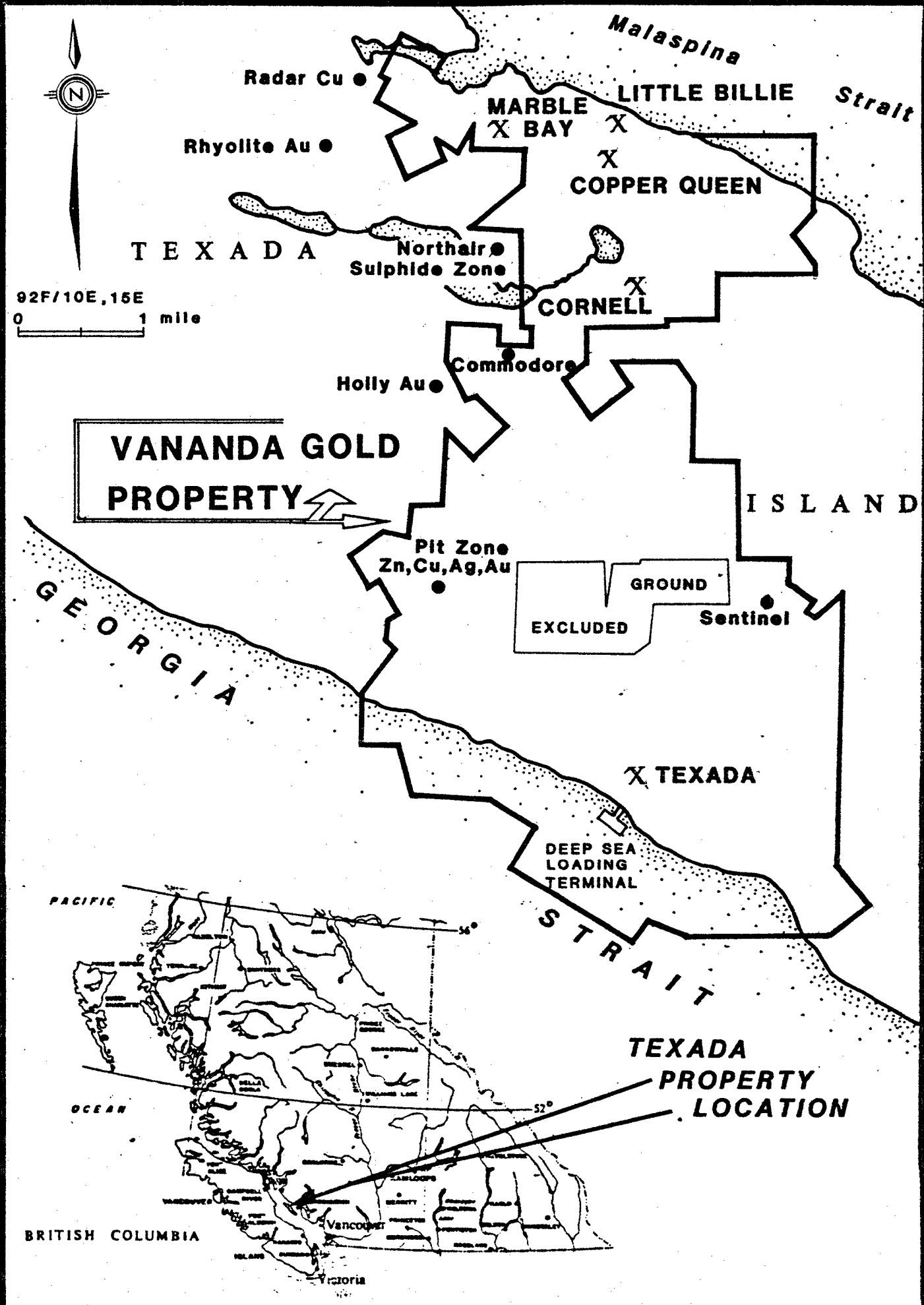


Figure 1

4.0

REGIONAL GEOLOGY

The regional geology of Texada Island has not been comprehensively studied since the work of McConnell (1914), although numerous published and unpublished maps and reports treat various isolated areas or specific problems.

The Vananda Gold property is underlain by a succession of mid-Mesozoic volcanic and sedimentary strata. McConnell (1914) described the andesitic to basaltic "porphyrites" of the Lower Jurassic(?) "Texada group" overlying Triassic or Jurassic limestones of the "Marble Bay formation". The recent compilation by Muller (1977) of the geology of Vancouver Island and adjacent islands classified the volcanic rocks on northern Texada Island as Karmutsen Group (middle to upper Triassic) and the limestones as the overlying upper Triassic Quatsino Formation. Clearly either McConnell's stratigraphy or Muller's assignment is in error; subsequent studies strongly imply the former, and suggest that the limestones in fact overlie the volcanic strata. A third possibility is that both Karmutsen and Bonanza Group (Jurassic) volcanic rocks are represented; further field work would be required to prove or disprove this hypothesis.

The volcanic and sedimentary strata have been cut by at least two types of intrusive rocks, thought to be of Mesozoic age. The more common, typified by the Gillies Lake Stock in the area of the Texada iron mines, is principally composed of quartz diorite and granodiorite. Near Vananda, closely associated with the gold-copper mines, are smaller bodies of diorite, diorite porphyry, and locally more basic intrusive rock. Numerous dykes, generally porphyritic, may be associated with either intrusive family. Such limited studies as have been undertaken suggest that the intrusive rocks are Jurassic or older (Carson, et al., 1971).

5.0

MINERAL DEPOSITS

Several types of mineral deposits have been explored and in some cases exploited on Texada Island, since the beginning of mining history in the late 1800's. Of these, the most important (not including the very extensive limestone quarries in the Marble Bay formation) are the iron-copper skarns on the west side of the island near Gillies Bay, and the gold-copper-silver skarn deposits near Vananda. Both types have had considerable production, as shown in Table 1. Although the Vananda deposits have produced far fewer tonnes of ore, their unit values were much higher than those of the iron-copper skarn deposits. They are a much more attractive exploration target at present, given their relatively high precious metal tenors. Table 2 shows the average grades of material mined from various deposits.

The Vananda gold-copper-silver deposits consisted of narrow relatively short lenses with very substantial down-plunge projections. Typical dimensions of the larger individual shoots would be about 4 x 25 x 150 metres, or about 60,000 tonnes. These lenses or shoots generally consist of bornite and chalcopyrite in a gangue of garnet, epidote, and diopside with lesser amounts of tremolite, wollastonite and other calc-silicate minerals, contained completely within the massive limestones, usually with associated local bleaching of the limestone to form "white rock". Free gold and native silver have been reported, and molybdenite is a widespread but minor constituent. Details are available in the published reports of McConnell (1914) and Stevenson (1945).

