KERR PROJECT REPORT - 1989

VOLUME I

TEXT, MAPS AND APPENDICES

NTS 104 B/8
SKEENA MINING DIVISION
SULPHURETS GOLD CORPORATION

Authors:	R.S. Hewton, B.P. Butterworth, S.G. Casselman, J.G. Payne
Commodities:	Cu, Au, Ag
Date:	December, 1989
N.T.S.:	104 B/8
LATITUDE:	56°28' North
LONGITUDE:	130°16' West
REPORT NO:	1065

SUMMARY

The 1989 exploration program on the Kerr and Tedray properties was successful in extending both the lateral and down-dip extent of the B-Zone copper-gold deposit. Geological reserves currently stand at 126 million tonnes grading 0.61% copper, 0.27 grams/tonne gold and 1.71 grams/tonne silver. Diamond drilling has yet to define the overall limits of the deposit and the potential to establish considerable additional reserves is excellent.

The B-Zone deposit forms a roughly tabular body which trends north-south and dips variably to the west. To date, 28 drill holes have intersected copper and gold mineralization over a 1600 metre length, 250 metre width and an average thickness of 112 metres. The deposit occurs within an alteration zone some 500 metres wide and at least 2500 metres long. The deposit is considered to be open along strike and at depth.

Diamond drilling in 1989 confirmed that most of the copper mineralization in the deposit consists of chalcopyrite and tennantite along with minor bornite and local concentrations of secondary chalcocite, covellite and native copper. The mineralization occurs as fine disseminations, veinlets, and coatings on pyrite and other sulphide grains. The host rock is a dacitic volcaniclastic assemblage that has been variably sericitized, silicified and chloritized and is locally referred to as a quartz-sericite-pyrite schist.

High-grade copper and gold mineralization in the B-Zone correlates well with a high chargeability-low resistivity induced polarization response. The I.P. anomaly has been traced for 1.7 kilometres along strike and has a width ranging from 200-250 metres. The geophysical response weakens dramatically, northward onto the Tedray property. Diamond drilling in this area has intersected thick accumulations of overburden, which is likely masking the bedrock geophysical response.

Environmental, metallurgical and economic studies have been initiated to provide background information for further development of the property. Preliminary economic studies indicate that, at a mining rate of 14,500 tonnes per day, the Kerr deposit could be economically viable at current day metal prices.

Future work on the Kerr and Tedray properties should include definition drilling within the known limits of the deposit and exploration drilling northward on the Tedray property, to determine the overall limits of the B-Zone deposit. In addition, induced polarization surveying, camp and road construction, metallurgical, economic and environmental studies are recommended for 1990.

KERR PROJECT REPORT - 1989

VOLUME I OF III

TEXT, MAPS AND APPENDICES

GENERAL CONTENTS

KERR PROJECT REPORT - 1989

VOLUME I OF III

TEXT, MAPS AND APPENDICES

TABLE OF CONTENTS

KERR PROJECT - 1989

LIST OF FIGURES

LIST OF TABLES

LIST OF PLATES

LIST OF APPENDICES

KERR PROJECT - 1989

VOLUME II OF III

LIST OF APPENDICES

APPENDIX V	1989 DIAMOND DRILL LOGS, LITHOGEOCHEMISTRY, HISTOGRAMS, MICROLYNX COMPUTER PRINT-OUTS, AND CROSS SECTIONS.

VOLUME III OF III

LIST OF APPENDICES

APPENDIX VI	Section 1 - 1988 DRILL HOLE LOGS, GEOCHEMISTRY, HISTOGRAMS, MICROLYNX COMPUTER PRINT-OUTS AND CROSS SECTIONS (B-ZONE DEPOSIT HOLES : K88-1,11, 14,15,16,17,18,20,21 AND 22)
	Section 2 - 1987 DRILL HOLE LOGS, HISTOGRAMS AND CROSS SECTIONS (B-ZONE DEPOSIT HOLES : K87-5,8)

INTRODUCTION

1. INTRODUCTION

1.1 Objectives

Previous exploration programs on the Kerr Property confirmed the presence of a high-grade copper-gold deposit, called the B-Zone, with a drill-inferred reserve of 60 million tonnes grading 0.86% copper, 0.34 g/tonne gold and 2.06 g/tonne silver. The deposit, through a widely-spaced drill hole pattern, had been traced for 1,000 metres in length, 200 metres in width and had an average thickness of 100 metres. The high-grade mineralization coincided with a high chargeability/low resistivity IP response that extended for some 700 metres north of the existing known mineralization. At the end of the 1988 program, the deposit and IP anomaly remained open in all directions.

Exploration activity in 1989 focused on the B-Zone copper-gold deposit. In-fill drilling was conducted within known limits of the deposit to confirm lateral and down dip continuity within the zone. In addition, drilling and IP geophysical surveying was carried out to the north to aid in determining the overall potential size and grade of the deposit.

Other work included detailed re-mapping of the property in an effort to gain a better understanding of the controls of the mineralization along with water quality sampling as part of an ongoing environmental study initiated in the latter part of 1988. The results of the 1989 program are documented in this report.

1.2 Location and Access

The Kerr Property is situated in northwestern British Columbia about 62 km north-northwest of the town of Stewart, B.C. (Figure 1). It is in the Skeena Mining Division (NTS 104B8) at 56°28' latitude and 130°16' longitude.

The fastest current access to the property is by helicopter from Stewart, B.C. For mobilization and demobilization during the 1989 program, vehicles were used to transport equipment along a 45 km dirt road to Tide Lake, 28 km south of the property. A contract helicopter was then used to ferry supplies to the property.

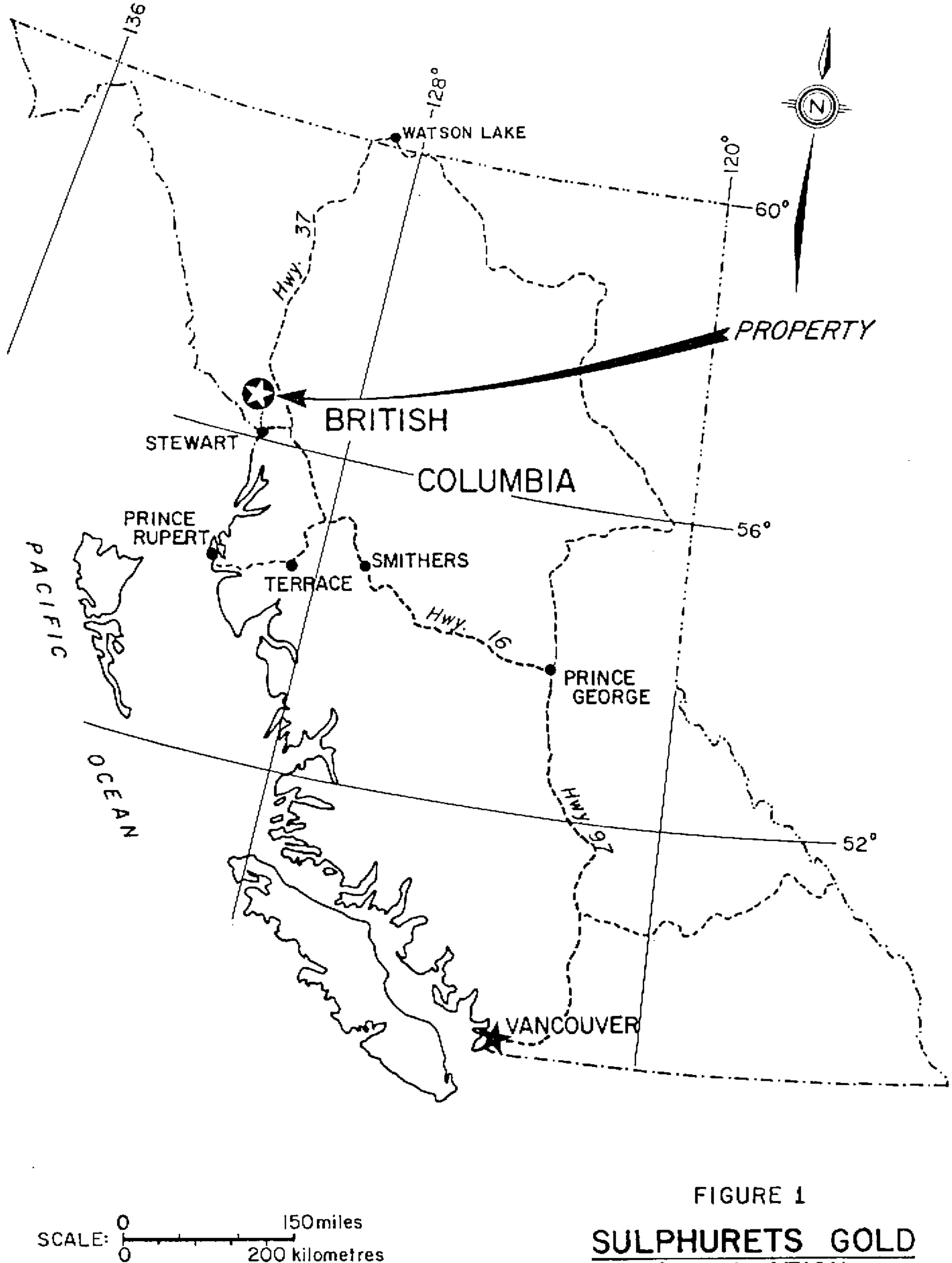


FIGURE 1

SULPHURETS GOLD CORPORATION

KERR PROPERTY

LOCATION MAP

SKEENA M.D. N.T.S. 104B/8

Future access possibilities would be an 80 km road down Sulphurets Creek, up the Unuk River, over a short pass to the Iskut River and along the Iskut to the Stewart-Cassiar Highway, approximately 190 km north of Stewart, B.C. This route has recently been examined by the Ministry of Energy, Mines and Petroleum Resources and is documented in a report entitled Iskut Valley Road Option Study (Smith and Gerath, 1989).

Topography in the vicinity of the property varies from broad open river valleys through rounded hills to rugged, glacier-covered mountain peaks. The centre of the Kerr Property straddles a rounded ridge with steep slopes on the south side and a broad flat valley leading to Sulphurets Creek on the north side.

Vegetation over most of the property is alpine grass and shrubs. The northern portion of the deposit appears to be a "kill zone", with poor vegetation development. At lower elevations, tag alders, grasses and stunted spruce trees are present. Along Sulphurets Creek and the lower elevations on the eastern ridge, large spruce and hemlock trees form dense forests with heavy underbrush, locally including Devil's Club.

1.3 Ownership/Claims

1.3.1 Mineral Claims

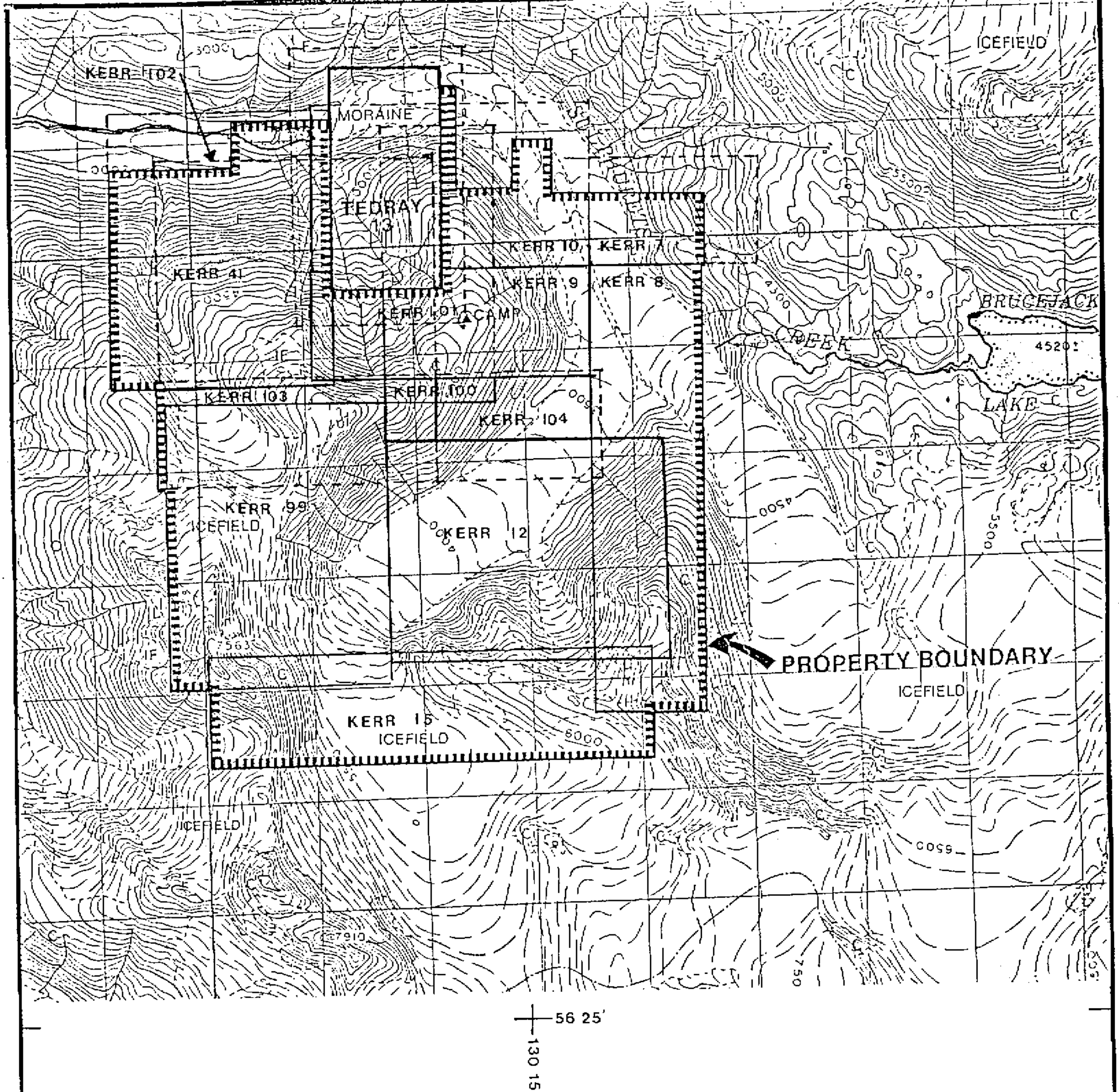
Mineral Claims comprising the Kerr property have had a complex history of ownership in the past year. The Kerr claims, up until early 1989, were held by Western Canadian Mining Corporation on behalf of the Kerr Joint Venture. Western Canadian held a 70% interest and Sulphurets Gold Corporation held a 30% interest in the Kerr Joint Venture. In addition to the Kerr claims, the Joint Venture had the option, under an agreement with Newhawk Gold Mines Ltd. and Granduc Mines Ltd., to earn a 50% interest in the Tedray 13 mineral claim adjoining the northern boundary of the Kerr claims. Under the terms of the agreement, the Kerr Joint Venture could earn their interest by making exploration expenditures of $500,000 by the end of 1990. The claims, record numbers and expiry dates are listed in Table 1 and displayed in Figure 2.

TABLE 1 : MINERAL CLAIMS STATUS

CL. NAME	REC.NO.	UNITS	HECTARES	EXPIRY DATE
KERR GROUP				
Kerr 7	3662	6	150	December 17, 1999
Kerr 8	3663	16	400	December 17, 1999
Kerr 9	3664	10	250	December 17, 1999
Kerr 10	3665	9	225	December 17, 1999
Kerr 12	3666	20	500	December 17, 1999
Kerr 15	3669	16	400	December 17, 1999
Kerr 41	3697	20	500	December 20, 1999
KERR GROUP 2				
Kerr 99	4690	20	500	October 30, 1999
Kerr 100	6286	10	250	July 17, 1999
Kerr 101	6725	15	375	June 30, 1999
Kerr 102	6884	20	500	August 23, 1999
Kerr 103	6885	10	250	August 23, 1999
Kerr 104	6886	6	150	August 23, 1999
TEDRAY 13	165	8	200	August 26, 1999

In January 1989, Western Canadian and Sulphurets Gold reached an agreement whereby Western Canadian acquired 7,645,512 common shares of Sulphurets Gold in return for Western Canadian's 70% interest in the Kerr property and the Kerr Joint Venture. In the end, Sulphurets Gold became the sole owner of the Kerr property and Western Canadian held approximately 74% of the issued shares of Sulphurets Gold.

Western Canadian Mining Corporation announced in early October that it had agreed to tender its holdings in Sulphurets Gold to PDI Acquisition Corp., a wholly owned subsidiary of Placer Dome Inc. PDI Acquisition Corp. made a follow-up offer to all minority shareholders of Sulphurets and, as of November 9, 1989 had acquired 99% of the outstanding shares of Sulphurets Gold Corporation.



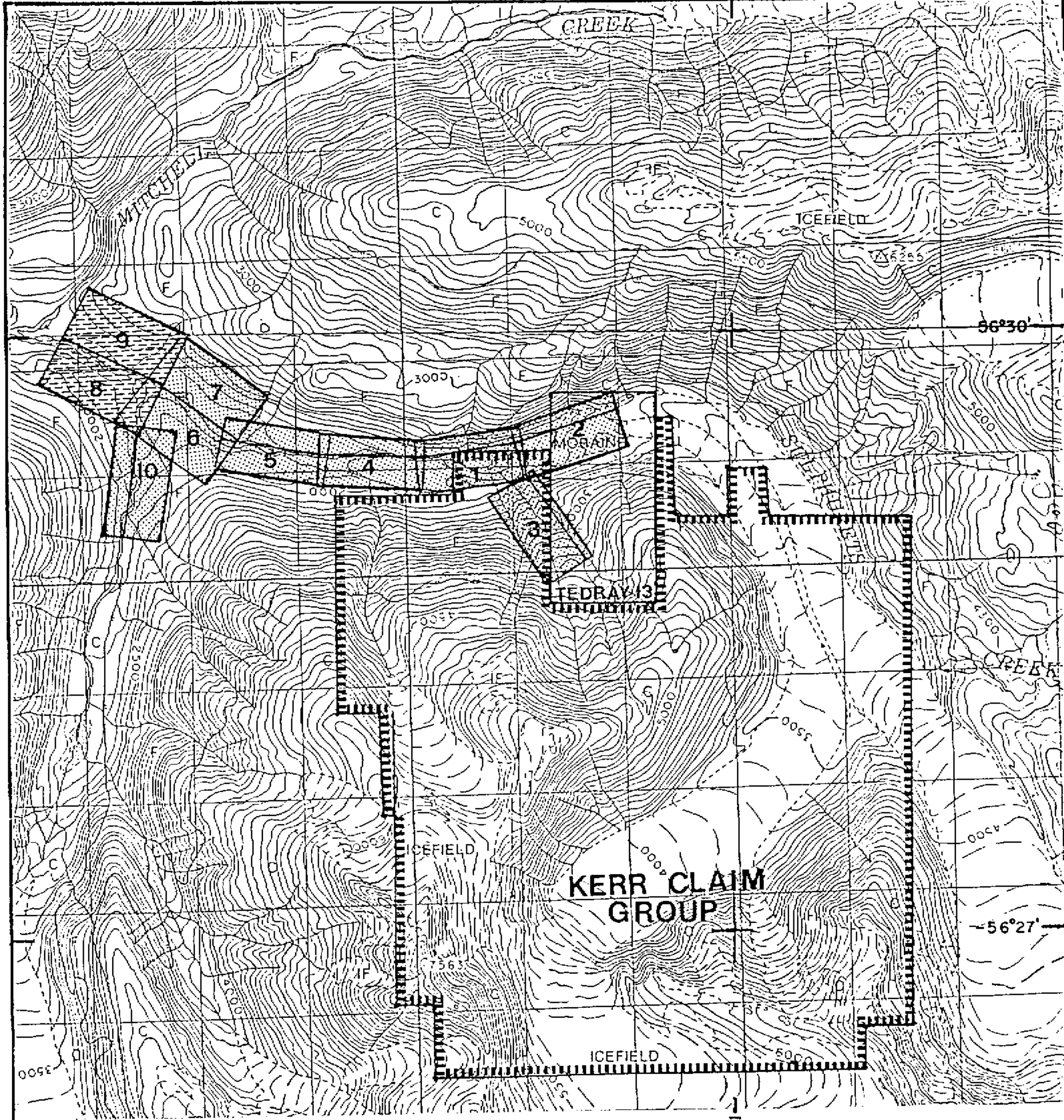
NTS 104B/8

SULPHURETS GOLD CORPORATION

KERR PROPERTY CLAIM MAP

Scale 0 1 2 KM

SKEENA M.D. RPT: 1065 FIGURE 2



N.T.S. 104B/8

SULPHURETS GOLD CORPORATION

KERR PROJECT 1989

PLACER CLAIMS

PLACER CLAIMS

Sul 1-7, 10 Staked Sept.20-21, 1989.

Sulphurets 8 & 9 Staked Sept. 20, 1988.

SKEENA M.D.

Scale 0 1 2 KM

RPT: 1065

FIGURE 3

1.3.2 Placer Claims

In addition to the mineral claims, the Kerr Joint Venture acquired 10 placer claims along Sulphurets Creek in 1988 to protect surface rights. Eight of the placer claims (Sulphurets 1-7 and 10) were allowed to lapse in 1989 and were subsequently re-staked by Sulphurets Gold Corporation. The two remaining placer claims (Sulphurets 8 and 9) are in good standing until September 20, 1990. The placer claims, listed below in Table 2 and illustrated in Figure 3, were vended to PDI acquisition Corp., together with the mineral claims.

TABLE 2 : PLACER CLAIMS STATUS

Claim Name	Record Number	Tag No.	Expiry Date
SUL 1	31	P 67764	September 20, 1990
SUL 2	32	P 67765	" 20, 1990
SUL 3	33	P 67766	" 20, 1990
SUL 4	34	P 67767	" 20, 1990
SUL 5	35	P 67768	" 20, 1990
SUL 6	36	P 67769	" 21, 1990
SUL 7	37	P 67770	" 21, 1990
SULPHURETS 8	8	P 65148	" 20, 1990
SULPHURETS 9	9	P 65149	" 20, 1990
SUL 10	38	P 67773	" 21, 1990

1.4 1989 Exploration Program and Expenditures

The 1989 exploration program on the Kerr and Tedray properties was designed to test the northern extension and down dip potential of the B-Zone copper-gold deposit. To this end, a total of 4,365 metres in 20 holes was drilled utilizing two diamond drills. In addition, 8 line kilometres of induced polarization surveying was carried out on the Tedray property to trace the lateral extent of a high chargeability/low resistivity IP anomaly known to be associated with high grade copper and gold mineralization. Further to this work, intimately associated with the B-Zone deposit, detailed mapping throughout most of the Alteration Zone and data collection associated with baseline environmental studies were also carried out.

Exploration expenditures to date on the Kerr and Tedray properties total $2,496,934 and $539,890, respectively. A detailed breakdown of expenditures by year and by company are presented in Table 3.

TABLE 3 : EXPLORATION EXPENDITURES

KERR PROPERTY

YEAR	WESTERN CANADIAN ($)	SULPHURETS GOLD ($)	YEAR TOTAL ($)	CUMULATIVE TOTAL ($)
1984	25,627	-	25,627	25,627
1985	158,678	-	158,678	184,305
1986	49,120	35,754	84,874	269,179
1987	445,082	228,250	673,332	942,511
1988	701,826	300,782	1,002,608	1,945,119
1989	Western Canadian sells interest in property to Sulphurets Gold			
1989	-	*551,816	551,816	2,496,935
	1,380,333	1,116,602	2,496,935	

TEDRAY PROPERTY

1988	Kerr Joint Venture options Tedray 13 M.C.			
1988	56,121	24,052	80,173	80,173
1989	-	*459,717	459,717	539,890
TOTALS:	56,121	483,769	539,890	

* Note: Totals are approximate as expenditures incurred during December have been estimated

GEOLOGY

2.0 GEOLOGY

2.1 Introduction

A detailed geological mapping program was conducted during the Summer of 1989 by J. Payne, an independant consulting geologist. Payne's work focused on the broad, north-south trending Alteration Zone that had been extensively drilled locally, but had never been thoroughly mapped on surface. Payne paid particular attention to the structural and stratigraphic relationship between the rocks in order to establish the nature and relative ages of volcanic, intrusive, hydrothermal and deformational events on the property. This information was then used to develop a model of the mineralization.

The results of the study are documented in a report entitled "Geological Report Kerr and Tedray Properties Sulphurets Glacier Area" (Payne, 1989) in Appendix I and displayed on Figures 5-7. The following sections (2.2 - 2.4) have been summarized by Payne from his report and pertain to the lithology, alteration, and structure of the property. Western Canadian Mining personnel prepared the section on Mineralization, principally from observations of drill core.

2.2 Regional Geology

The Kerr and Tedray properties are in the Intermontane Tectonic Belt between the western margin of the Bowser basin and the Coast Plutonic Complex (Figure 4a). Host rocks probably belong to the Lower Jurassic Hazelton Group (Figure 4b); however, the relationship between detailed and regional geology is understood poorly.

2.3 Property Geology : Lithologic Units (Figures 5-7)

Basement rocks (Unit 1), including quartz diorite, granodiorite, and coarsely porphyritic (plagioclase-hornblende) latite, form small inclusions in domes and intrusions of Unit 4.

To the east, at the base(?) of the stratigraphic section, are sedimentary rocks of Unit 2. These are dominated by thinly bedded argillite and siltstone, with less abundant sandstone and greywacke, and minor intervals of pebble and boulder conglomerates and cherty sedimentary rocks.

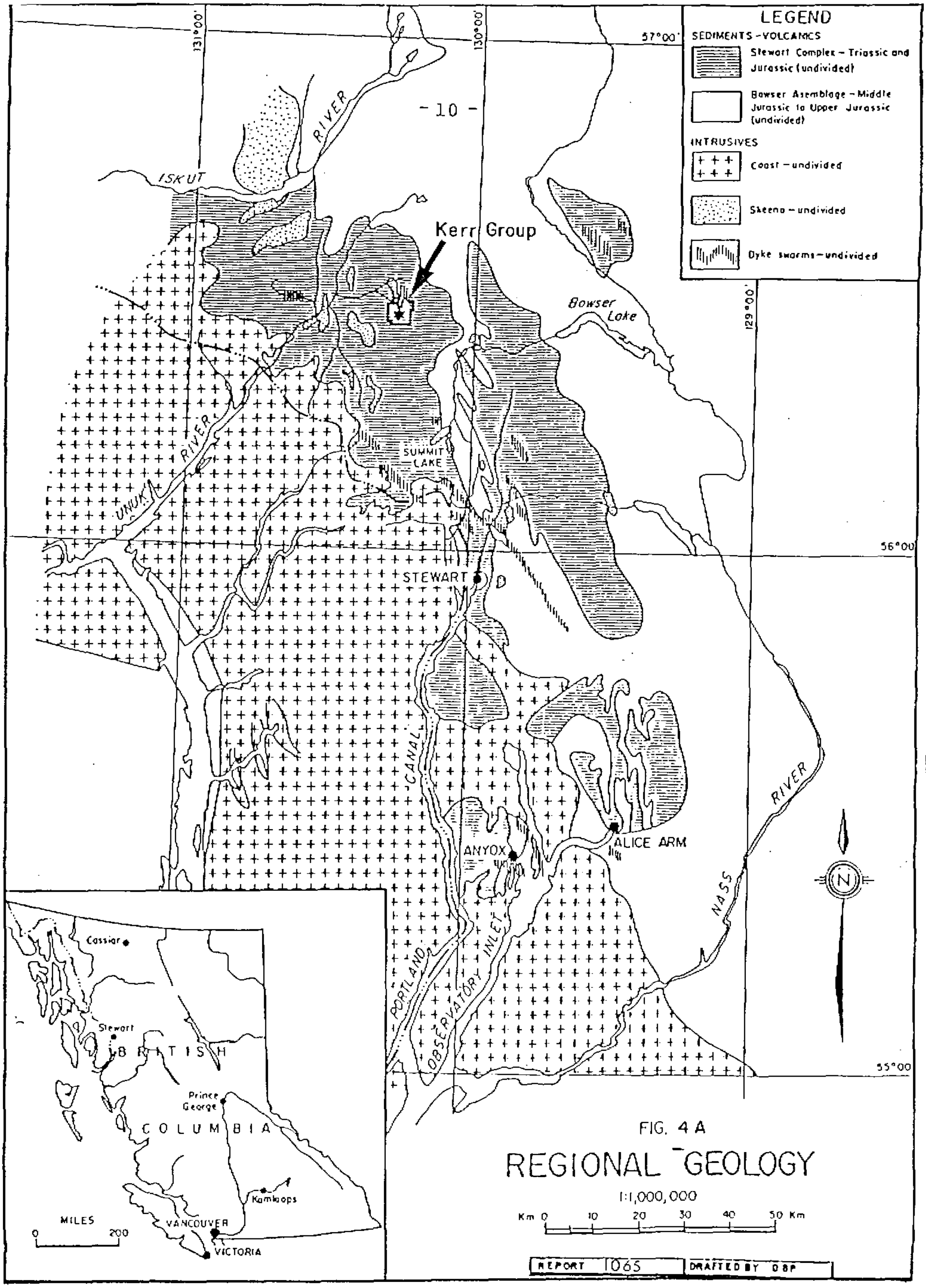


FIG. 4 A

REGIONAL GEOLOGY

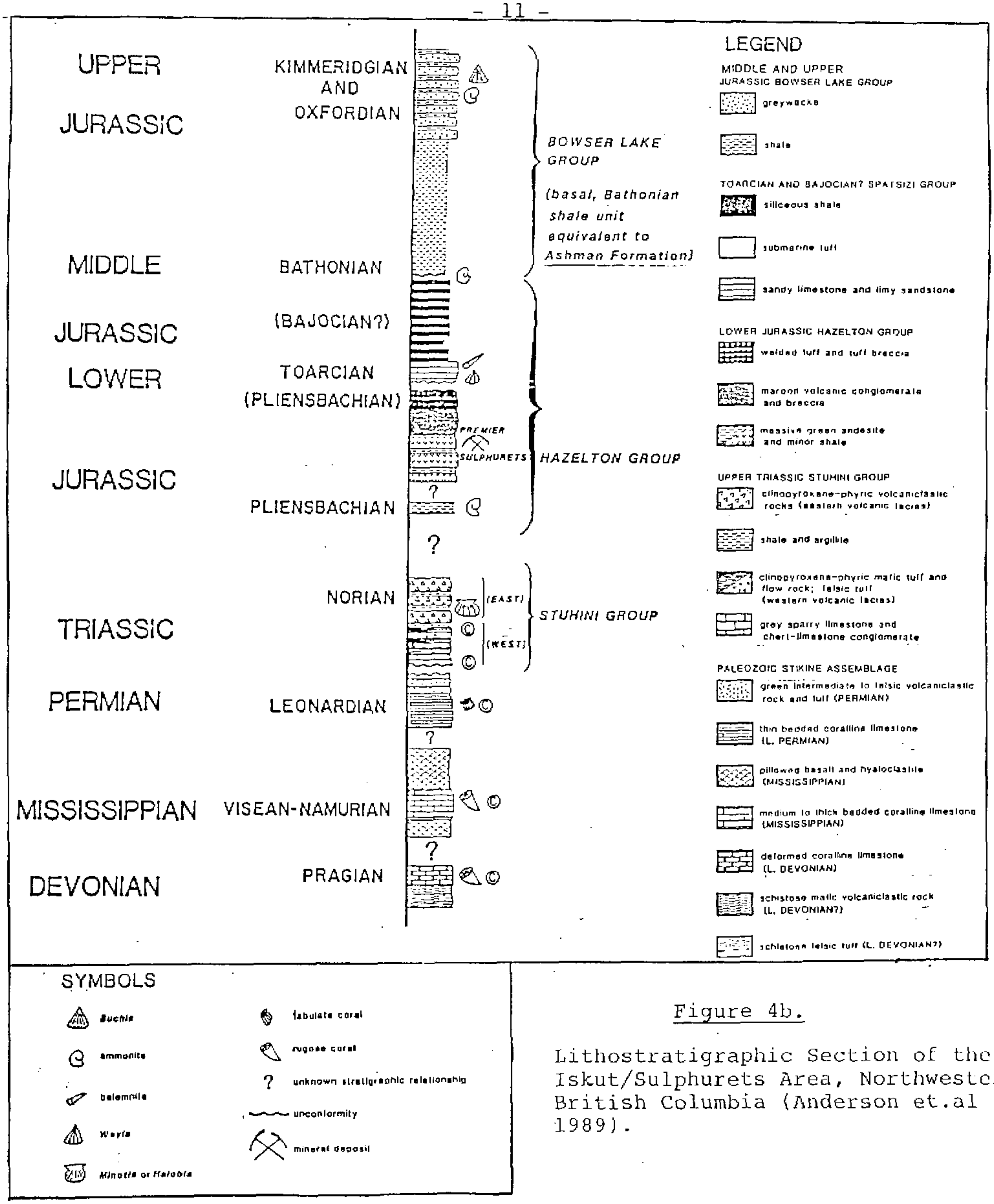


Figure 4b.

Lithostratigraphic Section of the Iskut/Sulphurets Area, Northwestern British Columbia (Anderson et.al 1989).

Unconformably overlying rocks of Unit 2 and hosting the main zones of economic interest are felsic pyroclastic rocks of Unit 3. A lower subunit to the east dominated by latite/dacite lapilli tuff, is overlain to the west by a much thicker subunit dominated by fine tuff. In places a prominent foliation (=bedding?) is parallel to contacts with thin, interbedded sequences of argillite and tuffaceous sediments. Steeply dipping, pene-contemporaneous, flow-banded latite dykes cut "bedding" in pyroclastic rocks at a moderate to high angle. Most rocks are altered strongly to moderately to quartz-sericite-(carbonate) schist with minor to abundant disseminated pyrite.

Zones of more intense hydrothermal activity are indicated by quartz-pyrite veins and lenses, in part parallel to bedding, and by the presence of quartz-pyrite-chalcopyrite-tetrahedrite-(bornite)-anhydrite replacement zones. These zones probably were formed shortly after formation of the host rocks during hiatuses in the volcanic activity. They occur at several locations throughout the property, and may represent more than one hydrothermal event. The quartz-sulfide deposits show some features similar to those of volcanogenic massive sulfide deposits and some features similar to those of high-level "porphyry" deposits. The former include:

1) strong concentration of quartz and pyrite in several zones, some of which are moderately stratabound just below thin intervals of sedimentary and tuffaceous sedimentary rocks.
2) local beds of massive pyrite up to 50 cm thick.
3) a thin layer (=bed?) of quartz-pyrite-chalcopyrite mineralization along the contact of felsic volcanic rocks with overlying argillite in the western part of the B-Zone Center.

The latter include:

1) low content of sphalerite and galena (seen only in the C-Zone at the east of the deposit (base of stratigraphic section).
2) very broad zones of alteration and disseminated Cu-mineralization and associated alteration.
3) tetrahedrite and bornite in the core of the replacement zones (these minerals are rare in volcanogenic massive sulfide deposits).

Massive porphyritic latite/andesite domes and/or flows of Unit 4 occur at two main stratigraphic levels, a lower level on the contact of rocks of Units 2 and 3, and an upper level on or near the upper contact of Unit 3 with Unit 5. Surrounding the dome in the A-Zone and A-North Zone, rocks of Unit 3 have been intruded by numerous small dykes and pods of Unit 4. On top of this dome is an irregular tabular body of latite/andesite which may be a flow. Abundant small dykes of Unit 4 occur in rocks of Unit 2 and several, commonly larger dykes occur in rocks of Unit 3. These are in part feeders to the domes.

In the A/A-North dome a hydrothermal center contains abundant disseminated pyrite and a variety of veins and veinlets dominated by one or more of quartz, calcite, and pyrite. Some also contain abundant chalcopyrite, others abundant sphalerite and galena, and a few contain concentrations of tetrahedrite/tennantite, argentite, electrum, and native gold. In the Tedray zone, veins are dominated by quartz-bornite-chalcopyrite, and pyrite is rare.

Overlying the upper zone of Unit 4 in the A-North Zone is an alternating sequence of argillite and latite flows, tuffs, and tuffaceous sedimentary rocks of Unit 5. The contact may in part be along an angular unconformity. Overlying this sedimentary wedge is a thick sequence of andesite lapilli tuff with less tuff, and minor interlayers of latite/dacite and argillite of Unit 6. This in turn is overlain by a thin, distinctive, light green latite/dacite lapilli tuff of Unit 7.

Andesite dykes of Unit 8 cut rocks of Unit 3 and 4. Most are massive and unfoliated. However, locally along borders and in some thinner zones, they are foliated moderately to strongly and a few contain tight folds in whose core the dykes show a prominent foliation parallel to its contacts.

2.4 Structure

The style and orientation of deformational features is markedly different in rocks of Unit 2 from those in younger rocks. Beds of Unit 2 were folded in mesoscopic, open to tight folds on which was superimposed later a generally weak metamorphic foliation (S_1). Fold axes plunge moderately to steeply southeast. The wide differences in orientation of fold axes and bedding planes and in fold style between Units 2 and 3 suggest that rocks of Unit 2 were folded prior to formation of rocks of

Unit 3, possibly during an early stage of regional deformation which, from regional studies, is suggested to have occurred in the Early Jurassic.

The main regional deformation is part of the Skeena Range Event of Middle Cretaceous age. This deformation produced regional, north- to northwest-trending folds which involve the Bowser Group, and easterly directed thrust faults.

Rocks of Unit 3,5,6 and 7 are cut by a steeply dipping, metamorphic foliation (S_1), which varies in intensity and in orientation. The line of intersection of bedding (S_0) and S_1 is marked by a prominent lineation (L_1), which generally strikes 270-320 degrees, and plunges 40-70 degrees. In the central part of the property, a broad north-facing, syncline is outlined in S_0 in rocks of Unit 3; its axis plunges northwest along the lineation. The contact between rocks of Unit 3 and the overlying stratiform rocks of Units 5-7 to the west appears to dip moderately to steeply to the west and southwest, with no evidence of the northwest-plunging syncline. The syncline in Unit 3 may indicate an earlier stage of deformation in the Skeena Range Event, upon which was superimposed a later, more penetrative deformation during which S_1 was developed.

In Unit 3, the intensity of development of the metamorphic foliation varies widely. In much of the southern part of the property, especially west of the B-Zone fault and near the West and Far West Faults, the metamorphic foliation is intense and has obliterated or virtually obliterated any evidence of S_0. In these regions L_1 also is poorly developed. Outwards from these zones, S_0 and L_1 gradually become more apparent, and in the major syncline, S_0 and L_1 are prominent whereas S_1 is weakly to moderately developed.

Many dykes and sills of rocks of Unit 4 which cut rocks of Units 2 and 3 were folded broadly about L_1 in folds which mimic the fold and style in the host rocks. Because rocks of Unit 4 are resistant to erosion, they commonly are preserved as ridges along synclinal noses, where they protect the less resistant, underlying rocks of Unit 3. In fold noses of dykes and sills of Unit 4, a strong foliation commonly was developed parallel to contacts of the dyke rather than parallel to S_1. Some small dykes and sills of Unit 4 contain a moderately to weakly developed fracture cleavage to foliation, which parallels S_1 in the surrounding rocks.

A set of generally north-south-trending faults which dip moderately to steeply to the west includes the Far West, West, A-Zone, B-Zone and Camp Faults. None of the faults show regional displacement; this interpretation is in contrast to what has been suggested in some previous studies. Movement up to a few tens of metres on the Far West and West Faults is indicated by the offset of sedimentary beds of Unit 5.

The B-Zone fault may have a right-lateral component of offset of up to 200 metres based on the offset of a large dyke of Unit 4a. Where the B-Zone Fault cuts the B-Zone sulfide mineralization, a thick intersection of quartz-sulfide-anhydrite mineralization occurs in the hangingwall of the fault. A wide "rubble zone" intersected by most holes drilled along the fault is caused mainly by alteration of anhydrite to gypsum in the zone of secondary sulfide enrichment and subsequent leaching of gypsum. This zone commonly contains secondary chalcocite-covellite as reaction rims on chalcopyrite and as coatings on pyrite.

The Camp Fault may have a moderate offset at the south end, where it commonly separates massive rocks of Unit 4b/c from moderately to well foliated rocks of Unit 3. Towards the north end it is difficult to trace through a zone of rubbly outcrop of rocks of Unit 2, and probably splays out into several branches with minor displacement on each.

2.5 Mineralization

Copper and gold mineralization comprising the B-Zone copper-gold deposit has been traced for some 1600 metres along strike and 200 to 250 metres in width. Chalcopyrite, tennantite (previously identified as tetrahedrite) and minor bornite are the dominant primary copper minerals in the deposit, with lesser amounts of secondary chalcocite and covellite. These minerals appear to be intimately associated with quartz veins and replacement patches of quartz and sericite and, on the basis of mineralogical and textural variations, can be subdivided into four distinct styles, as described below:

1. Rubble Zone

Much of the high-grade mineralization in the deposit, particularly at the south end of the property, is hosted within a highly fractured, quartz and sericite altered package of rocks referred to as the Rubble Zone (Plate 1). The Rubble Zone is characterized by fragments of core typically 2 to 4 centimetres in size that are interpreted to be derived from the weathering and leaching of anhydrite from the rocks. Chalcopyrite and tennantite are the dominant copper minerals, usually occurring as disseminated grains and as veins infilling fractures in a groundmass dominated by quartz (Plates 2,3). Chalcocite and covellite are important secondary copper minerals usually as alteration minerals after chalcopyrite and as reaction rims on pyrite grains (Plate 4). Deeper in the system in rocks below the Rubble Zone, these secondary copper sulphides disappear and primary copper mineralization predominates.

2. Quartz/Anhydrite/ +/- Chlorite Zones

A clearly defined anhydrite surface marks the boundary between the Rubble Zone and the more competent rocks below (Figure 18). This underlying sequence has been strongly silicified, both pervasively over lengthy sections and locally as stockwork-like zones. Fractures remain tightly healed by anhydrite and are also infilled with chalcopyrite and lesser tennantite. The style of mineralization observed within this zone, particularly at the bottom of holes 89-4 and 89-19, is rather distinctive in that the copper sulphides are typically very fine grained and form minute, anastomosing veinlets that infill microfractures in the host rocks (Plate 6). This style of mineralization is not observed at higher levels in the deposit in the less competent rocks comprising the Rubble Zone.

3. Quartz-Sulphide Veins/Stockwork Zones

Pockets of high grade copper and gold (up to 2% copper and 0.97 g/t, respectively) occur locally within the deposit, particularly in holes centred around the P-Zone (89-5, 89-7, 88-18). The increase in grade is attributed to bornite infilling fractures which, together with chalcopyrite, occur in quartz stockwork zones that are commonly bounded by or lie within "Rubble Zones" (Plate 5). Payne (Appendix 1) interprets this bornite mineralization to be concentrated in higher temperature zones in the core of the hydrothermal system.

4. Sericite/Quartz Replacement Zones

The three styles of mineralization previously described collectively comprise the B-Zone copper-gold deposit. The deposit is flanked to the west and, to a lesser degree, to the east by low to moderate grades of copper and gold. Chalcopyrite with lesser tennantite and chalcocite are the dominant copper minerals, which usually occur as irregular patches and disseminations throughout a groundmass of quartz and sericite (Plate 7). This low to moderate grade zone is best displayed in a cross-section through the south end of the Alteration Zone (Figure 25) where two drill holes (88-2, 88-3) intersected moderate grades of copper and gold over appreciable widths (0.41% copper and 0.24 g/t gold over 47 metres). This disseminated style of mineralization gives way to high grade gold-silver-copper vein-type mineralization further to the west, which was extensively tested in 1987 and 1988 (Kowalchuk and Jerema, 1987; Hewton and Butterworth, 1988).

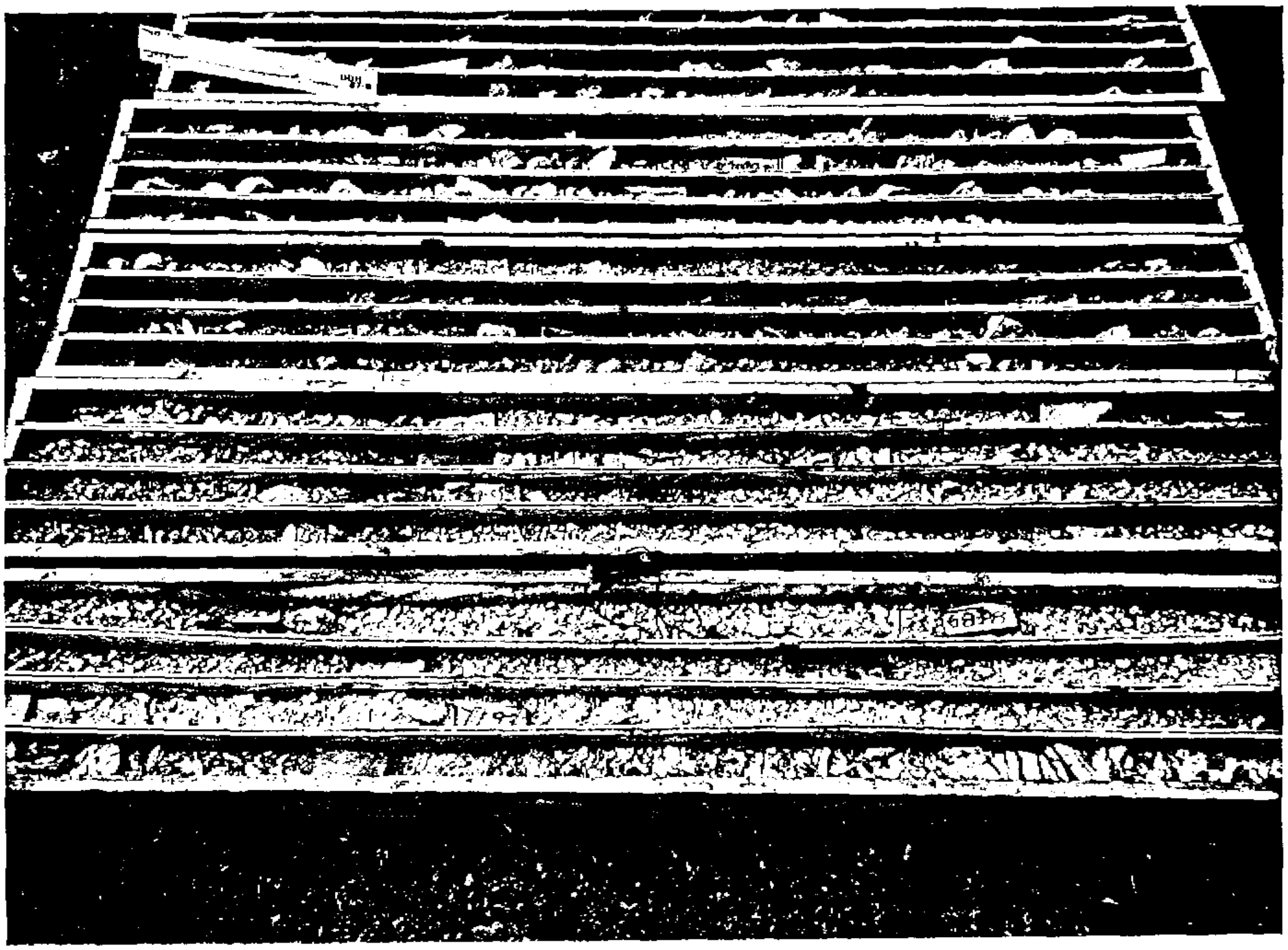
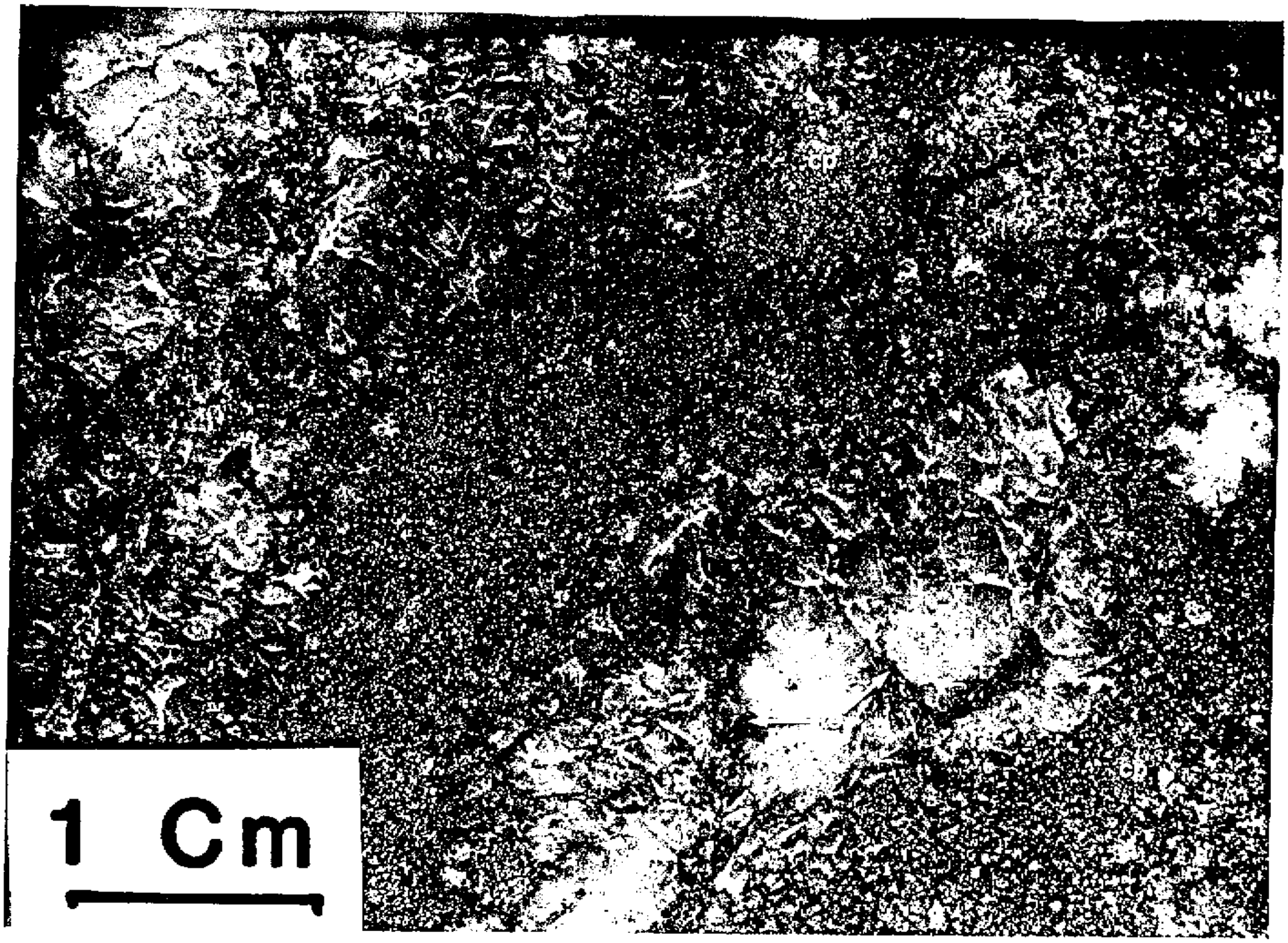


PLATE 1. Rubble Zone displaying characteristic highly fractured texture. Fragments typically range from 2-4 cm in size and are derived from the leaching of anhydrite/gypsum from the rocks.


cp
1 Cm

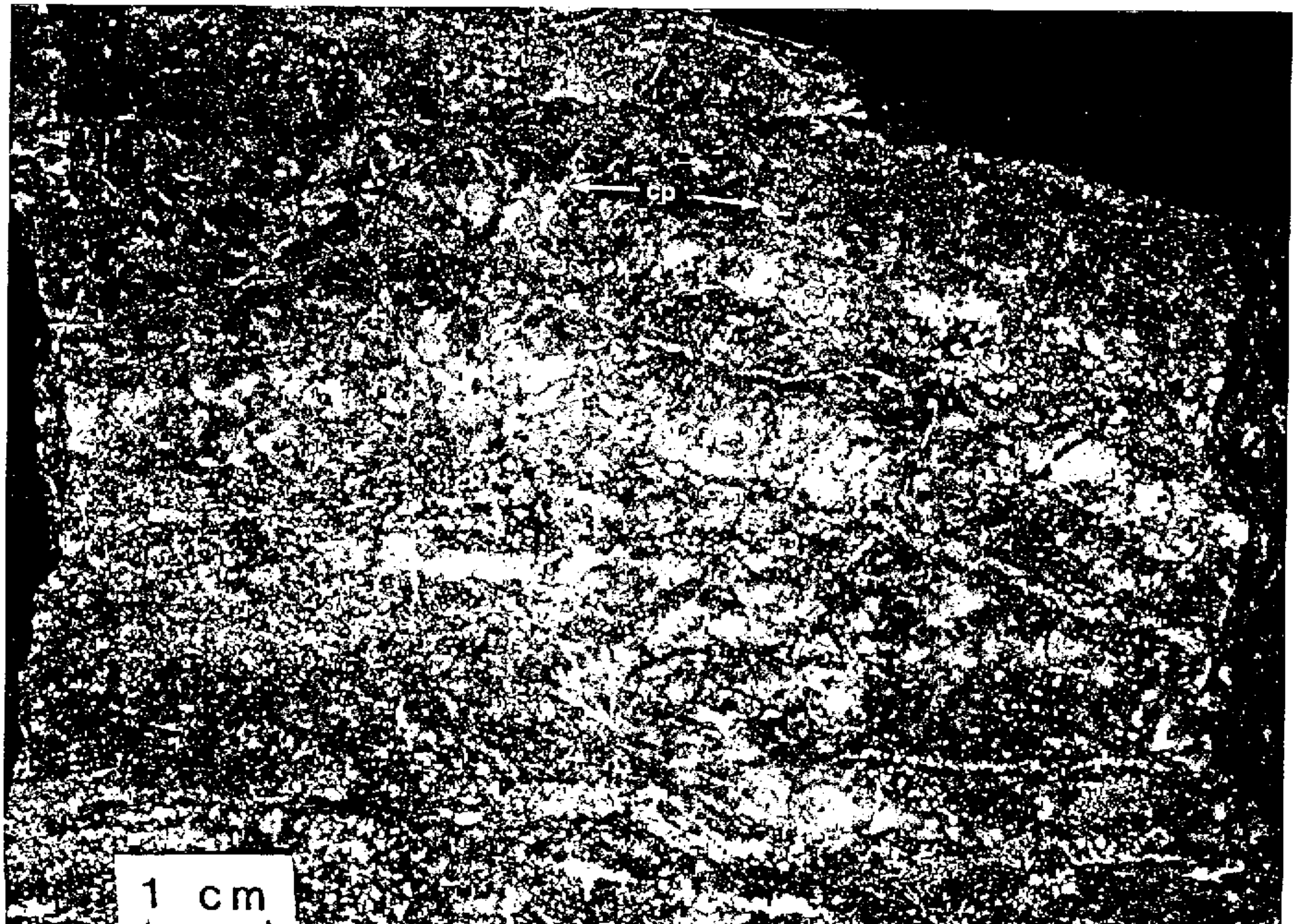

cp
1 cm

PLATE 2. Quartz-Sulphide Replacement patches and veins; quartz contains patches and seams of chalcopyrite (cp), and tetrahedrite/tennantite (te).

PLATE 3. As described above. Sample collected from surface expression of B-Zone deposit near P-Zone.


co
cp

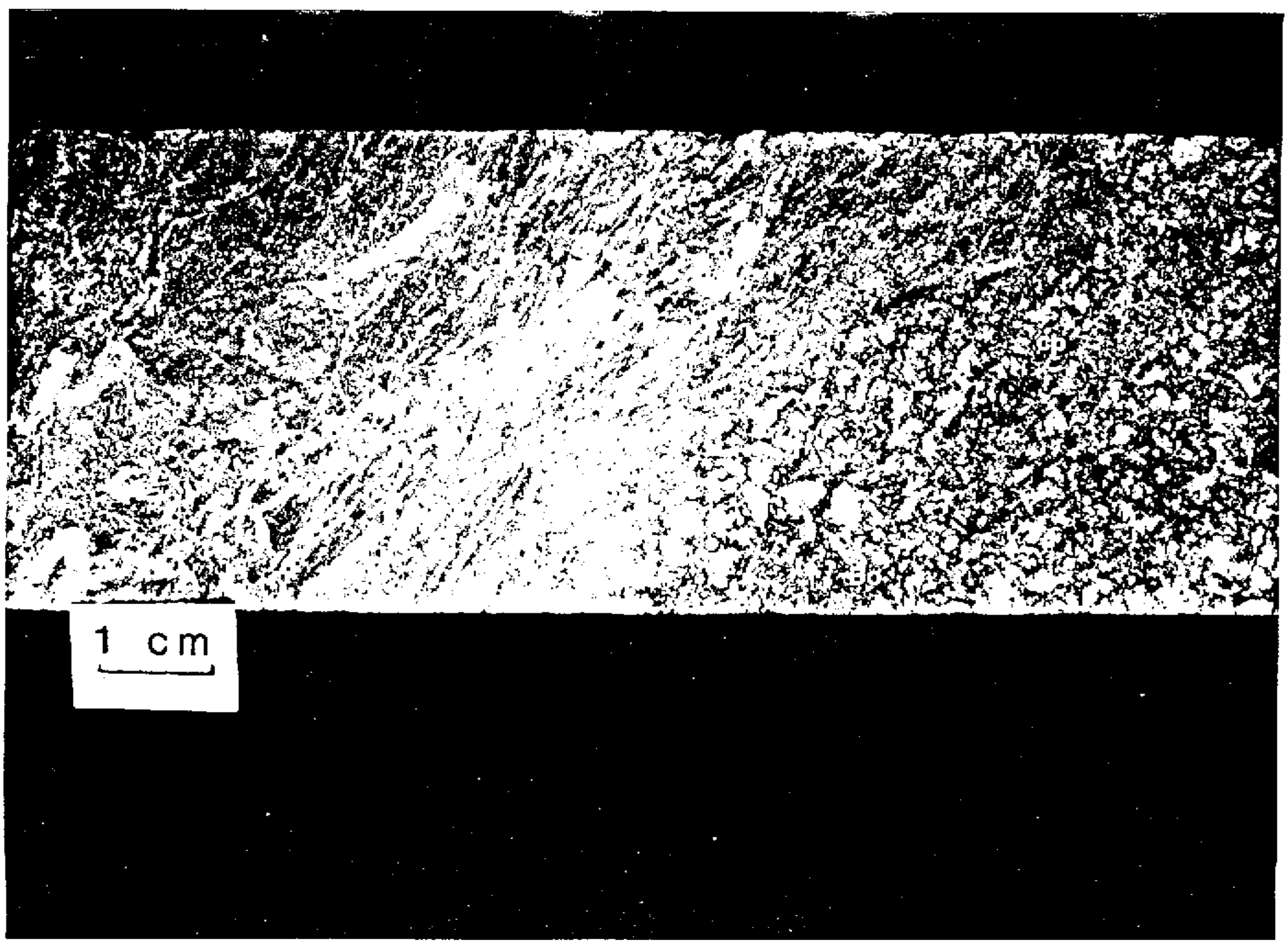
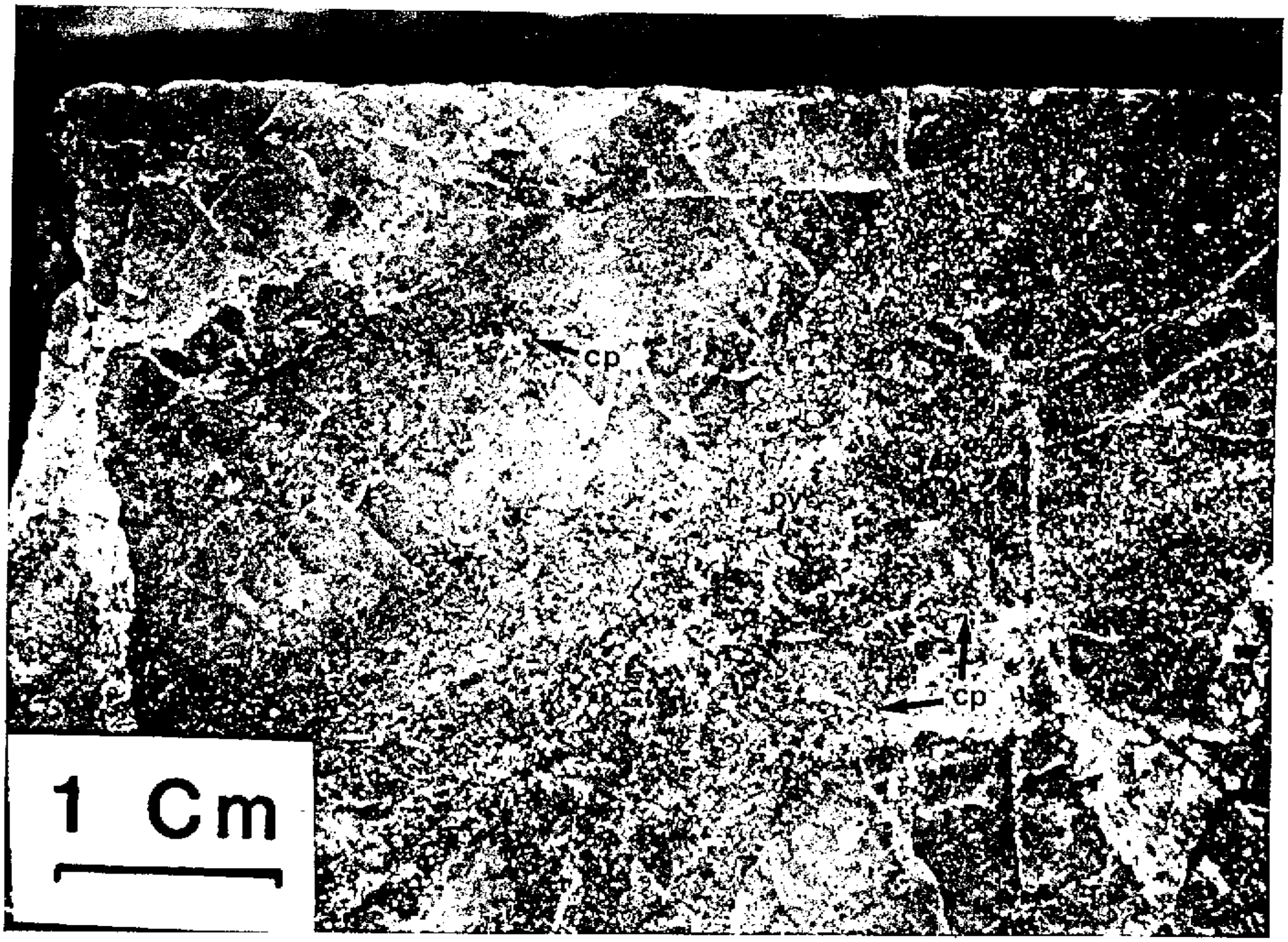

1 cm

PLATE 4. Covellite (co) and minor chalcocite (cc) occur as secondary sulphides shown here replacing chalcopyrite (cp) and locally as patches on borders of pyrite grains.

PLATE 5. Quartz-sulphide vein in contact with quartz-sericite-pyrite schist. Chalcopyrite (cp) and bornite (Bo) are concentrated within fractures and in patches with pyrite (py).


cp
py
cp
1 Cm

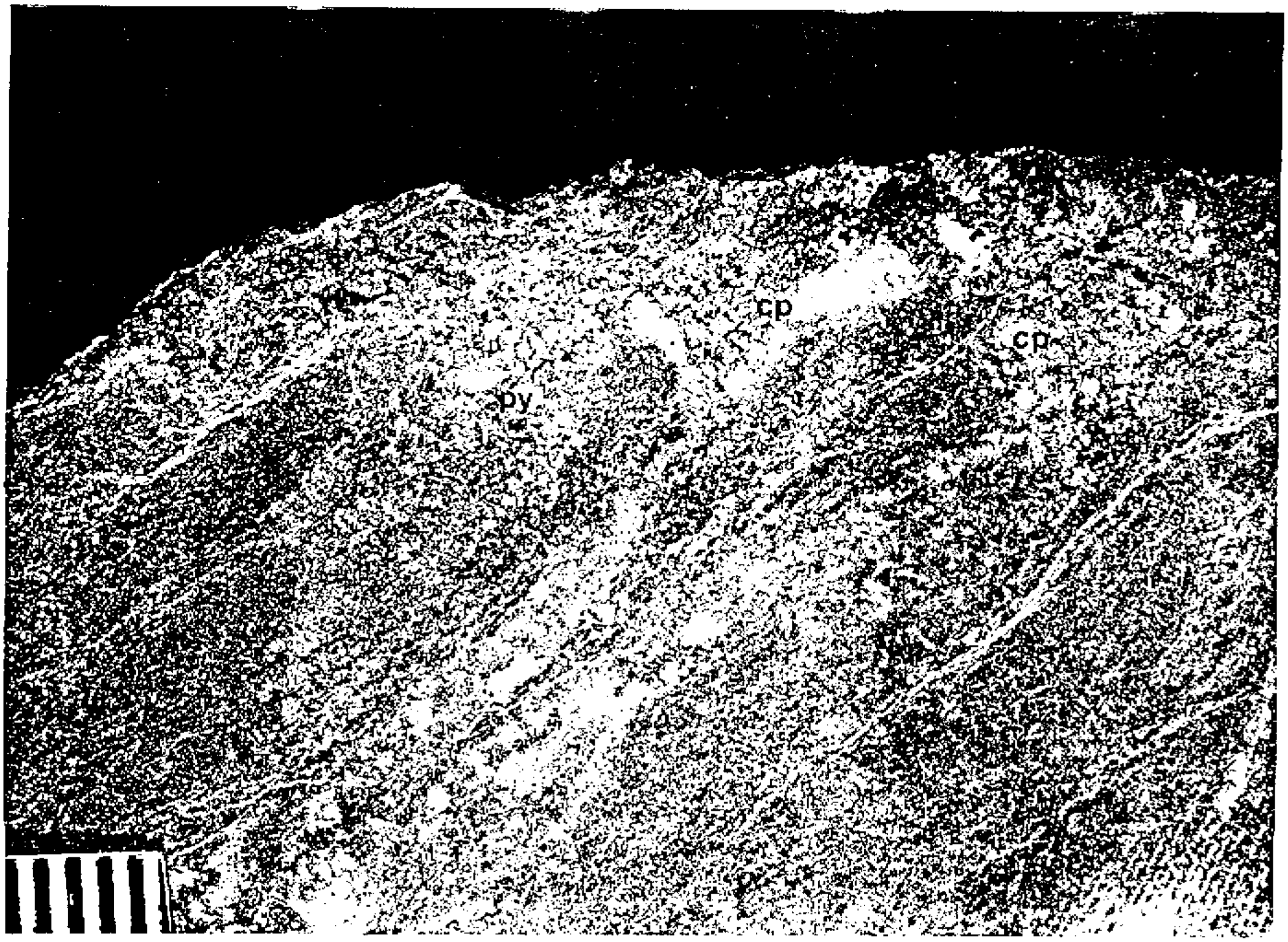

cp
cp
py

PLATE 6. Quartz-anhydrite-pyrite vein in latite tuff. Chalcopyrite (cp) occurs as fine grained disseminations and in veinlets in anhydrite veins and to a lesser extent is included in pyrite grains (py).

PLATE 7. Dacite lithic tuff displaying pervasive sericite alteration. Pyrite (py) and chalcopyrite (cp) are concentrated in irregular seams and patches in the host rock.

GEOCHEMISTRY

3.0 GEOCHEMISTRY

3.1 Procedure

Surface rock and drill core samples from holes 1 through 13 were crushed to 1/4 inch, in camp, using a gasoline powered primary jaw crusher. The crushed material was then passed through a Jones Riffle Splitter to obtain a split weighing approximately 250 grams, which was sent to Vangeochem Lab Ltd. in Vancouver, where it was pulverized. The remaining crushed material was stored on the property.

As the rock crusher was not functioning properly towards the end of the project, core samples from holes 14 through 19 were shipped to Vangeochem Labs for crushing and pulverizing.

The analytical procedures for the pulverized rock and drill core samples from holes 1 through 10 were identical. A 0.5 gram sample was measured from the pulp and digested in hot aqua-regia in a boiling water bath. After dilution with 10 ml of demineralized water, samples were analyzed for 30 elements by the inductively coupled plasma emission spectroscopy (ICP) technique. Samples from within the B-Zone deposit were then reanalyzed for copper by fire assay techniques.

In addition, a 10 gram fraction was measured from the pulp, digested as above, and analyzed for gold by atomic absorption. Samples which returned values greater than 1,000 ppb gold were reanalyzed by fire assay techniques.

The pulverized drill core samples from holes 11 through 19 were analyzed for copper and gold only, by fire assay techniques.

3.2 Surface Lithogeochemical Results

A total of 17 rock samples were collected on the property in 1989. Surface lithogeochemical analytical reports are included in Appendix II and results are plotted on Figures 7 and 8.

Samples 5403, JP284A, JP284B and JP284C, collected from the P-Zone, are anomalous in gold (up to 2,800 ppb) and copper (2,522 to >20,000 ppm). These samples were collected from the areas around the P-Zone, and likely represent the surface expression of the B-Zone deposit. This style of mineralization is similar to that observed in diamond drill holes K88-18 and 22 and K89-7.

Chalcopyrite and tennantite are the dominant copper minerals occurring as disseminations and veins in a groundmass dominated by quartz.

Sample JPANXV, from the A-North area, is composed of brecciated intermediate volcanic rock and sulphide vein mineralization. The sample contains 2,522 ppm copper, 4,629 ppm zinc, 1,010 ppb gold and 15.4 g/t silver and is similar in appearance and texture to the Meyer's Vein (Hewton and Butterworth, 1988). Diamond drill holes into the Meyer's Vein and surrounding area in 1988 intersected high grades of base- and precious-metals; however, correlation could not be achieved either laterally or down dip. Further work is required in the A-North area in order to effectively evaluate the area's base- and precious-metal potential and to determine the relationship to high grade base- and precious-metal veins in the A-Zone.

Sample 5408 was collected from the Goat Zone, near the southernmost limit of the baseline, on the cliffs above Sulphurets glacier. This sample contains 6.91% copper and 0.171 g/t gold. Samples 5404 to 5407, also from the Goat Zone, returned much lower copper values (.02 to .09%). Rock sampling from this area in the past has produced similar erratic values, possibly resulting from the leaching of copper and other minerals from some rocks and concentration elsewhere under different chemical conditions.

Samples 5409 to 5413 were collected from the West Cliffs area, in the northwestern corner of the property. Samples 5410 and 5412 returned anomalous concentrations of copper (1.50 and 0.99%, respectively), while sample 5411 contained 2.71% lead and 212.9 g/t silver. Many of the samples are of narrow, mineralized veins in moderately altered intermediate volcaniclastic rocks. This style of mineralization has been observed at a number of locations along the western margin of the alteration zone and appears to occur in small, isolated pockets. A systematic exploration program in this area could clarify the nature and extent of this peripheral style of mineralization and its relationship to the B-Zone copper-gold mineralization.

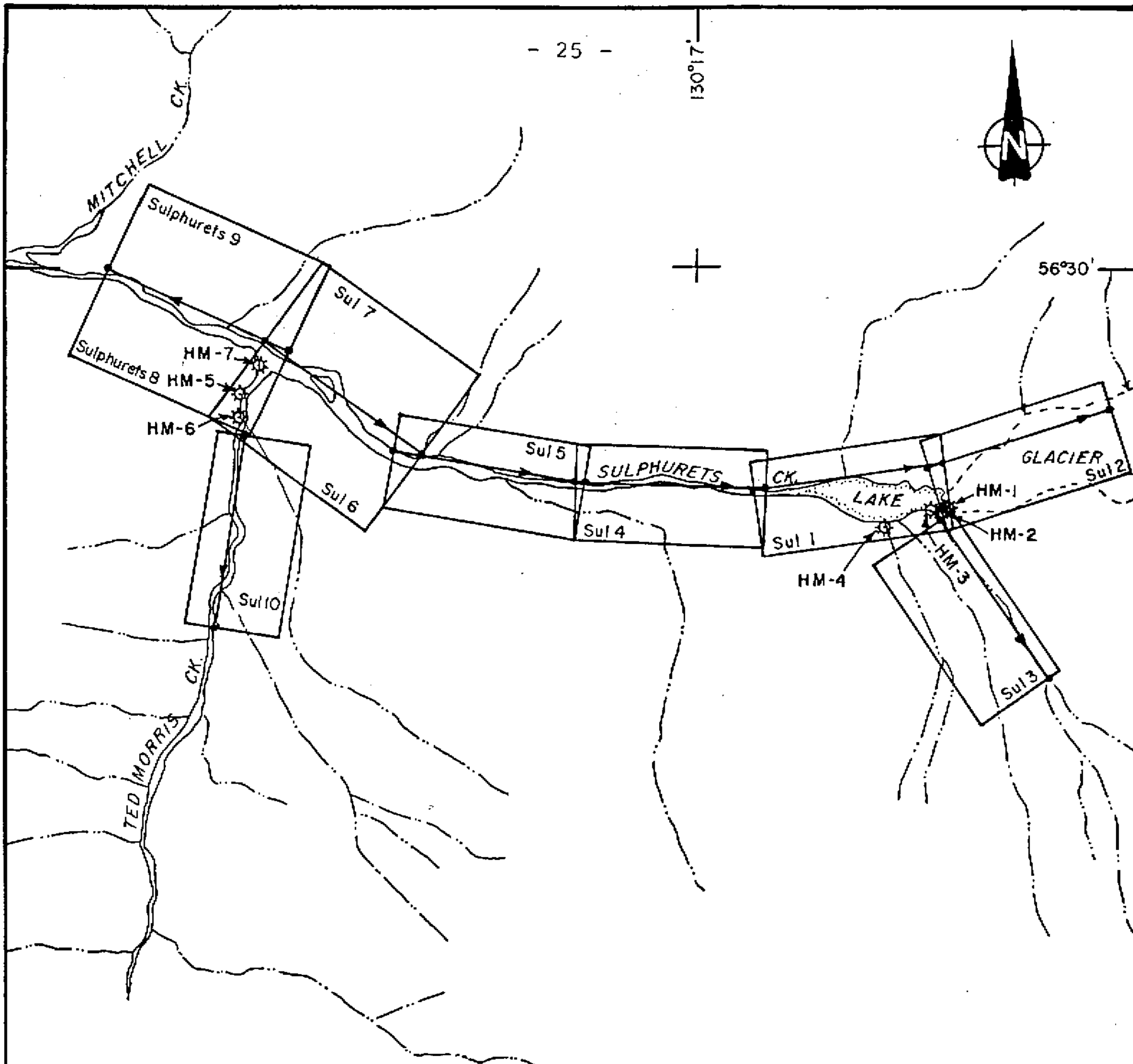
3.3 Heavy Mineral Concentrate Sampling

Seven heavy mineral concentrate samples were collected from Sulphurets Lake, Sulphurets Creek and Ted Morris Creek, which are covered by the Sul 1 to 7, 10 and Sulphurets 8 and 9 Placer Claims. Sulphurets Creek drains Sulphurets Lake at the northern boundary of the property (Figure 9). Ted Morris Creek flows northward into Sulphurets Creek, along the western boundary of the Kerr property.

A 10-30 kg sample of stream gravel was collected at each site. Each sample was wet sieved to approximately minus 20 mesh, the coarse fraction discarded, and the remaining fine fraction panned down, "tailed out", and visually inspected. All obvious minerals of interest, such as free gold, were noted.

The concentrates were then shipped to Vangeochem Labs for analysis. Sample preparation involved sieving the concentrate to -18 mesh and separating the -18 mesh fraction in tetrabromoethane (S.G. = 2.95 g/cc). The heavy minerals were then assayed for gold. The analytical reports are given in Appendix II.

Four of the seven samples contained anomalous concentrations of gold. Sample HMC-1, containing 0.162 oz Au/st, was obtained from the south-eastern end of Sulphurets Lake, near the confluence with a series of creeks draining the north slope of the Alteration Zone. Samples HMC-5, 6 and 7 contained 0.264, 0.420 and 0.442 oz Au/st, respectively. These samples were collected from the mouth of Ted Morris Creek and indicate a possible upstream source of gold mineralization west of the Alteration Zone on the Kerr property. Very little exploration has been done along the western margin of the claim block, as the majority of work on the Kerr property has concentrated on the large alteration zone in the centre. These results warrant follow-up work in the area to identify the source of the gold mineralization.



HEAVY MINERAL SAMPLES ☼

SAMPLE No.	COPPER (%)	GOLD (oz./st)
HMC-1	0.02	<0.005
HMC-2	0.03	0.012
HMC-3	0.06	0.162
HMC-4	0.08	0.050
HMC-5	0.04	0.264
HMC-6	0.04	0.420
HMC-7	0.04	0.442

SULPHURETS GOLD CORPORATION

1989
KERR PROJECT
PLACER CLAIMS
HEAVY MINERAL SAMPLES GEOCHEMISTRY

Scale 0 300 600 900 1200 METRES

RPT: 1065 | FIGURE 9

3.4 Check Assays

Systematic check assays were taken throughout the mineralized intervals during the 1989 drilling program. Every fifth sample was split a second time and the material was sent to Vangeochem for a second analysis. Every tenth sample was split a third time and the material was sent to Bondar-Clegg in Vancouver for a comparison analysis.

Lotus 123 was used to create plots comparing results from the different analyses (Figures 10 to 15). Figures 10 to 12 show that for copper there is a very good correlation between Bondar-Clegg results and Vangeochem check results and good correlations between Bondar-Clegg and the original Vangeochem results and Vangeochem check and original results. The comparisons suggest that a small percentage of the check results are slightly lower in value than the original results.

Gold result comparisons (Figure 13 to 15) are more difficult to interpret. Values reported as less than the lower detection limit were given a 0 value, which must be considered when looking at the graphs. A value reported as <0.005, for example, would plot on the "0" line, even though it may contain 0.004 oz Au/t. Bondar-Clegg and Vangeochem each have different detection limits.

There is a reasonable correlation between Bondar-Clegg gold results and Vangeochem's original results. There is no correlation between Vangeochem check and original values or Bondar-Clegg and Vangeochem check values. This lack of correlation may be explained by a nugget affect in the mineralization, but, as the Bondar-Clegg values correlate reasonably well with the original Vangeochem values, it suggests there may be a problem with Vangeochem check values.

Conclusions drawn are that the copper and gold values reported are more or less verified by check assaying, but there appears to be at least a certain amount of nugget affect for gold values. Either gold metallics should be analyzed in the future or a larger pulp sample should be used to determine gold values.

FIGURE 10.

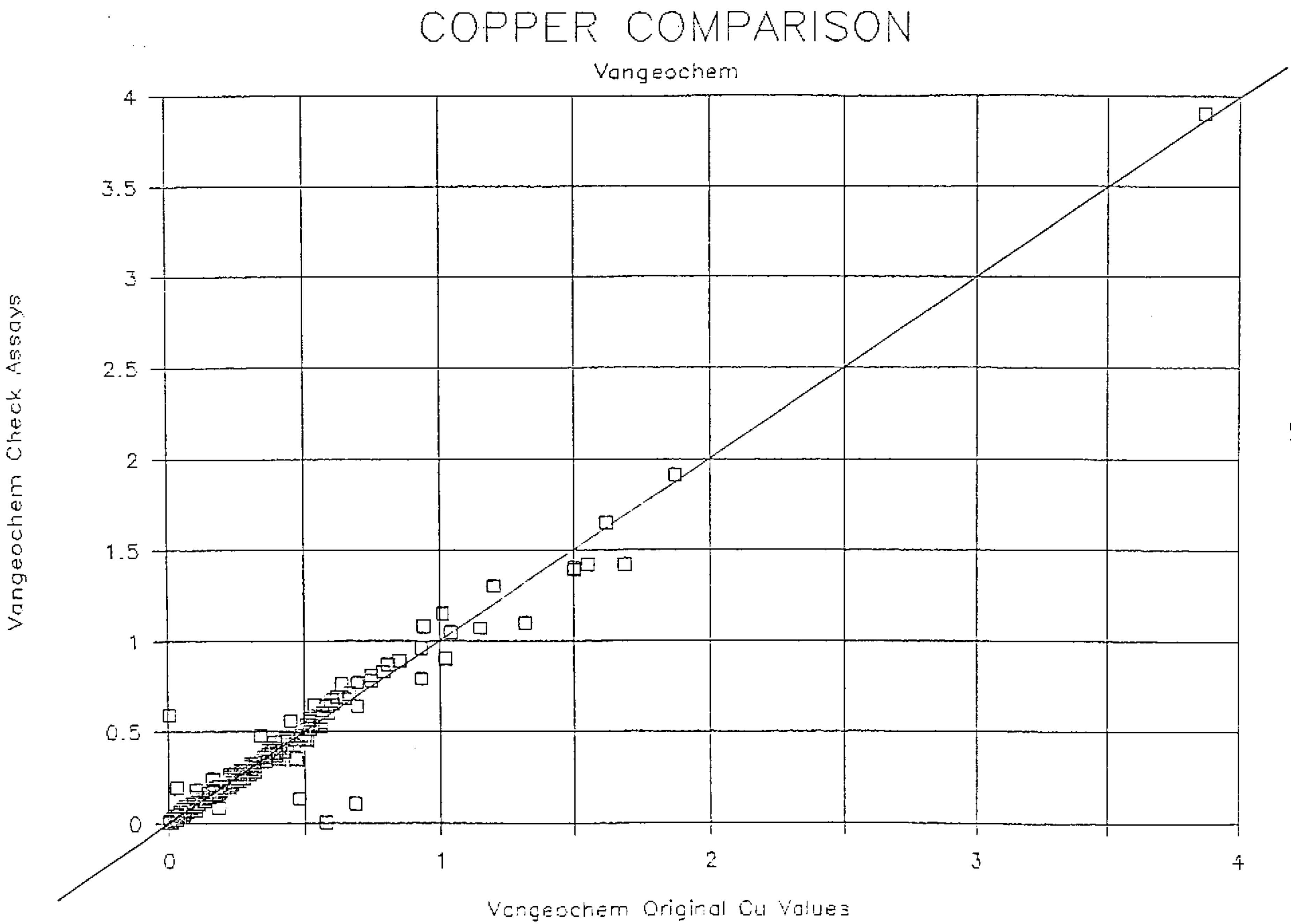

COPPER COMPARISON
Vangeochem
Vangeochem Check Assays
Vangeochem Original Cu Values
0
0.5
1
1.5
2
2.5
3
3.5
4
0
1
2
3
4

FIGURE 11.

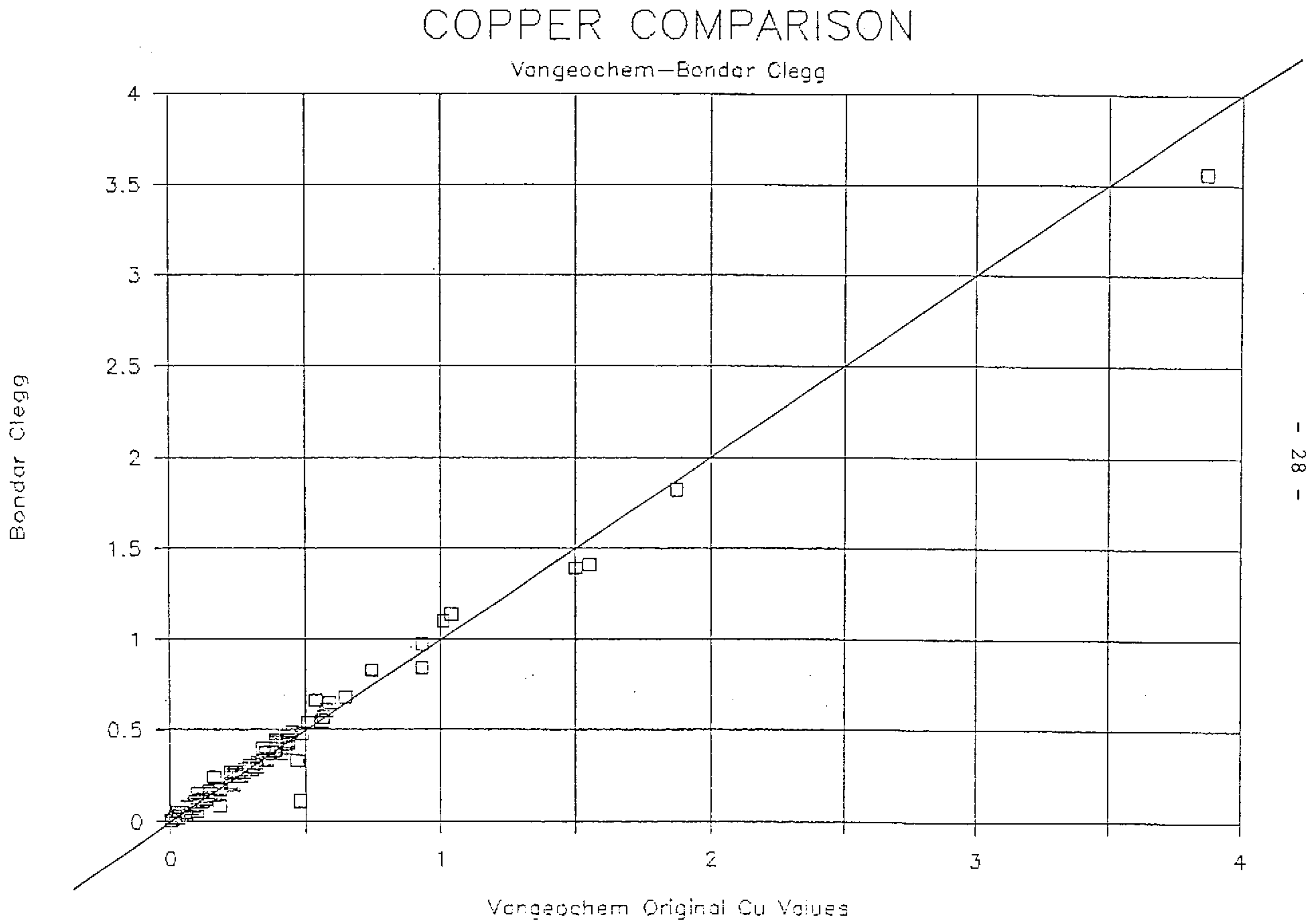

COPPER COMPARISON
Vangeochem—Bondar Clegg
Bondar Clegg
Vangeochem Original Cu Values
0
0.5
1
1.5
2
2.5
3
3.5
4
0
1
2
3
4

FIGURE 12.

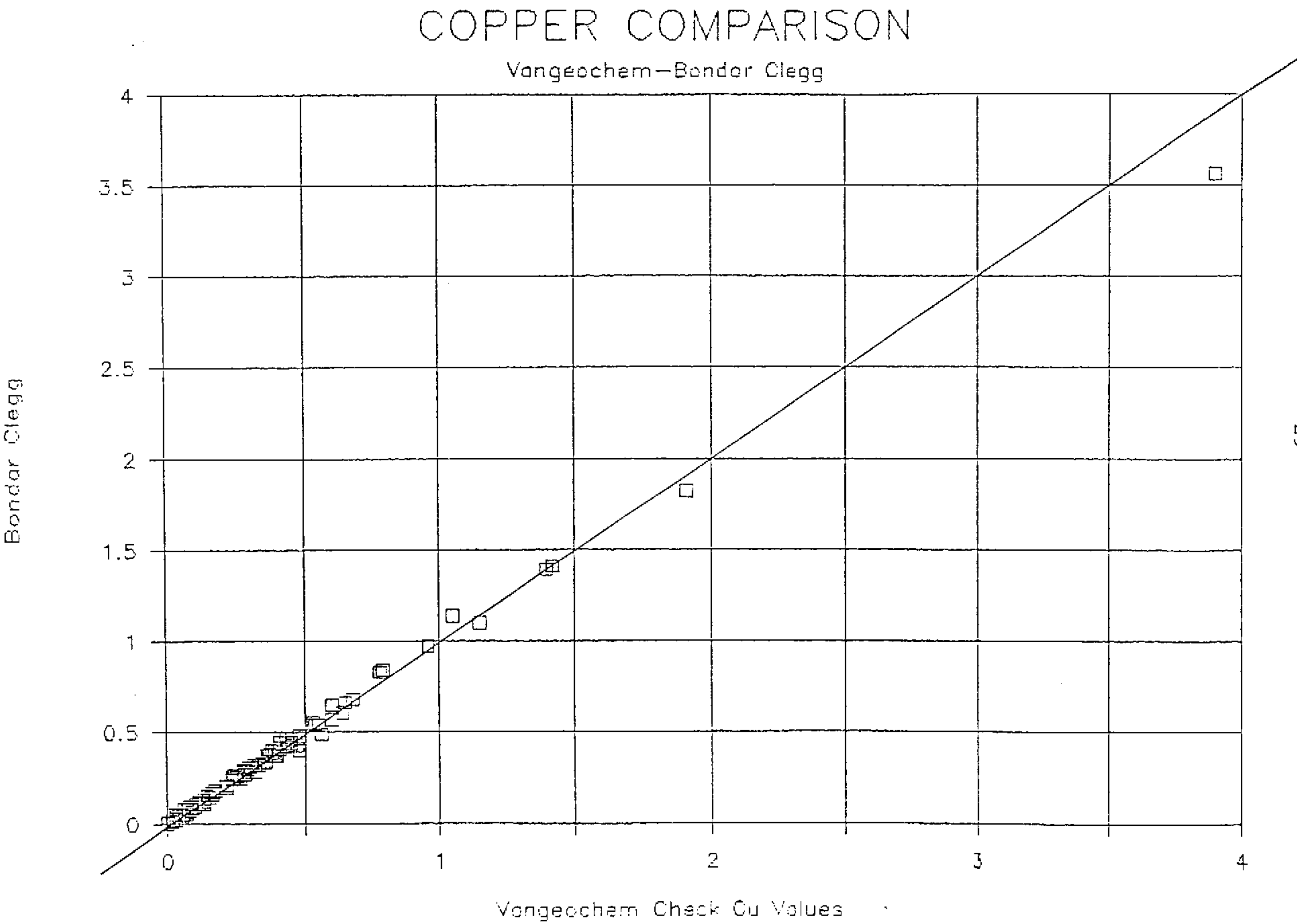

COPPER COMPARISON
Vangeochem—Bondar Clegg
Bondar Clegg
Vangeochem Check Cu Values
0
0.5
1
1.5
2
2.5
3
3.5
4
0
1
2
3
4

FIGURE 13.