The Texada Iron deposits (see McConnell, 1914; Sangster, 1969; Sutherland Brown and Merrett,

TABLE 1 - PRODUCTION FIGURES FOR TEXADA ISLAND MINES

<u>Mine</u>	<u>Period</u>	<u>Prod.(tonnes)</u>	<u>Au(g)</u>	<u>Ag(g)</u>	<u>Cu(kg)</u>	<u>Fe conc. (tonnes)</u>
Copper Queen	1903-1907	3,326 ²	37,175 ³	279,380 ³	148,330 ³	
Copper Queen	1907-1917	749 ²	9,891	75,238	32,417	
Cornell	1897-1919	40,687	471,085	2,194,471	1,368,512	
Little Billie	1896-1916	5,711	50,085	220,458	136,837	
Little Billie	1948-1952	58,000	313,083	977,846	682,261	
Marble Bay	1899-1929	<u>199,210⁴</u>	<u>1,544,100</u>	<u>12,620,500</u>	<u>6,788,900</u>	
Total Vananda		307,683	2,425,419	16,367,893	9,157,257	
Lake	1901-1921	946	3,017	35,955	47,659	
Prescott ⁵	1885-?	733	2,799	31,787	38,964	
Texada Iron ⁶ (Prescott, Yellow Kid, Paxton and Lake Mines	1952-1956	2,000,000	-7	-7	-7	1,300,000
	1957-1961	3,289,900	156,570	2,989,430	2,759,900	1,709,800
	1962-1966	5,168,900	281,950	5,374,600	6,220,400	2,590,300
	1967-1971	5,840,200	235,760	7,876,800	9,814,300	2,730,500
	1972-1976	<u>4,501,900</u>	<u>213,280</u>	<u>7,403,480</u>	<u>7,945,700</u>	<u>2,030,900</u>
Total		20,800,900	887,560	23,644,310	26,740,300	10,361,500

1. Figures are from MinFile, except for Copper Queen 1903-07 which are from Cox (1944).
2. These figures do not accord well with the reported mining history (including leasing) for this deposit, which suggests substantially more tonnage was mined.
3. These figures are approximate, derived by calculating backward from reported grade figures.
4. This figure is uncertain - MinFile gives 1906 production as 95,020 tonnes; I have assumed 9,502 tonnes, which is comparable to other years and yields commensurate grade figures.
5. Although this production is listed as Prescott, it may in fact refer to mining near the Paxton deposit.
6. All figures pertaining to these deposits are rounded slightly.
7. No copper concentrates were produced in this period.

TABLE 2 - PRODUCTION GRADES FOR TEXADA ISLAND MINES

Mine	Years	Tonnes	Au(g/t)	Ag(g/t)	Cu%
Copper Queen	1903-1907	3,326 ¹	11.2 ²	84.0 ²	4.5 ²
Copper Queen	1907-1917	749 ¹	13.2	100.5	4.3
Cornell	1897-1919	40,687	11.6	53.9	3.4
Little Billie	1896-1916	5,711	8.8	38.6	2.4
Little Billie	1948-1952	58,000	5.4	16.9	1.2
Marble Bay	1899-1929	<u>199,210³</u>	<u>7.8</u>	<u>63.4</u>	<u>3.4</u>
Total Vananda		307,683	7.9	53.2	3.0
Lake	1901-1921	946	3.2	38.0	5.0
Prescott	1895-?	733	3.8	43.4	5.3
Texada Iron	1957-1976	18,800,900 ²	0.05	1.25	0.14

1. These figures, from Cox (1944) and B.C. MinFile respectively, do not accord well with the reported mining history (including leasing) for this deposit.
2. These figures are approximations.
3. This figure is uncertain - MinFile gives 1906 production as 95,020 tonnes; I have assumed 9,502 tonnes, which is comparable to other years and yields commensurate grade figures.

1964; Meinert, 1984) are more normal magnetite-chalcopyrite skarns developed near the contacts of limestone, volcanics and quartz diorite intrusions. These in general have very low copper contents, as disseminated chalcopyrite, but there are a few related lenses of high-grade copper mineralization, almost exclusively chalcopyrite.

Also present on the island, although not on the Vananda Gold property, are numerous showings of gold-silver mineralization in quartz or quartz-carbonate veins and shear-zones in volcanic rocks, especially on the western side of the limestone belt. Some of these contain locally spectacular gold mineralization. Another occurrence of some considerable academic interest is the recent Northair Mines Ltd. discovery near Priest Lake. F.G. Hewett (personal communication, June 1986) reports that a flat-lying limey horizon, less than 50cm thick and contained within the western volcanic package, contains abundant pyrite, traces of chalcopyrite, and locally substantial gold values. Unfortunately, the tonnage potential appears to be extremely limited.

Numerous other mineral showings of various types, mostly copper-gold-silver and zinc or lead, are found in shears, veins and "replacements" on and adjacent to the Vananda Gold property. One of considerable interest consists of an apparently concordant zone within limestone in the Ideal Cement quarry toward the southern end of the property. Mineralization consists of irregular zones of granular semi-massive pyrite and sphalerite; grab samples taken by D. Constable (Winter, 1984) and by Canamax Resources Inc. assayed as follows:

	<u>Au(g/t)</u>	<u>Ag(g/t)</u>	<u>Zn%</u>	<u>Pb%</u>	<u>Cu%</u>
Constable	5.1	15.1	12.70	0.09	0.09
Canamax	6.1	15.2			

While there is no body of ore of this type exposed in the quarry wall, there is a pronounced IP anomaly some distance downdip from the showing; the presumed source lies at no great depth and could easily be tested by a few short vertical drill holes.

6.0

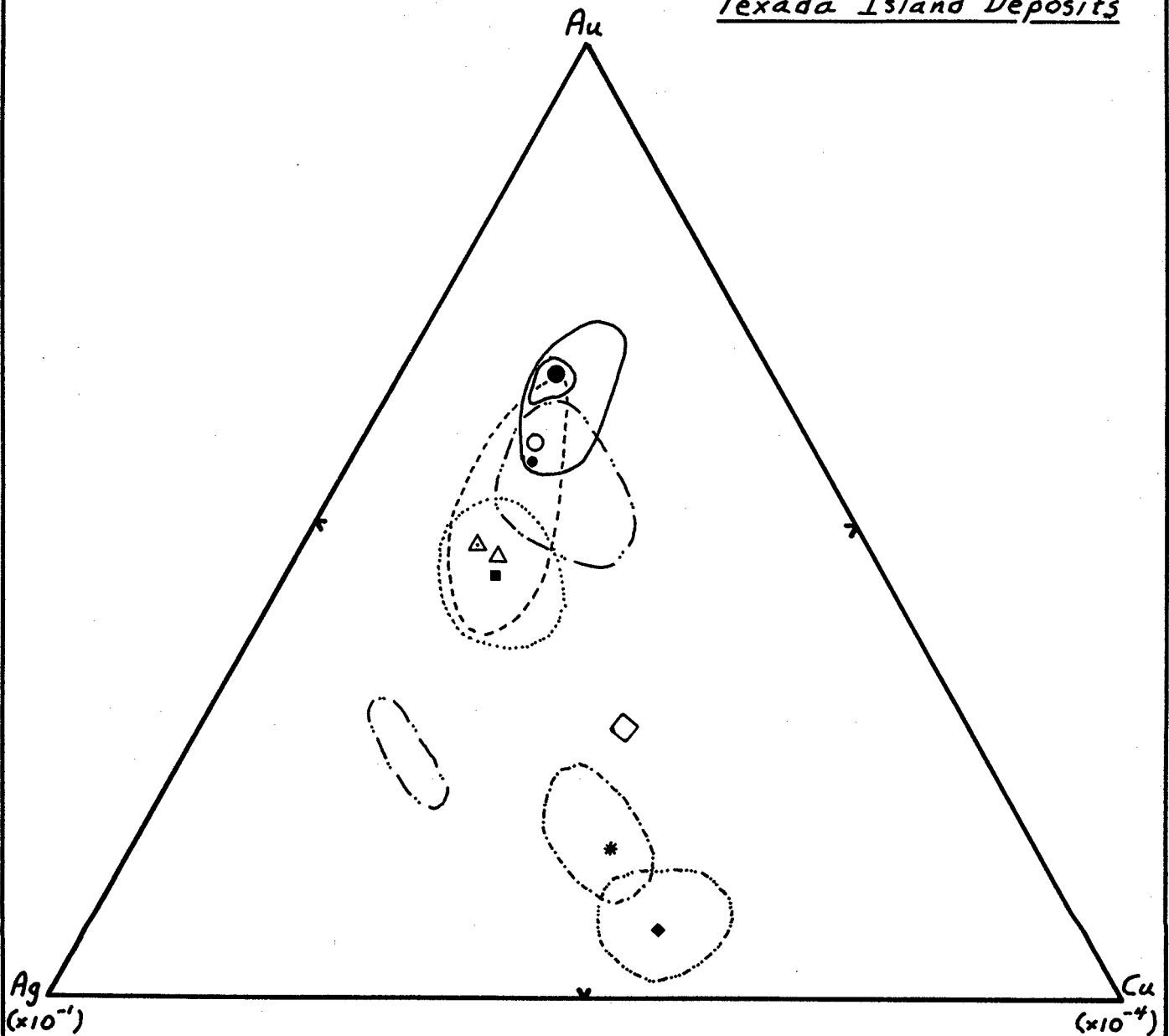
METAL RATIO STUDY

A convenient way of looking at the relative attractiveness of different types of skarn deposit is to study the precious metal content as a function of the copper grade, i.e. essentially the Au-Ag grade of copper concentrate or direct shipping ore, based on yearly production data as reported in the B.C. MinFile. This is best done with reference to a triangular plot (see Figure 2) which shows the relative abundances of Au, Ag and Cu. It is important to note that the numbers used are the gold content, one-tenth of the silver content, and one ten-thousandth of the copper content (in grams/tonne). This allows one to examine relative differences between deposits; if one used absolute metal values, all points would plot essentially at the copper apex. Another vivid way to present the data is to use a triangular plot (Figure 3) employing the contained dollar values (assuming present prices of \$US 325/oz for Au, \$US 5/oz for Ag, and \$US 0.65/lb for Cu).

Both these plots show the marked separation of the Vananda area deposits from those of the Texada iron mines area, even though two of these latter deposits, the Lake and Prescott, had early (albeit very limited) high-grade copper production. Clearly the two areas have radically different metal-ratio characteristics; presumably this can be taken to reflect a different genesis. Clearly, also, the Vananda area deposits represent a much more attractive target in the sense that a preponderance of their value (some 60-70%) is in precious metals, which today probably have more upward price volatility than copper.

It is probably significant that the higher precious metal (especially gold) deposits appear to be associated, at least spatially, with the more basic (diorite, gabbro) intrusive rocks. This observation, if it could be backed up with chemical data, could have very strong exploration significance.