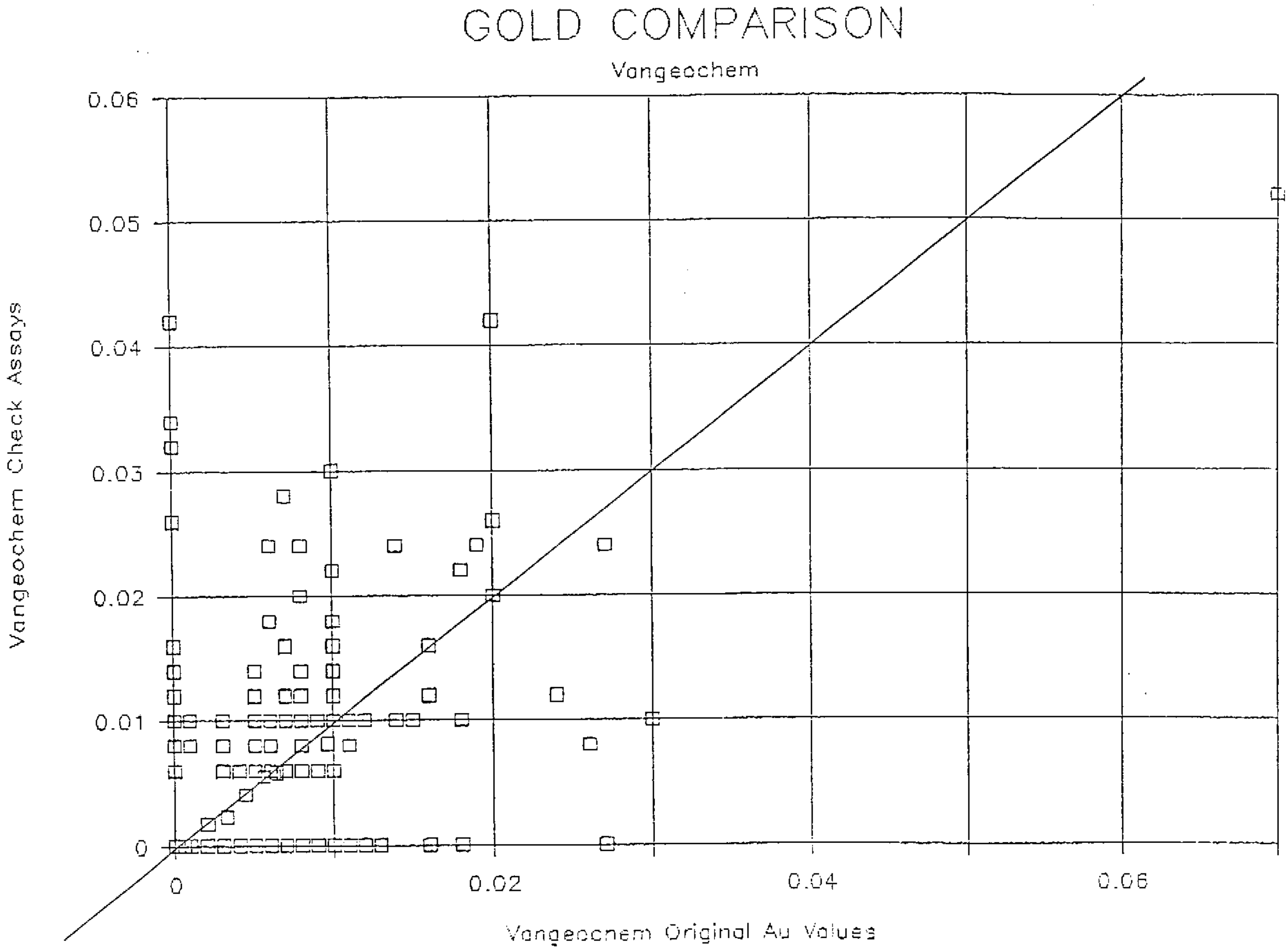

GOLD COMPARISON
Vangeochem
0.06
0.05
0.04
0.03
0.02
0.01
0
Vangeochem Check Assays
0
0.02
0.04
0.06
Vangeochem Original Au Values

FIGURE 14.

GOLD COMPARISON

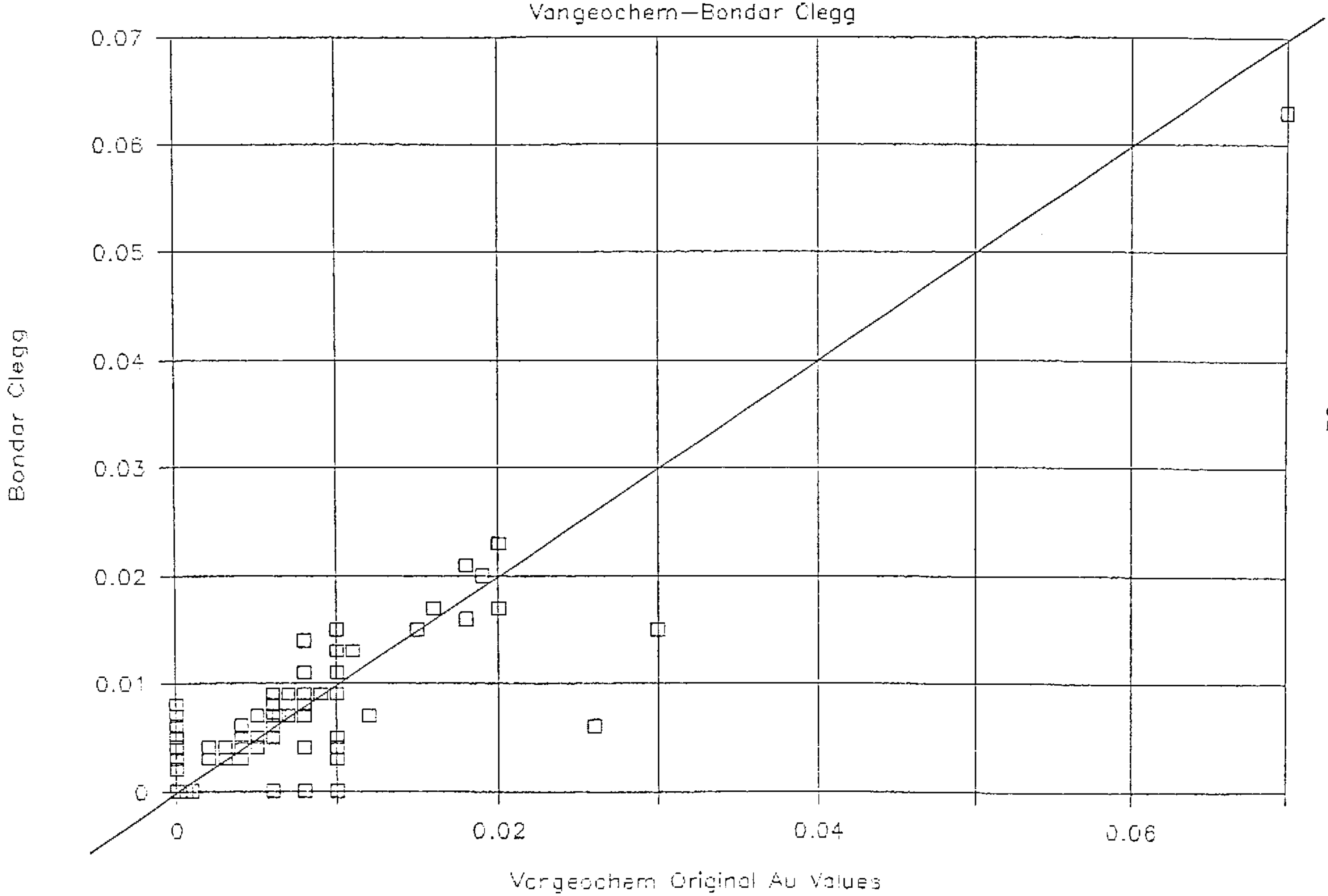
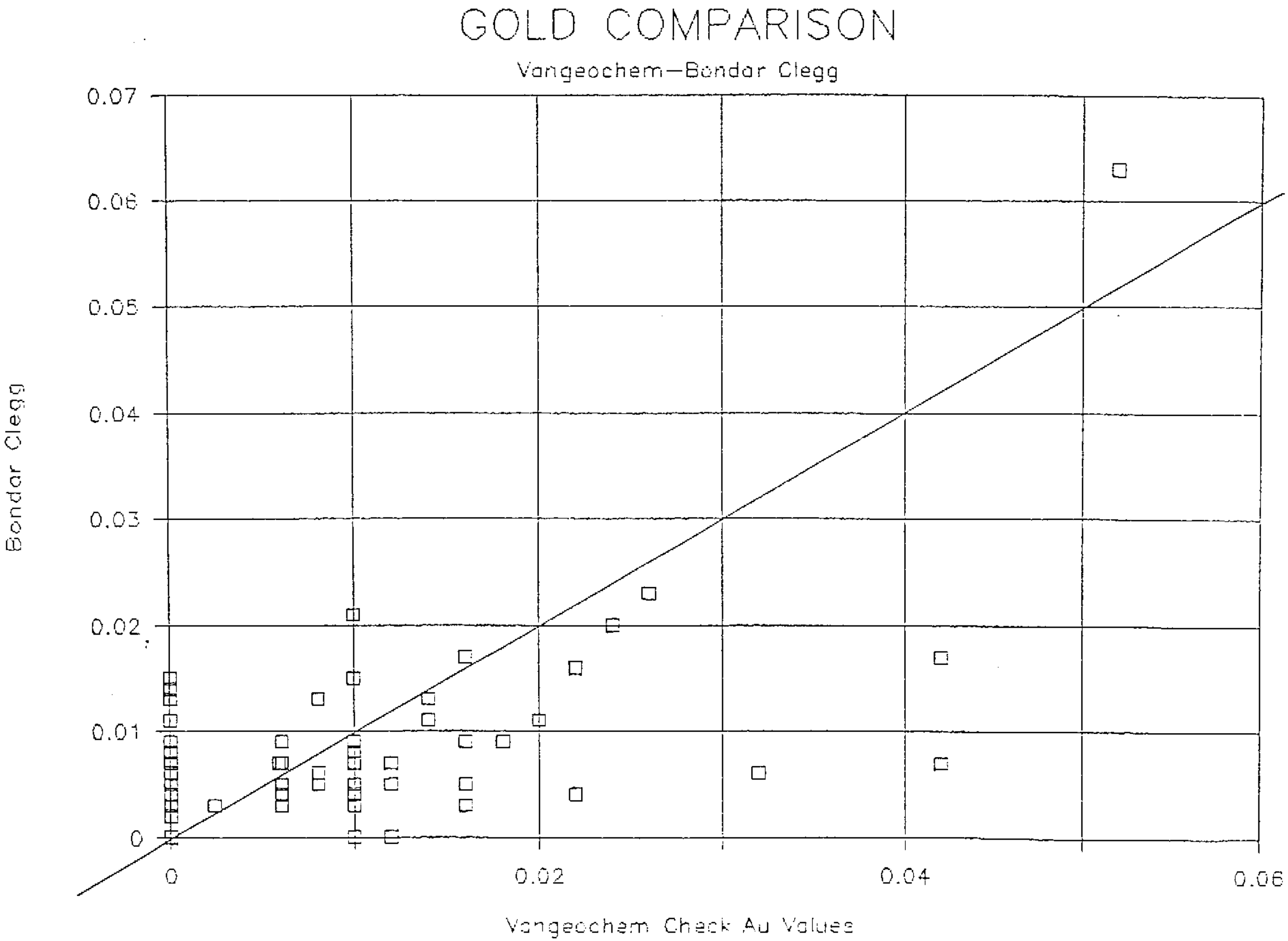


FIGURE 15.


GOLD COMPARISON
Vangeochem—Bondar Clegg
Bondar Clegg
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
0
0.02
0.04
0.06
Vangeochem Check Au Values

[redacted]

GEOPHYSICS

4.0 GEOPHYSICS

4.1 General and Procedure

Induced polarization surveying initiated in 1987 and expanded upon in 1988 outlined a north-south trending chargeability high/resistivity low anomaly that remained open to the north. In 1989, the survey was continued northward over the central portion of the Tedray property.

Orequest Consultants of Vancouver, B.C. were contracted to perform 8 Km of IP on cut lines with stations spaced 25 m apart. The survey was conducted in the time domain with a EDA (BRGM) IP-2 receiver and a Phoenix IPT-1 transmitter powered by a 5 h.p. generator. A dipole-dipole electrode array was used in 1989, while in 1987 and 1988 a pole-dipole array was used. The dipole-dipole array is determined to be a better arrangement for resolving small features both vertically and laterally, while the pole-dipole array offers increased signal strength in rocky and dry terrains where currents are very low (Lebel, 1989).

The techniques used and results of the survey are documented in a report by Lebel (1989). The results of the survey are presented in standard pseudosection format showing apparent resistivity in ohm-m, apparent chargeability in msec and the metal factor obtained by dividing the chargeability by the resistivity and multiplying by 2000. In previous surveys (1987, 1988) by Walcott and Associates, the metal factor was calculated by dividing chargeability by resistivity and multiplying by 100. Hence, the values obtained for the separate methods of calculation are not correlatable, but can be recalculated using a standard multiplication factor for ease of comparison. Fourth separation chargeability and resistivity data (1987-1989) are presented in contour form on Figures 16 and 17.

4.2 Geophysical Results

Comparison of the IP response with geological and diamond drilling results indicates an excellent correlation of the high-grade copper-gold mineralization in the B-Zone deposit with a corresponding chargeability high/resistivity low response. Generally, the B-Zone deposit is outlined by chargeability readings from 35 to as high as 76.7 millivolts per volt, and by resistivity readings from 200 to below 50 ohm-metres (Figures 16, 17). To date, the anomaly has been identified for a strike length of 1.7 km and has a maximum width of 250 m, although there is a 450 m section in the centre of the property where the survey could not be performed due to snow cover. Drilling in this area has confirmed the presence of high-grade copper and gold mineralization.

The southern extent of the conductivity anomaly remains open, however, the resistivity anomaly appears to terminate between lines 9400 and 9300 North. Drilling in this area continued to intersect significant mineralization and the deposit remains open to the south.

The extension of the IP survey northward onto the Tedray property in 1989 discovered a weakening of the geophysical response from line 9900N on the Tedray grid (which is separate from the Kerr grid) northward to line 10600N. Subsequent drilling in this area identified a thick (100 metre plus) cover of overburden, which is beyond the maximum depth penetration of the IP survey using the 25 m spaced dipole-dipole array. A wider spaced dipole array may be able to penetrate the overburden in this region.

DIAMOND
DRILLING

5.0 DIAMOND DRILLING

5.1 General

Diamond drilling on the Kerr property in 1989 was carried out by J.T. Thomas of Smithers, B.C. utilizing a modified JKS-300 (JT-600) diamond drill. A similar type of drill had been used with great success in 1988 allowing for effective drill testing of the property without the high operating and moving costs associated with a larger drill. Although some sacrifice had to be made with respect to depth penetration, it was felt that the smaller drill would be the most suited to fulfilling the objective of determining the overall potential size of the B-Zone deposit.

During the course of tracing the deposit northward, the smaller drill encountered a considerable accumulation of overburden in the southwest corner of the Tedray property. Two attempts to penetrate the overburden at one location (89-9, 89-9A) ended in abandoning the holes at 30.5 and 42.7 metres. It became apparent that, if further testing of the deposit northward onto the Tedray property was to be achieved, a larger drill would be required.

Thomas mobilized a Longyear 38 diamond drill to the property on August 28. In most areas the drill was able to penetrate the overburden and, because of its ability to drill to greater depths, was able to further test the down dip extent of the deposit. In addition, with two drills operating, the exploration program could be completed by mid-September and thus avoid any problems associated with deteriorating weather conditions likely to occur by the end of the month.

A Hughes 500D helicopter was contracted to move the smaller drill. The Longyear 38 could have been broken down into loads suitable for the Hughes 500D, but, as this would have taken considerable time, it proved more cost-effective and efficient to bring in a Bell 205 helicopter for the larger drill.

5.2 Statistics

A total of 4,364.7 metres in twenty holes was completed on the property in 1989. The JT600 diamond drill began by drilling BDBGM (thin wall) core but, because of excessive wear caused by the highly fractured nature of the core, had to be replaced by BQ equipment. The larger diamond drill utilized NQ equipment throughout the program. A summary of all drill hole technical data, *including holes drilled from 1985 through 1989,* is provided in Table 4.

Using drilling costs incurred for the project as invoiced from the contractor and information available on daily time sheets, the following costs and productivity rates have been calculated:

	Longyear 38	JT-600	Total
Metres Drilled	1,435.9	2,928.8	4,364.7
Invoice Cost	115,682.84	197,648.47	313,331.31
Days Worked	22	50	72
Invoice Cost/Metre	80.56	67.48	71.79
Invoice Cost/Day	5,258.31	3,952.97	4,351.82
Average Metres/Day (including moves)	65.3	58.6	60.6

5.3 Core Logging Procedure

In camp, diamond drill core was marked into 3 metre sample intervals (except when a change in rock type was noted) and core recovery and rock quality determination (RQD) were measured. Every 10 metres, the specific gravity of the core was calculated. The results are listed with the drill logs in Appendix V and VI.

Determination of the specific gravity was of particular importance as an accurate value is essential in calculating an ore reserve. Previous drill inferred ore reserve estimates were obtained by using an approximate value of 3.0. A more accurate value was calculated by first determining the weight of the sample in air (w) and then the weight in water (w'). The specific gravity was calculated by dividing the first weight (w) by the difference between the first and second weights (w-w'). The average, using all values from within the deposit, is 2.8.

When the logging was completed, the core was split, sampled, and moved to core storage racks.

Results from the core logging were entered into an IBM compatible computer utilizing a variety of software programs. Descriptive logs were entered into a word processing program (Wordperfect 5.0) while quantative geological data such as mineral percentages were entered into a data management and handling program (Microlynx). All remaining technical data, including rock quality determinations, specific gravity, sample numbers, intervals, and geochemical information, were entered on spreadsheets utilizing the Lotus 1-2-3 program.

5.4 Results

The B-Zone copper-gold deposit had been traced for a strike length of 1000 metres and a width of 200 metres in 12 of 39 holes drilled in 1987 and 1988. At the end of the 1988 program the deposit remained open both along strike and down dip.

In 1989, twenty holes were drilled to test both the lateral extent of the deposit northward and to establish continuity within an area previously defined by a wider-spaced drill hole pattern. Fifteen of the holes intersected significant mineralization. Three holes were either lost or abandoned in deep overburden.

Details of the sulphide mineralogy and styles of mineralization are discussed in Section 2.5. A drill hole summary of significant economic intersections using a 0.5% and 0.3% copper cut-off grade for the B-Zone deposit (1987 through 1989 drill holes) is illustrated in Table 5. Drill hole cross-sections are illustrated on Figures 18 to 25 and a longitudinal section through the B-Zone deposit is displayed on Figure 26. Drill hole logs, lithogeochemical results and histograms are presented in Appendix V.

TABLE 4

DIAMOND DRILL HOLE TECHNICAL DATA - 1989

HOLE #	NORTHING	EASTING	ELEV.	AZIM.	DIP	LENGTH	HOR. PROJ.	VERT.PROJ.	% REC.	CORE SIZE
*K89-1	10561.51	9660.27	1339.11	090	-58	46.33	24.55	39.29	33.26	BDBGM
*K89-2	10561.51	9660.27	1339.11	088	-60	101.19	50.60	87.63	66.08	BDBGM
*K89-3	10540.59	9546.06	1341.17	090	-58	139.90	69.95	121.16	74.65	BDBGM
*K89-4	10540.59	9545.72	1341.17	000	-90	239.88	7.27	239.69	85.82	BDBGM
*K89-5	10359.38	9624.29	1426.99	090	-60	214.88	105.81	187.02	79.06	BDBGM
*K89-6	9901.85	9595.49	1659.62	058	-60	279.50	148.02	236.89	91.44	BDBGM
*K89-7	10179.04	9600.93	1511.00	090	-60	206.35	109.88	174.51	92.73	BDBGM
T89-8	10879.31	9562.28	1160.67	090	-60	255.12	143.91	209.60	95.01	BQ
.T89-9	10865.06	9398.45	1165.85	090	-60	30.48	15.24	26.40	40.69	BQ
-T89-9A	10865.06	9398.45	1165.85	000	-90	42.67	0.00	42.67	--	BQ
*K89-10	10688.93	9471.95	1232.84	090	-60	276.45	152.30	230.10	91.13	BQ
*T89-11	10865.55	9473.51	1157.55	000	-90	327.66	47.28	321.79	95.27	BQ
*T89-12	10976.18	9657.92	1139.45	090	-60	181.97	104.47	152.00	78.21	BQ
*T89-13	10959.44	9506.99	1119.54	090	-60	334.37	219.47	246.98	90.17	BQ
*T89-14	10976.90	9350.54	1124.54	090	-60	266.99	144.75	224.03	98.25	NQ
*K89-15	10325.38	9469.85	1374.76	000	-90	252.07	19.72	250.52	94.34	BQ
*T89-16	10975.95	9350.51	1124.45	000	-90	355.07	3.72	355.69	97.34	NQ
.T89-17	11163.70	9301.06	1056.99	090	-60	125.30	62.65	108.51	0.00	NQ
*T89-18	10865.06	9398.45	1165.85	000	-90	327.05	44.57	321.58	92.58	NQ
*K89-19	10563.60	9410.80	1272.80	090	-75	361.49	124.58	338.19	97.65	NQ
				TOTAL =		4364.72				

* HOLES DEFINING THE B-ZONE DEPOSIT
K - HOLES DRILLED ON THE KERR PROPERTY
T - HOLES DRILLED ON THE TEDRAY PROPERTY

TABLE 4. Continued...

HOLE #	NORTHING	EASTING	ELEV.	AZIM.	DIP	LENGTH	HOR. PROJ.	VERT.PROJ.	% REC.	CORE SIZE
*K88-1	9632.3	9715.6	1712.0	090	-62	272.80	155.73	222.35	76.93	BQ
*K88-2	9626.4	9624.1	1723.7	090	-62	172.52	94.43	144.04	94.34	BQ
K88-3	9593.4	9511.3	1740.3	090	-45	183.18	130.31	129.18	83.84	BQ
K88-4	9561.5	9397.1	1770.8	090	-60	157.58	78.79	136.47	90.94	BQ
K88-5	9512.8	9395.2	1734.4	090	-60	179.22	98.73	149.17	92.86	BQ
88-6/87-13	9735.7	9402.4	1790.2	069	-45	53.81	93.65	82.03	92.96	BQ
88-7/87-14	9735.3	9401.3	1790.3	069	-70	8.67	26.08	62.86	82.12	BQ
K88-8	9708.8	9417.5	1788.3	249	-70	152.40	49.61	144.08	90.31	BQ
K88-9	9706.6	9420.5	1788.3	159	-45	136.25	96.34	96.34	91.30	BQ
K88-10	9711.5	9418.9	1788.6	000	-45	118.26	87.77	79.02	83.46	BQ
*K88-11	9570.1	9810.9	1634.3	090	-60	212.75	106.38	184.25	68.10	BQ
K88-12	9271.7	9884.0	1464.6	090	-60	94.75	47.38	82.06	95.30	BQ
K88-13	9791.9	9843.2	1661.9	090	-60	194.16	104.22	163.60	93.90	BQ
*K88-14	9847.3	9650.2	1700.6	090	-60	272.80	136.40	236.25	95.12	BQ
*K88-15	9415.0	9748.1	1594.2	090	-60	239.88	119.94	207.74	50.05	BQ
*K88-16	10387.4	9616.9	1412.3	125	-60	106.07	53.04	91.86	43.59	BQ
*K88-17	10352.2	9652.3	1441.2	140	-60	57.00	28.50	49.36	25.14	BQ
*K88-18	10229.1	9599.5	1468.8	060	-60	255.42	149.31	205.51	90.37	BQ
*K88-19	10227.6	9598.0	1468.8	240	-60	220.37	127.38	178.58	88.47	BQ
*K88-20	10085.5	9634.9	1568.1	090	-60	152.09	76.05	131.71	74.95	BQ
*K88-21	9598.1	9767.3	1674.3	VERT	-90	213.05	0.00	213.05	87.98	BQ
*K88-22	10227.2	9596.6	1468.9	VERT	-90	136.85	0.00	136.85	73.36	BQ
				TOTAL =		3589.88				
						=========				
T86-1	11814.30	9523.10	949.57	280	-45	69.80	49.35	49.35	89.56	BQ
T88-2	11713.54	9535.72	977.31	090	-45	45.41	32.11	32.11	83.07	BQ
				TOTAL =		115.21				
						=========				
K87-1	10178.6	9958.1	1596.2	062	-45	145.09	110.69	93.36	91.43	NQ
K87-2	10178.0	9957.0	1596.2	062	-70	135.94	52.09	125.45	98.89	NQ
K87-3	10258.4	10031.5	1590.8	250	-45	183.54	139.13	118.83	95.39	NQ
K87-4	9704.1	9957.4	1604.0	090	-45	97.54	72.39	65.18	84.83	NQ
*K87-5	9718.1	9729.3	1725.9	060	-60	228.90	134.61	183.59	85.74	NQ
K87-6	9710.4	9421.5	1788.6	069	-46	194.16	143.94	129.60	84.99	NQ
K87-7	9710.0	9420.6	1788.6	069	-70	66.75	24.46	62.09	83.06	NQ
*K87-8	9677.7	9857.4	1637.9	090	-58	147.22	75.82	126.17	60.48	NQ
K87-9	9963.5	10036.4	1622.6	122	-45	106.67	76.72	74.09	77.87	NQ
K87-10	9903.4	10035.5	1624.2	090	-60	91.44	49.73	76.58	92.64	NQ
K87-11	9642.4	9425.6	1782.5	103	-45	35.97	26.19	24.65	83.85	NQ
K87-12	9642.4	9424.5	1782.4	103	-70	41.45	14.18	38.95	90.06	NQ
K87-13	9735.7	9402.4	1790.2	069	-45	70.10	51.40	47.51	97.72	NQ
K87-14	9735.3	9401.3	1790.3	069	-70	59.44	22.48	54.97	96.38	NQ
				TOTAL =		1604.21				
						=========				
KE-85-1	9727.1	9511.8	1753.8	270	-45	52.80	37.34	37.34		BQ
KE-85-2	10169.8	9985.8	1598.9	345	-45	60.30	42.64	42.64		BQ
KE-85-3	10213.1	9976.6	1592.7	345	-45	76.80	54.31	54.31		BQ
				TOTAL =		189.90				
						=========				
	TOTAL METERAGE TO DATE					9863.9 m				
						=========				

* HOLES DEFINING THE B-ZONE DEPOSIT
K - HOLES DRILLED ON THE KERR PROPERTY
T - HOLES DRILLED ON THE TEDRAY PROPERTY

TABLE 5. Summary of mineralized drill hole intersections in the B-Zone

HOLE #	K89-2		AVERAGE	GRADES		
CUT-OFF	FROM	TO	WIDTH(m)	Cu %	Au(g/t)	Ag(g/t)
	16.50	49.90	33.40	0.12	0.559	0.56
0.5% Cu	49.90	101.19	51.29	0.81	0.253	1.06

HOLE #	K89-3		AVERAGE	GRADES		
CUT-OFF	FROM	TO	WIDTH(m)	Cu %	Au (g/t)	Ag(g/t)
	3.05	65.85	62.80	0.19	0.136	0.56
0.3% Cu	65.85	139.90	74.05	0.62	0.295	0.92
0.5% Cu	65.85	113.00	47.15	0.78	0.371	1.07

HOLE #	K89-4		AVERAGE	GRADES		
CUT-OFF	FROM	TO	WIDTH(m)	Cu %	Au(g/t)	Ag(g/t)
	3.05	97.00	93.95	0.23	0.212	0.96
0.3% Cu	97.00	239.88	142.88	0.48	0.205	0.50
0.5% Cu	190.00	239.88	49.88	0.60	0.280	0.73

HOLE #	K89-5		AVERAGE	GRADES		
CUT-OFF	FROM	TO	WIDTH(m)	Cu %	Au(g/t)	Ag(g/t)
	9.14	53.85	44.71	0.16	0.142	1.14
0.3% Cu	53.85	127.70	73.85	0.79	0.322	1.03
0.5% Cu	68.00	127.70	59.70	0.90	0.372	1.20
	127.70	214.88	87.18	0.11	0.222	0.56

HOLE #	K89-6		AVERAGE	GRADES		
CUT-OFF	FROM	TO	WIDTH(m)	Cu %	Au(g/t)	Ag(g/t)
	3.05	57.20	54.15	0.02	0.079	0.41
0.3% Cu	57.20	208.25	151.05	0.70	0.296	3.02
0.5% Cu	85.46	180.00	94.54	0.86	0.333	2.50
	208.25	279.50	71.25	0.21	0.154	0.51

HOLE #	K89-7		AVERAGE	GRADES		
CUT-OFF	FROM	TO	WIDTH(m)	Cu %	Au(g/t)	Ag(g/t)
0.3% Cu	3.05	138.10	135.05	0.63	0.283	1.63
0.5% Cu	70.30	138.10	67.80	0.91	0.366	2.37
	138.10	206.35	68.25	0.23	0.336	0.42

HOLE #	T89-8		AVERAGE	GRADES		
CUT-OFF	FROM	TO	WIDTH(m)	Cu %	Au(g/t)	Ag(g/t)
	4.57	40.00	35.43	0.29	0.150	0.60
0.3% Cu	40.00	166.00	126.00	0.43	0.185	1.04
	166.00	255.12	89.12	0.17	0.149	0.30

TABLE 5. Continued...

HOLE # K89-10		A V E R A G E		G R A D E S		
CUT-OFF	FROM	TO	WIDTH(m)	Cu %	Au(g/t)	Ag(g/t)
	6.10	101.00	94.90	0.12	0.116	N/A
0.5% Cu	101.00	178.05	77.05	0.80	0.197	N/A
	178.05	276.45	98.40	0.10	0.108	N/A

HOLE # T89-11		A V E R A G E		G R A D E S		
CUT-OFF	FROM	TO	WIDTH(m)	Cu %	Au(g/t)	Ag(g/t)
	10.00	78.00	68.00	0.09	0.215	N/A
0.3% Cu	78.00	317.40	239.40	0.49	0.240	N/A
0.5% Cu	222.00	309.00	87.00	0.73	0.258	N/A
	317.40	327.66	10.26	0.15	0.281	N/A

HOLE # T89-12		A V E R A G E		G R A D E S		
CUT-OFF	FROM	TO	WIDTH(m)	Cu %	Au(g/t)	Ag(g/t)
0.5% Cu	3.05	15.00	11.95	0.81	0.373	1.54
	15.00	181.97	166.97	0.13	0.119	0.42

HOLE # T89-13		A V E R A G E		G R A D E S		
CUT-OFF	FROM	TO	WIDTH(m)	Cu %	Au(g/t)	Ag(g/t)
	15.24	50.90	35.66	0.24	0.622	N/A
0.5% Cu	50.90	87.00	36.10	0.64	0.543	N/A
	87.00	334.37	247.37	0.16	0.230	N/A

HOLE # T89-14		A V E R A G E		G R A D E S		
CUT-OFF	FROM	TO	WIDTH(m)	Cu %	Au(g/t)	Ag(g/t)
	97.84	155.00	57.16	0.11	0.137	N/A
0.3% Cu	155.00	197.00	42.00	0.50	0.284	N/A
0.5% Cu	155.00	194.00	39.00	0.51	0.280	N/A
	197.00	266.99	69.99	0.15	0.138	N/A

HOLE # T89-16		A V E R A G E		G R A D E S		
CUT-OFF	FROM	TO	WIDTH(m)	Cu %	Au(g/t)	Ag(g/t)
	83.82	283	199.18	0.12	0.098	N/A
0.3% Cu	283.00	331.00	48.00	0.39	0.221	N/A
	331.00	355.70	24.70	0.06	0.000	N/A

HOLE # T89-18		A V E R A G E		G R A D E S		
CUT-OFF	FROM	TO	WIDTH(m)	Cu %	Au(g/t)	Ag(g/t)
	71.60	196.00	124.40	0.07	0.136	N/A
0.3% Cu	196.00	317.77	121.77	0.30	0.145	N/A
	317.77	327.05	9.28	0.02	0.000	N/A

HOLE # K89-19		A V E R A G E		G R A D E S		
CUT-OFF	FROM	TO	WIDTH(m)	Cu %	Au(g/t)	Ag(g/t)
	21.34	63.00	41.66	0.10	0.042	N/A
0.3% Cu	63.00	361.49	298.49	0.36	0.162	N/A
0.5% Cu	318.00	361.49	43.49	0.59	0.356	N/A

TABLE 5. Continued...

HOLE # K87-5			AVERAGE	GRADES		
CUT-OFF	FROM	TO	WIDTH(m)	Cu %	Au(g/t)	Ag(g/t)
	1.00	10.30	9.30	0.11	0.157	0.44
0.3% Cu	10.30	224.00	213.70	0.41	0.242	1.52
0.5% Cu	149.00	179.00	30.00	0.90	0.390	3.35
	224.00	228.90	4.90	0.06	0.107	2.40

HOLE # K87-8			AVERAGE	GRADES		
CUT-OFF	FROM	TO	WIDTH(m)	Cu %	Au(g/t)	Ag(g/t)
	2.70	28.40	25.70	0.03	0.309	1.14
0.3% Cu	28.40	115.10	86.70	1.10	0.375	2.04
0.5% Cu	29.90	115.10	85.20	1.11	0.381	2.07
	115.10	147.20	32.10	0.16	0.194	0.81

HOLE # K88-1			AVERAGE	GRADES		
CUT-OFF	FROM	TO	WIDTH(m)	Cu %	Au(g/t)	Ag(g/t)
	1.50	176.17	174.67	0.09	0.087	0.26
0.5% Cu	176.17	272.80	96.63	0.94	0.342	2.22

HOLE # K88-11			AVERAGE	GRADES		
CUT-OFF	FROM	TO	WIDTH(m)	Cu %	Au(g/t)	Ag(g/t)
	0.00	51.00	51.00	0.06	0.100	0.29
0.3% Cu	51.00	212.75	161.75	1.02	0.313	2.00
0.5% Cu	51.00	173.30	122.30	1.25	0.382	2.47

HOLE # K88-14			AVERAGE	GRADES		
CUT-OFF	FROM	TO	WIDTH(m)	Cu %	Au(g/t)	Ag(g/t)
	2.13	33.00	30.87	0.07	0.109	1.54
0.3% Cu	33.00	182.40	149.40	0.54	0.216	2.11
0.5% Cu	33.00	71.50	38.50	1.01	0.306	4.73
	182.40	272.80	90.40	0.18	0.133	0.40

HOLE # K88-15			AVERAGE	GRADES		
CUT-OFF	FROM	TO	WIDTH(m)	Cu %	Au(g/t)	Ag(g/t)
	3.05	71.50	68.45	0.07	0.093	0.64
0.3% Cu	71.50	224.50	153.00	0.52	0.213	2.60
0.5% Cu	133.00	176.00	43.00	0.81	0.325	5.06
	224.50	239.88	15.38	0.25	0.306	5.59

HOLE # K88-16			AVERAGE	GRADES		
CUT-OFF	FROM	TO	WIDTH(m)	Cu %	Au(g/t)	Ag(g/t)
	3.05	32.00	28.95	0.24	0.186	0.66
0.3% Cu	32.00	106.07	74.07	0.65	0.311	0.80
0.5% Cu	72.00	106.07	34.07	1.03	0.471	1.55

TABLE 5. Continued...

HOLE # K88-17		AVERAGE		GRADES		
CUT-OFF	FROM	TO	WIDTH(m)	Cu %	Au(g/t)	Ag(g/t)
	8.23	41.30	33.07	0.12	0.266	0.14
0.5% Cu	41.30	57.00	15.70	0.69	0.325	0.84

HOLE # K88-18		AVERAGE		GRADES		
CUT-OFF	FROM	TO	WIDTH(m)	Cu %	Au(g/t)	Ag(g/t)
0.3% Cu	3.05	164.00	160.95	0.86	0.402	1.05
0.5% Cu	40.80	164.00	123.20	1.02	0.436	1.28
	164.00	255.42	91.42	0.16	0.213	0.51

HOLE # K88-20		AVERAGE		GRADES		
CUT-OFF	FROM	TO	WIDTH(m)	Cu %	Au(g/t)	Ag(g/t)
	2.13	54.65	52.52	0.18	0.085	0.39
0.3% Cu	54.65	103.00	48.35	0.53	0.246	2.15
0.5% Cu	76.00	103.00	27.00	0.70	0.309	3.03
	103.00	152.00	49.00	0.10	0.135	0.38

HOLE # K88-21		AVERAGE		GRADES		
CUT-OFF	FROM	TO	WIDTH(m)	Cu %	Au(g/t)	Ag(g/t)
	1.52	162.10	160.58	0.11	0.114	1.25
0.5% Cu	162.10	213.05	50.95	1.17	0.539	2.75

HOLE # K88-22		AVERAGE		GRADES		
CUT-OFF	FROM	TO	WIDTH(m)	Cu %	Au(g/t)	Ag(g/t)
	2.74	30.00	27.26	0.26	0.150	0.19
0.3% Cu	30.00	126.50	96.50	0.62	0.322	0.94
0.5% Cu	69.10	109.00	39.90	1.03	0.554	1.59
	126.50	136.85	10.35	0.26	0.136	1.00

Significant copper mineralization was intersected over appreciable widths in most holes drilled in 1989. The majority of the holes were positioned to test the lateral extent of the deposit northward, while three holes were drilled to confirm continuity within an area on the north slope, where the deposit had been defined by only a few drill holes. The average grade, using all holes that define the deposit (Table 5) and a 0.3% cutoff, is 0.61% copper and 0.274 grams Au/tonne (0.008 oz Au/ton). The mineralized zone has been traced for 1600 metres along strike and a down dip extent or width of 250 metres. The thickness of the zone is difficult to determine because, as in 1988, many of the drill holes failed to fully penetrate the deposit, but an estimate derived from the average of all drill hole intersections is 112 metres. Using these dimensions and a specific gravity of 2.8, yields a volume of 126 million tonnes. A high grade zone grading 0.90% copper and 0.342 grams Au/tonne (0.01 oz Au/ton), defined by a 0.5% cut-off grade, forms a core to the much larger 126 million tonne deposit. The strike length, down dip extent and thickness are 1600 metres, 225 metres and 59 metres, respectively, and, using a specific gravity of 2.8, yield a volume of 59,000,000 tonnes.

Substantial in-fill drilling is required to confirm the exact geometry of the deposit and to elevate reserves to the proven category. Furthermore, additional drilling is required both down dip and along strike to determine the overall potential size of the deposit.

ENVIRONMENTAL
STUDY

6.0 ENVIRONMENTAL STUDIES

6.1 General

Norecol Environmental Consultants Ltd. was commissioned during the latter stages of the 1988 exploration program to initiate pre-production environmental studies on the Kerr property. The program consisted of water quality sampling, collection of ore and waste samples for determination of acid producing potential, a site reconnaissance survey for potential tailings sites, hydrology, and climatic studies. Following is a brief description of the results of water quality and acid-base accounting studies. Discussion of the remaining tasks has not been attempted here as only small amounts of data have been collected to date; details of the surveys are provided in more complete reports prepared by Norecol under separate cover and are included in Appendix IV.

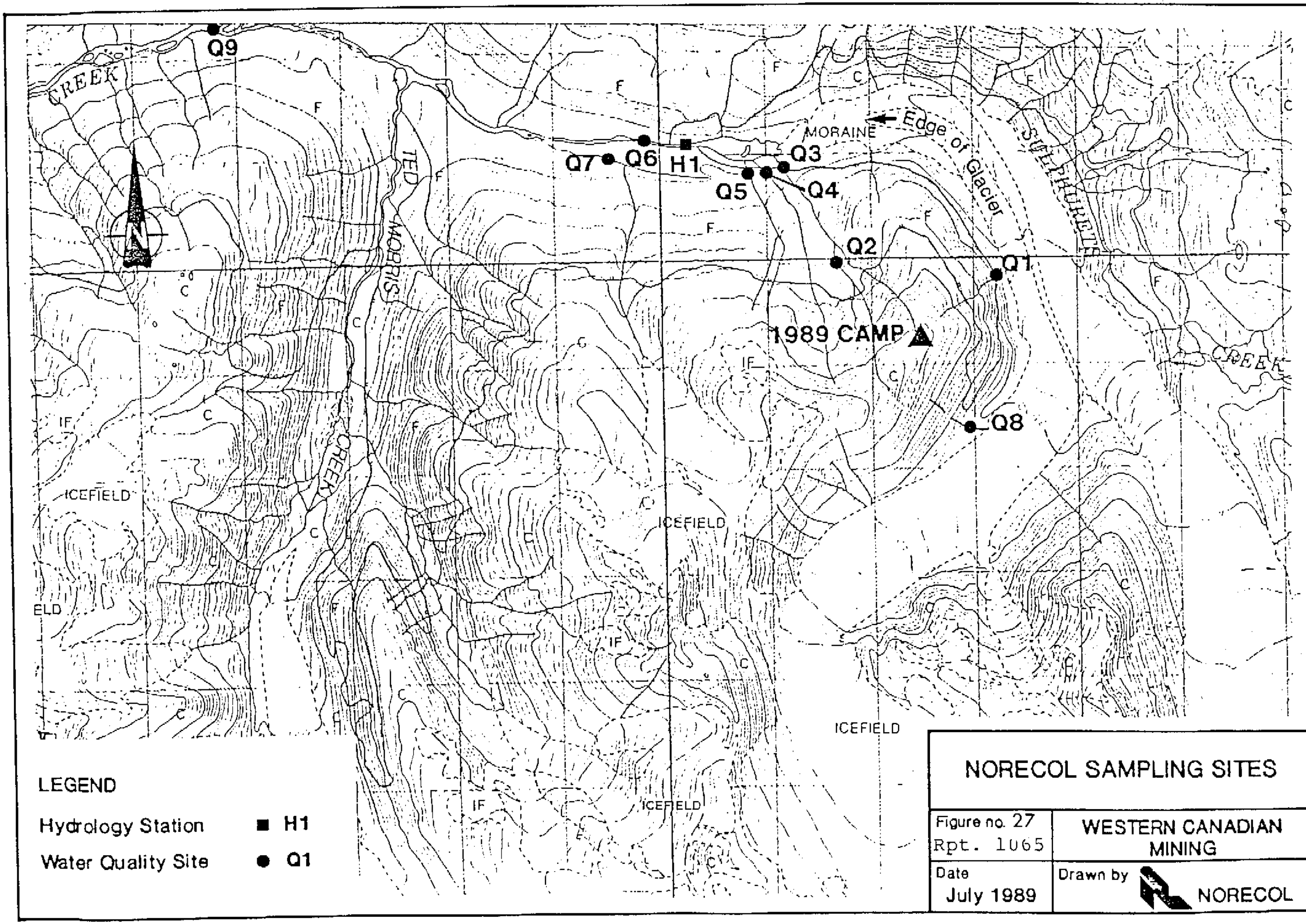
6.2 Water Quality Survey

Water quality samples have been collected on three separate occasions and represent Winter, Summer and early Fall seasonal periods. Nine sample sites have been established, two of which are on Sulphurets Creek, the remainder are on tributaries of Sulphurets in the vicinity of the deposit. Sample sites are displayed on Figure 27.

Results of the water quality sampling revealed that the creeks draining the north side of the deposit (Q2,Q3,Q4) were acidic and had very high metal loads. Samples collected elsewhere were much less acidic, softer and had lower metal loads. According to Norecol, most streams in the area exceed provincial Ministry of Environment metal criteria to protect fresh water aquatic life and it may require that mine development does not increase these naturally high levels.