Metal Ratio Plot,
Texada Island Deposits

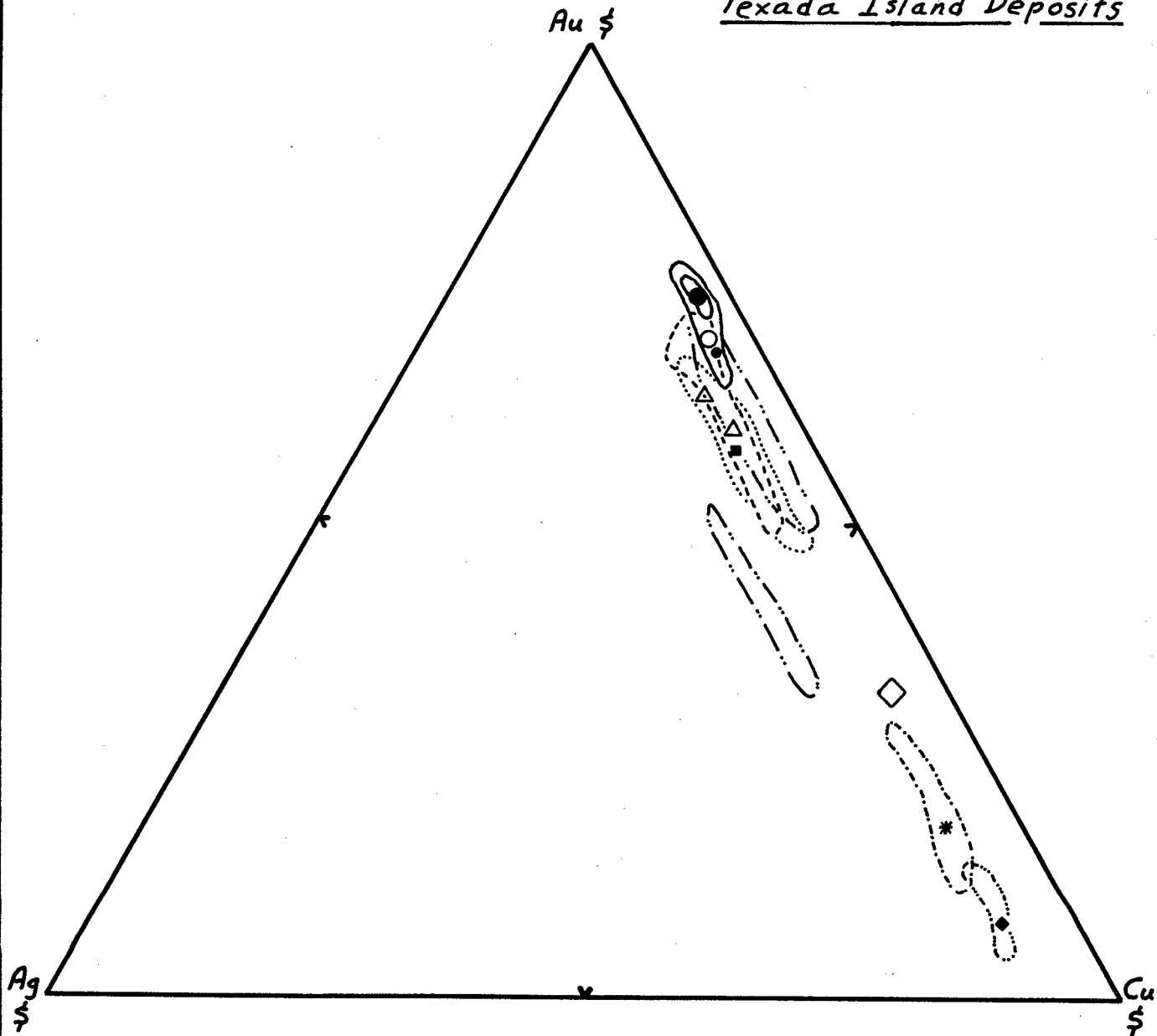


- Δ Copper Queen 1903-07
- Δ Copper Queen 1907-17
- ● Cornell 1897-1919
- ○ Little Billie 1896-1916
- ● Little Billie 1948-52
- ■ Marble Bay 1899-1919, 29
- ◆ Lake 1903, 07, 17
- ◆ Prescott
- * Texada Iron

fields derived from
annual production data,
points are total prod^{ty}.

Fig. 2

% of Total Worth Plot
Texada Island Deposits



- Δ Copper Queen 1903-07
- Δ Copper Queen 1907-17
- ● Cornell 1897-1919
- ○ Little Billie 1896-1916
- ● Little Billie 1948-52
- ■ Marble Bay 1899-1919, 29
- ◆ Lake 1903, 07, 17
- ◇ Prescott
- * Texada Iron

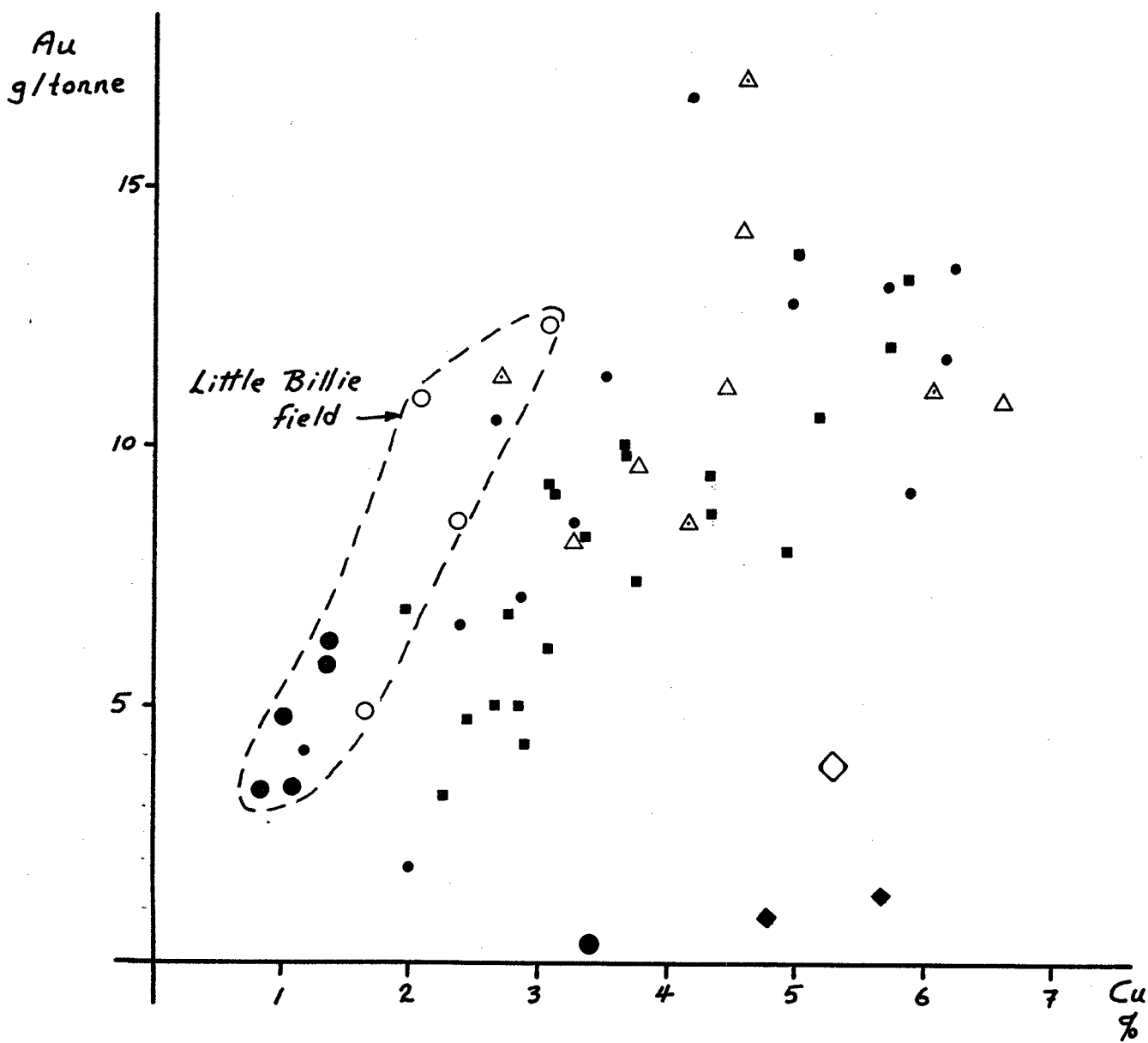
fields derived from
annual production data,
points are total prod^y.