6.3 Acid-Base Accounting Study

Eight samples representing an east-west section across the central portion of the Alteration Zone were selected for Acid-Base accounting studies. The suite of rocks comprised relatively unaltered hangingwall and footwall volcaniclastic rocks, sericitized and pyritized volcanic rocks peripheral to the deposit, and high and low sulphide "ore".



LEGEND

Hydrology Station ■ H1

Water Quality Site ● Q1

NORECOL SAMPLING SITES

Figure no. 27
Rpt. 1065

WESTERN CANADIAN MINING

Date
July 1989

Drawn by NORECOL

SURVEYING

The results of the Acid Base Accounting tests indicated that, theoretically, both ore and waste rocks have the potential to generate acid. Norecol states that further testing will be necessary at later stages of project planning to confirm the theoretical potential and to adequately define the rate of acid generation.

7.0 SURVEYING

7.1 General

McGladrey and Associates, Professional Land Surveyors, were contracted in 1988 to establish a number of survey station points relative to a grid reference point (10,000N, 10,000E, elevation 1634 m) on the Kerr property. These survey points were then used to tie in 1985 through 1988 diamond drill hole locations.

In 1989, McGladrey and Associates returned to the property during the latter stages of the exploration program to tie in grid stations, 1989 drill holes and two Tedray property drill holes which had not been surveyed previously. In addition, 13 airphoto targets, part of an aerial photographic survey, were also tied into the established reference point. A description of the survey techniques can be found in the 1988 Kerr Property report (Hewton and Butterworth, 1988).

Throughout the 1988 and 1989 exploration programs on the Tedray property, field crews encountered difficulties locating claim lines, I.D. posts and corner posts for the Tedray 13 claim; in fact, only the 2S I.D. post has been located to date. As a result, Erik Ostensoe, original staker of the claim, was returned to the property to search for the corner post. Being unable to find it, he replaced the post at the original site and signed a Statutory Declaration. The replacement legal corner post was then co-ordinated by survey ties to the reference point (10,000N, 10,000E) on the Kerr property. The relative co-ordinates of the LCP location, along with drill hole collar locations, are given in Table 6.

7.2 Aerial Photography

Eagle Mapping Services of Port Coquitlam, B.C. was contracted to perform an aerial photographic survey of the Kerr property. Airphoto targets were laid out along three east-west trending lines (flight lines) across the southern, central and northern regions of the property. Targets were co-ordinated to a reference point established on the Kerr property in 1988 (see Section 7.1). Target co-ordinates are listed in Table 6 and illustrated on Figure 28.

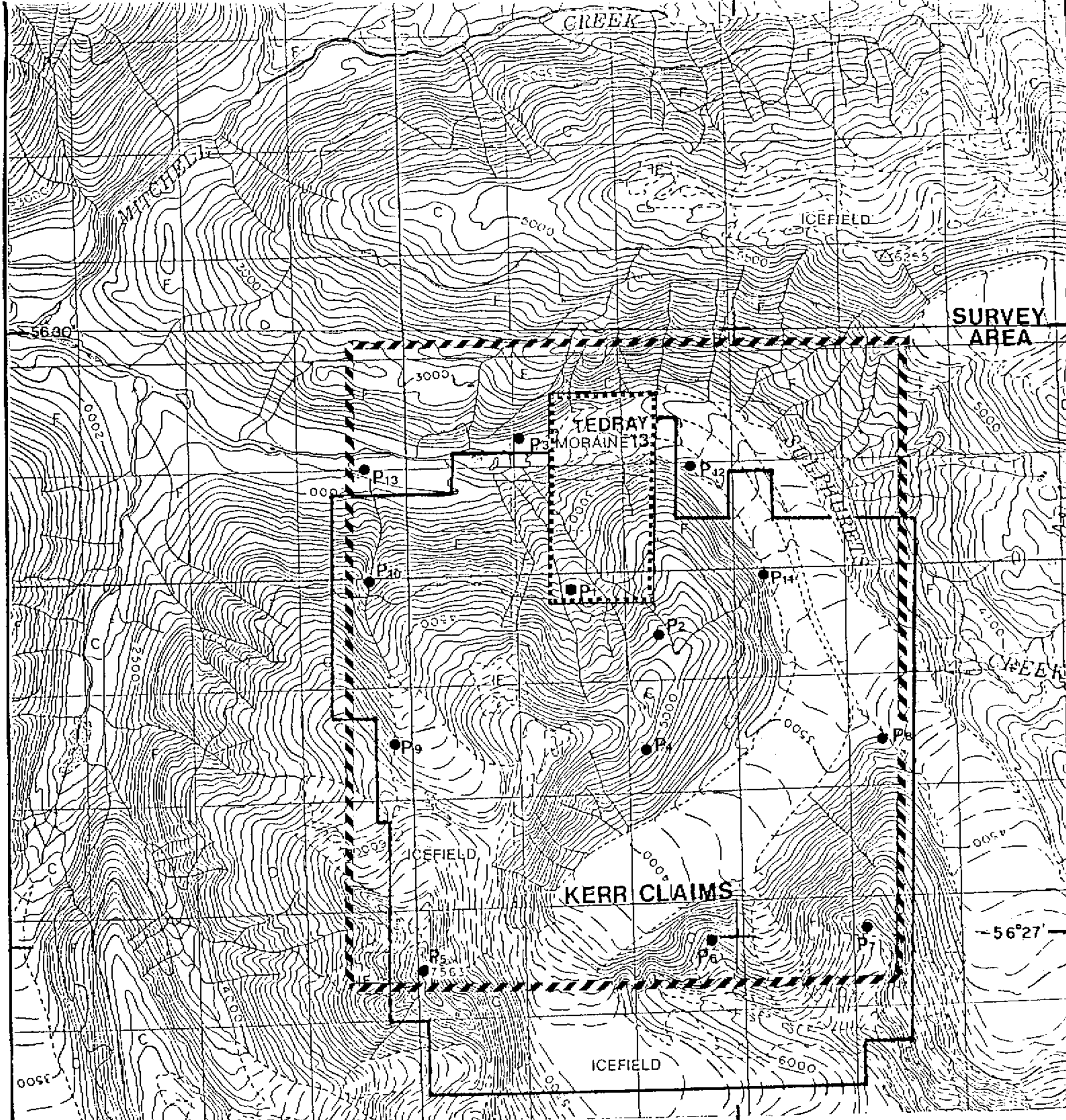
The survey was flown at an elevation of approximately 13,000 feet above sea level, yielding 1:15,000 scale airphotos. Photographs at this scale will allow for the preparation of more detailed orthophoto and contour maps than those presently in use.

TABLE 6 : SURVEY STATION CO-ORDINATES
(in metres)

STATION	NORTHING	EASTING	ELEVATION
	Legal Corner Post Locations		
Replacement LCP Tedray 13 set Pipe Post	12862.15	10093.75	732.80
	Drill Hole Locations		
89-1,2	10561.51	9660.27	1339.11
89-3	10540.59	9546.06	1341.17
89-4	10540.59	9545.72	1341.17
89-5	10359.38	9624.29	1426.99
89-6	9901.85	9595.49	1659.62
89-7	10179.04	9600.93	1511.00
89-8	10879.31	9562.28	1160.67
89-9,9A,18	10865.06	9398.45	1165.85
89-10	10688.93	9471.95	1232.84
89-11	10865.55	9473.51	1157.55
89-12	10976.18	9657.92	1139.45
89-13	10959.44	9506.99	1119.54
89-14	10976.90	9350.54	1124.54
89-15	10325.38	9469.85	1374.76
89-16	10975.95	9350.51	1124.45
89-17	11163.70	9301.06	1056.99
	Grid Stations		
10700N 10400W Kerr Grid	10640.15	9581.90	1309.0
9500N 10375E Tedray Grid	10685.40	9562.70	1273.10
9500N 10000E Tedray Grid	10666.20	9179.00	1267.00

TABLE 6 (cont'd)

STATION	NORTHING	EASTING	ELEVATION
	1988 Tedray Drill Holes		
T88-1	11814.31	9523.10	949.57
T88-2	11713.54	9535.72	977.31
	Photo Targets		
P-1	10973.99	9321.46	1124.43
P-2	10564.03	10130.05	1487.16
P-3	12392.50	8845.73	589.52
P-4	9529.33	10021.98	1520.86
P-5	9546.90	7929.15	2308.92
P-6	7755.38	10602.69	1643.25
P-7	7892.04	12040.18	2038.18
P-8	9585.94	12186.94	1098.52
P-9	9577.60	7702.84	1565.71
P-10	11068.64	7481.88	1031.46
P-11	11090.56	11101.36	879.25
P-12	12119.42	10445.08	756.04
P-13	12092.01	7443.60	579.23



N.T.S. 104B/8

●P6 Photo Target

SULPHURETS GOLD CORPORATION

KERR PROJECT 1989

AIR PHOTO TARGET SURVEY

Scale 0 1 2 KM

SKEENA M.D. RPT: 1065 FIGURE 28

CONCLUSIONS

8.0 CONCLUSIONS

Exploration activity on the Kerr and Tedray properties in 1989 focused on the B-Zone copper-gold deposit. The program was successful both in establishing continuity within the previously defined area of the deposit and also in extending the zone northward along strike onto the Tedray property.

A total of 27 drill holes have intersected copper and gold mineralization to date, outlining a zone some 1600 metres long, 200 metres wide and 112 metres thick. Drill inferred geological reserves currently stand at 126 million tonnes with an average grade of 0.61% copper, 0.27 grams/tonne gold, and 1.71 grams/tonne silver. A high grade deposit of 59 million tonnes grading 0.9% copper and 0.34 grams gold per tonne makes up the core of the larger deposit. The deposit is considered to be open both along strike and at depth and a considerable portion of the alteration zone remains to be tested.

Induced polarization surveys conducted in 1987 and 1988 yielded high chargeability/low resistivity anomalies that correlated well with the high-grade mineralization. In 1989, the anomaly was extended 300 metres north of the known existing mineralization; however, further to the north, the anomaly was abruptly cut off. Bedrock responses in this northern region are masked by thick accumulations of overburden. Further geophysical surveying in this area would have to employ techniques capable of greater depth penetration.

Detailed mapping and rock chip sampling carried out in previous years identified a number of additional target areas that host high-grade gold, silver and copper mineralization. Areas such as the A-Zone, A-North Zone, C-Zone and peripheral to the B-Zone deposit host a variety of styles of mineralization that were not examined in 1989. Further work is required in these areas in order to adequately evaluate their economic potential.

RECOMMENDATIONS

9.0 RECOMMENDATIONS

Exploration programs on the Kerr and Tedray properties have employed induced polarization survey techniques and wide-spaced drilling to effectively outline a large zone of copper and gold mineralization. Much work is now required to prove-up tonnages within the deposit and, in addition, to conduct exploration directly within the much broader alteration zone that remains untested. To this end, the following program is provided as an update to the previous program outlined in the 1988 project report (Hewton and Butterworth, 1988):

1) Diamond drilling within the known area of the deposit to elevate reserves to a proven and probable category.

2) Further drilling of the Tedray 13 property to determine the overall lateral extent of the deposit and, immediately west of the deposit, to determine the down dip potential or to look for parallel zones.

3) Completion of induced polarization surveying to the north, particularly along the eastern region of the alteration zone to close-off existing anomalies. In addition, employ a geophysical survey technique capable of penetrating thick accumulations of overburden that lie along the western half of the Tedray property.

4) Construction of an access road from Sulphurets Creek Valley to the ridge top to decrease dependency on helicopters and access drill sites, particulary in the north slope of the Kerr property and on the Tedray property.

5) Construction of a semi-permanent base camp in the valley, near Sulphurets Lake, to enable crew size increase and extend the working season.

6) Employment of a laboratory, including an atomic absorption unit to improve turnaround time for copper analyses.

7) Installation of telephone and telecopier units to improve communications.

8) Continue metallurgical, economic and environmental studies.

REFERENCES

Anderson, R.G., Thorkelson, D.J. and Bevier, M.L., 1989, Paleozoic and Mesozoic Evolution of the Iskut River Map Area, Northwestern British Columbia, Canada, and Setting of some Precious and Base Metal Mineral Deposits : Geological Survey of Canada paper presented at Northwest Mining Association Conference, December, 1989.

Butterworth, B.P. and Kozak, D.K. 1988, Geological, Geochemical and geophysical Report of the Tedray 13 claim: Western Canadian Mining Report 1025.

Hewton, R.S. and Butterworth, B.P, 1988, Kerr Project Report - 1988: Western Canadian Mining Report 1032.

Kowalchuck, J.M. and Jerema, M., 1987, A Geological, Geochemical, Geophysical and Diamond Drilling Report on the Kerr Property: Western Canadian Mining Report 996.

Lebel, J.L., 1989, Report on Induced Polarization Survey, Tedray Property; Western Canadian Mining Report 1064.

Payne, J., 1988, Petrographic Analysis of the Kerr Property: Western Canadian Mining Report 1035.

Smith, D. and Gerath, R.F., 1989, Iskut Valley Road Option Study: A Report to B.C. Ministry of Energy, Mines and Petroleum Resources by Thurber Consultants Ltd.

Walcott, P.E., 1988, A Geophysical Report on an Induced Polarization Survey, Iskut Area, British Columbia: Western Canadian Mining Report 1016.

COST STATEMENT

KERR PROPERTY - 1989

SALARIES		$ 96,862
AIRCRAFT - Fixed Wing	4,528	
- Helicopter	126,966	131,494
ASSAYS		14,484
CONSULTING - Geological Mapping /Petrographic Work	11,205	
- Environmental Studies	11,820	23,025
CLAIM FEES		5,410
DRAFTING/PHOTOCOPY/PHOTOGRAPHY		1,748
DRILLING		164,810
EXPEDITING		8,547
FIELD EQUIPMENT - Rental	8,526	
- Purchase/Repair	8,242	16,768
FUEL		3,273
FREIGHT/COURIER		4,333
HYDRO EXPENSE		34
MAPS/PUBLICATIONS/MISC.		452
RADIO/TELECOMMUNICATIONS		8,380
ROOM AND BOARD		13,134
STAKING		49
SURVEYING/MAP MAKING		3,747
TRAVEL		4,884
TRENCHING/BLASTING		8,817
VEHICLE		4,383
SUBTOTAL:		514,634
INTER COMPANY EXPLORATION/SUPERVISION		37,182
TOTAL:		$ 551,816

COST STATEMENT

TEDRAY PROJECT - 1989

SALARIES		$	54,740
AIRCRAFT - Fixed Wing	4,528		
- Helicopter	110,315		114,843
ASSAYS			15,298
CLAIM FEES			80
CONSULTING - Geological Mapping/ /Petrographic Work	3,353		
- Environmental Studies	7,373		10,726
CONTRACT - Geological Services	517		
- Geophysical Surveying	10,335		
- Linecutting	2,487		13,339
DRAFTING/PHOTOGRAPHY/PHOTOCOPYING			917
DIAMOND DRILLING			148,522
EXPEDITING			8,539
FIELD EQUIPMENT - Rental	6,051		
- Purchase/Repair	6,800		12,851
FUEL			3,528
FREIGHT/COURIER			4,235
HYDRO			34
RADIO/TELECOMMUNICATIONS			7,478
ROOM AND BOARD			12,754
SURVEYING/MAP MAKING			3,927
TRAVEL			4,884
TRENCHING/BLASTING			8,817
VEHICLE			4,210
SUBTOTAL:			429,722
INTER COMPANY EXPLORATION/SUPERVISION			29,995
TOTAL:		$	459,717

STATEMENT OF QUALIFICATIONS

I, Robert S. Hewton of West Vancouver, British Columbia, hereby certify that:

1. I am a geologist residing at 504 2180 Argyle Ave., West Vancouver, B.C., and am currently employed by Western Canadian Mining Corporation of 1170 - 1055 West Hastings Street, Vancouver, B.C. V6E 2E9

2. I graduated from McMaster University, Hamilton, Ontario with a B.Sc. in Geology in 1969 and have practised my profession since.

3. I am currently registered with the Association of Professional Engineers for the Province of British Columbia and with the Association of Professional Engineers of Yukon Territory.

4. I am a Fellow of the Geological Association of Canada and a Member of the Society of Economic Geologists.

5. Work on the property was done under my direct supervision.

Respectfully,

WESTERN CANADIAN MINING CORPORATION

R.S. Hewton, P. Eng.

Dated at Vancouver, British Columbia

this 8th day of January, 1990.

STATEMENT OF QUALIFICATIONS

I, Brian P. Butterworth, of North Vancouver, British Columbia, hereby certify that:

1. I am a geologist residing at 1008 Wellington Drive, North Vancouver, British Columbia and am employed by Western Canadian Mining Corporation of 1170 - 1055 West Hastings Street, Vancouver, British Columbia V6E 2E9

2. I received a Bachelor of Science degree from the Faculty of Geology of the University of British Columbia, Vancouver, British Columbia (1983).

3. I am a Fellow of the Geological Association of Canada.

4. I am the co-author of this report, which is based on field work supervised by myself, in 1989, under the direct supervision of R.S. Hewton, Vice President and General Manager.

B.P. BUTTERWORTH, B.Sc., F.G.A.C.

Dated at Vancouver, British Columbia

this 8 day of January, 1990.

STATEMENT OF QUALIFICATIONS

I, Scott Casselman of #214-144 West 4th Street, North Vancouver, British Columbia, hereby certify that:

1) I am a geologist currently employed by Western Canadian Mining Corporation, Suite 1170 - 1055 West Hastings Street, Vancouver, British Columbia. V6E 2E9

2) I graduated from Carleton University, Ottawa, Ontario with a Bachelor of Science Degree in Geology in the year 1985 and have practiced my profession since.

3) The field work presented in this report was conducted by myself and other members of Western Canadian Mining Corporation staff during the Summer of 1989 under the supervision of R.S. Hewton and B.P. Butterworth

Respectfully Submitted,

Scott G. Casselman, B.Sc.
Vancouver, Canada

January, 1990.

LIST OF PERSONNEL

R.S. Hewton	-	Exploration Manager
B.P. Butterworth	-	Project Geologist
H. Holm	-	Field Technician/Draftsman
S.G. Casselman	-	Geologist
K. Richmond	-	Field Technician
O. Korolew	-	Field Technician
M. Jury	-	Field Technician
C. Rowe	-	Field Technician
A. Bisson	-	Field Technician
T. Flint	-	Field Technician
A. Anderson	-	Cook/First Aid Attendant
S. Wenzell	-	Assistant Cook

LIST OF CONTRACT PERSONNEL

J.T. Thomas Drilling - diamond drilling
OreQuest Consultants - geophysics
Northern Mountain Helicopters - 205/500D helicopters
Central Mountain Air - fixed wing aircraft
Sourdough Secretarial Services - M. Fitton, expediter
Vangeochem Lab Ltd. - geochemical analyses
Bondar-Clegg and Co. Ltd. - geochemical analyses
Norecol Environmental Consultants Ltd. - environmental studies
Gordon Clark and Associates Ltd. - drill site preparation/line cutting
McGladrey and Associates - surveying
J. Payne - geological consultant
Vancouver Petrographics - petrographic analysis
H. Taylor - consulting mining engineer
B.C. Tel - satellite communications

APPENDIX I

GEOLOGICAL REPORT
KERR AND TEDRAY PROPERTIES
SULPHURETS GLACIER AREA

GEOLOGICAL REPORT
KERR AND TEDRAY PROPERTIES
SULPHURETS GLACIER AREA

NTS 104 B/8

56° 28' N, 130° 16'W

A Copper-Gold Prospect

for

WESTERN CANADIAN MINING CORP, LTD.,
1170 - 1055 West Hastings Street,
Vancouver, B.C., V6C 2T5

by

JOHN G. PAYNE, PhD
877 Old Lillooet Road,
North Vancouver, B.C., V7J 2H6

December 1989

TABLE of CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF MAPS (all inside back cover)

SUMMARY

The Kerr and Tedray properties are in the Intermontaine Tectonic Belt between the western margin of the Bowser Basin and the Coast Plutonic Complex. Host rocks probably belong to the Lower Jurassic Hazelton Group; however, the relationship between detailed and regional geology is understood poorly.

Basement rocks (**Unit 1**), including quartz diorite, granodiorite, and coarsely porphyritic (plagioclase-hornblende) latite, form small inclusions in domes and intrusions of Unit 4.

To the east, at the base(?) of the stratigraphic section, are sedimentary rocks of **Unit 2.** These are dominated by thinly bedded argillite and siltstone, with less abundant sandstone and greywacke, and minor intervals of pebble and boulder conglomerates and cherty sedimentary rocks.

Unconformably overlying rocks of Unit 2 and hosting the main zones of economic interest are felsic pyroclastic rocks of **Unit 3.** A lower subunit to the east dominated by latite/dacite lapilli tuff, is overlain to the west by a much thicker subunit dominated by fine tuff. In places a prominent foliation (=bedding?) is parallel to contacts with thin, interbedded sequences of argillite and tuffaceous sediments. Steeply dipping, pene-contemporaneous, flow-banded latite dikes cut "bedding" in pyroclastic rocks at a moderate to high angle. Most rocks are altered strongly to moderately to quartz-sericite-(carbonate) schist with minor to abundant disseminated pyrite.

Zones of more intense hydrothermal activity are indicated by **quartz-pyrite veins and lenses,** in part parallel to bedding, and by the presence of replacement zones of **quartz-pyrite-chalcopyrite-tetrahedrite-(bornite),** locally with **native gold** or **electrum. Anhydrite** commonly is abundant in sericite-pyrite alteration zones surrounding the siliceous cores. These deposits probably were formed shortly after formation of the host rocks during hiatuses in the volcanic activity. They occur at several locations throughout the property, and may represent more than one hydrothermal event. The quartz-sulfide deposits show some features similar to those of volcanogenic massive sulfide deposits and some features similar to those of high-level "porphyry" deposits.

Massive porphyritic latite/andesite domes and/or flows of **Unit 4** occur at two main stratigraphic levels, a lower level on the contact of rocks of Units 2 and 3, and an upper level on or near the upper contact of Unit 3 with Unit 5. Surrounding the dome in the A Zone and A-North Zone, rocks of Unit 3 have been intruded by numerous small dikes and pods of Unit 4. On top of this dome is an irregular tabular body of latite/andesite which may be a flow. In and near the domes at both stratigraphic levels, are **hydrothermal centers** in which rocks contain **abundant disseminated pyrite** and **veins** and **veinlets** dominated by one or more of **quartz, calcite,** and **pyrite,** with concentrations in the A/A-North Zone of **chalcopyrite, sphalerite, galena,** and minor **tetrahedrite/tennantite, argentite, electrum,** and **native gold,** and in the Tedray zone of **bornite** and **chalcopyrite.**

Overlying the upper zone of Unit 4 in the A-North Zone is an alternating sequence of argillite and latite flows, tuffs, and tuffaceous sedimentary rocks of **Unit 5.** These are overlain by a thick sequence dominated by andesite lapilli tuff with minor andesite tuff,

latite/dacite lapilli tuff and argillite of **Unit 6**. In turn, these are overlain by a distinctive, latite/dacite lapilli tuff of **Unit 7**.

Andesite dikes of **Unit 8** cut rocks of Units 3 and 4; most are massive, but a few were deformed.

The style and orientation of deformational features is markedly different in rocks of Unit 2 from those in younger rocks. Beds of Unit 2 were folded into mesoscopic, open to tight folds which plunge southeast, possibly during an Early Jurassic deformation event.

The main regional deformation is part of the **Skeena Range Event** of **Middle Cretaceous** age. This deformation produced regional, north- to northwest-trending folds and easterly directed thrust faults.

Rocks of Unit 3, 5, 6, and 7 are cut by a steeply dipping, metamorphic foliation (S1). The line of intersection of bedding (**S0**) and S1 is marked by a prominent lineation (L1), which generally strikes 270-320 degrees, and plunges 40-70 degrees. In the central part of the property, a broad north-facing, syncline is outlined in S0 in rocks of Unit 3; its axis plunges northwest along the lineation. The contact between rocks of Unit 3 and the overlying stratiform rocks of Units 5-7 to the west appears to dip moderately to steeply to the west and southwest, with no evidence of the northwest-plunging syncline. The syncline in Unit 3 may indicate an earlier stage of deformation in the Skeena Range Event, upon which was superimposed a later, more penetrative deformation during which S1 was developed.

Many dikes and sills of rocks of Unit 4 which cut rocks of Units 2 and 3 were folded broadly about L1 in folds which mimic the fold and style in the host rocks.

A set of generally north-south-trending faults which dip moderately to steeply to the west includes the Far West, West, A-Zone, B-Zone, and Camp Faults. None of the faults shows regional displacement. Where the B-Zone Fault cuts the B-Zone of sulfide mineralization, a thick intersection of quartz-sulfide-anhydrite mineralization occurs in the hangingwall of the fault. A wide "rubble zone" intersected by most holes drilled along the fault is caused mainly by alteration of anhydrite to gypsum in the zone of **secondary sulfide enrichment** and subsequent leaching of gypsum. This zone commonly contains **secondary chalcocite-covellite** as reaction rims on chalcopyrite and as coatings on pyrite.

Despite the fact that extensive drilling has outlined several zones of copper-(gold) mineralization, large parts of the zone of economic potential still remain untested. The main region of interest of this type is beneath the glacier and moraine along the western side of the zone. Also of interest and untested is the southern extension of the B-Zone (this part of zone is not as suitable for open-pit development as to the north).

Although the highest grade, extensive zones of Cu-(Au) mineralization on the property are dominated by replacement bodies rich in quartz, the abundance of bedded sulfides along and near the contact of sedimentary lenses in the sequence suggests the possibility that, during hiatuses in volcanic activity, stratabound massive sulfide deposits were formed in basins along such surfaces.

GEOLOGICAL REPORT
KERR AND TEDRAY PROPERTIES
SULPHURETS GLACIER AREA

A Copper-Gold Prospect

1.0 INTRODUCTION

The original purpose of the study was to examine the structural and lithological relationships of the felsic volcanic rocks which host the copper-gold deposits on the Kerr and Tedray properties, and to determine the controls of the deposits. When it became obvious that previous geological maps of the property were inadequate and that the structure was more complex than expected, the geology of the surrounding rocks was mapped as well.

Field work was done between July 21st and August 2nd, and between August 25th and 30th, 1989. For much of the property, mapping was done on a 1:2500 topographic base which showed locations of drill holes and various grids. One more-regional traverse was made to the southwest, using topographic bases at scales of 1:5000 and 1:50,000. Examination of drill cores and discussion of the geology with Brian Butterworth and Scott Cassleman, particularly regarding their understanding of drill hole data, aided in the geological interpretation. Thin sections were examined of many of the rock types and alteration assemblages.

2.0 GEOLOGY

2.1 Regional Geology

The regional geology is not well understood. Much of the following is from a discussion on November 23rd, 1989, with Bob Anderson of the Geological Survey of Canada. Regional stratigraphic sections by Anderson are shown in Figure 1.

The properties are in the **Intermontaine Tectonic Belt** between the western margin of the Bowser Basin and the Coast Plutonic Complex. The **Late Triassic Stuhini Group** shows a facies change from west to east. In the west is a characteristic limestone horizon containing Late Triassic conodonts. Above this is a sequence of felsic and mafic tuffs. To the east, the limestone unit becomes thinner and less ubiquitous, and felsic volcanic rocks are absent. Still further east, the section is dominated by sedimentary rocks including prominent feldspathic greywacke. Alldrick interpreted some of these rocks to belong to the Unuk River formation of the Hazelton Group. Rocks of the Stuhini Group are overlain by rocks of the Hazelton Group.

The lowest member of the **Hazelton Group,** the **Unuk River Formation** consists mainly of aphyric to weakly plagioclase phyric andesitic tuffs and lapilli tuffs with minor non-fossiliferous, siliceous siltstone interlayers. Fragmental andesites contain buff fragments in

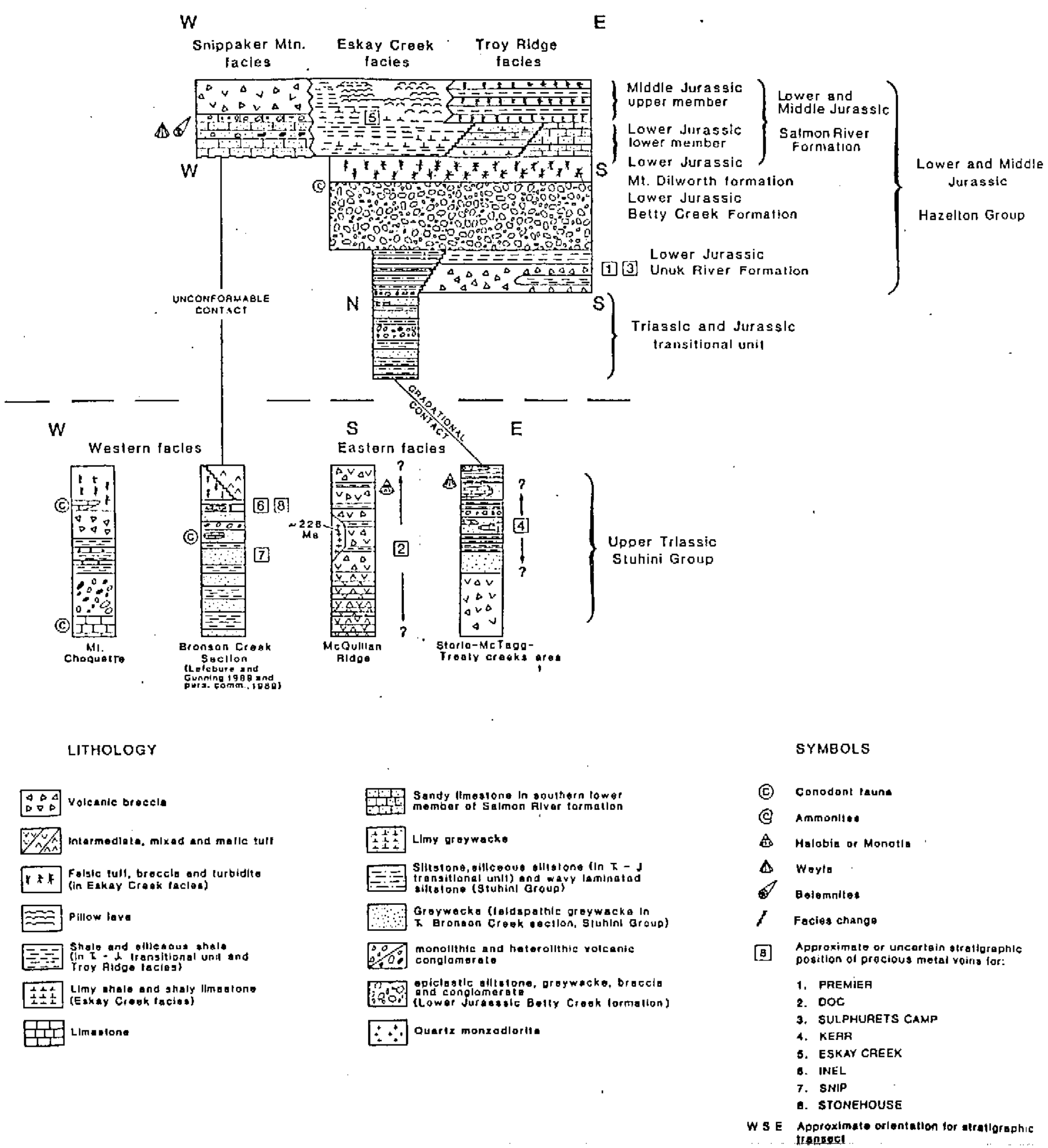


FIGURE 1. Regional Stratigraphic Columns

a paler green groundmass. The upper part of the Unuk River Formation contains "Premier Porphyry" flows characterized by K-feldspar phenocrysts.

These are overlain by commonly maroon volcanic epiclastic rocks of the **Betty Creek Formation**, which are overlain by coarse to aphanitic pyroclastic felsic volcanic rocks of the **Dilworth Formation** (**Pleinesbachian** age).

The upper member is the **Salmon River Formation**, at whose base is a thin (0.5-1 m), sandy, buff-colored limestone containing abundant fossils characterized by the assemblage of clams and belemnites of **Toarcian** age. Overlying this, the rocks show a facies change from limy sedimentary rocks to the south (near volcanic center [Alldrick]) to limy siltstone and sandstone in the middle, and thicker shales and greywackes to the north (deeper part of the basin).

The upper part of the Salmon River Formation (**Early Mid Jurassic**) shows a three-fold, east to west facies change. In the east the **Troy Ridge Sequence** contains thinly bedded "pajama beds" consisting of white felsic tuff interlayered with dark grey siliceous shale containing minor radiolaria. In the center the **Eskay Creek Formation** consists of limy shale and pillow lavas, characteristic of a back-arc basin. To the west, the **Snipaker Formation** consists of hornblende-porphyry, volcanoclastic rocks (volcanic arc) of uncertain age (because they are not overlain by the Bowser formation. Elsewhere rocks of the Salmon River Formation are overlain by fine to coarse clastic sedimentary rocks of the **Bowser Group.**

Early regional deformation probably occurred in the **Jurassic.** The main regional deformation is part of the **Skeena Range Event** of **Middle Cretaceous** age. This deformation produced north- to northwest-trending folds which involve the Bowser Group, and easterly directed thrust faults.

Plutonic events include four main ages, which correlate with the major volcanic events as follows:

Date	**Plutonic rocks**	**Volcanic rocks**
62-44 mA	Hyder	
180-175 mA	Zippa Mountain	Salmon River
196-189 mA	Texas Creek	Mount Dilworth, Unuk River
226-213 mA	Stikine	Stuhini

Rod Kirkham discussed some of the regional problems which became apparent during his mapping of the region around the properties in August 1989. Many of these problems relate to the timing and extent of major thrust faults, and to whether the region was affected by more than one stage of regional deformation.

The location of the Kerr property in the stratigraphic sequence is uncertain. Although it is in a region dominated by rocks of the Late Triassic Stuhini Group (Anderson, pers.comm.), the distinctly felsic nature of the volcanic rocks suggests that they belong to the Upper Jurassic Hazelton Group.

2.2 Lithologic Units (See Maps 1, 2, and 3)

The legend for the property is shown in Table 1 and geology is shown on Maps 1, 2, and 3. A lower, dominantly sedimentary interval to the east is overlain by two distinct, dominantly volcanic intervals to the west. Angular unconformities and subvolcanic domes and flows mark contacts of these major units. Rocks were deformed moderately and metamorphosed weakly during at least two events; the nature and timing of these events were not completely resolved during the study. Problems related to the structural interpretation will be discussed in detail in Section 2.3.

Table 1 **Legend**

Late Faults

Generally north-south-trending faults which dip moderately to steeply to the west include the Far West, West, A-Zone, B-Zone, and Camp Faults.

Regional Deformation (Skeena Range Event)

Strong to weak foliation in a north-south to northwest-southeast direction, and a strong to weak lineation, generally plunging 50-60 degrees northwest to west. Rocks of Units 3, 6, and 7, quartz-pyrite veins, and stratabound mineralized units dominated by quartz-pyrite-(chalcopyrite) in rocks of Unit 3 were warped about the lineation in mesoscopic to megascopic folds. (Note: bedding in rocks of Unit 2 does not conform to this fold pattern, suggesting that an earlier [Jurassic] folding event occurred in that unit.)

Late Dikes

8 Andesite Dikes

cut rocks of Units 3 and 4, age uncertain with respect to rocks of Units 5-7

Upper Volcanic-Sedimentary Unit

7 Latite/dacite lapilli tuff

6 Andesite lapilli tuff, tuff breccia, tuff,
minor latite/dacite intervals

6a argillite, argillaceous tuff (thin interlayers)
6L lapilli tuff, tuff breccia
6t tuff
6ts tuffaceous sediments (minor)
6F felsic members (with lithologic subscripts as above)

5 Argillite, latite tuff, minor latite flows

5a argillite, siltstone, thinly bedded
5b latite tuff, flow, tuffaceous sedimentary rocks

Possible angular unconformity along part of the contact 5

Extrusive and Hypabyssal Intermediate Rocks, Domes

4 Latite/Andesite dikes, sills, plugs, domes, flows(?)

(Hydrothermal event associated with formation of subvolcanic intrusive centers and domes at "A/A-North", "L", and "T" Zones)

4a plagioclase-(hornblende) porphyry, mainly massive, well foliated in narrow bodies and near some contacts
    4aK with K-feldspar phenocrysts, ?= "Premier Porphyry"

4b finer grained, generally moderately to weakly porphyritic with phenocrysts of plagioclase and hornblende, massive to weakly foliated
    4bH with altered, elongate hornblende phenocrysts
    4bK with moderately abundant K-feldspar in groundmass or locally as phenocrysts
    4bG with abundant diopside: hypabyssal alkali gabbro

4c aphanitic to glassy, massive, slightly porphyritic

4d monzo-diorite, fine to medium grained, relatively equigranular, the main zone is near DDH T-88-1.

Lower Volcanic Sequence

3 Fragmental Latite/Dacite

phenocrysts of plagioclase, biotite, and minor quartz; fragmental rocks commonly have a prominent "bedding", which locally is parallel to contacts with bedded rocks of Subunits 3a and 3ts.

3L lapilli tuff, mainly along the lower contact with argillite of Unit 2; commonly grey-brown, commonly with abundant Mn-oxides on fractures and weathered surfaces
    3Lz quartz-sericite-(pyrite-carbonate) alteration

3t fine to medium tuff (fresh rocks rare)
    3tz quartz-sericite-(carbonate) schist with minor to moderately abundant disseminated pyrite.

3d dikes; characterized by finely laminated flow-bands which cut "bedding" in rocks of Subunits 3Lz and 3tz.

3a* argillite, black, in part gradational to Subunit 3t
    3aL argillite with abundant dacite/latite fragments from 1-5 cm in size, grades into Subunit 3L along the east side of the property.

3ts* tuffaceous sedimentary rocks just southeast of the collar of DDH-88-17.

* these subunits occur directly above (northwest of) a zone of massive quartz-pyrite- Cu-sulfides. The contact is a target for a volcanogenic massive sulfide deposit.

Hydrothermal activity associated with culmination of volcanic eruptions in Unit 3 is indicated by abundant quartz-pyrite veins and lenses parallel to bedding, and by quartz-pyrite-chalcopyrite-tetrahedrite-(bornite) replacement zones (probably near-surface epithermal). These zones occur at several locations throughout the property, which may represent more than one hydrothermal event. Rocks formed during the hydrothermal event include the following:

- 3p Unit 3 with abundant pyrite and with pyrite lenses and seams, commonly parallel to bedding
- 3qp Unit 3 with quartz-pyrite veinlets and lenses, in part parallel to bedding and in part subparallel to foliation
- 3cu massive alteration zone dominated by quartz with patches and veinlets of pyrite and primary copper sulfides (chalcopyrite, tetrahedrite, and locally bornite); late recrystallized veinlets are of quartz-chalcopyrite-(tetrahedrite).
- 3Ah Unit 3 with abundant anhydrite, minor to moderately abundant quartz, pyrite and chalcopyrite

Possible Regional Deformation (Folding)

2 Sedimentary Rocks

- 2a argillite, siltstone, minor sandstone, commonly thinly bedded
- 2b sandstone, greywacke, commonly unbedded or thickly bedded, with minor argillite intervals.
- 2c pebble conglomerate, in part dominated by subangular to subrounded pebbles
- 2d conglomerate, containing abundant well rounded pebbles, cobbles, and boulders
- 2e cherty sedimentary rocks, thinly bedded, siliceous sedimentary rocks, in patches in Unit 4b/4c on the east side of the property and in drill holes and locally on surface in the "A"-Zone.

1 Basement Plutonic/Hypabyssal Rocks

quartz diorite and porphyritic (plagioclase-hornblende) latite inclusions in plugs of Unit 4b/c.

2.2.1 Unit 1 Plutonic and Hypabyssal Basement Rocks

Unit 1 consists of fine to medium grained plutonic and hypabyssal rocks, which form subrounded to elongate fragments from a few decimetres to several metres long in rocks of Unit 4b/c near Station 9300S, 10,000W. They represent fragments of a crystalline basement of unknown age upon which the volcanic rocks of Unit 3 were deposited.

The plutonic rocks are of a fine to medium grained porphyritic granodiorite to quartz-bearing diorite containing phenocrysts of plagioclase and much less hornblende (altered to chlorite-calcite-epidote) in a groundmass of plagioclase-quartz-K-feldspar with minor sphene (TS 776).

Less abundant inclusions of hypabyssal rocks are of porphyritic (plagioclase-hornblende) latite, somewhat similar in appearance to rocks of Subunit 4a, but with a coarser grained groundmass containing moderately abundant K-feldspar.

Lower Sedimentary Sequence

2.2.2 Unit 2 Sedimentary Rocks

These rocks occur in the eastern part of the property. The nature of their contact is uncertain with rocks of Unit 3. In places the contact is marked by a latite/andesite sill of Subunit 4a. Elsewhere, it is gradational from coarser, clastic sedimentary rocks to fragmental latite/dacite. Bedding attitudes in most rocks of Unit 2 are not parallel to the contact with rocks of Unit 3, and folds are disharmonic with those in Unit 3, suggesting an angular unconformity and deformation of the rocks of Unit 2 before deposition of the rocks of Unit 3. Rocks of Unit 2 are broadly to tightly folded along the contact with rocks of Unit 3, and contain moderately abundant sills, dikes, and irregular intrusions of rocks of Subunits 4a, 4b, and 4c.

Subunit 2a, which is the dominant subunit, consists of generally thinly bedded, medium grey to black argillite, medium grey siltstone, and light to medium brownish grey minor sandstone. Adjacent beds commonly show a moderate contrast in color on the weathered surface.

Subunit 2b consists of fine to medium grained, dark grey to brownish grey greywacke to intermediate tuff. It forms thickly, commonly poorly bedded sequences, which contain thin intervals of Subunit 2a. Abundant fragments are of plagioclase crystals and porphyritic andesite/latite, many of which are similar in composition to rocks of Subunits 4b and 4c (TS 767). A few hundred metres west of camp, rocks of Subunit 2b grade into those of Subunit 3L.

Subunit 2c is a massive, fine-pebble conglomerate, commonly dominated by subangular to subrounded pebbles in a sparse, silty to sandy groundmass.

Subunit 2d, which occurs locally with or near Subunit 2c, is characterized by abundant, well rounded pebbles, cobbles, and boulders of a variety of rock types, mainly intermediate volcanic rocks, and minor distinctive quartzite fragments (TS 770).

Subunit 2e consists of thinly bedded, light grey to green, siliceous sedimentary rocks. It forms inclusions up to several metres across in rocks of Subunit 4b/4c east of Camp Fault and smaller ones locally in A Zone.

Possible Regional Deformation (Folding)

Lower Volcanic Sequence

2.2.3 Unit 3 Felsic Volcanic Rocks

Rocks are fragmental latite and dacite, dominated by fine to medium tuffaceous rocks (Subunit 3t), and lesser coarse tuffs and lapilli tuffs (Subunit 3L). The latter commonly are concentrated near the eastern (stratigraphically lower) contact of the unit. Along the eastern margin, lapilli tuffs locally are gradational into greywacke and pebble conglomerate of Subunits 2b and 2c.

Subunit 3L consists of lapilli tuff and less coarse tuff containing moderately abundant fragments of a variety of types of extremely fine to very fine grained latite/dacite in a foliated groundmass dominated by sericite/muscovite and quartz. Along the eastern margin of the main alteration zone, rocks commonly are grey-brown in color and generally contain abundant Mn-oxides on fractures and weathered surfaces.

Subunit 3t consists of fine to medium latite/dacite tuff, with plagioclase and minor quartz and biotite phenocrysts and fragments of very fine latite/dacite in an extremely fine grained groundmass dominated by sericite and quartz. Generally it is altered strongly to moderately to quartz-sericite-(carbonate) schist (Subunit 3tz) with minor to moderately abundant disseminated pyrite.

Subunit 3ts consists of well bedded, latite to andesite tuffaceous sediments, which occur in a thin interval stratigraphically just above the B-Zone Center and outcrops just southeast of DDH 87-17.

Subunit 3a is a thin interlayer of argillite in the western part of the B Zone Center, which occurs in the nose of a northwest-plunging syncline. Along the contact with underlying rocks of Subunit 3tz is a lensy zone up to 10 cm wide of Subunit 3cu. This contact is the type of contact along which massive sulfide deposits occur in the volcanogenic massive sulfide environment.

Subunit 3d consists of latite/dacite dikes, recognized by finely laminated flow-banding which commonly is at an odd angle to the "bedding" in surrounding rocks of Subunits 3L and 3t, and in several places is seen to truncate "bedding". Most dikes trend north-south and dip steeply, and were altered by the same hydrothermal event which affected the surrounding rocks of Unit 3.