Fig. 3

A further apparent subdivision of the Vananda deposits can be effected by plotting gold content against copper grade (Figure 4). This shows very clearly that for a given copper grade the gold content of the Little Billie ores is significantly higher than for ores from the other Vananda area deposits. This distinction remains, although it is somewhat less pronounced amongst the Vananda deposits, if one plots a normalized graph of the contained worth (at today's prices) of precious metals against the worth of contained copper (see Figure 5). This is probably the most meaningful plot from an exploration point of view (setting aside for the moment all questions of metal recoveries), and it demonstrates firstly that the Vananda area deposits are clearly the superior target and secondly that within the Vananda camp there appear to be some systematic differences between deposits. Concentrates from a deposit like the Little Billie would probably have the highest value, and would almost certainly have the highest precious metal credits per unit of copper in the concentrate. The data appear to have rather too much scatter, and to be of too uncertain a character, to work out much in the way of camp scale zoning patterns.

One of the most important points to be made here is that in order to do this sort of study in a meaningful way, one must deal with large samples - yearly production data are ideal for this, especially where samples are several thousands of tonnes, and even better when a mill on site has produced concentrate, as is evidenced by the fact that the minimum scatter is given by the Little Billie 1948-52 data, representing ores milled on site. Individual samples, or drill hole intercepts, are too erratic to be of any use in such a study. Unfortunately, this essentially precludes the use of possible new drill data to

Gold Grade vs Copper Grade - Texada Island Deposits



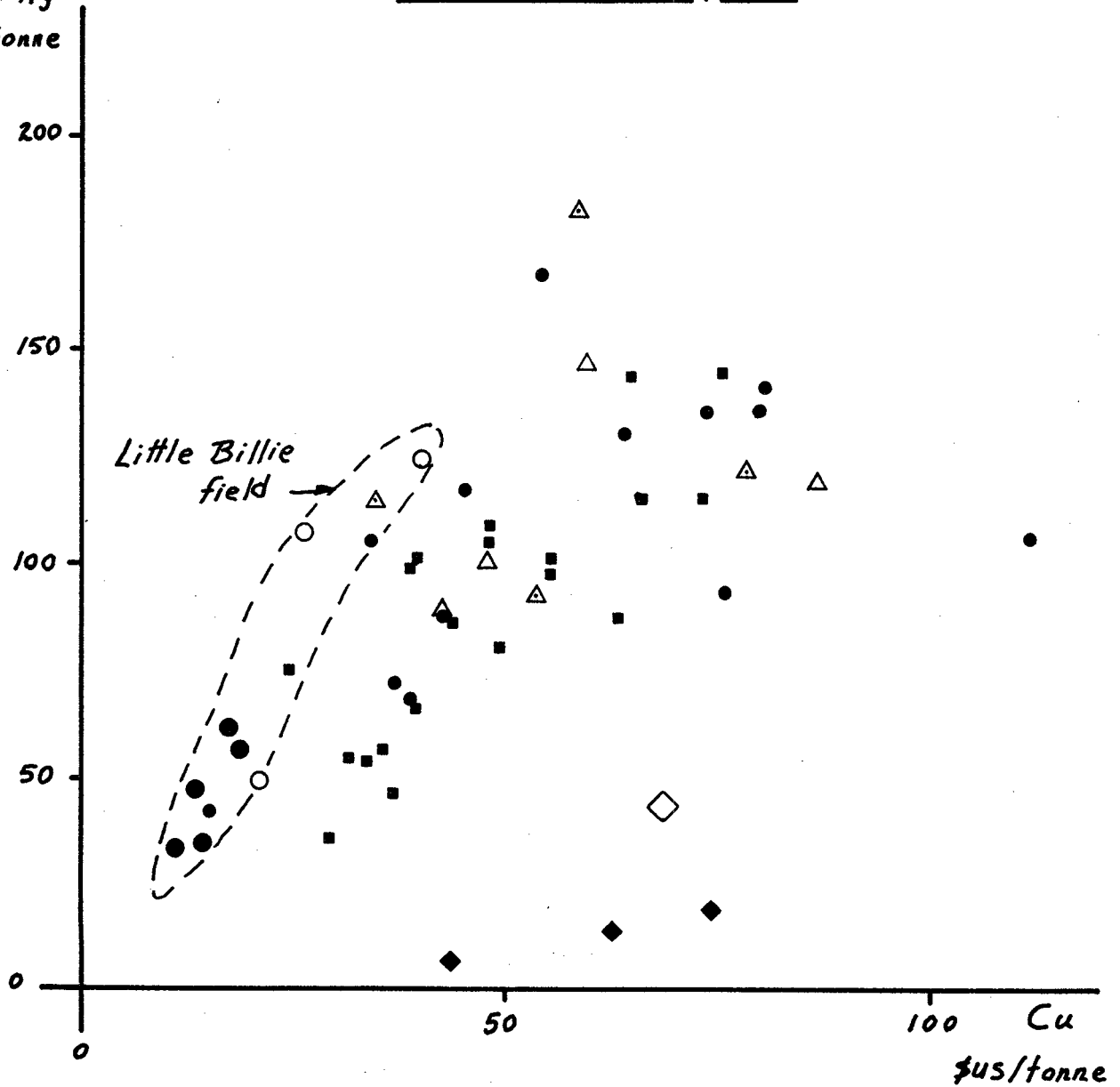
- △ Copper Queen 1903-07
- △ Copper Queen 1907-17
- Cornell 1897-1919
- Little Billie 1896-1916
- Little Billie 1948-52
- Marble Bay 1899-1919, 29
- ◆ Lake 1903, 07, 17
- ◇ Prescott (total)

data from yearly production figures.

Fig. 4

Contained Metal Worth, Precious Metals v/s Copper
Texada Island Deposits

Au + Ag
\$us/tonne



- △ Copper Queen 1903-07
- △ Copper Queen 1907-17
- Cornell 1897-1919
- Little Billie 1896-1916
- Little Billie 1948-52
- Marble Bay 1899-1919, 29
- ◆ Lake 1903, 07, 17
- ◇ Prescott (total)

*data from yearly
production figures.*

Fig. 5

work out camp zoning which might help answer the important question of whether there are two unique deposit types, or a continuum between the types as known to date. In preparing these drawings, some figures for annual production have been omitted, where the tonnages were small and the metal ratios radically different from those of the target annual productions.

7.0

SIGNIFICANT EXPLORATION RESULTS

The property has a long and complex history, as can be judged by reference to Appendix I and to the reports listed in the Bibliography. In the process of the work, several significant events took place:

- 1) In the 1920's numerous drill holes in the area of the Vananda Mines, especially the Cornell, returned good intersections (Lakes, 1930), which have been only partially followed-up. The best reported intersection, near the Cornell, was 7m grading 14.7 g/tonne Au and 11% Cu.
- 2) Toward the end of the second phase of mining at the Little Billie, several underground holes tested the downward extension of the ore-bodies, with attractive intersections (McLean, 1956). One intersection, in a possible new zone, was 5m (core length) grading 8.5 g/tonne Au and 2.69% Cu.
- 3) In 1979, Shima Resources drilled several holes in a gravity anomaly southeast of the Little Billie, with some interesting results (Winter, 1985). The best intersection was 2m grading 3.5 g/tonne Au and 1.68% Cu, as part of a total intersection of 16m grading 1.4 g/tonne Au and 1.31% Cu.
- 4) In 1984, Cartier Resources drilled several holes near the Cornell, with discouraging results, and one hole below the lower workings of the Little Billie, which cut 2.65m grading 7.9 g/tonne Au, 29.8 g/tonne Ag, and 1.98% Cu.

8.0

CONCLUSIONS

- 1) The Vananda Gold Ltd. property contains several important exploration targets, and is well located with regard to transportation and infrastructure.
- 2) The most important targets for the immediate term are deposits of the Vananda gold-copper-silver skarn type.
- 3) Significant exploration potential exists in the neighbourhood of the old mines, especially below the lower levels of the Little Billie, and probably elsewhere on the property.
- 4) Individual mines, or clusters of elongate vertical shoots, have the potential (based on historical experience) to produce as much as 300,000 tonnes of good grade gold-copper-silver ore.
- 5) A reasonable target to aim for would be 300,000 to 500,000 tonnes of material grading 5 to 12 g/tonne Au, 20 to 100 g/tonne Ag, and 1.5 to 3.5% Cu.
- 6) Detailed geological surveys coupled with geophysics and followed by extensive diamond drilling will be necessary to prove such tonnages.
- 7) The skarn gold-copper-silver deposits can be readily subdivided on the basis of metal ratios into gold-dominant (Vananda) and gold-subordinate (Texada) types. More work is necessary to establish whether the geological settings and wall-rock chemistry are recognizably different.
- 8) There is a wealth of data available on past work on the property which should be compiled before expensive field work is undertaken.

- 9) Industrial mineral targets such as "white rock" (altered limestone) and magnetite for heavy media should be investigated as the program progresses, but not to the detriment of the main exploration thrust.
- 10) Work on the geological and possible geophysical fieldwork, and on the compilation, should begin as soon as possible to take advantage of the summer season.

9.0

RECOMMENDATIONS

- 1) No expensive fieldwork such as diamond drilling or extensive geophysics should be undertaken until such time as all available exploration data have been compiled, plotted and correlated.
- 2) All data should be compiled and correlated at appropriate scales, probably 1:10,000 or more detailed. Separate maps or overlays should be prepared showing:
 - a) geology from all sources, with annotations, augmented by fieldwork as performed
 - b) geophysics, both ground and airborne
 - c) all known mineral occurrences, located as accurately as possible and described in marginal notes. Field checks, especially for location, would be very valuable.
 - d) locations of all drill holes and workings, as accurately located as possible, but not ignored simply because accurate locations are not readily available. This will give a comprehensive picture of what ground has been explored and what remains open.
 - e) land tenure, with as much accurate survey information as possible. This should be made as far as possible internally consistent and then "best-fitted" to the topographic base.
- 3) An annotated listing of all reports and correspondence should be prepared, outlining the salient features and what specific information could be of use in future work. This will help with continuity of effort on the property.

- 4) Detailed geological studies should commence soon, with emphasis on the overall geological setting, detailed lithological studies of limestones and skarns, alteration studies (especially in limestone), distribution and chemistry of intrusive bodies, geometry of dykes, and other structural data where appropriate. Studies of mineral assemblages and chemistry of the known deposits will be very useful.
- 5) The drill core for the recent drilling (and older work where possible) should be relogged in detail, especially with regard to the mineralogy and chemistry of skarn assemblages, to see if there are discernable variations laterally and vertically within and adjacent to the deposits. Detailed studies of trace metal contents of sulphide assemblages should be considered.
- 6) Detailed plans and sections should be prepared to help work out geometry and distribution of ore and critical geological relationships such as the relationship of ore to intrusive bodies or stratigraphy.
- 7) Some testwork should be undertaken to ascertain whether detailed magnetometry (preferably gradient method) could be used to map dykes and steep intrusive contacts.
- 8) Following these studies, diamond drilling should concentrate on the defined targets. It seems likely at this stage that a prime target area will be below the lower workings of the Little Billie, and perhaps below other mines as well.

10.0

QUESTIONS TO BE ADDRESSED

- 1) Is it true that the mined orebodies of the Vananda type followed the trace of dykes or contacts, and if so can these be readily traced?
- 2) What is the relationship of volcanic rocks to the limestone unit? Are we seeing one or two volcanic packages?
- 3) What are the real differences between the intrusives, and what chemical or physical means would best distinguish them? Are the differences significant in terms of ore controls?
- 4) What is the distribution of bleached limestone ("white rock")? Is this directly correlated with ore deposits, and if so is it a reliable guide? What is the detailed trace chemistry of the "white rock"?
- 5) Is there any evidence of a particular stratigraphic position for the known orebodies?
- 6) Is there any evidence to suggest that the known bodies were "pipes" or "chimneys", and that the complementary "flats" or mantos might exist at certain horizons within the limestone package?
- 7) What aspects of the geology seem best able to explain the distribution of different types of mineral occurrence on a property-wide basis?
- 8) How realistic is the hope of extending the reserves in any of the mines other than the Little Billie?

- 9) What are the approximate volumes of workings in the old mines? Could they be pumped out and rehabilitated? Would it be cheaper to do this for the Little Billie - Copper Queen, or to drill the 200 to 300 metre slice from surface?
- 10) Given historical grades, would the projected potential of 300,000 to 500,000 tonnes of mineralized rock, assuming it could be found, be sufficient to make a viable mine?
- 11) Given historical grades and ore dimensions, to what approximate depths would such material be mineable? What would be the appropriate costs for ground and water control?
- 12) What would be a reasonable allocation of drilling funds among the various priorities: extending the depth of the old mines, testing other surface showings, testing geophysical anomalies, and testing for completely blind targets (i.e. wildcatting)?
- 13) What regulatory problems can be foreseen, and what steps should be taken to address such concerns?