Except along part of the eastern contact, rocks of Unit 3 are altered moderately to strongly to quartz-sericite-pyrite-(carbonate) schist (**Subunits 3Lz, 3tz,** and **3d**) by the major hydrothermal event during which the major quartz-sulfide deposits were formed.

The culminations of the hydrothermal events, which occurred during hiatuses in felsic volcanic eruptions, are indicated by increased abundance of **quartz-pyrite veins and lenses** parallel to bedding, and by the presence of **replacement zones of quartz-pyrite-chalcopyrite-tetrahedrite-(bornite)** with locally trace **native gold** or **electrum. Anhydrite** is abundant in sericite-pyrite alteration zones surrounding the replacement bodies. These zones are gradational between stratabound and high-level epithermal deposits. They occur at several locations throughout the property, the most significant of which are the following:

1) B-Zone
   1a) B-South
   1b) B-Center (P-Zone), including zones east and west of DDH-88-18, and downdip to the north. This broad zone has potential for massive sulfide deposits along its upper (northwestern) contact.
   1c) B-North (Tedray South Zone), characterized by a high chargeability anomaly, and occurring just north of a zone of strong quartz-pyrite alteration of rocks of Unit 3.
   1d) B-West (DDH 88-14 and DDH 89-6 and largely untested zone to the north beneath the Kerr glacier and moraine); abundant chlorite.

2) C-Zone (east of B-Zone), footwall zone in Subunit 3Lz, characterized by presence of minor sphalerite and galena.

Hydrothermally altered rocks and stratabound deposits include the following mappable subunits:

Subunit 3p consist of beds averaging 1-5 cm thick and locally up to 50 cm thick of massive pyrite, or zones with very abundant pyrite lenses and seams, commonly parallel to bedding.

Subunit 3qp includes rocks with abundant quartz-pyrite veinlets and lenses, in part parallel to bedding and in part subparallel to foliation.

Subunit 3cu is dominated by quartz with patches and veinlets of pyrite and primary copper sulfides (chalcopyrite, tetrahedrite, and minor bornite). It contains microscopic patches and veinlets consisting of recrystallized quartz-chalcopyrite-(tetrahedrite).

Subunit 3Ab includes strongly altered rocks of Subunits 3t and 3L which contain abundant replacement patches and veins of anhydrite, with or without quartz and minor calcite and sulfides. It is poorly exposed on surface because in the weathered zone, anhydrite was leached, leaving a characteristic "rubble" zone.

Intermediate Extrusive Rocks, Domes, Hypabyssal Intrusions

2.2.4 Latite/Andesite Flow, Dome, Hypabyssal Intrusion, Breccia

Massive porphyritic latite/andesite domes and/or flows of Unit 4 occur at two main stratigraphic levels, which may have been formed at two different times from the same or similar source. The two stratigraphic levels are as follows:

1) **Lower Level:** along the contact of rocks of Units 2 and 3. Two main domes are present, one in the southeast centered around the "L"-Zone and the other in the north around the Tedray Bornite Showing. They are dominated by rocks of Subunits 4b and 4c, with some larger bodies containing cores of Subunit 4e.
2) **Upper Level:** A-North and West Bluffs Zones on or near the upper contact of Unit 3 with Unit 5. (These zones are separated by and probably offset along the Far West Fault.) On top of the dome in the A-North Zone is an irregular tabular body of latite/andesite, which caps the dome and the sequence of fragmental rocks of Unit 3. This may be a flow which would have been extruded during or after formation of the dome. This flow(?) is overlain conformably by an alternating sequence of sedimentary rocks and latite flows of Unit 5. Adjacent rocks of Unit 3 were intruded by numerous small dikes and pods of Subunits 4a and 4b.

Rocks of Unit 4 vary moderately in texture and composition. In most bodies, rocks are andesitic latite to andesite, with phenocrysts of plagioclase and hornblende in a groundmass dominated by plagioclase, in part altered to sericite and calcite. In cores of some intrusions are bodies of porphyritic latite to monzo-diorite containing plagioclase, hornblende, and in places biotite phenocrysts in a groundmass dominated by plagioclase with moderately abundant to very abundant K-feldspar.

Subunit 4a is characterized by prominent phenocrysts of plagioclase from 1-3 mm in size and less phenocrysts of hornblende of similar size and smaller and less abundant ones of apatite in a vitreous groundmass dominated by plagioclase. It forms sills and dikes in rocks of Unit 3, along the contact of Units 3 and 2, and less commonly in Unit 2. Larger bodies are massive, whereas smaller bodies and borders of larger ones commonly are foliated moderately to strongly. Foliation commonly is parallel to contacts of the bodies and in places is parallel to "bedding" in Unit 3, rather than being parallel to the regional metamorphic foliation. Locally, prominent K-feldspar phenocrysts are up to 2 cm in length (**Subunit 4aK**); this rock has the appearance of the rock known throughout the region as "Premier Porphyry".

Subunit 4b is characterized by much less abundant and less prominent phenocrysts of plagioclase and hornblende than in Subunit 4a in an aphanitic groundmass of plagioclase, chlorite, and carbonate. It varies moderately in texture and grain size and some bodies probably include several phases. Some samples have a lathy groundmass, suggesting that the original rock was andesite; in others, the groundmass contains more-equant plagioclase, suggesting an original latite composition.

Subunit 4bH is a porphyritic latite containing prominent elongate hornblende phenocrysts up to 1.5 mm long and less prominent plagioclase phenocrysts in a groundmass dominated by plagioclase and K-feldspar. It is moderately abundant in the A-North Zone, and was called "diorite" in some previous studies. Locally it contains minor inclusions up to 2 cm across of very fine grained slightly-more mafic rock and of medium grained diorite.

Subunit 4bK is similar to Subunit 4b, but contains moderately abundant K-feldspar in groundmass, and the groundmass commonly has a slightly coarser texture than normal. The subunit is best recognized by the positive K-stain with hydrofluoric acid and sodium cobaltinitrite. Because this stain was not done systematically in the field, the overall distribution of this subunit is uncertain.

Subunit 4bG was seen in one thin section (TS 780). It is a breccia containing abundant fragments of porphyritic hypabyssal alkali gabbro, which is characterized by phenocrysts of augite and less plagioclase in a groundmass dominated by plagioclase/sericite and patches of K-feldspar. The breccia groundmass is characterized by quartz and epidote, with less abundant pyrite-chalcopyrite. The fragments may have been derived from the basement.

Subunit 4c is a massive andesite to latitic andesite characterized by the absence of prominent phenocrysts and by an aphanitic, in part glassy, dark green groundmass dominated by plagioclase/sericite. In some previous studies, the subunit was misclassified as very fine grained latite/dacite tuff. It is gradational in texture to finer grained varieties Subunit 4b.

Subunit 4d is a fine to locally medium grained, porphyritic monzo-diorite containing plagioclase and hornblende phenocrysts and locally biotite and quartz phenocrysts in a very fine to fine grained groundmass dominated by plagioclase and primary K-feldspar. It occurs in the cores of some of the domes, most notably in the Tedray Bornite Zone and to a less extent in the A-North Zone.

In and near the cores of the A/A-North dome, rocks were altered hydrothermally, forming **abundant disseminated pyrite** and **veins** and veinlets dominated by one or more **quartz, calcite,** and **pyrite.** Some also contain abundant **chalcopyrite**, others abundant **sphalerite** and **galena**, and a few contain concentrations of **tetrahedrite/tennantite, argentite, electrum,** and **native gold.** In the Tedray zone, veins are dominated by **quartz-bornite-chalcopyrite**, and pyrite is rare.

Upper Volcanic-Sedimentary Sequence

2.2.5 Unit 5 Argillite, latite/dacite tuff, flow

Overlying the latite flow(?) at the top of the dome in the A-Zone and A-North Zone is an interlayered sequence of meta-sedimentary rocks (**Subunit 5a**) and latite/dacite tuffs and flows (**Subunit 5b**). The flows are similar to those of Subunit 4b, and probably represent late pulses of magma from the same or similar source as that for rocks of Subunit 4b. Flows are up to a few metres thick and dominate the lower part of the section. Bedded rocks in this part of the section consist of green and dark grey argillite and light to dark green tuffaceous sedimentary rocks and tuffs.

Higher up in the section latite/andesite flows are absent, and the section consists of thinly bedded, medium grey to black argillite and siltstone, similar lithologically to rocks of Subunit 2a. Rocks of Unit 5 form a lens which wedges out within a few decametres to the north and south of A-Zone. No rocks of Unit 5 were seen in the West Cliff Zone.

2.2.6 Unit 6 Andesite Tuff, Lapilli Tuff, Flow

Overlying rocks of Units 4 and 5 in the A-Zone and overlying rocks of Unit 4 in the West Cliff Zone is a sequence of medium to dark green to grey andesitic tuffs (**Subunit 6t**) and lapilli tuffs (**Subunit 6L**), with minor flows (**Subunit 6f**). A few, thin, latite/dacite members have a light to medium grey to green color (**Subunits 6Dt, 6DL**). Lapilli tuffs contain fragments of andesite to dacite averaging 1-5 cm in size, and locally up to 20 cm across. Interlayered with the tuffs are a few intervals of medium to dark grey argillite and tuffaceous argillite (**Subunit 6a**). At the top of the section is a distinct interval of dark green argillite to tuffaceous argillite showing prominent kink folds.

2.2.7 Unit 7 Latite/Dacite Lapilli Tuff

On the saddle about 1 km west of the property and overlying a thick interval of dark green tuffaceous argillite of Subunit 6a is a distinctive latite/dacite lapilli tuff (**Subunit 7L**) which contains angular fragments of latite/dacite averaging 1-5 cm in size in a light green groundmass containing prominent plagioclase phenocrysts averaging 1-2 mm in size. The unit also contains moderately abundant disseminated pyrite/pyrrhotite, which weathers to give the surface a prominent, patchy limonite stain.

Late Dikes

2.2.8 Unit 8 Andesite Dike

Intrusive into rocks of Unit 3 and locally into rocks of Unit 4b and 4c are dark green, aphanitic andesite dikes and sills (Unit 8). These commonly are massive, but locally where narrower and along some contacts, show a prominent foliation parallel to walls of the body. Many are irregular in outline, and a few were folded moderately. Locally, some dikes appear to grade along strike into bodies of Subunits 4a and 4b. As a result, age relations are uncertain, and it is possible that more than one age of andesite dikes is present. An earlier set might be associated with dikes of Unit 4, mainly Subunit 4a, and a later set, which cuts bodies of Unit 4, might have been intruded during or after the main deformation which affected rocks of Units 3 and 4.

3.0 STRUCTURE

The style and orientation of deformational features is markedly different in rocks of Unit 2 from those in rocks of Units 3, 5, 6, and 7. The former is marked by open to tight folds in bedding, with generally a weak metamorphic foliation. The latter commonly contain a less prominent bedding or layering feature and a prominent metamorphic foliation, whose intersection is marked by a prominent lineation.

Rocks of Units 4 and 8 generally lack deformation features. Rocks of Unit 4 are considered to have acted as massive units during deformation of rocks of Unit 3, although alternately it is possible that much of the deformation of rocks of Unit 3 preceded intrusion and extrusion of rocks of Unit 4. This is most suggestive in the A-Zone, where rocks of Unit 3 are well foliated and are cut by irregular massive to commonly weakly foliated bodies of Unit 4.

3.1 Deformation in Rocks of Unit 2

Bedding (**SØ**) is warped into broad to close folds along steeply dipping axial planes which vary moderately in orientation. Very few folds were seen in outcrop, but are indicated by the common, wide variation in the orientation of SØ between adjacent outcrops. Fold axes (**F1**) generally plunge moderately to steeply southeast. A weak to moderate and widespread foliation (**S1**) strikes southeast to east and dips steeply. It is parallel to and probably is the same foliation as that in adjacent rocks of Unit 3.

Along Sulphurets Glacier at the north end of the property, the attitude of SØ is relatively uniform and dips moderately to locally steeply southeast, with one close fold several metres across in which limbs dip steeply.

Along the contact with rocks of Unit 3, bedding attitudes generally are subvertical to steeply dipping to the east. The wide differences in orientation of fold axes and bedding planes and in fold style between Units 2 and 3 (see below) suggest that rocks of Unit 2 were folded prior to formation of rocks of Unit 3. Some other workers in the region have suggested that the contact between rocks of Units 2 and 3 is a major fault, but no direct evidence for such a fault was seen in this study.

3.2 Deformation in Rocks of Unit 3

Most of the less deformed rocks of Unit 3 contain a planar fabric, designated as SØ and interpreted as bedding or layering parallel to bedding contacts. SØ is defined by one or more of the following:

1) the contact between felsic volcanic rocks and thin interlayers of rocks of Subunits 3a and 3ts.
2) the orientation of micas and segregation of micas into thin cleavage planes along which the rock tends to break; this feature is cut by the regional foliation (S1).
3) concentrations of lenses of pyrite and of quartz-pyrite parallel to the above features.

Rocks of Unit 3 are cut by a steeply dipping, metamorphic foliation (S1), which varies moderately in intensity and in orientation. The line of intersection of SØ and S1 is marked by a prominent lineation (L1), which generally strikes 27Ø-32Ø degrees, and plunges 4Ø-7Ø degrees.

In the central part of the property, a broad synclinal warp is outlined in SØ; its axis plunges along the lineation. The strike of SØ is curved from about Ø1Ø degrees at the east, to Ø6Ø degrees in the nose of the fold, to 11Ø degrees in the west. The fold axis plunges northwest along the lineation. In much of the fold, S1 is developed moderately and strikes about 150 degrees. On the scale of a few centimetres to a few decimetres, features defined as S0, especially quartz-pyrite lenses are warped more tightly about L1. Despite the presence of many of these warps, the broad outline of the syncline is preserved.

More puzzling is the fact that the broad syncline does not fit the pattern of the regional structural data in the surrounding units. The contact between rocks of Unit 3 and the overlying stratiform rocks of Units 5 and 6 appears to dip moderately to steeply to the west and southwest, with no evidence of the northwest plunging syncline. One interpretation of this anomaly is that rocks of Unit 3 were folded prior to formation of the rocks of Units 5, 6, and 7. However, the style of deformation and orientation of metamorphic foliation is similar in rocks of Unit 3 south of the A-Zone and rocks of Units 5-7 to the west, indicating conclusively that they underwent that stage of deformation together.

Two alternate explanations are possible:

1) Because of differences in competencies of different units, and inhomogeneities in the volcanic and sedimentary pile, the deformation was very inhomogeneous.
2) The syncline marks an earlier stage of deformation during the Skeena Range Event, upon which was imposed a later more penetrative deformation during which S1 was developed.

In support of the first alternative is the fact that in Unit 3 the intensity of development of the metamorphic foliation varies widely. In much of the southern part of the property, especially west of the B-Zone fault and near the West Fault, the metamorphic foliation is intense and has obliterated or virtually obliterated any evidence of So. In these regions L1 also is very poorly developed. Outwards from these zones, a faint indication of a second planar feature (S0?) can be seen at a small angle to S1; in some of these rocks the two surfaces are similar, and it cannot be determined which is primary and which is secondary. Still further away, S0 is at a larger angle to S1, and both S0 and L1 are more prominent than in the zones of intense development of S1. These data indicate a deformation of very variable intensity. The reasons for these variations are uncertain and probably more than one-fold; most probable causes are:

1) different intensities of alteration produced rocks of different strengths; deformation was initiated in the weaker units and continued to deform these relative to more stronger units. Thus the zones of strong foliation in which bedding was transposed completely, may represent zones of more intense, early alteration to weak minerals such as sericite and anhydrite. Fresher and more siliceously altered rocks would have been more resistant to deformation, and bedding would have been preserved relatively well.

2) the presence of massive dikes and sills of Unit 4 would change the stress field and produce zones of variable alteration. Where dikes are more abundant, S1 in rocks of Unit 3 generally was developed less strongly than zones of Unit 3 relatively free of dikes.

Some of the deformation may have occurred prior to intrusion of bodies of Unit 4. Evidence form this is mainly from the A-Zone and A-North Zone where foliated rocks of Unit 3 are contained in relatively massive rocks of Unit 4. However, the fact that rocks of Unit 4 show locally a similar style of deformation to that in Unit 3 indicates that some regional deformation occurred after intrusion of rocks of Unit 4.

3.3 Deformation of Rocks of Unit 4

Many dikes and sills of rocks of Unit 4 which cut rocks of Units 2 and 3 were folded broadly about L1 in folds which mimic the fold style in the host rocks. A good example of this is the main ridge formed by the large sill of Unit 4a east of B-Zone Creek east of DDH 87-17. Because rocks of Unit 4 are resistant to erosion, they commonly are preserved in synclinal noses, which protect the less resistant, underlying rocks of Unit 3. A good example of such preservation is the dike which forms the nose of the main northwest-facing rib just northwest of DDH 87-18.

In dikes and sills of Unit 4, a strong foliation commonly was developed locally in fold noses near the contact with rocks of Unit 3; this foliation is parallel to contacts of the dike rather than parallel to S1. However, it probably was formed during the deformation which produced the folds in the host rocks. Some smaller dikes and sills of Unit 4 contain a weakly to moderately developed fracture cleavage to foliation, which parallels S1 in the surrounding rocks.

The reason why many of the bodies of Unit 4 lack foliation or are cut by a very weak foliation may be because during deformation they "floated" as relatively rigid blocks in a "sea" of less competent fragmental rocks of Unit 3, or as indicated below, deformation in them was dominated by warping, whereas surrounding rocks of Unit 3 were deformed by shearing along S1.

3.4 Deformation of Rocks of Units 5, 6, and 7

Sedimentary rocks of Unit 5 commonly show a prominent foliation which cuts bedding at a moderate to high angle, and yields a prominent lineation parallel to the lineation in Unit 3. Locally, tight, mesoscopic folds in SØ were developed at unusual angles to the regional trend.

Rocks of Unit 6 show a prominent foliation (S1), which locally cuts an earlier "bedding" surface (SØ) forming a northwest- to west-plunging lineation (L1). On the south slope of the property, these features are identical in orientation and character to those in underlying rocks of Unit 3. On the ridge further west, S1 is warped moderately to locally tightly in folds which are oriented at unusual angles to the regional trend. In much of this area, SØ is indistinct, and it probably was transposed parallel to or subparallel to foliation.

In the saddle to the west in rocks of Unit 6a and overlying rocks of Unit 7, a strong "bedding" foliation (SØ) is cut by a weaker, steeply dipping, metamorphic foliation (S1), producing a prominent lineation. Orientation of structural features are similar to corresponding features further east, indicating a relatively uniform deformation affected rocks along the ridge west of the Kerr Property. In the West Cliff Zone, SØ is developed locally, and is cut by a prominent foliation (S1) whose orientation is subparallel to that of SØ in rocks of Unit 3 east of the Far West Fault.

3.5 Deformation of Rocks of Unit 8

Most andesite dikes of Unit 8 are massive and unfoliated. However, locally along borders and in some thinner zones, they are foliated moderately to strongly, and a few, including the large dike at 10000E, 10000N contain tight folds in whose core the dikes show a prominent foliation parallel to its contacts. This indicates that some of the dikes were present during at least one major period of deformation.

3.6 Late Faults

A set of generally north-south-trending faults which dip moderately to steeply to the west includes the Far West, West, A-Zone, B-Zone, and Camp Faults. The Camp Fault extends northeast from the southern end of the B-Zone Fault. None of the faults shows regional displacement; this interpretation is in contrast to what has been suggested in some previous studies.

Because of the absence of distinct marker units, the offset on the faults commonly is difficult to determine. Small to moderate movement on the Far West and West Faults is indicated by the offset of sedimentary beds of Unit 5. To the north, rocks of Unit 3 in the A-North Zone are offset to the West Cliff Zone, but the amount of offset is impossible to determine.

The B-Zone fault may have a right-lateral component of offset of up to 200 metres based on the offset of the main dike of Unit 4a east of DDH 88-16. Just west of the B-Zone Fault, the dike is strongly foliated and sheared.

Where the B-Zone Fault cuts the B-Zone of sulfide mineralization, a thick intersection of quartz-sulfide- anhydrite mineralization occurs in the hangingwall of the fault. A wide "rubble zone" intersected by most holes drilled along the fault is caused mainly by alteration of anhydrite to gypsum in the zone of secondary sulfide enrichment and subsequent leaching of gypsum.

The Camp Fault may have a moderate offset at the south end, where it commonly separates massive rocks of Unit 4b/c from moderately to well foliated rocks of Unit 3. Towards the north end it is difficult to trace through a zone of rubbly outcrop of rocks of Unit 2, and probably splays out into several branches with minor displacement on each.

4.0 ECONOMIC GEOLOGY

4.1 Description of Deposits

A detailed description of the deposits is contained in the report by Brian Butterworth and Scott Casselman).

Rocks of Unit 3 show widespread alteration to quartz-sericite-pyrite-carbonate. In these alteration zones are zones of more intense alteration and replacement by quartz and/or pyrite. Contacts and textures commonly are gradational between the altered rocks and replacement zones. Quartz-pyrite concentrations occur as lenses parallel to S0 and as crosscutting veinlets and veins. The lenses parallel to S0 were deformed by the main deformation associated with development of S1 and L1, some of the crosscutting veinlets may have been formed during this deformation by remobilization of quartz and pyrite.

In cores of some zones of quartz-pyrite mineralization are zones of stronger alteration and replacement containing abundant quartz and pyrite and a variety of primary copper-bearing minerals: mainly chalcopyrite and tetrahedrite, with locally abundant bornite. Tetrahedrite and bornite are interpreted as being concentrated in higher-temperature zones in the cores of the hydrothermal system(s). Minor native gold and electrum were identified in a few thin sections. Anhydrite is common in many of the deposits, and occurs mainly outwards from the core of higher-grade sulfides, commonly associated with a broader halo of sericite-pyrite alteration, which contains lower-grade copper mineralization.

In the zone of secondary enrichment, chalcocite-covellite forms reaction rims on chalcopyrite and as coatings on pyrite. Anhydrite was altered to gypsum, which during weathering was leached from the rock, leaving a rubbly residue. In drill cores this zone yields long sections of strongly broken core, resembling a fault zone but without gouge.

The character of mineralization is similar in most of the deposits. A few deposits (e.g. B-Zone West) contain moderately abundant chlorite; however, chlorite commonly is concentrated away from and mainly in the footwall of the sulfide-rich zones.

The deposits show microscopic evidence of the regional deformation. These include the following:

1) subgrain granulation and straining of medium to coarse grained aggregates of quartz. (Note: this quartz contains moderately abundant dusty opaque/semiopaque inclusions).
2) recrystallization of pyrite into subhedral to euhedral aggregates containing interstitial quartz and less chlorite and muscovite.
3) recrystallization of quartz and much less chlorite and muscovite into subparallel aggregates in pressure shadows of pyrite grains.
4) patches and veinlike zones up to several mm across of recrystallized, fine to medium grained quartz containing patches up to as few mm across dominated by chalcopyrite and/or tetrahedrite. Quartz in these zones is unstrained and free of dusty inclusions.

4.2 Interpretation

The quartz-sulfide deposits probably were formed in a region extending from slightly below the sea-water interface characteristic of volcanogenic massive sulfide deposits to the epithermal zone characteristic of high-level "porphyry" deposits.

The following features are typical of volcanogenic massive sulfide deposits formed near the rock/sea-water interface:

1) strong concentration of quartz and pyrite in several zones, some of which are moderately stratabound just below thin intervals of sedimentary and tuffaceous sedimentary rocks.
2) local beds of massive pyrite up to 50 cm thick, such as the lens near DDH 88-19.
3) a thin layer (bed?) of quartz-pyrite-chalcopyrite mineralization along the contact of felsic volcanic rocks with overlying argillite west of the B Zone Center.

The following features are more typical of an epithermal or "porphyry" deposit formed at shallow depth:

1) low content of sphalerite and galena (seen only in the C-Zone at the east of the deposit [base of stratigraphic section]). (Sphalerite with or without galena is abundant in most volcanogenic massive sulfide deposits, both in the massive sulfide and in the upper part of the footwall stringer zone.)
2) very broad zones of alteration and disseminated copper mineralization and associated alteration.
3) tetrahedrite and bornite in the core of the replacement zones (these minerals are rare in volcanogenic massive sulfide deposits.

Stratiform lenses of pyrite-chalcopyrite may be present in the volcanic pile. The most probable places for these to occur are along surfaces stratigraphically a few metres to tens of metres above the zones of strong quartz-pyrite-chalcopyrite replacement in the B-Zone.

5.0 Conclusions:

5.1 Structure

Data suggest several separate deformation events have contributed to the present complex distribution of bedding attitudes, folds, and penetrative metamorphic fabric. However, insufficient regional work has been done to distinguish and characterize such separate events. The most intriguing features to be explained are as follows:

1) the age and nature of the broad northwest-plunging syncline in rocks of Unit 3 in the core of the Kerr property, and how it structurally relates to the regional west-dipping pattern.

2) the disharmony between deformation features in Unit 2 and Unit 3 and the folded contact of Unit 2 and Unit 3, whose orientation and style is similar to that of folds in Unit 3. These suggest deformation of Unit 2 before deposition of Unit 3, but other alternatives are possible.

3) the possible angular unconformity in the A-North Zone, where a dome and gently to moderately dipping flows of Unit 4 cut through and overlap, respectively, steeply dipping rocks of Unit 3. Conformably overlying the dacite flow of Unit 4, are flows and interbedded sedimentary rocks and interlayered flows of Unit 5.

5.2 Mineral Deposits

Despite the fact that extensive drilling has outlined several zones of copper-(gold) mineralization, large parts of the zone of economic potential still remain untested. One main region of interest of this type is the B-West zone north of DDH 88-14 and 89-6 beneath the Kerr Glacier and moraine. Also of interest and untested is the southern extension of the B-Zone south of DDH 88-15 (this part of zone is not as suitable for open-pit development as to the north).

The highest grade, extensive zones of Cu-(Au) mineralization on the property are dominated by quartz replacement (=porphyry zone or siliceous feeder zone of massive sulfide deposit). However, the abundance of stratiform, in part bedded sulfides along and near the contact of sedimentary lenses in the sequence suggests the possibility that the hydrothermal systems also produced stratabound massive sulfide deposits in basins along such surfaces during hiatuses in volcanic activity. Because such zones might be small, exploration for them would need to be directed by the interpretation of folding in rocks of Unit 3, in particular to the projected traces of such surfaces.

Zones of higher-grade gold mineralization associated with domes and subvolcanic intrusions of Unit 4 were formed by separate but related hydrothermal systems to those which formed the replacement bodies in rocks of Unit 3.

John G. Payne,
December 1989

APPENDIX II

SURFACE LITHOGEOCHEMICAL ANALYTICAL REPORTS

HEAVY MINERAL CONCENTRATE ANALYTICAL REPORTS

VANGEOCHEM LAB LIMITED
1988 Triumph Street, Vancouver, B.C. V5L 1K5
Ph:(604)251-5656 Fax:(604)254-5717

ICAP GEOCHEMICAL ANALYSIS

A .5 gram sample is digested with 5 ml of 3:1:2 HCl to HNO_3 to H_2O at 95 °C for 90 minutes and is diluted to 10 ml with water.
This leach is partial for Al, Ba, Ca, Cr, Fe, K, Mg, Mn, Na, P, Pd, Pt, Sn, Sr and W.

ANALYST: [signature]

REPORT #: 890396 PA　　WESTERN CANADIAN　　Proj: 9101　　Date In: 89/07/31　　Date Out:89/08/02　　Att: B BUTTERWORTH

Sample Number	Ag	Al	As	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Mo	Na	Ni	P	Pb	Sb	Sn	Sr	U	W	Zn
	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	%	%	ppm	ppm	%	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
05401	1.2	2.45	161	51	3	1.08	1.1	29	57	216	5.20	0.31	3.08	767	3	0.02	37	0.18	47	<2	4	46	<5	<3	86
05402	0.7	0.55	50	38	<3	0.24	0.2	21	33	121	4.04	0.15	0.17	157	4	0.01	16	0.18	23	<2	3	15	<5	<3	19

VGC VANGEOCHEM LAB LIMITED

MAIN OFFICE
1988 TRIUMPH ST.
VANCOUVER, B.C. V5L 1K5
• (604) 251-5656
• FAX (604) 254-5717

BRANCH OFFICES
PASADENA, NFLD.
BATHURST, N.B
MISSISSAUGA, ONT.
RENO, NEVADA, U.S.A.

SAMPLE #	Au ppb
05401	50
05402	80

VANGEOCHEM LAB LIMITED

1988 Triumph Street, Vancouver, B.C. V5L 1K5
Ph:(604)251-5656 Fax:(604)254-5717

ICAP GEOCHEMICAL ANALYSIS

A .5 gram sample is digested with 5 ml of 3:1:2 HCl to HNO_3 to H_2O at 95 °C for 90 minutes and is diluted to 10 ml with water.
This leach is partial for Al, Ba, Ca, Cr, Fe, K, Mg, Mn, Na, P, Pd, Pt, Sn, Sr and W.

ANALYST: [signature]

REPORT #: 890417 PA   WESTERN CANADIAN MINING   Proj: 9101   Date In: 89/09/04   Date Out:89/08/08   Att: BUTTERWORTH

Sample Number	Ag	Al	As	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Mo	Na	Ni	P	Pb	Sb	Sn	Sr	U	W	Zn
	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	%	%	ppm	ppm	%	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
5403	34.8	0.32	99	24	<3	0.11	2.5	13	77	>20000	6.48	0.21	0.08	93	10	0.02	56	0.07	19	<2	5	7	<5	<3	68
JP 284A	4.3	0.11	80	10	3	0.11	2.8	19	123	16036	8.73	0.28	0.01	43	6	0.02	19	0.10	49	<2	5	58	<5	<3	52
JP 284B	5.3	0.22	191	11	4	0.34	2.9	19	122	>20000	>10.00	0.40	0.02	31	8	0.02	22	0.28	104	<2	6	87	<5	<3	37
JP 284C	5.2	0.14	>2000	23	<3	0.17	0.1	8	252	>20000	3.61	0.13	0.01	26	44	0.01	9	0.02	20	356	3	22	<5	<3	306
JP ANIV	15.4	1.69	157	20	3	1.55	34.9	23	42	2522	5.74	0.40	1.46	1321	87	0.08	40	0.14	1303	<2	4	44	<5	<3	4629

VGC VANGEOCHEM LAB LIMITED

MAIN OFFICE
1988 TRIUMPH ST.
VANCOUVER, B.C. V5L 1K5
• (604) 251-5656
• FAX (604) 254-5717

BRANCH OFFICES
PASADENA, NFLD.
BATHURST, N.B.
MISSISSAUGA, ONT
RENO, NEVADA, U.S.A.

REPORT NUMBER: 890417 GA   JOB NUMBER: 890417   WESTERN CANADIAN MINING CORP.

SAMPLE #	Au ppb
5403	2800
JP 284A	40
JP 284B	30
JP 284C	120
JP ANXV	1010

VGC VANGEOCHEM LAB LIMITED

MAIN OFFICE
1988 TRIUMPH ST.
VANCOUVER, B.C. V5L 1K5
● (604) 251-5656
● FAX (604) 254-5717

BRANCH OFFICES
PASADENA, NFLD.
BATHURST, N.B.
MISSISSAUGA, ONT.
RENO, NEVADA, U.S.A.

SAMPLE #	Cu %	Au oz/st
05404	.02	<.005
05405	.07	<.005
05406	.04	<.005
05407	.09	<.005
05408	6.91	<.005

VGC VANGEOCHEM LAB LIMITED

MAIN OFFICE
1988 TRIUMPH ST.
VANCOUVER, B.C. V5L 1K5
• (604) 251-5656
• FAX (604) 254-5717

BRANCH OFFICES
PASADENA, NFLD.
BATHURST, N.B.
MISSISSAUGA, ONT.
RENO, NEVADA, U.S.A.

REPORT NUMBER: 890553A AA   JOB NUMBER: 890553A   WESTERN CANADIAN MINING CORP.

SAMPLE #	Cu %	Pb %	Ag oz/st
5409	.13	--	.91
5410	1.50	--	--
5411	.07	2.71	6.21
5412	.99	--	--
5413	.10	--	--

VANGEOCHEM LAB LIMITED

1988 Triumph Street, Vancouver, B.C. V5L 1K5
Ph:(604)251-5656 Fax:(604)254-5717

ICAP GEOCHEMICAL ANALYSIS

A .5 gram sample is digested with 5 ml of 3:1:2 HCl to HNO_3 to H_2O at 95 °C for 90 minutes and is diluted to 10 ml with water.
This leach is partial for Al, Ba, Ca, Cr, Fe, K, Mg, Mn, Na, P, Pd, Pt, Sn, Sr and W.

ANALYST: [signature]

REPORT #: 890553 PA   WESTERN CANADIAN   Proj: 9101   Date In: 89/09/05   Date Out:89/09/15   Att: B BUTTERWORTH

Sample Number	Ag	Al	As	Ba	Bi	Ca	Cd	Co	Cr	Cu	Fe	K	Mg	Mn	Mo	Na	Ni	P	Pb	Sb	Sn	Sr	U	W	Zn
	ppm	%	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	%	%	%	ppm	ppm	%	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm
5409	20.7	0.09	43	52	<3	5.30	10.2	3	247	1301	0.88	0.85	0.07	2572	9	0.01	9	0.02	129	540	<2	427	<5	<3	1706
5410	3.8	0.74	43	76	<3	0.28	0.6	5	59	14937	2.91	0.13	0.21	453	7	0.01	5	0.17	52	<2	<2	19	<5	<3	377
5411	>50.0	0.26	558	34	<3	9.34	13.3	3	53	893	5.92	1.79	0.89	>20000	5	0.01	5	0.04	>20000	475	<2	1698	<5	<3	1859
5412	7.0	2.20	343	9	6	0.55	3.4	47	55	10534	>10.00	0.48	0.87	1795	23	0.01	24	0.32	602	<2	3	46	<5	<3	300
5413	0.6	1.56	5	364	<3	0.99	0.1	15	29	1276	2.75	0.23	0.86	927	3	0.02	12	0.13	156	<2	<2	62	<5	<3	107

VGC VANGEOCHEM LAB LIMITED

MAIN OFFICE
1988 TRIUMPH ST.
VANCOUVER, B.C. V5L 1K5
• (604) 251-5656
• FAX (604) 254-5717

BRANCH OFFICES
PASADENA, NFLD.
BATHURST, N.B.
MISSISSAUGA, ONT
RENO, NEVADA, U.S.A.

REPORT NUMBER: 890553 GA JOB NUMBER: 890553 WESTERN CANADIAN MINING CORP.

SAMPLE #	Au ppb
5409	30
5410	490
5411	350
5412	560
5413	nd

VGC VANGEOCHEM LAB LIMITED

MAIN OFFICE
1988 TRIUMPH ST.
VANCOUVER, B.C. V5L 1K5
● (604) 251-5656
● FAX (604) 254-5717

BRANCH OFFICES
PASADENA, NFLD.
BATHURST, N.B.
MISSISSAUGA, ONT.
RENO, NEVADA, U.S.A.

SAMPLE #	Cu %	Au oz/st
HMC-1	.02	<.005
HMC-2	.03	.012
HMC-3	.06	.162
HMC-4	.08	.050
HMC-5	.04	.264
HMC-6	.04	.420
HMC-7	.04	.442
DETECTION LIMIT	.01	.005

1 Troy oz/short ton = 34.28 ppm 1 ppm = 0.0001% ppm = parts per million < = less than

signed: ____________

APPENDIX III

CHECK ASSAY ANALYTICAL REPORTS AND SAMPLE COMPARISON TABLE

VGC VANGEOCHEM LAB LIMITED

MAIN OFFICE
1988 TRIUMPH ST.
VANCOUVER, B.C. V5L 1K5
● (604) 251-5656
● FAX (604) 254-5717

BRANCH OFFICES
PASADENA, NFLD.
BATHURST, N.B.
MISSISSAUGA, ONT.
RENO, NEVADA, U.S.A.

SAMPLE #	Cu %	Au oz/st
4053A	1.20	.038
4055A	.62	.006
4056A	.10	<.005
4062A	.12	.034
4064A	.17	<.005
4066A	.30	.028
4068A	.18	<.005
4070A	.51	.022
4072A	.42	.010
4074A	.41	.004
4076A	.45	<.005
4078A	1.25	.024
4080A	1.42	.012
4084A	<.01	<.005
4086A	.05	<.005
4088A	.04	.008
4090A	.02	.082
4092A	.48	<.005
4094A	3.86	<.005
4096A	.37	<.005
DETECTION LIMIT	.01	.005

1 Troy oz/short ton = 34.28 ppm 1 ppm = 0.0001% ppm = parts per million < = less than

signed: ________

VGC VANGEOCHEM LAB LIMITED

MAIN OFFICE
1988 TRIUMPH ST.
VANCOUVER, B.C. V5L 1K5
• (604) 251-5656
• FAX (604) 254-5717

BRANCH OFFICES
PASADENA, NFLD.
BATHURST, N.B.
MISSISSAUGA, ONT.
RENO, NEVADA, U.S.A.

SAMPLE #	Cu %	Au oz/st
4098A	.69	.010
4100A	.48	.006
4106A	.64	<.005
4108A	.07	<.005
4110A	.41	<.005
4112A	1.75	.026
4114A	.87	.010
4116A	1.08	.006
4118A	<.01	<.005
4120A	.25	.008
4122A	.29	.018
4124A	.09	.006
4126A	.15	.010
4128A	.24	<.005
4132A	.87	.006
4134A	.08	<.005
4136A	.03	.012
04051	.46	.010
04052	.87	.016
04053	1.15	.020
DETECTION LIMIT	.01	.005

1 Troy oz/short ton = 34.28 ppm   1 ppm = 0.0001%   ppm = parts per million   < = less than

signed: ________________

VGC VANGEOCHEM LAB LIMITED

MAIN OFFICE
1988 TRIUMPH ST.
VANCOUVER, B.C. V5L 1K5
● (604) 251-5656
● FAX (604) 254-5717

BRANCH OFFICES
PASADENA, NFLD.
BATHURST, N.B.
MISSISSAUGA, ONT.
RENO, NEVADA, U.S.A.

SAMPLE #	Cu %	Au oz/st
04054	.65	.006
04055	.64	.010
04056	.10	<.005
04057	1.07	.028
04058	.10	.006
04059	1.08	.006
04060	.31	.008
04061	.53	.012
04062	.11	.016
04063	.11	.006
04064	.16	.010
04065	.28	.008
04066	.30	.006
04067	.26	.012
04068	.17	<.005
04069	.29	.010
04070	.48	<.005
04071	.29	<.005
04072	.41	.006
04073	.33	<.005
DETECTION LIMIT	.01	.005

1 Troy oz/short ton = 34.28 ppm 1 ppm = 0.0001% ppm = parts per million < = less than

signed: [signature]

VGC VANGEOCHEM LAB LIMITED

MAIN OFFICE
1988 TRIUMPH ST.
VANCOUVER, B.C. V5L 1K5
• (604) 251-5656
• FAX (604) 254-5717

BRANCH OFFICES
PASADENA, NFLD.
BATHURST, N.B.
MISSISSAUGA, ONT.
RENO, NEVADA, U.S.A.

SAMPLE #	Cu %	Au oz/st
04074	.39	<.005
04075	<.01	<.005
04076	.44	<.005
04077	.71	.010
04078	1.05	.024
04079	.31	.008
04080	1.42	.026
04081	1.10	.024
04082	1.42	<.005
04083	.51	<.005
04084	<.01	<.005
04085	.59	.006
04086	.03	.010
04087	.26	.008
04088	.04	.010
04089	.04	.006
04090	.02	.052
04091	.76	.024
04092	.45	<.005
04093	.69	<.005
DETECTION LIMIT	.01	.005

1 Troy oz/short ton = 34.28 ppm 1 ppm = 0.0001% ppm = parts per million < = less than

signed: ________

VGC VANGEOCHEM LAB LIMITED

MAIN OFFICE
1988 TRIUMPH ST.
VANCOUVER, B.C. V5L 1K5
● (604) 251-5656
● FAX (604) 254-5717

BRANCH OFFICES
PASADENA, NFLD.
BATHURST, N.B.
MISSISSAUGA, ONT.
RENO, NEVADA, U.S.A.

SAMPLE #	Cu %	Au oz/st
04094	3.90	.022
04095	.29	<.005
04096	.36	.006
04097	.77	.018
04098	.65	.014
04099	.67	.006
04100	.56	<.005
04101	.05	<.005
04102	.60	.012
04103	<.01	<.005
04104	.01	<.005
04105	.07	.008
04106	.60	.012
04107	.22	<.005
04108	.08	.010
04109	.89	.006
04110	.48	.006
04111	.48	<.005
04112	1.91	.010
04113	.83	<.005
DETECTION LIMIT	.01	.005

1 Troy oz/short ton = 34.28 ppm 1 ppm = 0.0001% ppm = parts per million < = less than

signed: ________________

VGC VANGEOCHEM LAB LIMITED

MAIN OFFICE
1988 TRIUMPH ST.
VANCOUVER, B.C. V5L 1K5
● (604) 251-5656
● FAX (604) 254-5717

BRANCH OFFICES
PASADENA, NFLD.
BATHURST, N.B.
MISSISSAUGA, ONT.
RENO, NEVADA, U.S.A.

SAMPLE #	Cu %	Au oz/st
04114	.78	<.005
04115	1.65	.006
04116	.96	.008
04117	1.30	.010
04118	<.01	<.005
04119	.23	<.005
04120	.24	.006
04121	.29	.010
04122	.32	<.005
04123	.08	.006
04124	.08	<.005
04125	.19	<.005
04126	.14	.008
04127	.18	.006
04128	.24	.008
04132	.79	<.005
04133	.90	.006
04134	.09	<.005
04135	.10	<.005
04136	.03	<.005
DETECTION LIMIT	.01	.005

1 Troy oz/short ton = 34.28 ppm 1 ppm = 0.0001% ppm = parts per million < = less than

signed: ____________

VGC VANGEOCHEM LAB LIMITED

MAIN OFFICE
1988 TRIUMPH ST.
VANCOUVER, B.C. V5L 1K5
● (604) 251-5656
● FAX (604) 254-5717

BRANCH OFFICES
PASADENA, NFLD.
BATHURST, N.B.
MISSISSAUGA, ONT
RENO, NEVADA, U.S.A.

SAMPLE #	Cu %	Au oz/st
04137	.04	<.005
05404	.02	<.005
05405	.07	<.005
05406	.04	<.005
05407	.09	<.005
05408	6.91	<.005

VGC VANGEOCHEM LAB LIMITED

MAIN OFFICE
1988 TRIUMPH ST.
VANCOUVER, B.C. V5L 1K5
(604) 251-5656
FAX (604) 254-5717

BRANCH OFFICES
PASADENA, NFLD.
BATHURST, N.B.
MISSISSAUGA, ONT.
RENO, NEVADA, U.S.A.

REPORT NUMBER: 890583 AA   JOB NUMBER: 890583   WESTERN CANADIAN MINING CORP.

SAMPLE #	Cu %	Au oz/st
4138	.07	<.005
4139	.08	<.005
4140	.13	.006
4141	.07	<.005
4142	.06	<.005
4143	.12	.010
4144	.10	.010
4145	.41	.012
4146	.26	.012
4147	.32	.024
4148	.36	.018
4149	.46	.030
4150	.35	.042
4151	.36	.010
4152	.21	.006
4153	.54	.034
4154	.45	.022
4155	.20	.010
4156	.60	.016
4157	.81	.026
DETECTION LIMIT	.01	.005

1 Troy oz/short ton = 34.28 ppm   1 ppm = 0.0001%   ppm = parts per million   < = less than

signed: ____________________

VGC VANGEOCHEM LAB LIMITED

MAIN OFFICE
1988 TRIUMPH ST.
VANCOUVER, B.C. V5L 1K5
• (604) 251-5656
• FAX (604) 254-5717

BRANCH OFFICES
PASADENA, NFLD.
BATHURST, N.B.
MISSISSAUGA, ONT.
RENO, NEVADA, U.S.A

REPORT NUMBER: 890583 AA JOB NUMBER: 890583 WESTERN CANADIAN MINING CORP.

SAMPLE #	Cu %	Au oz/st
4158	.44	.032
4159	.57	.010
4160	1.40	.010
4161	.22	.014
4162	.12	.016
4170	.29	.008
4171	.58	<.005
4172	.39	.006
4173	1.39	.012
4174	.10	.010
4175	.24	.010
4176	.37	<.005
4177	.16	.020
4178	.10	.010
4179	.11	.010
4180	.16	.012
4181	.14	.006
4182	.47	.010
DETECTION LIMIT	.01	.005

1 Troy oz/short ton = 34.28 ppm 1 ppm = 0.0001% ppm = parts per million < = less than

signed: ____________________

VGC VANGEOCHEM LAB LIMITED

MAIN OFFICE
1988 TRIUMPH ST.
VANCOUVER, B.C. V5L 1K5
• (604) 251-5656
• FAX (604) 254-5717

BRANCH OFFICES
PASADENA, NFLD.
BATHURST, N.B.
MISSISSAUGA, ONT.
RENO, NEVADA, U.S.A.