11.0

BIBLIOGRAPHY

- AGER, C.A., 1978. Gravity Survey - Texada Island claims groups. Report (#6770) submitted for assessment credit to the British Columbia Ministry of Energy, Mines, and Petroleum Resources on behalf of Shima Resources Ltd., 11 pp. and Appendices.
- AGER, C.A. and BERRETA, M.G. 1979. Gravity, IP, Magnetic & EM Survey - Texada Island claim groups. Unpublished report for Shima Resources Ltd., dated July 9, 1979, 8 pp. and Appendices.
- ANDERSON, T.P. 1976. Arbutus Mapleleaf and Monica Claim Groups, Nanaimo Mining Division, Van Anda, Texada Island, B.C. Report submitted for assessment credit to the British Columbia Ministry of Energy, Mines, and Petroleum Resources on behalf of Ideal Basic Industries, 10 pp. and Appendices.
- CANDY, C., and WHITE, G.E. 1985. Cartier Resources Inc., Geophysical Report on a multipole induced polarization survey on the Texada Island project, Nanaimo M.D., Lat. 49°42'N, Long. 124°32'W, NTS 92F/10, 92F/15. Unpublished report, 20 pp.
- CARSON, D.J.T., MULLER, J.E., WANLESS, R.K. and STEVENS, R.D. 1971. Age of the contact metasomatic copper and iron deposits, Vancouver and Texada Islands, British Columbia. Geological Survey of Canada Paper 71-36, 9 pp.
- COVENEY, C.J. 1966. Bethex Explorations Ltd. (N.P.L.) - Ideal Cement, Little Billie Mine. Unpublished report, 2 pp. and Appendices.

- COX, C.R. 1946. The Vananda Mining Company Limited - report on 1. The Little Billy Operations, 2. Possibilities of the Copper Queen, and 3. Possibilities of the Cornell Mines. Unpublished report for Pioneer Gold Mines of B.C. Ltd.
- DOLMAGE, V. 1944. Industrial Metals Mining Co. Ltd. Unpublished report concerning copper-gold mines in the Vananda area, Texada Island, B.C., 6 pp.
- FAHRNI, K.C. 1978. Shima Resources Ltd. Properties, Texada Island, B.C. Lat. 49°43'N, Long. 124°32'W, N.T.S. Block 92F-NE. Unpublished report for Shima Resources By Keith C. Fahrni, P.Eng dated March 15, 1978, 19 pp. and Appendices.
- FAHRNI, K.C. 1980a. Shima Resources Limited, Texada Island, B.C. Nanaimo M.D., Latitude 49°43'N, Longitude 124°32'W, NTS Block 92F-NE. A report outlining work done during 1979 toward development of the property in qualification for MEIP grant, 3 pp. and Appendices, dated Feb. 13, 1980.
- FAHRNI, K.C. 1980b. Shima Resources Limited, Texada Island, B.C. Nanaimo Mining Division, Latitude 49°43'N, Longitude 124°32'W, NTS Block 92F-NE. A report recommending further drill work following upon work done during 1979 and described in submissions dated February 14, 1980, 5 pp., dated Mar. 7, 1980.
- FAHRNI, K.C. 1981. Report of 1980 drilling, Shima Resources Limited, Texada Island property, Nanaimo Mining Division B.C., Canada. NTS 92F-NE, Latitude 49°43'North, Longitude 124°32'West. Unpublished report dated January 1981, 11 pp. and Appendices.

HAMILTON, W.S., 1948? The Industrial Metals Mining Company Ltd. Unpublished report on the Little Billy, Copper Queen and Cornell mines for Vananda Mines (1948) Limited, 7 pp.

LAKES, A. 1930. Report on the property of Central Copper and Gold Company, Limited, Texada Island, B.C. Unpublished report, 28 pp.

LAMB, J. 1970. Exploration proposal for the Vananda copper belt, Texada Island, B.C. Unpublished report for Ideal Cement Company, 9 pp.

McCONNELL, R.G. 1914. Texada Island, B.C. Geological Survey of Canada Memoir 58 (No. 48, Geological Series), 112 pp.

McLEAN, D. 1956. Vananda Mines (1948) Ltd. Unpublished report concerning the Little Billy and Copper Queen mines, 8 pp.

MEINERT, L.D. 1984. Mineralogy and petrology of iron skarns in western British Columbia, Canada. Economic Geology 79, pp. 869-882.

MULLAN, A.W. 1977. Report on the magnetometer survey, Vananda area, Texada Island, Nanaimo Mining Division, B.C. for Bacon and Crowhurst, Ltd. Report (#6160) submitted for assessment credit to the British Columbia Ministry of Energy, Mines and Petroleum Resources on behalf of Mr. R. Margetts on the Natalie Claim (12 units), 4 pp. and Appendices.

MULLER, J.E. 1977. Geology of Vancouver Island. Geological Survey of Canada Open File 463 - 2 maps (1:250,000) with notes.

NEY, C.S. 1943. Surface Geology. Undated, unsigned notes to accompany geology map, 17 pp.

- SANGSTER, D.F., 1969. The contact metasomatic magnetite deposits of south western British Columbia. Geological Survey of Canada, Bulletin 172, 85 pp.
- STEVENSON, J.S. 1945. Little Billie Mines, Texada Island, British Columbia. Reprinted from the Annual Report of the British Columbia Minister of Mines, 1944. 15 pp.
- SUTHERLAND BROWN, A. and MERRETT, J.E. 1964. Texada Mines Ltd. Annual Report, British Columbia Minister of Mines and Petroleum Resources, Lode Metals Section, pp. 146-151.
- WINTER, L.D.S. 1984. Geological report and proposed exploration program on the Texada Island property, Nanaimo Mining Division, British Columbia of Cartier Resources Inc. Unpublished report dated June 19, 1984, 19 pp. and Appendices.
- WINTER, L.D.S. 1985. Interim exploration report, Cartier Resources Inc., Texada Island property, Nanaimo Mining Division, British Columbia. Unpublished report dated Mar. 20, 1985, 28 pp. and Appendices.

12.0

STATEMENT OF QUALIFICATIONS

- I, Giles R. Peatfield, hereby certify that:
1. I am a consulting geologist with a business office at #201-311 Water Street, Vancouver, British Columbia, V6B 1B8
 2. I am a principal of MineQuest Exploration Associates Ltd., a company performing geological consulting and contract exploration services for the mineral exploration industry.
 3. I am a graduate of the University of British Columbia (B.A.Sc., Geological Engineering, 1966) and of Queen's University at Kingston (Ph.D., 1978).
 4. I am a fellow of the Geological Association of Canada, a Member of the Canadian Institute of Mining and Metallurgy, of the Mineralogical Association of Canada, of the Association of Exploration Geochemists, and of the Association of Professional Engineers of British Columbia.
 5. I have practiced my profession as a geologist for more than 17 years.
 6. Nature of Investigation: I visited the Texada Island property on June 7, 1986. This report is based on those examinations and conversations with Messrs. Stanley Beale and David Watkins of Vananda Gold Ltd. and on examination of numerous reports and files in the possession of Vananda Gold Ltd.
 7. I have no interest, direct or indirect, nor do I expect to receive any interest in the property which is the subject of this report or in the securities of Vananda Gold Ltd.

Signed: _____

G. R. Peatfield

G.R. Peatfield, P.Eng.



Dated at Vancouver, B.C. this
10th day of July, 1986

13.0

USE OF REPORT

**DATA REVIEW AND RECOMMENDATIONS
TEXADA ISLAND PROPERTY**

by

G.R. Peatfield, Ph.D., P.Eng
of
MineQuest Exploration Associates Ltd.

for

Vananda Gold Ltd.

Permission is given to make use of this report, in its entire and unedited form, in a Prospectus or Statement of Material Facts, or for other appropriate purpose. Written permission of MineQuest Exploration Associates Ltd. must be obtained before release of any quotation or summary.

July 10, 1986



G.R. Peatfield
G.R. Peatfield, Ph.D., P.Eng.

APPENDIX I

Partial Chronology, Texada Island Mines

APPENDIX I

Partial Chronology - Texada Island Mines

- 1873 James Richardson of the Geological Survey of Canada examines the iron ranges on the west coast of the Island.
- 1875 The iron deposits are acquired by the Puget Sound Iron Company.
- 1880 The Little Billie is located.
- 1885 G.M. Dawson (GSC) examines the shoreline of Texada Island, searching for Cretaceous coal measures, and revisiting the west coast magnetite deposits.
- 1885 The Prescott produces some iron ore, and to some high-grade copper-gold-silver ore in 1890 1885.
- 1895 The Copper Queen is located.
- 1896 The Little Billie commences production.
- 1897 The Cornell is located and commences production.
- 1898 The Marble Bay is located.
- 1899 The Marble Bay commences production.
- 1901 Pacific Steel Company leases the Prescott to and ships iron ore to Irondale, Washington.
1904
- 1903? The Copper Queen commences production.
- 1907 The Lake ships 1000 tons of copper ore.
- 1908 R.G. McConnell (GSC) examines Texada, to preparing (GSC Memoir 58-1914) the only 1909 complete report ever published on the geology of the Island.
- 1916 The Little Billie closes.
- 1917 The Copper Queen closes.
- 1919 The Cornell and Marble Bay (?) close.

APPENDIX I (Continued)

- 1922 All the buildings on the iron mines are destroyed by fire.
- 1927 Some geophysics and diamond drilling are to undertaken in the Little Billie - Copper
1928 Queen - Cornell camp.
- 1929 The Marble Bay ships a small amount of ore.
- 1930 Central Copper and Gold Co. Ltd. assembles the Little Billie, Copper Queen and Cornell properties and surrounding ground, and a comprehensive report is written by Arthur Lakes. A total of 25 diamond drill holes are completed, with some encouraging results.
- 1942 Industrial Metals Mining Co. Ltd. assembles to the Little Billie, Copper Queen, Cornell and
1945 Marble Bay mines, dewateres and cleans up the Little Billie, does considerable diamond drilling, and installs machinery. Surface geology is mapped by C.S. Ney in 1942-43 (Ney, 1943). V. Dolmage (1944) reports briefly on the mines in 1944. In late 1944, Pioneer Gold Mines options the property and takes over management (Cox, 1944).
- 1944 J.S. Stevenson of the B.C. Department of Mines studies the Little Billie mine (Stevenson, 1945).
- 1945 The Little Billie, Copper Queen and Cornell mines are sold to Vananda Mining Company, who commence deepening the Little Billie shaft from 400 to 600 feet.
- 1948 Vananda Mines (1948) Ltd. is formed to take over the property of Vananda Mines Ltd., although management is held by Sheep Creek Gold Mines Ltd. A 150 tpd mill is installed at the Little Billie and begins production in November 1948 (Hamilton, 1948).
- 1948 Milling at the Little Billie continues on an to intermittent basis. Late in 1951 the Little
1951 Billie and Copper Queen mines are connected with a drift on the sixth level. The area below the Copper Queen is diamond drilled

APPENDIX I (Continued)

with discouraging results, and that below the Little Billie with several very good intersections (McLean, 1956).

- 1951 Texada Mines Ltd. purchases the holdings of the Puget Sound Iron Company.
- 1952 Production of iron concentrates begins at Texada Iron.
- 1956 The mill circuits at Texada Iron are changed to recover by product chalcopyrite. Production of iron and copper concentrates continues to 1976.
- 1965 Bethex Explorations Ltd. options the Little Billie from Ideal Cement Company, who are in the process of assembling property on Texada. Bethex is interested in the molybdenum possibilities, and clean out and sample on the 80 level. They also drill four diamond drill holes totalling 988 feet. Their results do not encourage them and they relinquish their option (Coveney, 1966).
- 1969 Sangster (1969) publishes the results of his studies of the iron-copper skarn deposits of Vancouver and Texada Islands.
- 1970 By this time, Ideal Cement Company has acquired most of the mineral claims in the Vananda area. John Lamb writes a short report outlining a proposal for a comprehensive exploration program designed to search for more gold-copper-silver deposits (Lamb, 1970).
- 1975 Ideal completes an aeromagnetic survey and detailed compilation of the technical data on the project (Anderson, 1976).
- 1976 Ideal completes a limited amount of ground magnetics on the ground immediately northeast of Priest Lake, on ground which is not presently part of the Vananda Gold property. Results are inconclusive (Mullan, 1977).

APPENDIX I (Continued)

- 1977 Shima Resources, a non-reporting company, is formed and acquires the Ideal Cement Co. mineral rights under a lease arrangement.
- 1978 Shima does considerable geophysics: gravity, to magnetics and IP (Ager, 1978; Ager and 1980 Berreta, 1979), along with a geological synthesis and diamond drilling (Fahrni, 1978, 1980 a & b; 1981). This aggregates 16 holes, of which 11 test a gravity anomaly southeast of the Little Billie workings, with generally discouraging results. One hole cuts 16 metres of 1.3% Cu; the gold values are low (1.41 g/tonne) but these values should be checked.
- 1981 The property is consolidated by a private to company, Marble Bay Holdings Ltd., which 1984 acquires an option on the property from Ideal Basic Industries and Ideal Cement.
- 1984 Cartier Resources Inc. acquires the property by purchasing the shares of Marble Bay Holdings to acquire the option, and in 1984 drills 1338 metres in 10 diamond drill holes (Winter, 1984; 1985). Nine of these are designed to test reported (Lakes, 1930) high-grade intersections northwest of the Cornell but are not successful. The tenth cuts mineralization below the sixth level of the Little Billie, grading 1.98% Cu, 7.89 g/tonne Au, and 29.8 g/tonne Ag over 2.65m. Geophysical surveys are carried out (Candy and White, 1985).
- 1986 Vananda Gold Ltd. is formed, and negotiates an option agreement with Cartier to explore the property.