REPORT NUMBER: 890554 GA   JOB NUMBER: 890554   WESTERN CANADIAN MINING CORP.

SAMPLE #	Au ppb
4163	280
4164	80
4165	140
4166	nd
4167	190
4168	200
4169	60

DETECTION LIMIT 5

nd = none detected   -- = not analysed   is = insufficient sample

VGC VANGEOCHEM LAB LIMITED

MAIN OFFICE
1988 TRIUMPH ST.
VANCOUVER, B.C. V5L 1K5
• (604) 251-5656
• FAX (604) 254-5717

BRANCH OFFICES
PASADENA, NFLD.
BATHURST, N.B.
MISSISSAUGA, ONT.
RENO, NEVADA, U.S.A

REPORT NUMBER: 890554 AA JOB NUMBER: 890554 WESTERN CANADIAN MINING CORP.

SAMPLE #	Cu %
4163	.46
4164	.13
4165	.28
4166	.02
4167	.29
4168	.24
4169	.08
DETECTION LIMIT	.01

1 Troy oz/short ton = 34.28 ppm 1 ppm = 0.0001% ppm = parts per million < = less than

signed: ________________

VGC VANGEOCHEM LAB LIMITED

MAIN OFFICE
1988 TRIUMPH ST.
VANCOUVER, B.C. V5L 1K5
• (604) 251-5656
• FAX (604) 254-5717

BRANCH OFFICES
PASADENA, NFLD.
BATHURST, N.B.
MISSISSAUGA, ONT.
RENO, NEVADA, U.S.A

REPORT NUMBER: 890637 AA JOB NUMBER: 890637 WESTERN CANADIAN MINING CORP.

SAMPLE #	Cu %	Au oz/st
4183	.39	<.005
4184	.43	<.005
4185	.45	.010
4186	.55	<.005
4187	.17	<.005
4188	.53	<.005
4189	.64	.010
4190	.21	<.005
4191	.37	<.005
4192	.41	<.005
4193	.56	<.005
4194	.13	<.005
4195	.07	<.005
4196	.12	<.005
4197	.01	<.005
4198	.28	<.005
4199	.15	<.005
DETECTION LIMIT	.01	.005

1 Troy oz/short ton = 34.28 ppm 1 ppm = 0.0001% ppm = parts per million < = less than

signed: ________

VGC VANGEOCHEM LAB LIMITED

MAIN OFFICE
1988 TRIUMPH ST.
VANCOUVER, B.C. V5L 1K5
• (604) 251-5656
• FAX (604) 254-5717

BRANCH OFFICES
PASADENA, NFLD.
BATHURST, N.B
MISSISSAUGA, ONT.
RENO, NEVADA, U.S.A.

REPORT NUMBER: 890741 AA   JOB NUMBER: 890741   WESTERN CANADIAN MINING CORP.

SAMPLE #	Cu %	Au oz/st
4201	.02	<.005
4202	.27	<.005
4203	.03	<.005
4204	.07	<.005
4205	.05	<.005
4206	.05	<.005
4207	.04	<.005
4208	.05	<.005
4209	.10	<.005
4210	.13	<.005
4211	.13	<.005
4212	.27	<.005
4213	.25	<.005
4214	.34	<.005
4215	.07	<.005
4216	.13	<.005
4217	.14	<.005
4218	.12	<.005
4219	.20	<.005
4220	.05	<.005
DETECTION LIMIT	.01	.005

1 Troy oz/short ton = 34.28 ppm   1 ppm = 0.0001%   ppm = parts per million   < = less than

signed: ____________

VGC VANGEOCHEM LAB LIMITED

MAIN OFFICE
1988 TRIUMPH ST.
VANCOUVER, B.C. V5L 1K5
● (604) 251-5656
● FAX (604) 254-5717

BRANCH OFFICES
PASADENA, NFLD.
BATHURST, N.B.
MISSISSAUGA, ONT.
RENO, NEVADA, U.S.A.

REPORT NUMBER: 890741 AA   JOB NUMBER: 890741   WESTERN CANADIAN MINING CORP.

SAMPLE #	Cu %	Au oz/st
4221	.14	<.005
4222	.18	<.005
4223	.37	.010
4224	.05	<.005
4225	.10	<.005
4226	.28	.024
4227	.68	.042
4228	.20	<.005
4229	.16	.010
4230	.20	<.005
4231	.07	<.005
4232	<.01	<.005
4233	.03	<.005
4234	.15	.010
4235	.02	<.005
4236	.01	<.005
4237	.06	<.005
4238	.09	<.005
4239	.03	<.005
4240	.02	<.005
DETECTION LIMIT	.01	.005

1 Troy oz/short ton = 34.28 ppm   1 ppm = 0.0001%   ppm = parts per million   < = less than

signed: ________________

VGC VANGEOCHEM LAB LIMITED

MAIN OFFICE
1988 TRIUMPH ST.
VANCOUVER, B.C. V5L 1K5
● (604) 251-5656
● FAX (604) 254-5717

BRANCH OFFICES
PASADENA, NFLD.
BATHURST, N.B.
MISSISSAUGA, ONT.
RENO, NEVADA, U.S.A.

REPORT NUMBER: 890741 AA   JOB NUMBER: 890741   WESTERN CANADIAN MINING CORP.

SAMPLE #	Cu %	Au oz/st
4241	.02	<.005
4242	.04	<.005
4243	.08	<.005
4244	.07	<.005
4245	.15	<.005
4246	.09	<.005
4247	.38	<.005
4248	.19	<.005
4249	.28	.010
4250	.17	<.005
4251	.25	.012
4252	.29	<.005
4253	.27	<.005
4254	.05	<.005
4255	.04	.010
4256	.04	<.005
4257	.05	<.005
4258	.02	<.005
4259	.05	.010
4260	.04	.012
DETECTION LIMIT	.01	.005

1 Troy oz/short ton = 34.28 ppm   1 ppm = 0.0001%   ppm = parts per million   < = less than

signed: ____________

VGC VANGEOCHEM LAB LIMITED

MAIN OFFICE
1988 TRIUMPH ST.
VANCOUVER, B.C. V5L 1K5
● (604) 251-5656
● FAX (604) 254-5717

BRANCH OFFICES
PASADENA, NFLD.
BATHURST, N.B.
MISSISSAUGA, ONT.
RENO, NEVADA, U.S.A.

REPORT NUMBER: 890741 AA   JOB NUMBER: 890741   WESTERN CANADIAN MINING CORP.

SAMPLE #	Cu %	Au oz/st
4261	.09	.014
4262	.06	.010
4263	.11	<.005
4264	.27	<.005
4266	.32	<.005
4267	.33	<.005
4268	.43	<.005
4269	.41	<.005
4270	.24	<.005
4271	.43	<.005
4272	.18	<.005
4273	.02	<.005
4274	.06	<.005
4275	.09	<.005
4276	.15	.010
4277	.25	<.005
4278	.39	<.005
4279	.23	<.005
4280	.52	.010
4281	.23	.006
DETECTION LIMIT	.01	.005

1 Troy oz/short ton = 34.28 ppm   1 ppm = 0.0001%   ppm = parts per million   < = less than

signed: ____________

VGC VANGEOCHEM LAB LIMITED

MAIN OFFICE
1988 TRIUMPH ST.
VANCOUVER, B.C. V5L 1K5
● (604) 251-5656
● FAX (604) 254-5717

BRANCH OFFICES
PASADENA, NFLD.
BATHURST, N.B.
MISSISSAUGA, ONT.
RENO, NEVADA, U.S.A.

REPORT NUMBER: 890741 AA JOB NUMBER: 890741 WESTERN CANADIAN MINING CORP.

SAMPLE #	Cu %	Au oz/st
4282	.24	<.005
4283	.34	.016
4284	.37	.014
4285	.24	<.005
4286	.29	<.005
4287	.31	<.005
4288	.38	.014
4289	.40	.010
4290	.38	.016
4291	.28	<.005
4292	.33	<.005
4293	.40	<.005
4294	.65	.006
4295	.54	<.005
4296	.35	<.005
DETECTION LIMIT	.01	.005

1 Troy oz/short ton = 34.28 ppm 1 ppm = 0.0001% ppm = parts per million < = less than

signed: ____________

Bondar-Clegg & Company Ltd.
130 Pemberton Ave.
North Vancouver, B.C.
V7P 2R5
(604) 985-0681 Telex 04-352667

BONDAR-CLEGG

A DIVISION OF INCHCAPE INSPECTION & TESTING SERVICES

Certificate of Analysis

REPORT: V89-06883.4

DATE PRINTED: 13-OCT-89

PROJECT: 9101

SAMPLE NUMBER	ELEMENT UNITS	Au OPT	Cu PCT
P4 4053		0.011	1.10
P4 4055		0.007	0.61
P4 4056		0.003	0.10
P4 4062		0.017	0.12
P4 4064		0.008	0.16
P4 4066		0.007	0.31
P4 4068		0.004	0.18
P4 4070		0.005	0.48
P4 4072		0.005	0.42
P4 4074		0.005	0.40
P4 4076		0.004	0.43
P4 4078		0.020	1.14
P4 4080		0.023	1.41
P4 4084		<0.002	<0.01
P4 4086		<0.002	0.05
P4 4088		0.003	0.03
P4 4090		0.063#	0.02
P4 4092		0.014	0.46
P4 4094		0.016	3.56
P4 4096		0.007	0.37
P4 4098		0.013	0.66
P4 4100		0.006	0.49
P4 4106		0.007	0.65
P4 4108		0.004	0.07
P4 4110		0.003	0.40
P4 4112		0.021	1.82
P4 4114		0.015	0.83
P4 4116		0.013	0.97
P4 4118		<0.002	<0.02
P4 4120		0.005	0.26
P4 4122		0.006	0.28
P4 4124		0.006	0.08
P4 4126		0.006	0.15
P4 4128		0.005	0.24
P4 4132		0.008	0.84
P4 4134		0.005	0.08
P4 4136		0.002	0.03

Bondar-Clegg & Company Ltd.
130 Pemberton Ave.
North Vancouver, B.C.
V7P 2R5
(604) 985-0681 Telex 04-352667

BONDAR-CLEGG

A DIVISION OF INCHCAPE INSPECTION & TESTING SERVICES

Certificate of Analysis

DATE PRINTED: 29-SEP-89
PROJECT: 9101 PAGE 1

REPORT: V89-06804.4

SAMPLE NUMBER	ELEMENT UNITS	Au OPT	Cu PCT
D2 67201		0.003	0.11
D2 67202		<0.002	0.01
D2 67203		0.007	0.25
D2 67204		0.006	0.30
D2 67205		0.004	0.37
D2 67206		<0.002	0.09
D2 67207		0.005	0.38
D2 67208		<0.002	0.10
D2 67209		<0.002	0.17
D2 67210		0.004	0.43
D2 67211		0.004	0.47
D2 67212		0.003	0.54
D2 67213		0.011	0.55
D2 67214		0.003	0.21
D2 67215		0.004	0.44
D2 67216		0.003	0.13
D2 67217		0.007	0.12
D2 67218		0.003	0.29
D2 67219		<0.002	0.05
D2 67220		0.003	0.11
D2 67221		0.004	0.05
D2 67222		0.004	0.10
D2 67223		0.005	0.24
D2 67224		0.009	0.34
D2 67225		0.007	0.33
D2 67226		0.004	0.20
D2 67227		0.004	0.44
D2 67228		0.009	0.57
D2 67229		0.006	0.44
D2 67230		0.015	1.39
D2 67231		0.003	0.11

Registered Assayer, Province of British Columbia

Bondar-Clegg & Company Ltd.
130 Pemberton Ave.
North Vancouver, B.C.
V7P 2R5
(604) 985-0681 Telex 04-352667

BONDAR-CLEGG

Certificate of Analysis

A DIVISION OF INCHCAPE INSPECTION & TESTING SERVICES

DATE PRINTED: 19-OCT-89

REPORT: V89-06985.4

PROJECT: 9101

SAMPLE NUMBER	ELEMENT UNITS	Au OPT	Cu PCT
X2 67232		0.009	0.28
X2 67233		0.004	0.07
X2 67234		0.003	0.04
X2 67235		0.004	0.04
X2 67236		0.005	0.13
X2 67237		0.008	0.28
X2 67238		0.005	0.33
X2 67239		0.007	0.12
X2 67240		<0.002	0.12
X2 67241		0.005	0.15
X2 67242		0.015	0.38
X2 67243		0.003	0.10
X2 67244		0.017	0.68
X2 67245		0.003	0.17
X2 67246		<0.002	0.06
X2 67247		0.005	0.02
X2 67248		0.006	0.01
X2 67249		0.003	0.08
X2 67250		<0.002	0.02
X2 67251		0.003	0.02
X2 67252		0.004	0.09
X2 67253		0.005	0.14
X2 67254		0.007	0.40
X2 67255		0.009	0.27
X2 67256		0.005	0.26
X2 67257		0.005	0.29
X2 67258		0.003	0.04
X2 67259		0.003	0.05
X2 67260		0.007	0.04
X2 67261		0.011	0.08
X2 67262		0.013	0.11
X2 67264		0.007	0.32
X2 67265		0.006	0.41
X2 67266		0.009	0.42
X2 67267		<0.002	0.02
X2 67268		0.003	0.08
X2 67269		0.004	0.24
X2 67270		0.007	0.25
X2 67271		0.009	0.24
X2 67272		0.005	0.33

SAMPLE NUMBER	ELEMENT UNITS	Au OPT	Cu PCT
X2 67273		0.004	0.24
X2 67274		0.004	0.32
X2 67275		0.005	0.39
X2 67276		0.006	0.27
X2 67277		0.007	0.37
X2 67278		0.009	0.54

HOLE #	SAMPLE #	VGC CHECK	BON/CLEGG CHECK	Cu%	VGC Cu%	BON/CLEGG Cu%	Au oz/T	VGC Au oz/st	BON/CLEG Au oz/st
K89-2	13180	4051		0.43	0.46		0.008	0.010	
	13185	4052		0.81	0.87		0.010	0.016	
	13190	4053	4053	1.01	1.15	1.10	0.008	0.020	0.011
	13195	4054		0.61	0.65		0.004	0.006	
	13198	4055	4055	0.58	0.64	0.61	0.005	0.010	0.007
K89-3	13220	4056	4056	0.11	0.10	0.10	0.002	<0.005	0.003
	13225	4057		1.15	1.07		0.007	0.028	
	13230	4058		0.69	0.10		0.008	0.006	
	13235	4059		0.94	1.08		0.006	0.006	
	13240	4060		0.30	0.31		0.003	0.008	
	13245	4061		0.53	0.53		0.005	0.012	
K89-4	13250	4062	4062	0.11	0.11	0.12	0.016	0.016	0.017
	13255	4063		0.10	0.11		0.004	0.006	
	13260	4064	4064	0.14	0.16	0.16	0.006	0.010	0.008
	13265	4065		0.30	0.28		0.008	0.008	
	13270	4066	4066	0.31	0.30	0.31	0.006	0.006	0.007
	13275	4067		0.24	0.26		0.007	0.012	
	13280	4068	4068	0.17	0.17	0.18	0.002	<0.005	0.004
	13285	4069		0.31	0.29		0.006	0.010	
	13290	4070	4070	0.49	0.48	0.48	0.006	<0.005	0.005
	13295	4071		0.28	0.29		0.005	<0.005	
	13300	4072	4072	0.41	0.41	0.42	0.005	0.006	0.005
	13305	4073		0.32	0.33		0.005	<0.005	
	13310	4074	4074	0.43	0.39	0.40	0.005	<0.005	0.005
	13315	4075		0.58	<0.01		0.005	<0.005	
	13320	4076	4076	0.39	0.44	0.43	0.004	<0.005	0.004
	13325	4077		0.67	0.71		0.008	0.010	
	13330	4078	4078	1.04	1.05	1.14	0.019	0.024	0.020
K89-5	13355	4079		0.31	0.31		0.003	0.008	
	13360	4080	4080	1.55	1.42	1.41	0.020	0.026	0.023
	13365	4081		1.32	1.10		0.014	0.024	
	13370	4082		1.69	1.42		0.016	<0.005	
	13375	4083		0.51	0.51		0.007	<0.005	
	13380	4084	4084	<0.01	<0.01	<0.01	<0.005	<0.005	<0.002
	13385	4085		<0.01	0.59		<0.005	0.006	
	13390	4086	4086	0.02	0.03	0.05	0.001	0.010	<0.002
	13395	4087		0.22	0.26		0.005	0.008	
	13400	4088	4088	0.03	0.04	0.03	0.003	0.010	0.003
	13405	4089		0.04	0.04		0.003	0.006	
	13410	4090	4090	0.02	0.02	0.02	0.070	0.052	0.063
K89-6	13435	4091		0.64	0.76		0.008	0.024	
	13440	4092	4092	0.42	0.45	0.46	0.008	<0.005	0.014
	13445	4093		0.62	0.69		0.001	<0.005	
	13450	4094	4094	3.87	3.90	3.56	0.018	0.022	0.016
	14005	4095		0.26	0.29		0.001	<0.005	
	14010	4096	4096	0.35	0.36	0.37	0.006	0.006	0.007
	14015	4097		0.70	0.77		0.010	0.018	
	14020	4098	4098	0.54	0.65	0.66	0.010	0.014	0.013
	14025	4099		0.60	0.67		0.008	0.006	
	14030	4100	4100	0.45	0.56	0.49	0.006	<0.005	0.006
	14035	4101		0.05	0.05		<0.005	<0.005	
	14040	4102		0.57	0.60		0.008	0.012	
	14045	4103		0.01	<0.01		<0.005	<0.005	
	14050	4104		0.02	0.01		0.001	<0.005	
	14055	4105		0.05	0.07		0.001	0.008	
	14060	4106	4106	0.59	0.60	0.65	0.007	0.012	0.007
	14065	4107		0.22	0.22		0.004	<0.005	
	14070	4108	4108	0.06	0.08	0.07	0.003	0.010	0.004
K89-7	14085	4109		0.85	0.89		0.010	0.006	

HOLE #	SAMPLE #	VGC CHECK	BON/CLEGG CHECK	Cu%	VGC Cu%	BON/CLEGG Cu%	Au oz/T	VGC Au oz/st	BON/CLEG Au oz/st
	14090	4110	4110	0.34	0.48	0.40	0.004	0.006	0.003
	14095	4111		0.47	0.48		0.010	<0.005	
	14100	4112	4112	1.87	1.91	1.82	0.018	0.010	0.021
	14105	4113		0.79	0.83		0.013	<0.005	
	14110	4114	4114	0.75	0.78	0.83	0.010	<0.005	0.015
	14115	4115		1.62	1.65		0.010	0.006	
	14120	4116	4116	0.93	0.96	0.97	0.011	0.008	0.013
	14125	4117		1.20	1.30		0.012	0.010	
	14130	4118	4118	<0.01	<0.01	<0.02	<0.005	<0.005	<0.002
	14135	4119		0.26	0.23		0.006	<0.005	
	14140	4120	4120	0.24	0.24	0.26	0.004	0.006	0.005
	14145	4121		0.29	0.29		0.009	0.010	
	14150	4122	4122	0.30	0.32	0.28	0.004	<0.005	0.006
T89-8	14155	4183		0.38	0.39		0.005	<0.005	
	14160	4184	67211	0.44	0.43	0.47	0.003	<0.005	0.004
	14165	4185		0.51	0.45		0.006	0.010	
	14170	4186	67212	0.56	0.55	0.54	0.003	<0.005	0.003
	14175	4187		0.19	0.17		0.004	<0.005	
	14180	4188	67213	0.56	0.53	0.55	0.010	<0.005	0.011
	14185	4189		0.70	0.64		0.008	0.010	
	14190	4190	67214	0.22	0.21	0.21	0.003	<0.005	0.003
	14195	4191		0.40	0.37		0.006	<0.005	
	14200	4192	67215	0.43	0.41	0.44	0.003	<0.005	0.004
	14205	4193		0.52	0.56		0.005	<0.005	
	14210	4194	67216	0.13	0.13	0.13	0.003	<0.005	0.003
	14215	4195		0.07	0.07		0.003	<0.005	
	14220	4196	67217	0.13	0.12	0.12	0.012	<0.005	0.007
	14225	4197		<0.01	0.01		<0.005	<0.005	
	14230	4198	67218	0.32	0.28	0.29	<0.005	<0.005	0.003
	14235	4199		0.17	0.15		<0.005	<0.005	
K89-10	14245	4123		0.08	0.08		<0.005	0.006	
	14250	4124	4124	0.18	0.08	0.08	<0.005	<0.005	0.006
	14255	4125		0.03	0.19		<0.005	<0.005	
	14260	4126	4126	0.10	0.14	0.15	0.006	0.008	0.006
	14265	4127		0.10	0.18		<0.005	0.006	
	14270	4128	4128	0.16	0.24	0.24	<0.005	0.008	0.005
	14290	4132	4132	0.93	0.79	0.84	0.008	<0.005	0.008
	14295	4133		1.02	0.90		0.006	0.006	
	14300	4134	4134	0.06	0.09	0.08	<0.005	<0.005	0.005
	14305	4135		0.08	0.10		<0.005	<0.005	
	14310	4136	4136	0.03	0.03	0.03	<0.005	<0.005	0.002
	14315	4137		0.02	0.04		<0.005	<0.005	
	14320	4138	67219	0.10	0.07	0.05	<0.005	<0.005	<0.002
	14325	4139		0.06	0.08		<0.005	<0.005	
	14330	4140	67220	0.48	0.13	0.11	0.010	0.006	0.003
T89-11	14335	4141		0.06	0.07		<0.005	<0.005	
	14340	4142	67221	0.04	0.06	0.05	0.008	<0.005	0.004
	14345	4143		0.12	0.12		0.010	0.010	
	14350	4144	67222	0.09	0.10	0.10	0.008	0.010	0.004
	14355	4145		0.41	0.41		0.016	0.012	
	14360	4146	67223	0.25	0.26	0.24	0.010	0.012	0.005
	14365	4147		0.30	0.32		0.006	0.024	
	14370	4148	67224	0.35	0.36	0.34	0.006	0.018	0.009
	14375	4149		0.47	0.46		0.010	0.030	
	14380	4150	67225	0.47	0.35	0.33	<0.005	0.042	0.007
	14385	4151		0.36	0.36		<0.005	0.010	
	14390	4152	67226	0.23	0.21	0.20	<0.005	0.006	0.004
	14395	4153		0.51	0.54		<0.005	0.034	
	14400	4154	67227	0.44	0.45	0.44	0.010	0.022	0.004

HOLE #	SAMPLE #	VGC CHECK	BON/CLEGG CHECK	Cu%	VGC Cu%	BON/CLEGG Cu%	Au oz/T	VGC Au oz/st	BON/CLEGG Au oz/st
	14405	4155		0.22	0.20		0.014	0.010	
	14410	4156	67228	0.57	0.60	0.57	0.010	0.016	0.009
	14415	4157		0.75	0.81		<0.005	0.026	
	14420	4158	67229	0.39	0.44	0.44	<0.005	0.032	0.006
	14425	4159		0.52	0.57		<0.005	0.010	
	14430	4160	67230	1.50	1.40	1.39	0.030	0.010	0.015
	14435	4161		0.23	0.22		0.008	0.014	
	14440	4162	67231	0.10	0.12	0.11	0.010	0.016	0.003
TB9-12	14445	4163		0.50	0.46		0.010	0.008	
	14450	4164	67201	0.12	0.13	0.11	0.003	0.007	0.003
	14455	4165		0.27	0.28		0.004	0.004	
	14460	4166	67202	0.01	0.02	0.01	0.001	<0.005	<0.002
	14465	4167		0.27	0.29		0.006	0.006	
	14470	4168	67203	0.23	0.24	0.25	0.006	0.006	0.007
	14475	4169		0.06	0.08		0.002	0.002	
TB9-13	14510	4170	67204	0.29	0.29	0.30	0.026	0.008	0.006
	14515	4171		0.56	0.58		0.018	<0.005	
	14520	4172	67205	0.41	0.39	0.37	0.010	0.006	0.004
	14525	4173		1.50	1.39		0.024	0.012	
	14530	4174	67206	0.10	0.10	0.09	0.006	0.010	<0.002
	14535	4175		0.28	0.24		<0.005	0.010	
	14540	4176	67207	0.37	0.37	0.38	0.006	<0.005	0.005
	14545	4177		0.16	0.16		0.020	0.020	
	14550	4178	67208	0.10	0.10	0.10	0.010	0.010	<0.002
	14555	4179		0.11	0.11		<0.005	0.010	
	14560	4180	67209	0.18	0.16	0.17	0.008	0.012	<0.002
	14565	4181		0.15	0.14		<0.005	0.006	
	14570	4182	67210	0.44	0.47	0.43	<0.005	0.010	0.004
	14575	4201		0.02	0.02		<0.005	<0.005	
	14580	4202	67232	0.30	0.27	0.28	0.006	<0.005	0.009
	14585	4203		0.03	0.03		0.010	<0.005	
	14590	4204	67233	0.08	0.07	0.07	0.010	<0.005	0.004
	14595	4205		0.05	0.05		<0.005	<0.005	
	14600	4206	67234	0.05	0.05	0.04	0.010	<0.005	0.003
	14605	4207		0.05	0.04		<0.005	<0.005	
	14610	4208	67235	0.06	0.05	0.04	<0.005	<0.005	0.004
TB9-14	18155	4209		0.10	0.10		<0.005	<0.005	
	18160	4210	67236	0.13	0.13	0.13	<0.005	<0.005	0.005
	18165	4211		0.13	0.13		<0.005	<0.005	
	18170	4212	67237	0.27	0.27	0.28	<0.005	<0.005	0.008
	18175	4213		0.27	0.25		<0.005	<0.005	
	18180	4214	67238	0.34	0.34	0.33	<0.005	<0.005	0.005
	18185	4215		0.07	0.07		0.010	<0.005	
	18190	4216	67239	0.12	0.13	0.12	<0.005	<0.005	0.007
	18195	4217		0.13	0.14		<0.005	<0.005	
	18200	4218	67240	0.13	0.12	0.12	<0.005	<0.005	<0.002
	18205	4219		0.18	0.20		<0.005	<0.005	
K89-15	14615	4220		0.06	0.05		<0.005	<0.005	
	14620	4221	67241	0.15	0.14	0.15	<0.005	<0.005	0.005
	14625	4222		0.18	0.18		<0.005	<0.005	
	14630	4223	67242	0.38	0.37	0.38	0.015	0.010	0.015
	14635	4224		0.05	0.05		<0.005	<0.005	
	14640	4225	67243	0.11	0.10	0.10	<0.005	<0.005	0.003
	14645	4226		0.26	0.28		0.027	0.024	
	14650	4227	67244	0.65	0.68	0.68	0.020	0.042	0.017
	14655	4228		0.20	0.20		0.008	<0.005	
	14660	4229	67245	0.16	0.16	0.17	<0.005	0.010	0.003
	14665	4230		0.18	0.20		0.007	<0.005	
	14670	4231	67246	0.07	0.07	0.06	<0.005	<0.005	<0.002

HOLE #	SAMPLE #	VGC CHECK	BDN/CLEGG CHECK	Cu%	VGC Cu%	BDN/CLEGG Cu%	Au oz/T	VGC Au oz/st	BDN/CLEG Au oz/st
	14675	4232		0.01	<0.01		<0.005	<0.005	
	14680	4233	67247	0.03	0.03	0.02	<0.005	<0.005	0.005
	14685	4234		0.16	0.15		0.015	0.010	
	14690	4235	67248	0.03	0.02	0.01	<0.005	<0.005	0.006
	14695	4236		0.01	0.01		<0.005	<0.005	
T89-16	18210	4237	67249	0.07	0.06	0.08	0.010	<0.005	0.003
	18215	4238		0.08	0.09		0.010	<0.005	
	18220	4239	67250	0.03	0.03	0.02	<0.005	<0.005	<0.002
	18225	4240		0.02	0.02		<0.005	<0.005	
	18230	4241	67251	0.03	0.02	0.02	<0.005	<0.005	0.003
	18235	4242		0.05	0.04		<0.005	<0.005	
	18240	4243	67252	0.08	0.08	0.09	0.010	<0.005	0.004
	18245	4244		0.08	0.07		0.005	<0.005	
	18250	4245	67253	0.16	0.15	0.14	0.005	<0.005	0.005
	18255	4246		0.10	0.09		0.027	<0.005	
	18260	4247	67254	0.37	0.38	0.40	0.006	<0.005	0.007
	18265	4248		0.17	0.19		0.009	<0.005	
	18270	4249	67255	0.27	0.28	0.27	0.008	0.010	0.009
	18275	4250		0.16	0.17		<0.005	<0.005	
	18280	4251	67256	0.22	0.25	0.26	0.005	0.012	0.005
	18285	4252		0.29	0.29		0.007	<0.005	
	18290	4253	67257	0.29	0.27	0.29	0.006	<0.005	0.005
	18295	4254		0.04	0.05		<0.005	<0.005	
	18300	4255	67258	0.04	0.04	0.04	<0.005	0.010	0.003
T89-18	18305	4256		0.03	0.04		<0.005	<0.005	
	18310	4257	67259	0.04	0.05	0.05	<0.005	<0.005	0.003
	18315	4258		0.02	0.02		<0.005	<0.005	
	18320	4259	67260	0.04	0.05	0.04	0.007	0.010	0.007
	18325	4260		0.03	0.04		<0.005	0.012	
	18330	4261	67261	0.09	0.09	0.08	0.010	0.014	0.011
	18335	4262		0.07	0.06		0.007	0.010	
	18340	4263	67262	0.11	0.11	0.11	0.011	<0.005	0.013
	18345	4264		0.24	0.27		0.007	<0.005	
	18355	4266		0.31	0.32		0.006	<0.005	
	18360	4267	67264	0.32	0.33	0.32	0.007	<0.005	0.007
	18365	4268		0.46	0.43		0.006	<0.005	
	18370	4269	67265	0.39	0.41	0.41	<0.005	<0.005	0.006
	18375	4270		0.23	0.24		0.006	<0.005	
	18380	4271	67266	0.42	0.43	0.42	0.009	<0.005	0.009
	18385	4272		0.18	0.18		0.005	<0.005	
	18390	4273	67267	0.02	0.02	0.02	<0.005	<0.005	<0.002
K89-19	18395	4274		0.07	0.06		<0.005	<0.005	
	18400	4275	67268	0.09	0.09	0.08	<0.005	<0.005	0.003
	18405	4276		0.16	0.15		0.005	0.010	
	18410	4277	67269	0.25	0.25	0.24	0.005	<0.005	0.004
	18415	4278		0.40	0.39		0.009	<0.005	
	18420	4279	67270	0.26	0.23	0.25	0.008	<0.005	0.007
	18425	4280		0.52	0.52		0.011	0.010	
	18430	4281	67271	0.25	0.23	0.24	0.007	0.006	0.009
	18435	4282		0.22	0.24		<0.005	<0.005	
	18440	4283	67272	0.36	0.34	0.33	<0.005	0.016	0.005
	18445	4284		0.36	0.37		<0.005	0.014	
	18450	4285	67273	0.23	0.24	0.24	<0.005	<0.005	0.004
	18455	4286		0.29	0.29		<0.005	<0.005	
	18460	4287	67274	0.32	0.31	0.32	<0.005	<0.005	0.004
	18465	4288		0.40	0.38		0.005	0.014	
	18470	4289	67275	0.39	0.40	0.39	<0.005	0.010	0.005
	18475	4290		0.37	0.38		0.007	0.016	
	18480	4291	67276	0.27	0.28	0.27	<0.005	<0.005	0.006

HOLE #	SAMPLE #	VGC CHECK	BON/CLEGG CHECK	Cu%	VGC Cu%	BON/CLEGG Cu%	Au oz/T	VGC Au oz/st	BON/CLEG Au oz/st
	18485	4292		0.31	0.33		<0.005	<0.005	
	18490	4293	67277	0.37	0.40	0.37	0.005	<0.005	0.007
	18495	4294		0.60	0.65		0.009	0.006	
	18500	4295	67278	0.51	0.54	0.54	0.009	<0.005	0.009
	18505	4296		0.41	0.35		0.009	<0.005	

APPENDIX IV

BASELINE ENVIRONMENTAL STUDY REPORTS

NORTCOL
ENVIRONMENTAL CONSULTANTS LTD.
Suite 600, 1281 West Georgia Street
Vancouver, British Columbia
Canada V6E 3J7
Telephone: (604) 682-2291
Fax: (604) 682-8323

⇒ AAB ✓
⇒ B2 ✓
⇒ Kerr Environment

November 18, 1988
File: 1-174-01.01

RECEIVED
NOV 18 1988

Western Canadian Mining Corporation
1170 - 1055 West Hastings Street
Vancouver, British Columbia
V6E 2E9

Attention: Mr. Brian Butterworth
Project Geologist

Dear Brian;

RE: ACID-BASE ACCOUNTING ASSAYS FOR THE KERR PROJECT

Enclosed are the analytical results from the eight samples submitted for acid-base accounting to Chemex from the Kerr Project along with a brief interpretation.

The negative net neutralization potentials in all but one sample indicate most rocks in the deposit theoretically have the potential to produce acid. It should be emphasized that potential to produce acid is not synonymous with actual production of acidic drainage. First, ore samples may, through the milling process, have most of their sulphides removed. Second, factors such as the types and distribution of sulphides, as well as the reaction kinetics, may mitigation against the formation of acid drainage.

Samples for acid-base accounting (ABA) were submitted to Chemex Labs, North Vancouver. Samples from the Kerr Property were selected to represent all rock types and areas of the known deposit. We understand the deposit is a porphyry copper-gold deposit which is fault controlled. Samples were from altered and unaltered footwall and hanging wall and ore samples of varying sulphide content. Known geology of the samples is listed in Table 1.

Analytical and Calculation Procedures

Samples were dried and pulverized using a ring pulverizer, screened to -140 mesh, and homogenized.

The sulphur content was determined by LECO furnace. The maximum potential acidity was calculated from the total sulphur content using the stoichiometric equation of pyrite oxidation. The amount of base needed to neutralize the resultant acid was calculated in tonnes of calcium carbonate equivalent (1% sulphur = 31.25 t $CaCO_3$ equivalent per 1000 t of material).

Neutralization potential was determined by adding a known excess of hydrochloric acid, heating to ensure complete reaction, and titrating the digested sample to pH 7 with sodium hydroxide. The net neutralization potential was calculated by subtracting the maximum potential acidity from the neutralization potential and was expressed in t of $CaCO_3$ per 1000 t of material.

Paste pH was measured in a 2:1 mixture of pulverized sample to distilled water.

Results

Results are listed in Table 2. Based on the criterion that negative neutralization potentials lower than -5 t $CaCO_3$/ 1000 t rock indicate a potential for acid generation, only one sample, #9549 unaltered hanging-wall rock composed of dacite crystal tuff, is not potentially acid-generating.

Paste pH's varied from 4.6 to 8.6, with all but two samples being neutral or alkaline. Sample #3188, low sulphide ore, had a paste pH of 4.6 and sample #9697, high sulphide ore, 5.0. These pH's indicate that some weathering and acid production was occurring. All other samples were neutral or alkaline, indicating that no acid was currently being produced in these samples.

Total sulphur percentages ranged from 1.18 to 9.52%. The lower sulphur contents were in the waste rock and the low sulphide ore samples. Altered hanging and footwall and high sulphide ore samples had medium to high sulphur content. This result was as expected from the distribution of sulphides observed visually in core samples.

Maximum potential acidity by definition follows the same trend as total sulphur previously discussed. Maximum potential acidities ranged from 37 to 298 t $CaCO_3$/1000 t of rock.

Neutralization potential represents the capacity of rock to consume acid and is reported in the same units as maximum potential acidity (t $CaCO_3$/1000 t rock). Neutralization potentials for Kerr samples ranged from 3 to 88 t $CaCO_3$/1000 t of rock with a mean of 40 t $CaCO_3$/1000 t of rock. Samples

3188 and 9697, both high sulphide ore, had the highest potential acidities (298 and 213 t $CaCO_3$/1000 t rock, respectively) and the lowest neutralization potentials (3 and 5 t $CaCO_3$/1000 t rock, respectively). These results together indicate that this rock may produce acid most quickly of any rock in the deposit or host formation. In fact, samples had somewhat acidic paste pH's (4.6 and 5.0, respectively) which supports this assertion. Other samples had neutralization potentials that ranged from 17 to 88 t $CaCO_3$/1000 t rock. As the neutralization potential increases, the time for acid drainage to begin to occur from a rock type is likely to increase, although not necessarily in a linear fashion. This occurs because acid generated by sulphide oxidation is consumed, in situ, by carbonates in the rock and thus drainage off the rock is neutral, or alkaline. Mineralogical examination of whole rock is necessary to confirm the presence of carbonates, however, as other minerals such as feldspars can contribute to neutralization potential. Once all the carbonate is consumed, or if all the carbonate is consumed, acid drainage commences and continues until all the sulphide available for oxidation is oxidized as sulphate production rates drop to low levels.

Net neutralization potential is derived by subtracting the maximum potential acidity from the neutralization potential. Net neutralization potentials ranged from -295 to +51 t $CaCO_3$/1000 t of rock with a mean of -121 t $CaCO_3$/1000 t of rock. High sulphide ore samples, not surprisingly, had the lowest net neutralization potentials, followed by altered hanging and footwall rock. Low sulphide ore and unaltered host rocks had the highest net neutralization potentials.

The results of these ABA tests have indicated that there is theoretically a potential in both ore and waste rock of the Kerr Deposit to generate acid. Further testing will likely be necessary at later stages of project planning to confirm the theoretical potential and to adequately define the rate of acid generation. Further studies should be designed in concert with the conceptual mine plan as it evolves, in order that further testing programs will be cost effective, will provide required information for mine planning, and will satisfy regulatory approval requirements.

NORECOL

I trust this report will meet your current requirements. Please give me a call if you have any questions about the ABA tests.

Yours truly

NORECOL ENVIRONMENTAL CONSULTANTS LIMITED

Bruce Ott, Ph.D.
Senior Biologist

BO/dw

cc: R. Hawes, Norecol

Enclosure

TABLE 1

WESTERN CANADIAN MINING KERR PROJECT ACID-BASE ACCOUNTING SAMPLE LOCATION AND GEOLOGY

SAMPLE TYPE	DESCRIPTION	DRILL HOLE STATISTICS			MINERALIZATION (%)			
		HOLE #	INTERVAL (m)	SAMPLE #	Py	Cp	CC	CB
Unaltered Hangingwall	Dacite Crystal Tuff	88-8	107.0-110.05	9549	5	-	-	3
Altered Hangingwall	Moderately Sericitized Dacite Tuff	88-3	42.0-44.0	9259	12	-	0.1	3
Altered Hangingwall	Strong to Intensely Sericitized Dacite Crystal Tuff	88-2	93.4-95.4	9188	25	-	-	0.2
Ore	High Sulphide	88-11	135.0-138.0	9697	25	0.5	8	1
Ore	High Sulphide	88-18	120.0-122.0	3188	30	0.1	0.1	0.2
Ore	Low Sulphide	88-18	95.0-98.0	3179	3	0.1	0.1	0.2
Altered Footwall	Strongly Sericitized Dacite Lapilli Tuff	88-13	94.35-97.35	9813	25	-	-	2
Unaltered Footwall	Tuff Breccia	87-9	64.0-66.0	3670	?	?	-	?

NORECOL

TABLE 2

WESTERN CANADIAN MINING KERR PROJECT
ACID-BASE ACCOUNTING RESULTS

			TONNE $CaCO_3$/1000 TONNES		
SAMPLE DESCRIPTION	PASTE pH	TOTAL SULPHUR (%S)	MAXIMUM POTENTIAL ACIDITY	NEUT. POTENTIAL	NET NEUT. POTENTIAL
#3179	7.8	2.32	73	24	-49
#3188	4.6	9.52	298	3	-295
#3670	8.4	3.32	104	71	-123
#9188	8.2	5.22	163	74	- 89
#9759	7.7	3.90	122	17	-105
#9549	8.6	1.18	37	88	+51
#9697	5.0	6.81	213	5	-208
#9813	7.7	5.96	186	39	-147

Norecol

Environmental
Consultants Ltd.

Suite 700
1090 West Pender Street
Vancouver, B.C.
Canada V6E 2N7
Telephone: (604) 682-2291
Fax: (604) 682-8323

January 30, 1989
File: 1-174-01.01

Western Canadian Mining Corp.
1170-1055 West Hastings Street
Vancouver, B.C.
V6E 2E9

Attention: Mr. Brian Butterworth

Dear Brian,

RE: ATTACHED WATER QUALITY RESULTS FOR THE KERR PROPERTY

We have just received from B.C. Research the water quality results for our November trip. Results are discussed in this report; the attached figure shows sample locations and the accompanying tables contain the complete data set.

Summary

Samples were collected by Brian Butterworth of Western Canadian Mining and Bruce Ott of Norecol from eight sites on the Kerr Property, November 10, 1988. Two sites were on Sulphurets Creek and the remainder were on tributaries of Sulphurets in the vicinity of the deposit. Creeks were near early winter low levels when sampled and, with the exception of Mitchell Creek where it flowed into Sulphurets Creek, did not appear turbid.

Creeks draining the north side of the deposit (Q2, Q3 and Q4) were acidic to very acidic, hard and had high metal loads. Stations Q5 and Q7 on the northwest side of the deposit, Q1 on the east side, and Q8 on the southeast side were much less acidic, softer and had lower metals loads. Sulphurets Creek had neutral pH, was only moderately hard and had lower metals loads than Q2, Q3, and Q4. Most streams in the area exceeded some provincial Ministry of Environment (MOE) metal criteria to protect fresh water aquatic life. The Ministry may require that mine development does not increase these naturally high levels.

Deposit Drainages

Q8

Sample Q8 was from a small stream draining the southeast side of the mountain containing the Kerr Deposit (see attached Figure). Flow was a few L/s over boulders on an approximately 30% slope. The stream disappeared under the edge of the glacier. The water was near neutral pH (6.8) when sampled; had moderate alkalinity (93 mg $CaCO_3$/L); average conductance for the area (217 umhos/cm); moderate hardness (141 mg $CaCO_3$/L), though not as hard as other streams in the area; moderate total solids levels for the area (162 mg/L); moderate sulphate for the area (40 mg/L); and low nitrates and total phosphorus (0.042 mg N/L, 0.017 mg P/L). Cyanide was undetectable.

Most total metals (which include metals absorbed on particles and ionic/colloidal metals) were at or below detection with the exception of aluminum (0.039 mg/L) and iron (0.18 mg/L). Examination of dissolved metals assays indicates that metals were almost totally in the particulate fraction.

Q1

Sample Q1 was collected from water flowing off a cliff face above Sulphurets glacier on the east side of the Deposit (attached figure). Face rock had a pronounced rusty limonite stain when sampled. The water was somewhat acidic (pH 6.2); with a relatively low alkalinity (33 mg $CaCO_3$/L); average conductance for the area (231 umhos/cm); relatively high total solids (267 mg/L), and suspended solids (123 mg/L) levels, reflecting the extreme stream gradient over the cliff; moderate sulphate and total phosphorus levels (50 mg S/L, 0.355 mg P/L); and relatively low nitrate levels (0.010 mg/L). Cyanide was not detectable.

Of the total metals and metalloids measured, aluminum (0.24 mg/L), arsenic (0.01 mg/L), barium (0.033 mg/L), cobalt (0.003 mg/L), chromium (0.005 mg/L), copper (0.04 mg/L), iron (1.04 mg/L), manganese (0.13 mg/L) and zinc (0.0061 mg/L) were above detection. Examination of the dissolved metals data indicates that all metals and metalloids, except barium, are almost completely in the particulate, and less biologically available, fraction. Dissolved metals were all near, or below, detection levels.

Q2 and Q3

Two samples were taken from a stream that drains directly off known mineralization on the Deposit. The stream drains in a northerly direction. Sample Q2 was taken at a break in slope, approximately 500 m below the old camp, and Q3 was taken 10 m above Sulphurets Lake near the mouth of the stream. The stream falls over a series of boulders and chutes for most of its length. Rocks in the stream and the surrounding area have a rusty limonite stain.

Both samples had quite low pH's (3.2 and 3.3 for Q2 and Q3, respectively). Conductance at Q2 was 784 umhos/cm and at Q3, 709 umhos/cm. The water also had a high dissolved solids load (636 mg/L at Q2 and 531 mg/L at Q3). The creek water was quite hard (246 mg/L at Q2 and Q3). These three parameters together suggest a very high ionic content in the stream, as would be expected at the pH observed. Sulphate was very high (408 mg/L at Q2 and 362 mg/L at Q3), a clear indication that acid was actively being produced by the rocks in the drainage when sampled. At Q2, nitrates were below detection but other nitrogen species (ammonia and nitrite) were quite high (0.090 and 0.023 mg/L, respectively). At Q3 ammonia was the same as at Q2 but nitrite was about half the Q2 level. Nitrate at Q3 was measurable but quite low (0.011 mg/L). Total phosphorus at both sites was moderately low (0.177 and 0.038 mg/L at Q2 and Q3, respectively). Cyanide was not detectable in the stream.

Metals and metalloids were almost entirely in the dissolved fraction both Q2 and Q3. *Typical of acidic drainages* aluminum, copper, iron and manganese were all considerably elevated in concentration.

METAL	Q2	Q3
Al	6.2	5.5
Cu	2.3	1.8
Fe	23	11
Mn	2.28	1.45

all mg/L

Norecol

Cobalt, nickel and zinc, and to a lesser extent, cadmium were being leached by the acidic water.

METAL	Q2	Q3
Cd	0.0013	0.0010
Co	0.06	0.04
Ni	0.018	0.012
Zn	0.037	0.027

all mg/L

Examination of these data indicates very little gradient in any parameters from Q2 to Q3. The lack of a pronounced negative gradient away from the deposit could be explained in several ways. First, the acid pH acted to keep metals in solution. Second, the stream bed is very precipitous and there is little or no addition of water from tributaries. Third, ground water seeps, if they exist, were probably of a similar nature to the stream because they originate in the same high sulphide ore body as the surface stream water.

The precipitous nature of the stream precludes its utilization by fish. The high metals levels, especially copper, probably inhibit production of fish food organisms and thus the stream is of negligible utility to fish either as habitat or a source of food.

Q4, Q5 and Q7

Three other streams, located progressively more westward from the known ore body, were sampled in order to determine the extent of the ore body's influence on water characteristics. Sample Q4 was taken in a stream closest to stream Q3, Q5 the next westward and Q7 still further west. All samples were taken near the mouths of the streams near Sulphurets Lake (Q4 and Q5) or Sulphurets Creek (Q7). Streams from which Q4 and Q5 were taken have similar profiles to the previously described stream. Stream Q7 has two branches, one originating at relatively low elevation near stream Q5 and one, much longer, originating in an icefield above and to the west of the Kerr Deposit. Although desirable, it was not possible because of poor access to obtain a sample from the glacier-fed branch of stream Q7.

There was a very pronounced rise in pH and drop in sulphate and metal levels between streams Q3 and Q4. It would appear that Q4 and streams west of it are not influenced by the ore body proper and the oxydizing pyritic rock.

There was a general pattern of increasing pH and alkalinity levels as one progresses westward away from the Kerr Deposit. The pH varied from a low of 6.7 at Q4 to a high of 7.6 at Q7 when collected. Alkalinity increased from 36 at Q4 to 100 mg $CaCO_3$/L at Q7. Alkalinity at the latter site was the highest of any of the samples and is quite high for mountain streams in British Columbia.

The pattern for conductance, suspended solids, hardness and sulphate was somewhat different. Conductance dropped from 308 umhos/cm at Q4 to 237 umhos/cm at Q5 but increased to 343 umhos/cm at Q7. This increase at Q7 may reflect an increase in sulphate, or also may be due to major ions that were not assayed for, such as calcium, sodium and potassium. Increased conductance does not correspond with increased metal ions. Suspended solids and hardness repeated the pattern exhibited by conductance, showing a drop between Q4 and Q5 and an increase once again at Q7. Sulphate dropped from 148 mg/L at Q4 to 82 mg/L at Q5. The concentration at Q7 was 122 mg/L. This suggests that stream Q7 is influenced by an acid generating rock. The pH was not low (and metal loads not high) because of the buffering effect of the alkalinity contributed principally by a carbonate source. The most likely source of the acid was from the glacier-fed branch as the other branch of Q7 originates near the stream Q5. Stream Q5 did not exhibit the same characteristics of high sulphate, conductance and hardness shown by sample Q7.

There was no apparent pattern among the three streams in nitrogen species and total phosphorus concentrations. Nitrite was below detection (<0.002 mg/L) in all three samples; ammonia, nitrate and total phosphorus were low. Cyanide was not detectable in any of the three stations.

Metals decrease between Q4 and Q5 but remain nearly the same between Q5 and Q7. Sample Q4 had high total aluminum (1.1 mg/L), copper (0.36 mg/L), iron (2.51 mg/L), and manganese (0.32 mg/L). Most of the copper and iron were in the dissolved fraction, half the aluminum was dissolved and about one quarter of the manganese. As with stream Q3, cobalt, nickel and zinc were detectable in stream Q4, although at lower levels than in stream Q4. Sample Q4 exhibited a transition phase; the stream was still under the influenced by acid drainage but to a lesser degree so than stream Q3.

Stream Q5 had metal levels near normal for pristine mountain streams and exhibited none of the acid drainage characteristics shown by Q4. Stream Q7, as mentioned above, had metal levels similar to Q5.

Streams Q4 and Q5 are too steeply inclined to provide fish habitat. Invertebrate fish food might live in Q5 but may be limited in Q4 by the high copper levels.

Sulphurets Creek

Q6 and Q9

Two samples were collected in Sulphurets Creek, Q6 just below the outlet of Sulphurets Lake and Q9, just below the junction with Mitchell Creek flowing into Sulphurets Creek from the north. At the time of sampling Mitchell Creek carried an appreciable sediment load. Sulphurets Creek was quite low and the water transparent down to the confluence with Mitchell Creek.

Parameters other than total and dissolved metals and sediment loads were quite similar between the two sampling points. The pH at Q6 was 7.0 and at Q9, 6.8. Alkalinity at Q6 was 48 and at Q9, 64 mg $CaCO3/L$. Conductance at Q6 was 195 and at Q9, 251 umhos/cm. Hardness was 111 at Q6 and at Q9, 145 mg $CaCO3/L$. Sulphate was 64 at Q6 and at Q9, 86 mg/L. None of these differences are significant. Nutrients, nitrate and total phosphorus, were somewhat higher at Q9 (0.078 vs 0.104 mg N/L and 0.003 vs 0.115 mg P/L), perhaps due to the particulate load at the latter sample site. Cyanide was not detectable at either site in Sulphurets Creek.

Total metals and metalloids were considerably elevated at Q9 compared to Q6 corresponding with high suspended solids load at Q9. Dissolved metals assays indicate that aluminum, cobalt, copper, iron, manganese, nickel and zinc were higher at Q9 than at Q6, again correlated with high suspended solids levels at Q9.

Of all the parameters measured at Q6, only total copper exceeded the MOE criterion for protection of freshwater aquatic life

(0.0052 vs a criterion of 0.002 mg/L). However, this copper level is not unusual for many streams that are inhabited by fish. (There are currently no data on resident fish populations in Sulphurets Creek.) Several parameters exceed MOE criteria for protection of fresh water aquatic life at Q9; this is not uncommon during periods when streams carry high suspended solids. Subsequent sampling at different seasons would better characterize the site on a year-round basis.

Naturally elevated levels of metals, especially aluminum, iron and copper have a bearing on mine development for the following reason. There may be some concern expressed by MOE that mining activity does not result in a material increase of metals levels in Sulphurets Creek if resident trout are present. This concern would likely be manifested in permit conditions for mine and tailings water discharges to Sulphurets Creek and this is possibly one area where negotiations with the Ministry would be required.

Yours truly,

NORECOL ENVIRONMENTAL CONSULTANTS LIMITED

Bruce S. Ott, Ph.D.
Senior Biologist

BSO/dw

Enclosure

ANALYTICAL RESULTS FOR WATER SAMPLES FROM
WESTERN CANADIAN MINES, KERR PROJECT
SITE: Q1

ANALYTICAL PARAMETER	NOV. 10/88
pH	7.2
Alkalinity (mg $CaCO_3$/L)	125
Turbidity (NTU)	32
Conductance (µmhos/cm)	231
Total Solids (mg/L)	267
Suspended Solids (mg/L)	123
EDTA-Hardness (mg $CaCO_3$/L)	154
Sulfate (mg/L)	50
Ammonia (mg N/L)	<0.005
Nitrate (mg N/L)	0.010
Nitrite (mg N/L)	<0.002
Total Phosphorus (mg P/L)	0.355
Total Cyanide (mg/L)	<0.001
TOTAL METALS: (mg/L)	
Ag	<0.0002
Al	0.24
As	0.010
Ba	0.033
Cd	<0.0002
Co	0.003
Cr	0.005
Cu	0.04
Fe	1.04
Hg (µg/L)	<0.05
Mn	0.13
Mo	<0.005
Ni	<0.002
Pb	<0.001
Sb	<0.002
Se	<0.001
Zn	0.0061
DISSOLVED METALS: (mg/L)	
Ag	<0.0002
Al	<0.01
As	0.003
Ba	0.024
Cd	<0.0002
Co	<0.001
Cr	<0.001
Cu	<0.0005
Fe	0.009
Mn	<0.001
Mo	<0.005
Ni	<0.002
Pb	<0.001
Sb	<0.002
Se	<0.001
Zn	<0.0005

ANALYTICAL RESULTS FOR WATER SAMPLES FROM
WESTERN CANADIAN MINES, KERR PROJECT
SITE: Q2

ANALYTICAL PARAMETER	NOV. 10/88
pH	3.2
Alkalinity (mg $CaCO_3$/L)	-
Turbidity (NTU)	0.3
Conductance (µmhos/cm)	784
Total Solids (mg/L)	636
Suspended Solids (mg/L)	<1
EDTA-Hardness (mg $CaCO_3$/L)	246
Sulfate (mg/L)	408
Ammonia (mg N/L)	0.090
Nitrate (mg N/L)	<0.005
Nitrite (mg N/L)	0.023
Total Phosphorus (mg P/L)	0.177
Total Cyanide (mg/L)	<0.001
TOTAL METALS: (mg/L)	
Ag	<0.0002
Al	6.2
As	0.004
Ba	0.005
Cd	0.0013
Co	0.06
Cr	0.002
Cu	2.3
Fe	23
Hg (µg/L)	<0.05
Mn	2.28
Mo	<0.005
Ni	0.018
Pb	<0.001
Sb	<0.002
Se	<0.001
Zn	0.37
DISSOLVED METALS: (mg/L)	
Ag	<0.0002
Al	6.1
As	0.004
Ba	<0.005
Cd	0.0013
Co	0.06
Cr	0.002
Cu	2.3
Fe	23
Mn	2.11
Mo	<0.005
Ni	0.018
Pb	<0.001
Sb	<0.002
Se	<0.001
Zn	0.36

ANALYTICAL RESULTS FOR WATER SAMPLES FROM
WESTERN CANADIAN MINES, KERR PROJECT
SITE: Q3

ANALYTICAL PARAMETER	NOV. 10/88
pH	3.3
Alkalinity (mg $CaCO_3$/L)	-
Turbidity (NTU)	0.6
Conductance (µmhos/cm)	709
Total Solids (mg/L)	531
Suspended Solids (mg/L)	<1
EDTA-Hardness (mg $CaCO_3$/L)	246
Sulfate (mg/L)	362
Ammonia (mg N/L)	0.091
Nitrate (mg N/L)	0.011
Nitrite (mg N/L)	0.010
Total Phosphorus (mg P/L)	0.038
Total Cyanide (mg/L)	<0.001
TOTAL METALS: (mg/L)	
Ag	<0.0002
Al	5.5
As	0.001
Ba	0.012
Cd	0.0010
Co	0.04
Cr	0.001
Cu	1.8
Fe	11
Hg (µg/L)	<0.05
Mn	1.45
Mo	<0.005
Ni	0.012
Pb	<0.001
Sb	<0.002
Se	<0.001
Zn	0.27
DISSOLVED METALS: (mg/L)	
Ag	<0.0002
Al	5.1
As	0.001
Ba	0.008
Cd	0.0010
Co	0.04
Cr	0.001
Cu	1.8
Fe	10
Mn	1.36
Mo	<0.005
Ni	0.012
Pb	<0.001
Sb	<0.002
Se	<0.001
Zn	0.27

ANALYTICAL RESULTS FOR WATER SAMPLES FROM
WESTERN CANADIAN MINES, KERR PROJECT
SITE: Q4

ANALYTICAL PARAMETER	NOV. 10/88
pH	6.7
Alkalinity (mg $CaCO_3$/L)	36
Turbidity (NTU)	12.5
Conductance (µmhos/cm)	308
Total Solids (mg/L)	287
Suspended Solids (mg/L)	24
EDTA-Hardness (mg $CaCO_3$/L)	180
Sulfate (mg/L)	148
Ammonia (mg N/L)	0.015
Nitrate (mg N/L)	0.023
Nitrite (mg N/L)	<0.002
Total Phosphorus (mg P/L)	0.048
Total Cyanide (mg/L)	<0.001
TOTAL METALS: (mg/L)	
Ag	<0.0002
Al	1.1
As	0.003
Ba	0.024
Cd	0.0003
Co	0.008
Cr	<0.001
Cu	0.36
Fe	2.51
Hg (µg/L)	<0.05
Mn	0.32
Mo	<0.005
Ni	0.003
Pb	<0.001
Sb	<0.002
Se	<0.001
Zn	0.06
DISSOLVED METALS: (mg/L)	
Ag	<0.0002
Al	0.05
As	<0.001
Ba	0.016
Cd	0.0003
Co	0.005
Cr	<0.001
Cu	0.029
Fe	0.09
Mn	0.27
Mo	<0.005
Ni	0.003
Pb	<0.001
Sb	<0.002
Se	<0.001
Zn	0.03

ANALYTICAL RESULTS FOR WATER SAMPLES FROM
WESTERN CANADIAN MINES, KERR PROJECT
SITE: Q5

ANALYTICAL PARAMETER	NOV. 10/88
pH	6.9
Alkalinity (mg $CaCO_3$/L)	51
Turbidity (NTU)	0.1
Conductance (μmhos/cm)	237
Total Solids (mg/L)	194
Suspended Solids (mg/L)	<1
EDTA-Hardness (mg $CaCO_3$/L)	136
Sulfate (mg/L)	82
Ammonia (mg N/L)	<0.005
Nitrate (mg N/L)	0.400
Nitrite (mg N/L)	<0.002
Total Phosphorus (mg P/L)	0.005
Total Cyanide (mg/L)	<0.001
TOTAL METALS: (mg/L)	
Ag	<0.0002
Al	<0.01
As	0.003
Ba	0.023
Cd	<0.0002
Co	0.001
Cr	<0.001
Cu	0.0006
Fe	0.021
Hg (μg/L)	<0.05
Mn	0.0014
Mo	<0.005
Ni	<0.002
Pb	<0.001
Sb	<0.002
Se	<0.001
Zn	0.0035
DISSOLVED METALS: (mg/L)	
Ag	<0.0002
Al	<0.01
As	0.003
Ba	0.019
Cd	<0.0002
Co	0.001
Cr	<0.001
Cu	<0.0005
Fe	0.005
Mn	<0.001
Mo	<0.005
Ni	<0.002
Pb	<0.001
Sb	<0.002
Se	<0.001
Zn	0.0030

ANALYTICAL RESULTS FOR WATER SAMPLES FROM
WESTERN CANADIAN MINES, KERR PROJECT
SITE: Q6

ANALYTICAL PARAMETER	NOV. 10/88
pH	7.0
Alkalinity (mg $CaCO_3$/L)	48
Turbidity (NTU)	1.2
Conductance (µmhos/cm)	195
Total Solids (mg/L)	153
Suspended Solids (mg/L)	2
EDTA-Hardness (mg $CaCO_3$/L)	111
Sulfate (mg/L)	64
Ammonia (mg N/L)	<0.005
Nitrate (mg N/L)	0.078
Nitrite (mg N/L)	<0.002
Total Phosphorus (mg P/L)	0.003
Total Cyanide (mg/L)	<0.001
TOTAL METALS: (mg/L)	
Ag	<0.0002
Al	0.049
As	<0.001
Ba	0.043
Cd	<0.0002
Co	0.002
Cr	<0.001
Cu	0.0052
Fe	0.05
Hg (µg/L)	<0.05
Mn	0.08
Mo	<0.005
Ni	<0.002
Pb	<0.001
Sb	<0.002
Se	<0.001
Zn	0.0025
DISSOLVED METALS: (mg/L)	
Ag	<0.0002
Al	0.022
As	<0.001
Ba	0.041
Cd	<0.0002
Co	0.001
Cr	<0.001
Cu	0.0022
Fe	0.009
Mn	0.08
Mo	<0.005
Ni	<0.002
Pb	<0.001
Sb	<0.002
Se	<0.001
Zn	0.0017

ANALYTICAL RESULTS FOR WATER SAMPLES FROM
WESTERN CANADIAN MINES, KERR PROJECT
SITE: Q7

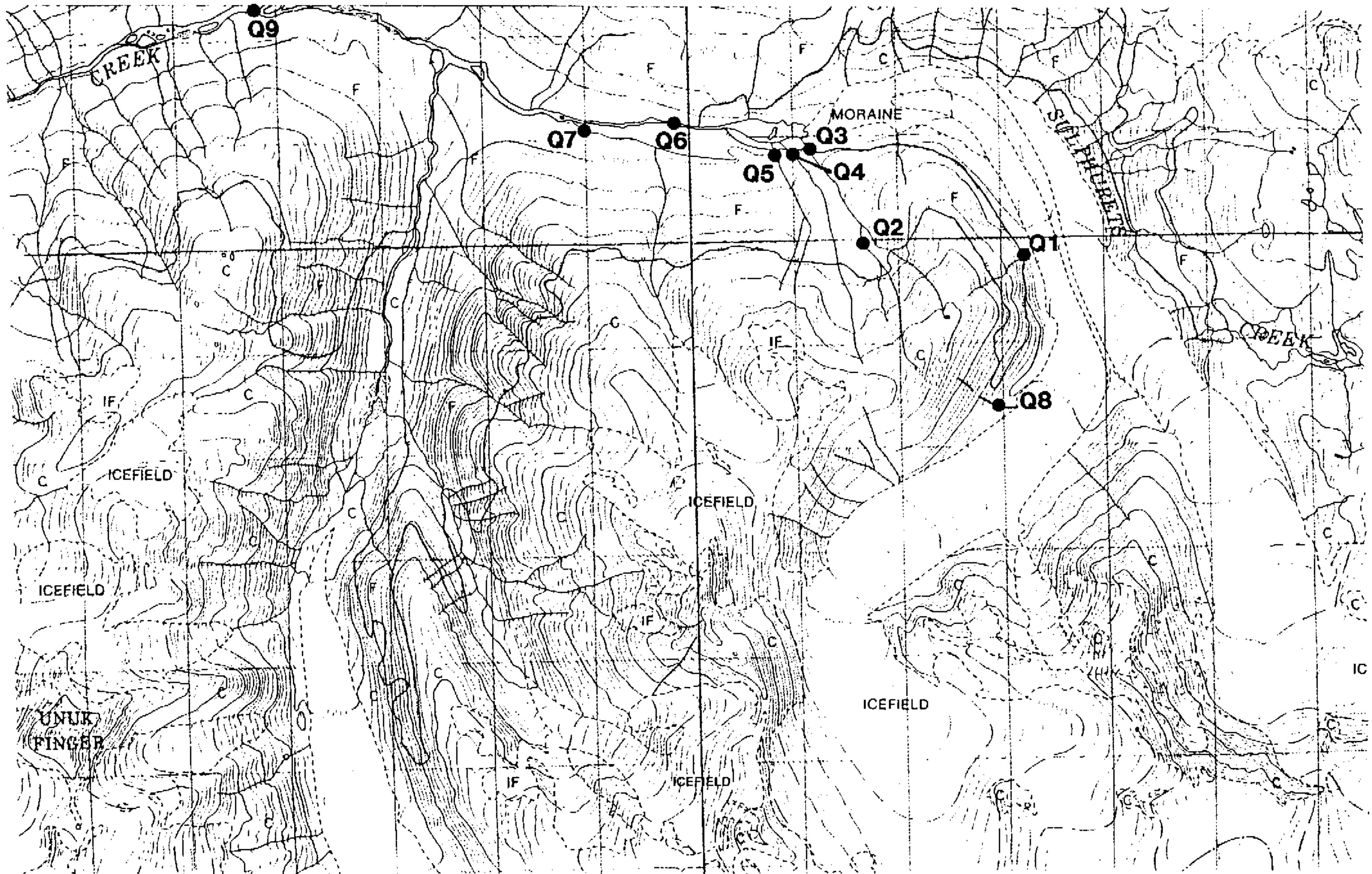
ANALYTICAL PARAMETER	NOV. 10/88
pH	7.6
Alkalinity (mg $CaCO_3$/L)	100
Turbidity (NTU)	1.8
Conductance (µmhos/cm)	343
Total Solids (mg/L)	293
Suspended Solids (mg/L)	<1
EDTA-Hardness (mg $CaCO_3$/L)	213
Sulfate (mg/L)	122
Ammonia (mg N/L)	0.025
Nitrate (mg N/L)	0.404
Nitrite (mg N/L)	<0.002
Total Phosphorus (mg P/L)	<0.003
Total Cyanide (mg/L)	<0.001
TOTAL METALS: (mg/L)	
Ag	<0.0002
Al	<0.01
As	0.002
Ba	0.027
Cd	<0.0002
Co	0.003
Cr	<0.001
Cu	0.0005
Fe	0.028
Hg (µg/L)	<0.05
Mn	0.0017
Mo	<0.005
Ni	<0.002
Pb	<0.001
Sb	<0.002
Se	<0.001
Zn	0.0023
DISSOLVED METALS: (mg/L)	
Ag	<0.0002
Al	<0.01
As	0.002
Ba	0.026
Cd	<0.0002
Co	0.003
Cr	<0.001
Cu	-
Fe	0.006
Mn	<0.001
Mo	<0.005
Ni	<0.002
Pb	<0.001
Sb	<0.002
Se	<0.001
Zn	0.0019

ANALYTICAL RESULTS FOR WATER SAMPLES FROM
WESTERN CANADIAN MINES, KERR PROJECT
SITE: 08

ANALYTICAL PARAMETER	NOV. 10/88
pH	6.8
Alkalinity (mg $CaCO_3$/L)	93
Turbidity (NTU)	1.8
Conductance (µmhos/cm)	217
Total Solids (mg/L)	165
Suspended Solids (mg/L)	3
EDTA-Hardness (mg $CaCO_3$/L)	141
Sulfate (mg/L)	40
Ammonia (mg N/L)	<0.005
Nitrate (mg N/L)	0.042
Nitrite (mg N/L)	<0.002
Total Phosphorus (mg P/L)	0.017
Total Cyanide (mg/L)	<0.001
TOTAL METALS: (mg/L)	
Ag	<0.0002
Al	0.039
As	0.003
Ba	0.035
Cd	<0.0002
Co	0.001
Cr	<0.001
Cu	0.0005
Fe	0.18
Hg (µg/L)	<0.05
Mn	0.025
Mo	<0.005
Ni	<0.002
Pb	<0.001
Sb	<0.002
Se	<0.001
Zn	0.0007
DISSOLVED METALS: (mg/L)	
Ag	<0.0002
Al	<0.01
As	0.001
Ba	0.019
Cd	<0.0002
Co	<0.001
Cr	<0.001
Cu	-
Fe	0.021
Mn	<0.001
Mo	<0.005
Ni	<0.002
Pb	<0.001
Sb	<0.002
Se	<0.001
Zn	<0.0005

ANALYTICAL RESULTS FOR WATER SAMPLES FROM
WESTERN CANADIAN MINES, KERR PROJECT
SITE: Q9

ANALYTICAL PARAMETER	NOV. 10/88
pH	6.8
Alkalinity (mg $CaCO_3$/L)	64
Turbidity (NTU)	19
Conductance (μmhos/cm)	251
Total Solids (mg/L)	236
Suspended Solids (mg/L)	42
EDTA-Hardness (mg $CaCO_3$/L)	145
Sulfate (mg/L)	86
Ammonia (mg N/L)	<0.005
Nitrate (mg N/L)	0.104
Nitrite (mg N/L)	<0.002
Total Phosphorus (mg P/L)	0.115
Total Cyanide (mg/L)	<0.001
TOTAL METALS: (mg/L)	
Ag	<0.0002
Al	0.51
As	0.003
Ba	0.026
Cd	0.0011
Co	0.005
Cr	<0.001
Cu	0.10
Fe	2.35
Hg (μg/L)	<0.05
Mn	0.18
Mo	<0.005
Ni	0.003
Pb	<0.001
Sb	<0.002
Se	<0.001
Zn	0.10
DISSOLVED METALS: (mg/L)	
Ag	<0.0002
Al	0.06
As	<0.001
Ba	0.010
Cd	<0.0002
Co	0.003
Cr	<0.001
Cu	0.0078
Fe	0.05
Mn	0.14
Mo	<0.005
Ni	0.003
Pb	<0.001
Sb	<0.002
Se	<0.001
Zn	0.04



NORECOL SAMPLING SITES

Norecol
Environmental
Consultants Ltd.

Suite 700
1090 West Pender Street
Vancouver, B.C.
Canada V6E 2N7
Telephone: (604) 682-2291
Fax: (604) 682-8323

RECEIVED
JUL 27 1989

July 27, 1989
File: 1-174-02.01

Sulphurets Gold Corp.
1170-1055 West Hastings Street
Vancouver, British Columbia
V6E 2E9

Attention: Mr. Bob Hewton, P. Eng.
Vice-President, Exploration

Dear Bob;

RE: ATTACHED TAILINGS SITE REPORT

The attached report is our preliminary tailings site selection report. If you have any questions, please feel free to give me a call.

Yours truly,

NORECOL ENVIRONMENTAL CONSULTANTS LTD.

Bruce S. Ott, Ph.D.
Project Manager

BSO/sip

Attachment

WESTERN CANADIAN MINING
KERR PROJECT
PRELIMINARY TAILINGS SITE SELECTION

INTRODUCTION

As part of a field trip to collect water quality and hydrology data, Bruce Ott of Norecol Environmental Consultants Ltd. investigated potential tailings sites in the vicinity of the Kerr property on Sulphurets Creek. This report contains the results of those investigations and discussions with the project manager, Mr. Brian Butterworth.

The Kerr deposit is located 50 km north of Stewart and immediately west of Sulphurets glacier. The terrain is rugged and relief on the property spans over 1200 m. The area features one major drainage, Sulphurets Creek. This creek drains Sulphurets glacier and is fed by a number of small and larger tributaries. The largest tributaries are Ted Morris and Mitchell creeks. Tailings storage sites near the deposit are limited by topographic constraints to the valleys formed by Sulphurets Creek and its major tributaries.

We understand the Kerr deposit has the potential for up to 100 million tonnes of ore or more. Much of the tailings and waste rock may be acid generating based on preliminary testing conducted in 1988 and will likely require underwater storage to control acid generation. Therefore a target volume of 100 million cubic metres was chosen as a conservative estimate of the total storage volume requirement.

Based on this volume requirement, Sulphurets Lake and Creek appears to be the area most suitable for tailings storage. From discussions with Brian Butterworth we understand that the lake may be within economic mineralization. We have therefore divided the creek valley into two possible tailings sites (Figure 1). Tailings storage will only be feasible in the Sulphurets drainage if diversion of Sulphurets, Ted Morris and Mitchell creeks is possible.

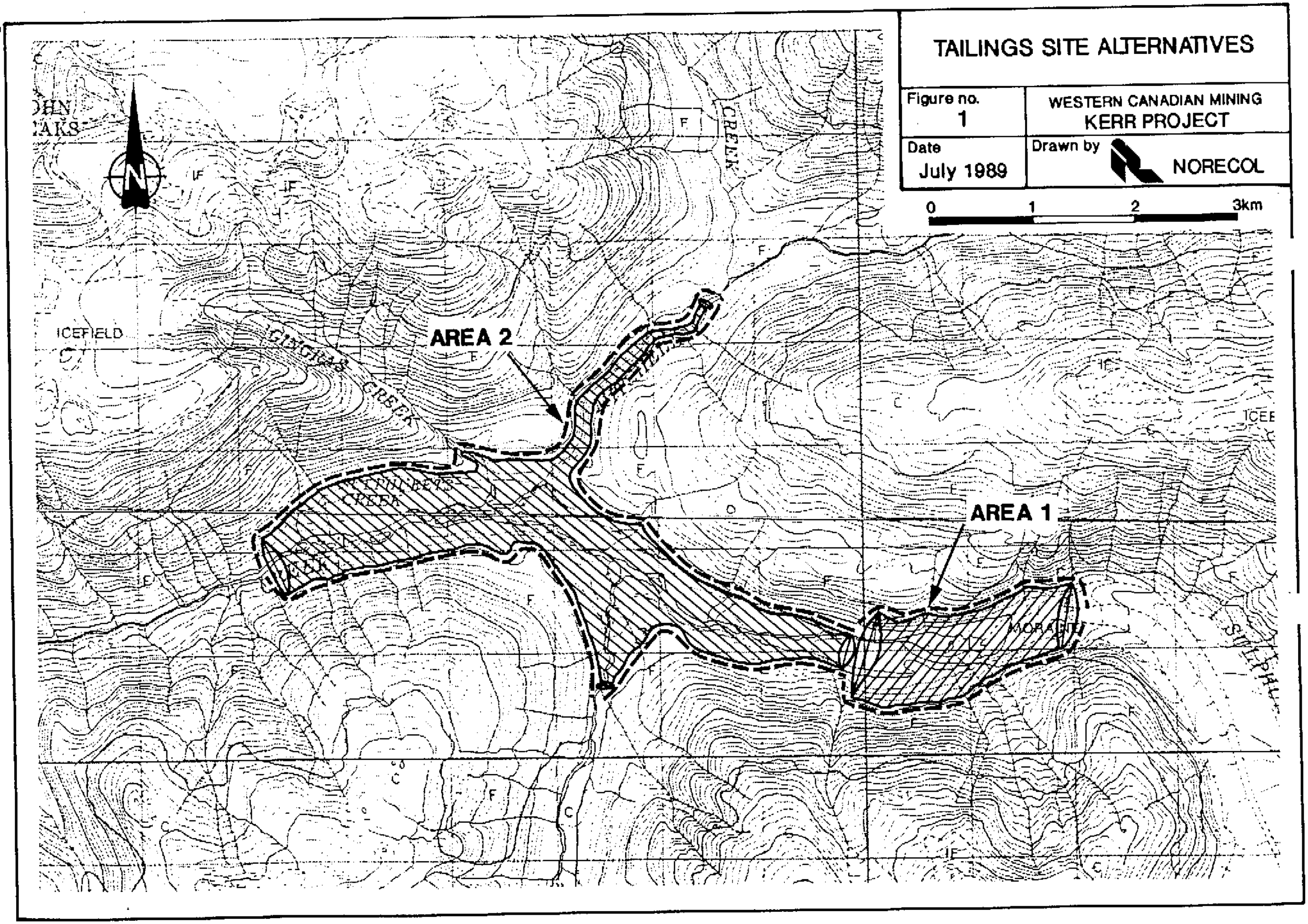
Although it is unlikely fish inhabit the reaches of Sulphurets Creek and tributaries near the property, an evaluation of the fisheries potential of Sulphurets Lake and Creek, Ted Morris Creek and Mitchell Creek will be required before site alternatives are presented to government. Norecol may be able to conduct fisheries studies in the Sulphurets drainage this summer in conjunction with other work in the area. A geotechnical evaluation of tailings sites will also be required as part of feasibility studies.

TAILINGS SITES

Sulphurets Lake (Area 1)

The volume of this site (Area 1 on Figure 1) was calculated by assuming a valley length of 1900 m and an average valley width of 400 m. A height of 131 m is required to accommodate a volume of 100 million cubic metres with no allowance for freeboard. The area is pictured in Figure 2.

This site is attractive physically because the lake lies in a well defined, steep-sided valley. Two embankments will be required at the upstream and downstream sides of the lake, the upper 600 m long and the lower 900 m. The upper dam will cause



TAILINGS SITE ALTERNATIVES
Figure no.
1
WESTERN CANADIAN MINING
KERR PROJECT
Date
July 1989
Drawn by
NORECOL
0
1
2
3km
AREA 2
AREA 1
ICEFIELD
CREEK

a lake to form at the toe of Sulphurets glacier. Diversion ditches will be required around both sides of Sulphurets Lake to ensure that clean water does not enter the tailings impoundment. Design of these ditches will require good flow data for Sulphurets Creek, probably on a monthly basis. Ditches will need to be sized to contain at least a one in ten year storm event, or peak snow runoff, which ever is greater.

Sulphurets and Ted Morris Creeks

The volume of Area 2 on Figure 1 was calculated by first measuring the area enclosed by the 1600 ft, 1700 ft, 1800 ft and 1900 ft contours. Volumes for each 100 ft contour interval were then calculated by multiplying the depth (30 m) by the average surface area. A dam elevation of 1836 ft is required to accommodate a volume of 100 million cubic metres with no allowance for freeboard. The area is pictured in Figure 3.

Area 2 is less desirable than Area 1 from physical and environmental considerations because four embankments (versus two) and much longer diversion ditches will be required and because a much greater area of stream will have to be diverted to accommodate tailings storage. In addition to Sulphurets Creek, both Mitchell and Ted Morris creeks must also be diverted. This site may be necessary if ore occurs under Sulphurets Lake.

Preliminary aspects of the four embankments required at Area 2 are as follows. The embankment on the upstream end of Sulphurets Creek will need to be about 400 m long and less than 30 m high; that on Ted Morris Creek, about 100 m long and high enough to divert the creek at flood; that on Mitchell Creek the same as Ted Morris Creek; and that on the downstream end of

Figure 2
Tailings Site
Alternative
Site 1

Figure 3 Tailings Site Alternative Site 2

Sulphurets Creek about 600 m long by 120 m high. Diversion ditches will again be required to divert clean water. Larger ditches will be necessary at this site because of the greater volume of creek water involved. Again water flow data will have to be obtained for design. Sizing considerations for this site would be as discussed for Area 1.

Norecol

Environmental
Consultants Ltd.

Suite 700
1090 West Pender Street
Vancouver, B.C.
Canada V6E 2N7
Telephone: (604) 682-2291
Fax: (604) 682-8323

September 7, 1989
File: 1-174-02.01

Western Canadian Mining Corporation
1170 - 1055 West Hastings Street
Vancouver, British Columbia
V6E 2E9

Attention: Mr. Bob Hewton, P. Eng
Vice-President, Exploration

Dear Bob;

RE: KERR PROPERTY WATER QUALITY RESULTS, JULY 1989

The accompanying tables list the water quality results for the July collection at the Kerr property.

The most noteworthy difference between the November 1988 and July 1989 samples was an increase in pH by 0.5 to over 1 unit. This has occurred at all sites except Q7. At this time we do not have a large enough data base to explain this increase. Field and lab pH correlate fairly well, that is, both measurement sets in July, 1989 indicated a rise in pH.

Metals patterns were quite similar between the sampling in November and that in July. Metals are generally low except for the streams with acidic pH. There is one mercury concentration above detection (July site Q2). This may be real, an analytical error, or contamination; mercury was below detection at this site in November.

In contrast to the pattern for metals, the presence of snow melt water has resulted in a pronounced increase in total phosphorus.

I trust this report will satisfy your immediate requirements. This information will be analysed along with data to come and will eventually form part of your Stage I report.

Norecol

If you have any questions, please do not hesitate to give me a call.

Yours truly

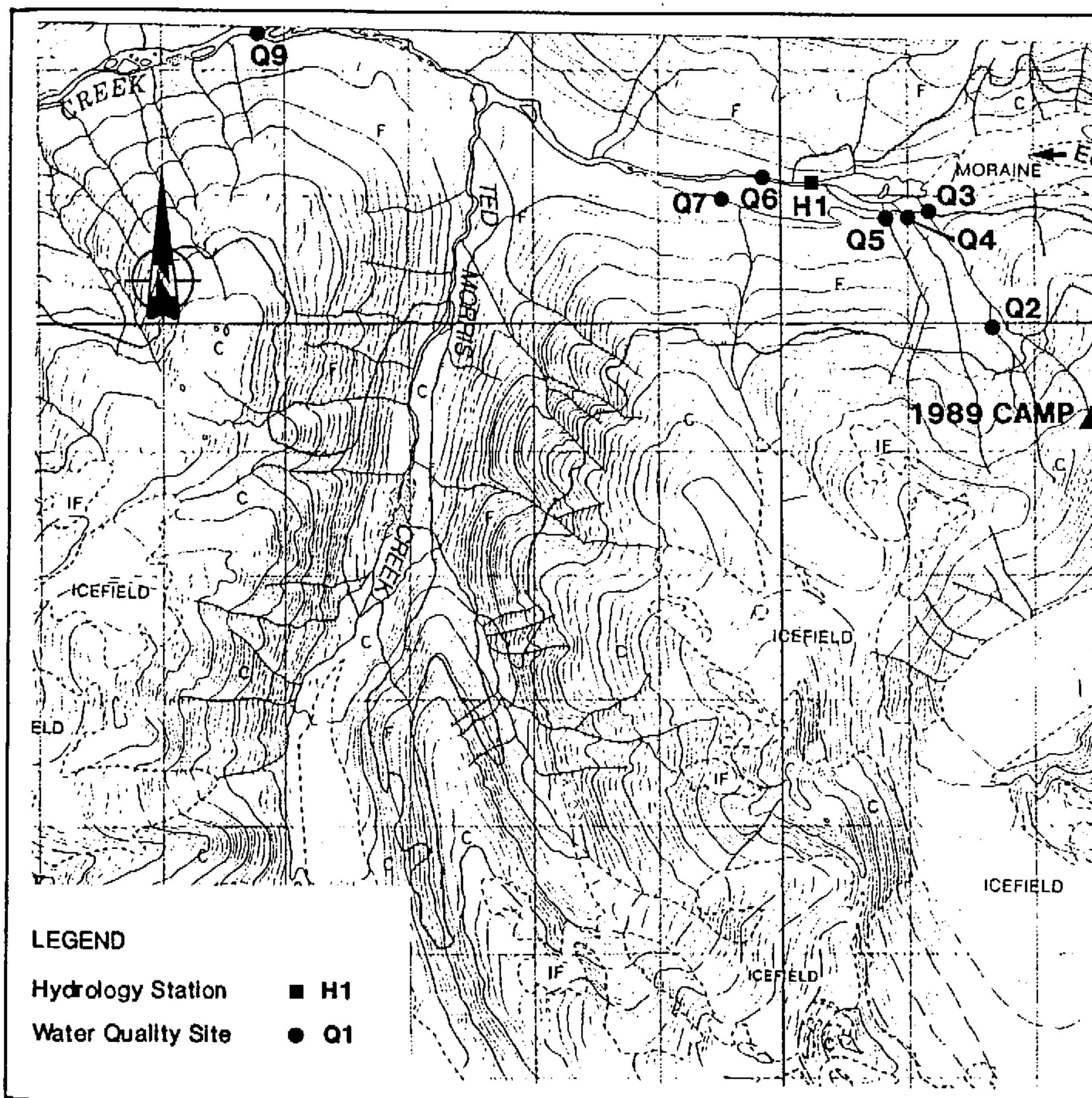
NORECOL ENVIRONMENTAL CONSULTANTS LTD.

Bruce S. Ott, Ph.D.
Project Manager

BSO/dsw

Enclosures

cc: Mr. Brian Butterworth



NORECOL SAMPLING SITES

Figure no. 1	WESTERN CANADIAN MINING
Date July 1989	Drawn by NORECOL

ANALYTICAL RESULTS FOR WATER SAMPLES FROM WESTERN CANADIAN MINES, KERR PROJECT SITE: Q1

ANALYTICAL PARAMETER	NOV. 10/88	JULY 15/89
pH	7.2	7.6
Alkalinity (mg $CaCO_3$/L)	125	68
Turbidity (NTU)	32	1.0
Conductance (µmhos/cm 20°C)	231	181
Total Solids (mg/L)	267	142
Suspended Solids (mg/L)	123	2
EDTA-Hardness (mg $CaCO_3$/L)	154	108
Sulfate (mg/L)	50	40
Ammonia (mg N/L)	<0.005	0.009
Nitrate (mg N/L)	0.010	<0.005
Nitrite (mg N/L)	<0.002	<0.002
Total Phosphorus (mg P/L)	0.355	0.008
Total Cyanide (mg/L)	<0.001	<0.001
TOTAL EXTRACTABLE METALS: (mg/L)		
Ag	<0.0002	<0.0001
Al	0.24	0.012
As	0.010	<0.001
Ba	0.033	0.019
Cd	<0.0002	<0.0002
Co	0.003	<0.001
Cr	0.005	<0.001
Cu	0.04	0.0010
Fe	1.04	0.012
Hg (µg/L)	<0.05	<0.05
Mn	0.13	<0.001
Mo	<0.005	<0.005
Ni	<0.002	<0.002
Pb	<0.001	<0.001
Sb	<0.002	<0.002
Se	<0.001	<0.001
Zn	0.0061	<0.0005
DISSOLVED METALS: (mg/L)		
Ag	<0.0002	<0.0001
Al	<0.01	0.012
As	0.003	<0.001
Ba	0.024	0.019
Cd	<0.0002	<0.0002
Co	<0.001	<0.001
Cr	<0.001	<0.001
Cu	<0.0005	-
Fe	0.009	<0.005
Mn	<0.001	<0.001
Mo	<0.005	<0.005
Ni	<0.002	<0.002
Pb	<0.001	<0.001
Sb	<0.002	<0.002
Se	<0.001	<0.001
Zn	<0.0005	<0.0005

ANALYTICAL RESULTS FOR WATER SAMPLES FROM
WESTERN CANADIAN MINES, KERR PROJECT
SITE: Q2

ANALYTICAL PARAMETER	NOV. 10/88	JULY 15/89
pH	3.2	3.2
Alkalinity (mg $CaCO_3$/L)	-	-
Turbidity (NTU)	0.3	35
Conductance (µmhos/cm)	784	315
Total Solids (mg/L)	636	188
Suspended Solids (mg/L)	<1	49
EDTA-Hardness (mg $CaCO_3$/L)	246	46
Sulfate (mg/L)	408	115
Ammonia (mg N/L)	0.090	0.029
Nitrate (mg N/L)	<0.005	<0.005
Nitrite (mg N/L)	0.023	<0.002
Total Phosphorus (mg P/L)	0.177	0.214
Total Cyanide (mg/L)	<0.001	<0.001
TOTAL EXTRACTABLE METALS: (mg/L)		
Ag	<0.0002	<0.0001
Al	6.2	2.3
As	0.004	0.013
Ba	0.005	0.05
Cd	0.0013	0.0003
Co	0.06	0.009
Cr	0.002	<0.001
Cu	2.3	0.87
Fe	23	12.5
Hg (µg/L)	<0.05	0.13
Mn	2.28	0.48
Mo	<0.005	<0.005
Ni	0.018	0.006
Pb	<0.001	0.004
Sb	<0.002	0.003
Se	<0.001	<0.001
Zn	0.37	0.08
DISSOLVED METALS: (mg/L)		
Ag	<0.0002	<0.0001
Al	6.1	1.6
As	0.004	0.004
Ba	<0.005	0.016
Cd	0.0013	0.0003
Co	0.06	0.009
Cr	0.002	<0.001
Cu	2.3	0.86
Fe	23	10.6
Mn	2.11	0.41
Mo	<0.005	<0.005
Ni	0.018	0.006
Pb	<0.001	0.002
Sb	<0.002	<0.002
Se	<0.001	<0.001
Zn	0.36	0.08

ANALYTICAL RESULTS FOR WATER SAMPLES FROM
WESTERN CANADIAN MINES, KERR PROJECT
SITE: Q3

ANALYTICAL PARAMETER	NOV. 10/88	JULY 15/89
pH	3.3	3.2
Alkalinity (mg $CaCO_3$/L)	-	-
Turbidity (NTU)	0.6	11
Conductance (µmhos/cm)	709	377
Total Solids (mg/L)	531	234
Suspended Solids (mg/L)	<1	10
EDTA-Hardness (mg $CaCO_3$/L)	246	87
Sulfate (mg/L)	362	138
Ammonia (mg N/L)	0.091	0.017
Nitrate (mg N/L)	0.011	<0.005
Nitrite (mg N/L)	0.010	<0.002
Total Phosphorus (mg P/L)	0.038	0.056
Total Cyanide (mg/L)	<0.001	<0.001
TOTAL EXTRACTABLE METALS: (mg/L)		
Ag	<0.0002	<0.0001
Al	5.5	2.2
As	0.001	0.005
Ba	0.012	0.024
Cd	0.0010	0.0003
Co	0.04	0.007
Cr	0.001	<0.001
Cu	1.8	0.80
Fe	11	6.2
Hg (µg/L)	<0.05	<0.05
Mn	1.45	0.52
Mo	<0.005	<0.005
Ni	0.012	0.006
Pb	<0.001	0.001
Sb	<0.002	<0.002
Se	<0.001	<0.001
Zn	0.27	0.09
DISSOLVED METALS: (mg/L)		
Ag	<0.0002	<0.0001
Al	5.1	1.9
As	0.001	0.001
Ba	0.008	0.014
Cd	0.0010	0.0003
Co	0.04	0.007
Cr	0.001	<0.001
Cu	1.8	0.80
Fe	10	5.1
Mn	1.36	0.49
Mo	<0.005	<0.005
Ni	0.012	0.006
Pb	<0.001	<0.001
Sb	<0.002	<0.002
Se	<0.001	<0.001
Zn	0.27	0.09

ANALYTICAL RESULTS FOR WATER SAMPLES FROM
WESTERN CANADIAN MINES, KERR PROJECT
SITE: Q4

ANALYTICAL PARAMETER	NOV. 10/88	JULY 15/89
pH	6.7	7.4
Alkalinity (mg $CaCO_3$/L)	36	36
Turbidity (NTU)	12.5	13
Conductance (µmhos/cm)	308	178
Total Solids (mg/L)	287	149
Suspended Solids (mg/L)	24	13
EDTA-Hardness (mg $CaCO_3$/L)	180	99
Sulfate (mg/L)	148	66
Ammonia (mg N/L)	0.015	<0.005
Nitrate (mg N/L)	0.023	<0.005
Nitrite (mg N/L)	<0.002	<0.002
Total Phosphorus (mg P/L)	0.048	0.054
Total Cyanide (mg/L)	<0.001	<0.001
TOTAL EXTRACTABLE METALS: (mg/L)		
Ag	<0.0002	<0.0001
Al	1.1	0.58
As	0.003	0.002
Ba	0.024	0.031
Cd	0.0003	<0.0002
Co	0.008	<0.001
Cr	<0.001	<0.001
Cu	0.36	0.08
Fe	2.51	0.69
Hg (µg/L)	<0.05	<0.05
Mn	0.32	0.10
Mo	<0.005	<0.005
Ni	0.003	<0.002
Pb	<0.001	0.001
Sb	<0.002	<0.002
Se	<0.001	<0.001
Zn	0.06	0.013
DISSOLVED METALS: (mg/L)		
Ag	<0.0002	<0.0001
Al	0.05	0.20
As	<0.001	<0.001
Ba	0.016	0.020
Cd	0.0003	<0.0002
Co	0.005	<0.001
Cr	<0.001	<0.001
Cu	0.029	0.0015
Fe	0.09	0.12
Mn	0.27	0.038
Mo	<0.005	<0.005
Ni	0.003	<0.002
Pb	<0.001	<0.001
Sb	<0.002	<0.002
Se	<0.001	<0.001
Zn	0.03	0.0052

ANALYTICAL RESULTS FOR WATER SAMPLES FROM
WESTERN CANADIAN MINES, KERR PROJECT
SITE: Q5

ANALYTICAL PARAMETER	NOV. 10/88	JULY 15/89
pH	6.9	7.6
Alkalinity (mg $CaCO_3$/L)	51	60
Turbidity (NTU)	0.1	0.3
Conductance (µmhos/cm)	237	209
Total Solids (mg/L)	194	155
Suspended Solids (mg/L)	<1	<1
EDTA-Hardness (mg $CaCO_3$/L)	136	115
Sulfate (mg/L)	82	68
Ammonia (mg N/L)	<0.005	<0.005
Nitrate (mg N/L)	0.400	<0.005
Nitrite (mg N/L)	<0.002	<0.002
Total Phosphorus (mg P/L)	0.005	0.005
Total Cyanide (mg/L)	<0.001	<0.001
TOTAL EXTRACTABLE METALS: (mg/L)		
Ag	<0.0002	<0.0001
Al	<0.01	0.012
As	0.003	0.002
Ba	0.023	0.019
Cd	<0.0002	<0.0002
Co	0.001	<0.001
Cr	<0.001	<0.001
Cu	0.0006	0.0029
Fe	0.021	0.026
Hg (µg/L)	<0.05	<0.05
Mn	0.0014	0.0029
Mo	<0.005	<0.005
Ni	<0.002	<0.002
Pb	<0.001	<0.001
Sb	<0.002	<0.002
Se	<0.001	<0.001
Zn	0.0035	0.0026
DISSOLVED METALS: (mg/L)		
Ag	<0.0002	<0.0001
Al	<0.01	<0.01
As	0.003	0.002
Ba	0.019	0.019
Cd	<0.0002	<0.0002
Co	0.001	<0.001
Cr	<0.001	<0.001
Cu	<0.0005	0.0007
Fe	0.005	<0.005
Mn	<0.001	<0.001
Mo	<0.005	<0.005
Ni	<0.002	<0.002
Pb	<0.001	<0.001
Sb	<0.002	<0.002
Se	<0.001	<0.001
Zn	0.0030	0.0023

ANALYTICAL RESULTS FOR WATER SAMPLES FROM
WESTERN CANADIAN MINES, KERR PROJECT
SITE: Q6

ANALYTICAL PARAMETER	NOV. 10/88	JULY 15/89
pH	7.0	8.5
Alkalinity (mg $CaCO_3$/L)	48	22
Turbidity (NTU)	1.2	100
Conductance (µmhos/cm)	195	51
Total Solids (mg/L)	153	177
Suspended Solids (mg/L)	2	123
EDTA-Hardness (mg $CaCO_3$/L)	111	26
Sulfate (mg/L)	64	10
Ammonia (mg N/L)	<0.005	0.010
Nitrate (mg N/L)	0.078	0.017
Nitrite (mg N/L)	<0.002	<0.002
Total Phosphorus (mg P/L)	0.003	0.196
Total Cyanide (mg/L)	<0.001	<0.001
TOTAL EXTRACTABLE METALS: (mg/L)		
Ag	<0.0002	<0.0001
Al	0.049	5.2
As	<0.001	0.009
Ba	0.043	0.12
Cd	<0.0002	<0.0002
Co	0.002	0.002
Cr	<0.001	0.002
Cu	0.0052	0.022
Fe	0.05	4.5
Hg (µg/L)	<0.05	<0.05
Mn	0.08	0.22
Mo	<0.005	<0.005
Ni	<0.002	<0.002
Pb	<0.001	0.007
Sb	<0.002	0.002
Se	<0.001	<0.001
Zn	0.0025	0.017
DISSOLVED METALS: (mg/L)		
Ag	<0.0002	<0.0001
Al	0.022	2.0
As	<0.001	0.03
Ba	0.041	0.06
Cd	<0.0002	<0.0002
Co	0.001	<0.001
Cr	<0.001	<0.001
Cu	0.0022	0.0072
Fe	0.009	1.36
Mn	0.08	0.07
Mo	<0.005	<0.005
Ni	<0.002	<0.002
Pb	<0.001	0.002
Sb	<0.002	<0.002
Se	<0.001	<0.001
Zn	0.0017	0.0060

ANALYTICAL RESULTS FOR WATER SAMPLES FROM WESTERN CANADIAN MINES, KERR PROJECT SITE: Q7

ANALYTICAL PARAMETER	NOV. 10/88	JULY 15/89
pH	7.6	7.6
Alkalinity (mg $CaCO_3$/L)	100	33
Turbidity (NTU)	1.8	17
Conductance (µmhos/cm)	343	79
Total Solids (mg/L)	293	84
Suspended Solids (mg/L)	<1	20
EDTA-Hardness (mg $CaCO_3$/L)	213	44
Sulfate (mg/L)	122	14
Ammonia (mg N/L)	0.025	<0.005
Nitrate (mg N/L)	0.404	<0.005
Nitrite (mg N/L)	<0.002	<0.002
Total Phosphorus (mg P/L)	<0.003	0.066
Total Cyanide (mg/L)	<0.001	<0.001
<u>TOTAL EXTRACTABLE METALS:</u> (mg/L)		
Ag	<0.0002	<0.0001
Al	<0.01	0.79
As	0.002	0.004
Ba	0.027	0.018
Cd	<0.0002	<0.0002
Co	0.003	<0.001
Cr	<0.001	<0.001
Cu	0.0005	0.0032
Fe	0.028	1.20
Hg (µg/L)	<0.05	<0.05
Mn	0.0017	0.08
Mo	<0.005	<0.005
Ni	<0.002	0.021
Pb	<0.001	0.003
Sb	<0.002	<0.002
Se	<0.001	<0.001
Zn	0.0023	0.0048
<u>DISSOLVED METALS:</u> (mg/L)		
Ag	<0.0002	<0.0001
Al	<0.01	0.22
As	0.002	0.002
Ba	0.026	0.016
Cd	<0.0002	<0.0002
Co	0.003	<0.001
Cr	<0.001	<0.001
Cu	-	0.0006
Fe	0.006	0.26
Mn	<0.001	0.014
Mo	<0.005	<0.005
Ni	<0.002	<0.002
Pb	<0.001	<0.001
Sb	<0.002	<0.002
Se	<0.001	<0.001
Zn	0.0019	0.0011

ANALYTICAL RESULTS FOR WATER SAMPLES FROM
WESTERN CANADIAN MINES, KERR PROJECT
SITE: Q8

ANALYTICAL PARAMETER	NOV. 10/88	
pH	6.8	8.0
Alkalinity (mg $CaCO_3$/L)	93	95
Turbidity (NTU)	1.8	3.0
Conductance (μmhos/cm)	217	224
Total Solids (mg/L)	165	163
Suspended Solids (mg/L)	3	2
EDTA-Hardness (mg $CaCO_3$/L)	141	132
Sulfate (mg/L)	40	41
Ammonia (mg N/L)	<0.005	0.006
Nitrate (mg N/L)	0.042	0.008
Nitrite (mg N/L)	<0.002	<0.002
Total Phosphorus (mg P/L)	0.017	0.013
Total Cyanide (mg/L)	<0.001	<0.001
TOTAL EXTRACTABLE METALS: (mg/L)		
Ag	<0.0002	<0.0001
Al	0.039	0.17
As	0.003	0.003
Ba	0.035	0.025
Cd	<0.0002	<0.0002
Co	0.001	<0.001
Cr	<0.001	<0.001
Cu	0.0005	0.0014
Fe	0.18	0.36
Hg (μg/L)	<0.05	<0.05
Mn	0.025	0.024
Mo	<0.005	<0.005
Ni	<0.002	<0.002
Pb	<0.001	0.001
Sb	<0.002	<0.002
Se	<0.001	<0.001
Zn	0.0007	0.0016
DISSOLVED METALS: (mg/L)		
Ag	<0.0002	<0.0001
Al	<0.01	<0.01
As	0.001	0.001
Ba	0.019	0.024
Cd	<0.0002	<0.0002
Co	<0.001	<0.001
Cr	<0.001	<0.001
Cu	-	<0.0005
Fe	0.021	0.010
Mn	<0.001	0.0010
Mo	<0.005	<0.005
Ni	<0.002	<0.002
Pb	<0.001	<0.001
Sb	<0.002	<0.002
Se	<0.001	<0.001
Zn	<0.0005	<0.0005

ANALYTICAL RESULTS FOR WATER SAMPLES FROM
WESTERN CANADIAN MINES, KERR PROJECT
SITE: Q9

ANALYTICAL PARAMETER	NOV. 10/88	JULY 15/89
pH	6.8	7.7
Alkalinity (mg $CaCO_3$/L)	64	24
Turbidity (NTU)	19	98
Conductance (μmhos/cm)	251	75
Total Solids (mg/L)	236	289
Suspended Solids (mg/L)	42	239
EDTA-Hardness (mg $CaCO_3$/L)	145	38
Sulfate (mg/L)	86	19
Ammonia (mg N/L)	<0.005	0.007
Nitrate (mg N/L)	0.104	0.014
Nitrite (mg N/L)	<0.002	<0.002
Total Phosphorus (mg P/L)	0.115	0.378
Total Cyanide (mg/L)	<0.001	<0.001
<u>TOTAL EXTRACTABLE METALS</u>: (mg/L)		
Ag	<0.0002	<0.0001
Al	0.51	6.9
As	0.003	0.009
Ba	0.026	0.21
Cd	0.0011	0.0008
Co	0.005	0.004
Cr	<0.001	0.004
Cu	0.10	0.11
Fe	2.35	8.2
Hg (μg/L)	<0.05	<0.05
Mn	0.18	0.35
Mo	<0.005	<0.005
Ni	0.003	0.004
Pb	<0.001	0.007
Sb	<0.002	<0.002
Se	<0.001	<0.001
Zn	0.10	0.07
<u>DISSOLVED METALS</u>: (mg/L)		
Ag	<0.0002	<0.0001
Al	0.06	0.60
As	<0.001	<0.001
Ba	0.010	0.040
Cd	<0.0002	<0.0002
Co	0.003	<0.001
Cr	<0.001	<0.001
Cu	0.0078	0.3
Fe	0.05	0.64
Mn	0.14	0.06
Mo	<0.005	<0.005
Ni	0.003	<0.002
Pb	<0.001	0.001
Sb	<0.002	<0.002
Se	<0.001	<0.001
Zn	0.04	0.0056

Norecol
Environmental
Consultants Ltd

Suite 700
1090 West Pender Street
Vancouver, B.C.
Canada V6E 2N7
Telephone: (604) 682-2291
Fax: (604) 682-8323

RECEIVED
NOV - 8 1989

November 6, 1989
File: 1-174-02.01

Western Canadian Mining Corporation
1170 - 1055 West Hastings Street
Vancouver, British Columbia
V6E 2E9

Attention: Mr. Bob Hewton, P. Eng.
Vice-President, Exploration

Dear Bob;

RE: KERR PROPERTY WATER QUALITY AND HYDROLOGY RESULTS, SEPTEMBER 1989

Water Quality

The accompanying tables list the water quality results for the September 17, 1989 collection at the Kerr property.

As noted in our September 26, 1989 trip report, no water was present at Q1 and Q8 at sampling time and these points are absent from the data set.

With few exceptions, the September data are within the ranges established by the two previous samplings (November, 1988 and July, 1989). Phosphorus and/or nitrogen species (ammonia, nitrite, nitrate) are higher than previously recorded at some sites; the pattern is not consistent or readily explainable with the limited data available. Molybdenum (Q2), selenium (Q2), aluminum (Q3, Q5), iron (Q3, Q5), nickel (Q3), and Zinc (Q4) reached new highs in September. Excursions beyond established ranges do not appear to be quantitatively significant.

The attached figure shows sample locations which were the same as for July, except Q4. Site Q4 was taken at the November 1988 location slightly west of the July 1989 location. This stream is braided and the major channel appears to change with season.

Norecol

Hydrology

Discharge of Sulphurets Creek at the outlet from Sulphurets Lake was measured on August 17, 1989. Total discharge was 4.3 m^3/s when measured. Maximum depth measured was just under one meter. Flow conditions represent late summer, that is, snow melt was probably no longer present in Sulphurets Lake, but Sulphurets glacier was melting and contributing to the outflow from Sulphurets Lake.

Bad weather prevented flow measurements in Sulphurets Creek at the end of October, 1989.

The spot discharge measurement in August will be combined with information logged on staff gauge height during July and August to provide some background information of Sulphurets Creek hydrology. A more complete record is desirable in order to provide data for engineering design and for waste and water management for a producing mine and remains to be collected in subsequent years.

I trust this information meets your immediate requirements. Please give me a call if you have any questions.

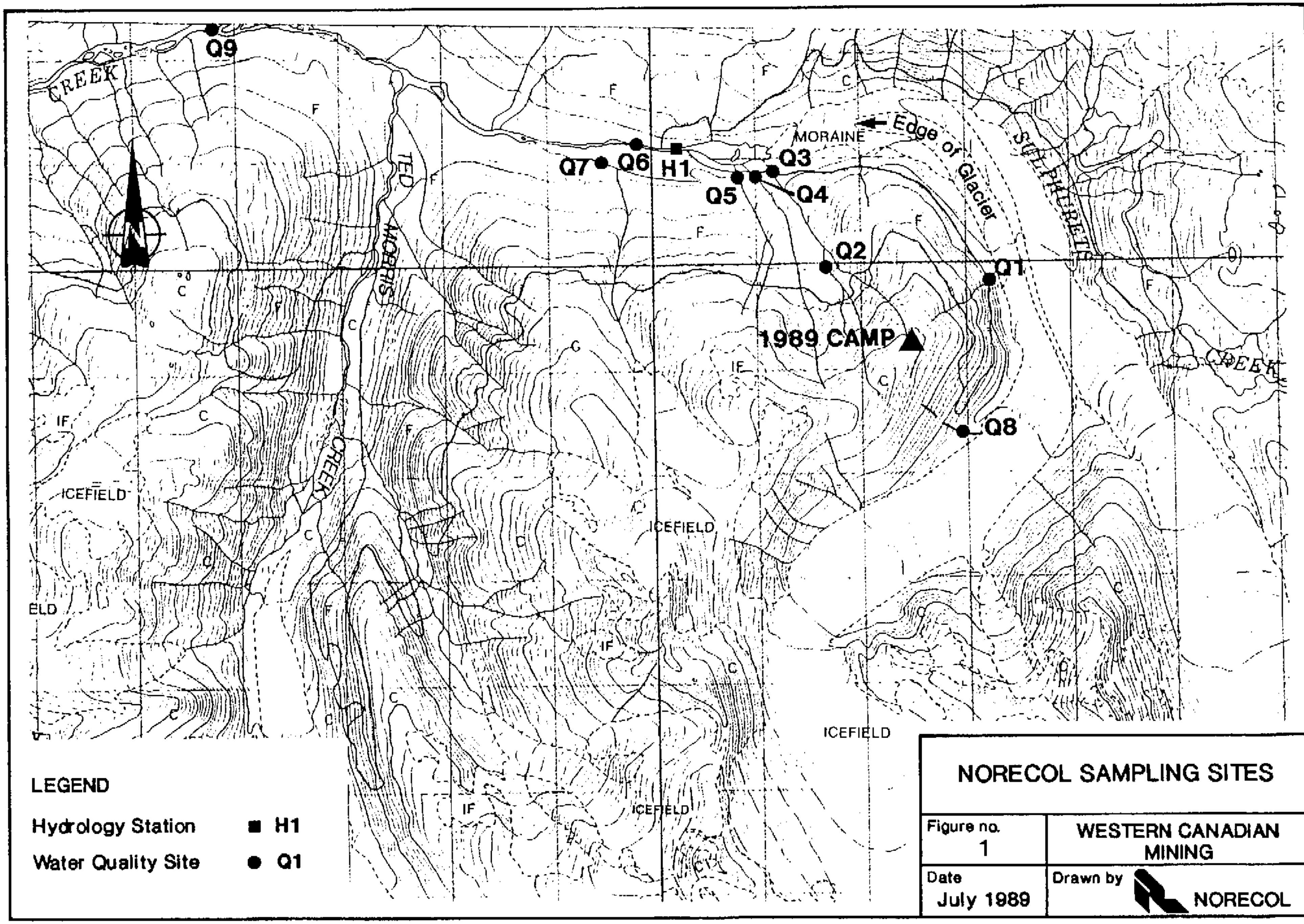
Yours truly,

NORECOL ENVIRONMENTAL CONSULTANTS LTD.

Bruce S. Ott, Ph.D.
Project Manager

BSO/sip

Attachment



LEGEND

Hydrology Station ■ H1

Water Quality Site ● Q1

NORECOL SAMPLING SITES

Figure no. 1

WESTERN CANADIAN MINING

Date July 1989

Drawn by NORECOL

ANALYTICAL RESULTS FOR WATER SAMPLES FROM WESTERN CANADIAN MINES, KERR PROJECT
SITE: Q1

ANALYTICAL PARAMETER	NOV. 10/88	JULY 15/89
pH	7.2	7.6
Alkalinity (mg $CaCO_3$/L)	125	68
Turbidity (NTU)	32	1.0
Conductance (µmhos/cm 20°C)	231	181
Total Solids (mg/L)	267	142
Suspended Solids (mg/L)	123	2
EDTA-Hardness (mg $CaCO_3$/L)	154	108
Sulfate (mg/L)	50	40
Ammonia (mg N/L)	<0.005	0.009
Nitrate (mg N/L)	0.010	<0.005
Nitrite (mg N/L)	<0.002	<0.002
Total Phosphorus (mg P/L)	0.355	0.008
Total Cyanide (mg/L)	<0.001	<0.001
TOTAL EXTRACTABLE METALS: (mg/L)		
Ag	<0.0002	<0.0001
Al	0.24	0.012
As	0.010	<0.001
Ba	0.033	0.019
Cd	<0.0002	<0.0002
Co	0.003	<0.001
Cr	0.005	<0.001
Cu	0.04	0.0010
Fe	1.04	0.012
Hg (µg/L)	<0.05	<0.05
Mn	0.13	<0.001
Mo	<0.005	<0.005
Ni	<0.002	<0.002
Pb	<0.001	<0.001
Sb	<0.002	<0.002
Se	<0.001	<0.001
Zn	0.0061	<0.0005
DISSOLVED METALS: (mg/L)		
Ag	<0.0002	<0.0001
Al	<0.01	0.012
As	0.003	<0.001
Ba	0.024	0.019
Cd	<0.0002	<0.0002
Co	<0.001	<0.001
Cr	<0.001	<0.001
Cu	<0.0005	-
Fe	0.009	<0.005
Mn	<0.001	<0.001
Mo	<0.005	<0.005
Ni	<0.002	<0.002
Pb	<0.001	<0.001
Sb	<0.002	<0.002
Se	<0.001	<0.001
Zn	<0.0005	<0.0005

ANALYTICAL RESULTS FOR WATER SAMPLES FROM
WESTERN CANADIAN MINES, KERR PROJECT
SITE: Q2

ANALYTICAL PARAMETER	NOV. 10/88	JULY 15/89	SEPT. 17/89
pH	3.2	3.2	3.0
Alkalinity (mg $CaCO_3$/L)	-	-	-
Turbidity (NTU)	0.3	35	65
Conductance (µmhos/cm)	784	315	651
Total Solids (mg/L)	636	188	644
Suspended Solids (mg/L)	<1	49	54
EDTA-Hardness (mg $CaCO_3$/L)	246	46	343
Sulfate (mg/L)	408	115	352
Ammonia (mg N/L)	0.090	0.029	0.009
Nitrate (mg N/L)	<0.005	<0.005	<0.005
Nitrite (mg N/L)	0.023	<0.002	0.022
Total Phosphorus (mg P/L)	0.177	0.214	0.498
Total Cyanide (mg/L)	<0.001	<0.001	<0.001
TOTAL EXTRACTABLE METALS: (mg/L)			
Ag	<0.0002	<0.0001	<0.0001
Al	6.2	2.3	5.5
As	0.004	0.013	0.012
Ba	0.005	0.05	0.06
Cd	0.0013	0.0003	0.0004
Co	0.06	0.009	0.045
Cr	0.002	<0.001	0.002
Cu	2.3	0.87	2.50
Fe	23	12.5	34
Hg (µg/L)	<0.05	0.13	0.12
Mn	2.28	0.48	2.22
Mo	<0.005	<0.005	0.010
Ni	0.018	0.006	0.035
Pb	<0.001	0.004	0.001
Sb	<0.002	0.003	<0.002
Se	<0.001	<0.001	0.002
Zn	0.37	0.08	0.33
DISSOLVED METALS: (mg/L)			
Ag	<0.0002	<0.0001	<0.0001
Al	6.1	1.6	4.7
As	0.004	0.004	0.004
Ba	<0.005	0.016	0.011
Cd	0.0013	0.0003	0.0004
Co	0.06	0.009	0.041
Cr	0.002	<0.001	0.001
Cu	2.3	0.86	2.41
Fe	23	10.6	31
Mn	2.11	0.41	2.20
Mo	<0.005	<0.005	0.007
Ni	0.018	0.006	0.035
Pb	<0.001	0.002	<0.001
Sb	<0.002	<0.002	<0.002
Se	<0.001	<0.001	<0.001
Zn	0.36	0.08	0.33

ANALYTICAL RESULTS FOR WATER SAMPLES FROM
WESTERN CANADIAN MINES, KERR PROJECT
SITE: Q3

ANALYTICAL PARAMETER	NOV. 10/88	JULY 15/89	SEPT. 17/89
pH	3.3	3.2	3.1
Alkalinity (mg $CaCO_3$/L)	-	-	-
Turbidity (NTU)	0.6	11	19
Conductance (μmhos/cm)	709	377	680
Total Solids (mg/L)	531	234	601
Suspended Solids (mg/L)	<1	10	12
EDTA-Hardness (mg $CaCO_3$/L)	246	87	290
Sulfate (mg/L)	362	138	363
Ammonia (mg N/L)	0.091	0.017	0.008
Nitrate (mg N/L)	0.011	<0.005	<0.005
Nitrite (mg N/L)	0.010	<0.002	0.021
Total Phosphorus (mg P/L)	0.038	0.056	0.105
Total Cyanide (mg/L)	<0.001	<0.001	<0.001
TOTAL EXTRACTABLE METALS: (mg/L)			
Ag	<0.0002	<0.0001	<0.0001
Al	5.5	2.2	6.0
As	0.001	0.005	0.003
Ba	0.012	0.024	0.036
Cd	0.0010	0.0003	0.0006
Co	0.04	0.007	0.038
Cr	0.001	<0.001	<0.001
Cu	1.8	0.80	2.03
Fe	11	6.2	14.4
Hg (μg/L)	<0.05	<0.05	<0.05
Mn	1.45	0.52	1.76
Mo	<0.005	<0.005	<0.005
Ni	0.012	0.006	0.030
Pb	<0.001	0.001	<0.001
Sb	<0.002	<0.002	<0.002
Se	<0.001	<0.001	<0.001
Zn	0.27	0.09	0.30
DISSOLVED METALS: (mg/L)			
Ag	<0.0002	<0.0001	<0.0001
Al	5.1	1.9	5.5
As	0.001	0.001	0.002
Ba	0.008	0.014	0.014
Cd	0.0010	0.0003	0.0006
Co	0.04	0.007	0.036
Cr	0.001	<0.001	<0.001
Cu	1.8	0.80	1.96
Fe	10	5.1	13.8
Mn	1.36	0.49	1.75
Mo	<0.005	<0.005	<0.005
Ni	0.012	0.006	0.029
Pb	<0.001	<0.001	<0.001
Sb	<0.002	<0.002	<0.002
Se	<0.001	<0.001	<0.001
Zn	0.27	0.09	0.29

ANALYTICAL RESULTS FOR WATER SAMPLES FROM
WESTERN CANADIAN MINES, KERR PROJECT
SITE: Q4

ANALYTICAL PARAMETER	NOV. 10/88	JULY 15/89	SEPT. 17/89
pH	6.7	7.4	7.1
Alkalinity (mg $CaCO_3$/L)	36	36	42
Turbidity (NTU)	12.5	13	4.0
Conductance (µmhos/cm)	308	178	243
Total Solids (mg/L)	287	149	222
Suspended Solids (mg/L)	24	13	5
EDTA-Hardness (mg $CaCO_3$/L)	180	99	136
Sulfate (mg/L)	148	66	96
Ammonia (mg N/L)	0.015	<0.005	0.011
Nitrate (mg N/L)	0.023	<0.005	<0.005
Nitrite (mg N/L)	<0.002	<0.002	<0.002
Total Phosphorus (mg P/L)	0.048	0.054	0.012
Total Cyanide (mg/L)	<0.001	<0.001	<0.001
TOTAL EXTRACTABLE METALS: (mg/L)			
Ag	<0.0002	<0.0001	<0.0001
Al	1.1	0.58	0.49
As	0.003	0.002	0.001
Ba	0.024	0.031	0.028
Cd	0.0003	<0.0002	<0.0002
Co	0.008	<0.001	0.001
Cr	<0.001	<0.001	<0.001
Cu	0.36	0.08	0.15
Fe	2.51	0.69	0.75
Hg (µg/L)	<0.05	<0.05	<0.05
Mn	0.32	0.10	0.09
Mo	<0.005	<0.005	<0.005
Ni	0.003	<0.002	0.003
Pb	<0.001	0.001	<0.001
Sb	<0.002	<0.002	<0.002
Se	<0.001	<0.001	0.001
Zn	0.06	0.013	0.024
DISSOLVED METALS: (mg/L)			
Ag	<0.0002	<0.0001	<0.0001
Al	0.05	0.20	0.11
As	<0.001	<0.001	<0.001
Ba	0.016	0.020	0.017
Cd	0.0003	<0.0002	<0.0002
Co	0.005	<0.001	<0.001
Cr	<0.001	<0.001	<0.001
Cu	0.029	0.0015	0.029
Fe	0.09	0.12	0.13
Mn	0.27	0.038	0.09
Mo	<0.005	<0.005	<0.005
Ni	0.003	<0.002	0.002
Pb	<0.001	<0.001	<0.001
Sb	<0.002	<0.002	<0.002
Se	<0.001	<0.001	0.001
Zn	0.03	0.0052	0.014

ANALYTICAL RESULTS FOR WATER SAMPLES FROM
WESTERN CANADIAN MINES, KERR PROJECT
SITE: Q5

ANALYTICAL PARAMETER	NOV. 10/88	JULY 15/89	SEPT. 17/89
pH	6.9	7.6	7.3
Alkalinity (mg $CaCO_3$/L)	51	60	53
Turbidity (NTU)	0.1	0.3	1.5
Conductance (µmhos/cm)	237	209	244
Total Solids (mg/L)	194	155	212
Suspended Solids (mg/L)	<1	<1	8
EDTA-Hardness (mg $CaCO_3$/L)	136	115	146
Sulfate (mg/L)	82	68	90
Ammonia (mg N/L)	<0.005	<0.005	0.013
Nitrate (mg N/L)	0.400	<0.005	0.217
Nitrite (mg N/L)	<0.002	<0.002	<0.002
Total Phosphorus (mg P/L)	0.005	0.005	0.020
Total Cyanide (mg/L)	<0.001	<0.001	<0.001
TOTAL EXTRACTABLE METALS: (mg/L)			
Ag	<0.0002	<0.0001	<0.0001
Al	<0.01	0.012	0.025
As	0.003	0.002	0.002
Ba	0.023	0.019	0.025
Cd	<0.0002	<0.0002	<0.0002
Co	0.001	<0.001	<0.001
Cr	<0.001	<0.001	0.001
Cu	0.0006	0.0029	0.0018
Fe	0.021	0.026	0.05
Hg (µg/L)	<0.05	<0.05	<0.05
Mn	0.0014	0.0029	0.0075
Mo	<0.005	<0.005	<0.005
Ni	<0.002	<0.002	<0.002
Pb	<0.001	<0.001	<0.001
Sb	<0.002	<0.002	<0.002
Se	<0.001	<0.001	0.003
Zn	0.0035	0.0026	0.016
DISSOLVED METALS: (mg/L)			
Ag	<0.0002	<0.0001	<0.0001
Al	<0.01	<0.01	<0.01
As	0.003	0.002	0.001
Ba	0.019	0.019	0.017
Cd	<0.0002	<0.0002	<0.0002
Co	0.001	<0.001	<0.001
Cr	<0.001	<0.001	<0.001
Cu	<0.0005	0.0007	0.0007
Fe	0.005	<0.005	<0.005
Mn	<0.001	<0.001	0.0012
Mo	<0.005	<0.005	<0.005
Ni	<0.002	<0.002	<0.002
Pb	<0.001	<0.001	<0.001
Sb	<0.002	<0.002	<0.002
Se	<0.001	<0.001	0.002
Zn	0.0030	0.0023	0.014

ANALYTICAL RESULTS FOR WATER SAMPLES FROM
WESTERN CANADIAN MINES, KERR PROJECT
SITE: Q6

ANALYTICAL PARAMETER	NOV. 10/88	JULY 15/89	SEPT. 17/89
pH	7.0	8.5	7.2
Alkalinity (mg $CaCO_3$/L)	48	22	23
Turbidity (NTU)	1.2	100	31
Conductance (µmhos/cm)	195	51	69
Total Solids (mg/L)	153	177	92
Suspended Solids (mg/L)	2	123	33
EDTA-Hardness (mg $CaCO_3$/L)	111	26	38
Sulfate (mg/L)	64	10	19
Ammonia (mg N/L)	<0.005	0.010	0.006
Nitrate (mg N/L)	0.078	0.017	0.012
Nitrite (mg N/L)	<0.002	<0.002	<0.002
Total Phosphorus (mg P/L)	0.003	0.196	0.080
Total Cyanide (mg/L)	<0.001	<0.001	<0.001
<u>TOTAL EXTRACTABLE METALS:</u> (mg/L)			
Ag	<0.0002	<0.0001	<0.0001
Al	0.049	5.2	0.8
As	<0.001	0.009	0.003
Ba	0.043	0.12	0.06
Cd	<0.0002	<0.0002	<0.0002
Co	0.002	0.002	<0.001
Cr	<0.001	0.002	<0.001
Cu	0.0052	0.022	0.016
Fe	0.05	4.5	0.75
Hg (µg/L)	<0.05	<0.05	<0.05
Mn	0.08	0.22	0.08
Mo	<0.005	<0.005	<0.005
Ni	<0.002	<0.002	<0.002
Pb	<0.001	0.007	0.001
Sb	<0.002	0.002	<0.002
Se	<0.001	<0.001	<0.001
Zn	0.0025	0.017	0.0055
<u>DISSOLVED METALS:</u> (mg/L)			
Ag	<0.0002	<0.0001	<0.0001
Al	0.022	2.0	0.27
As	<0.001	0.003	0.001
Ba	0.041	0.06	0.32
Cd	<0.0002	<0.0002	<0.0002
Co	0.001	<0.001	<0.001
Cr	<0.001	<0.001	<0.001
Cu	0.0022	0.0072	0.0032
Fe	0.009	1.36	0.34
Mn	0.08	0.07	0.05
Mo	<0.005	<0.005	<0.005
Ni	<0.002	<0.002	<0.002
Pb	<0.001	0.002	<0.001
Sb	<0.002	<0.002	<0.002
Se	<0.001	<0.001	<0.001
Zn	0.0017	0.0060	0.0018

ANALYTICAL RESULTS FOR WATER SAMPLES FROM
WESTERN CANADIAN MINES, KERR PROJECT
SITE: Q7

ANALYTICAL PARAMETER	NOV. 10/88	JULY 15/89	SEPT. 17/89
pH	7.6	7.6	7.4
Alkalinity (mg $CaCO_3$/L)	100	33	60
Turbidity (NTU)	1.8	17	6.0
Conductance (μmhos/cm)	343	79	165
Total Solids (mg/L)	293	84	139
Suspended Solids (mg/L)	<1	20	2
EDTA-Hardness (mg $CaCO_3$/L)	213	44	102
Sulfate (mg/L)	122	14	40
Ammonia (mg N/L)	0.025	<0.005	<0.005
Nitrate (mg N/L)	0.404	<0.005	0.010
Nitrite (mg N/L)	<0.002	<0.002	<0.002
Total Phosphorus (mg P/L)	<0.003	0.066	<0.003
Total Cyanide (mg/L)	<0.001	<0.001	<0.001
TOTAL EXTRACTABLE METALS: (mg/L)			
Ag	<0.0002	<0.0001	<0.0001
Al	<0.01	0.79	0.11
As	0.002	0.004	0.002
Ba	0.027	0.018	0.037
Cd	<0.0002	<0.0002	<0.0002
Co	0.003	<0.001	<0.001
Cr	<0.001	<0.001	<0.001
Cu	0.0005	0.0032	<0.0005
Fe	0.028	1.20	0.15
Hg (μg/L)	<0.05	<0.05	<0.05
Mn	0.0017	0.08	0.013
Mo	<0.005	<0.005	<0.005
Ni	<0.002	0.021	<0.002
Pb	<0.001	0.003	<0.001
Sb	<0.002	<0.002	<0.002
Se	<0.001	<0.001	<0.001
Zn	0.0023	0.0048	<0.001
DISSOLVED METALS: (mg/L)			
Ag	<0.0002	<0.0001	<0.0001
Al	<0.01	0.22	<0.01
As	0.002	0.002	0.001
Ba	0.026	0.016	0.023
Cd	<0.0002	<0.0002	<0.0002
Co	0.003	<0.001	<0.001
Cr	<0.001	<0.001	<0.001
Cu	-	0.0006	<0.0005
Fe	0.006	0.26	0.012
Mn	<0.001	0.014	0.0020
Mo	<0.005	<0.005	<0.005
Ni	<0.002	<0.002	<0.002
Pb	<0.001	<0.001	<0.001
Sb	<0.002	<0.002	<0.002
Se	<0.001	<0.001	<0.001
Zn	0.0019	0.0011	<0.0005

ANALYTICAL RESULTS FOR WATER SAMPLES FROM
WESTERN CANADIAN MINES, KERR PROJECT
SITE: Q8

ANALYTICAL PARAMETER	NOV. 10/88	JULY 15/89
pH	6.8	8.0
Alkalinity (mg $CaCO_3$/L)	93	95
Turbidity (NTU)	1.8	3.0
Conductance (μmhos/cm)	217	224
Total Solids (mg/L)	165	163
Suspended Solids (mg/L)	3	2
EDTA-Hardness (mg $CaCO_3$/L)	141	132
Sulfate (mg/L)	40	41
Ammonia (mg N/L)	<0.005	0.006
Nitrate (mg N/L)	0.042	0.008
Nitrite (mg N/L)	<0.002	<0.002
Total Phosphorus (mg P/L)	0.017	0.013
Total Cyanide (mg/L)	<0.001	<0.001
TOTAL EXTRACTABLE METALS: (mg/L)		
Ag	<0.0002	<0.0001
Al	0.039	0.17
As	0.003	0.003
Ba	0.035	0.025
Cd	<0.0002	<0.0002
Co	0.001	<0.001
Cr	<0.001	<0.001
Cu	0.0005	0.0014
Fe	0.18	0.36
Hg (μg/L)	<0.05	<0.05
Mn	0.025	0.024
Mo	<0.005	<0.005
Ni	<0.002	<0.002
Pb	<0.001	0.001
Sb	<0.002	<0.002
Se	<0.001	<0.001
Zn	0.0007	0.0016
DISSOLVED METALS: (mg/L)		
Ag	<0.0002	<0.0001
Al	<0.01	<0.01
As	0.001	0.001
Ba	0.019	0.024
Cd	<0.0002	<0.0002
Co	<0.001	<0.001
Cr	<0.001	<0.001
Cu	-	<0.0005
Fe	0.021	0.010
Mn	<0.001	0.0010
Mo	<0.005	<0.005
Ni	<0.002	<0.002
Pb	<0.001	<0.001
Sb	<0.002	<0.002
Se	<0.001	<0.001
Zn	<0.0005	<0.0005

ANALYTICAL RESULTS FOR WATER SAMPLES FROM
WESTERN CANADIAN MINES, KERR PROJECT
SITE: Q9

ANALYTICAL PARAMETER	NOV. 10/88	JULY 15/89	SEPT. 17/89
pH	6.8	7.7	7.5
Alkalinity (mg $CaCO_3$/L)	64	24	33
Turbidity (NTU)	19	98	26
Conductance (µmhos/cm)	251	75	115
Total Solids (mg/L)	236	289	126
Suspended Solids (mg/L)	42	239	35
EDTA-Hardness (mg $CaCO_3$/L)	145	38	66
Sulfate (mg/L)	86	19	32
Ammonia (mg N/L)	<0.005	0.007	<0.005
Nitrate (mg N/L)	0.104	0.014	0.010
Nitrite (mg N/L)	<0.002	<0.002	<0.002
Total Phosphorus (mg P/L)	0.115	0.378	0.083
Total Cyanide (mg/L)	<0.001	<0.001	<0.001
TOTAL EXTRACTABLE METALS: (mg/L)			
Ag	<0.0002	<0.0001	<0.0001
Al	0.51	6.9	0.9
As	0.003	0.009	0.002
Ba	0.026	0.21	0.06
Cd	0.0011	0.0008	0.0005
Co	0.005	0.004	0.002
Cr	<0.001	0.004	<0.001
Cu	0.10	0.11	0.044
Fe	2.35	8.2	1.72
Hg (µg/L)	<0.05	<0.05	<0.05
Mn	0.18	0.35	0.09
Mo	<0.005	<0.005	<0.005
Ni	0.003	0.004	0.002
Pb	<0.001	0.007	0.001
Sb	<0.002	<0.002	<0.002
Se	<0.001	<0.001	<0.001
Zn	0.10	0.07	0.03
DISSOLVED METALS: (mg/L)			
Ag	<0.0002	<0.0001	<0.0001
Al	0.06	0.60	0.17
As	<0.001	<0.001	<0.001
Ba	0.010	0.040	0.029
Cd	<0.0002	<0.0002	0.0003
Co	0.003	<0.001	<0.001
Cr	<0.001	<0.001	<0.001
Cu	0.0078	0.03	0.0051
Fe	0.05	0.64	0.22
Mn	0.14	0.06	0.08
Mo	<0.005	<0.005	<0.005
Ni	0.003	<0.002	<0.002
Pb	<0.001	0.001	<0.001
Sb	<0.002	<0.002	<0.002
Se	<0.001	<0.001	<0.001
Zn	0.04	0.0056	0.016

TABLE 1

WESTERN CANADIAN MINING KERR PROJECT
SULPHURETS CREEK DISCHARGE
Site H1, August 17, 1989

COMMENT	STATION (m)	DEPTH (m)	REV	TIME (s)	WIDTH (m)	AREA (m^2)	REV/S	VELOCITY (m/s)	CELL DISCHARGE (m^3/s)	TOTAL DISCHARGE (m3/s)
RB										
	3.30	0.00								
	4.30	0.18	7	53	1.50	0.2700	0.132	0.094	0.02536	0.02536
	5.30	0.38	30	51	1.00	0.3800	0.588	0.397	0.15094	0.17630
	6.30	0.69	30	59	1.00	0.6900	0.508	0.344	0.23749	0.41379
	7.30	0.79	40	43	1.00	0.7900	0.930	0.625	0.49339	0.90718
	8.30	0.93	40	45	1.00	0.9300	0.889	0.597	0.55539	1.46256
	9.30	0.86	40	42	1.00	0.8600	0.952	0.639	0.54971	2.01227
	10.30	0.78	40	45	1.00	0.7800	0.889	0.597	0.46581	2.47808
	11.30	0.60	40	41	1.00	0.6000	0.976	0.655	0.39274	2.87082
	12.30	0.66	40	51	1.00	0.6600	0.784	0.528	0.34848	3.21930
	13.30	0.64	40	52	1.00	0.6400	0.769	0.518	0.33154	3.55083
	14.30	0.62	40	42	1.00	0.6200	0.952	0.639	0.39630	3.94713
	15.30	0.57	30	47	1.00	0.5700	0.638	0.431	0.24539	4.19252
	16.30	0.32	20	61	1.60	0.5120	0.328	0.224	0.11474	4.30726
	17.40	0.00	0	0						
LB										

Norecol
Environmental
Consultants Ltd.

RECEIVED
NOV 21 1989

1989 British Columbia Export Award

November 20, 1989
File: 1-174-02.01

Suite 700
1090 West Pender Street
Vancouver, B.C.
Canada V6E 2N7
Telephone: (604) 682-2291
Fax: (604) 682-8323

Western Canadian Mining Corp.
1170 - 1055 West Hastings Street
Vancouver, British Columbia
V6E 2E9

Attention: Mr. Bob Hewton, P.Eng.
Vice-President, Exploration

Dear Bob;

RE: ENVIRONMENTAL STUDIES AT THE KERR PROPERTY - 1990

As promised, the following briefly summarized what we completed in our early environmental program and outlines our recommendations for an environmental program for the Kerr property for 1990.

The program we have outlined assumes the earliest date for a pre-feasibility study and a production decision would be 1991.

There are several areas which require further environmental assessment. These relate to both the Kerr Property and the infrastructure required to serve the potential development. Specifically related to the property, we feel the following should be addressed as continuing environmental studies: acid generation, water quality, hydrology, climate, and fisheries.

We also suggest that environmental issues related to the access corridor and power facilities be addressed at some point early in mine planning.

Since infrastructure development will greatly depend on the course of action adopted by the provincial government,the environmental work in this regard is probably best left until such time as these plans become more clear.

Water Quality

Water samples have been collected for three seasons to date: winter, summer and early fall; a fourth remains to be collected and could be done so in May of 1990. We highly recommend continuing the water sampling program to obtain a second year's record. The provincial Ministry of the Environment is now requesting monthly samples over a two year period. While we feel that monthly sampling is excessive, seasonal variation over a two year period is desirable if time allows for sample collection. We therefore recommend water samples be collected in May, July, September and November in 1990.

Hydrology of Sulphurets Creek

One stream discharge measurement was made and a staff gauge installed in 1989. Continuation of staff gauge readings on a twice weekly basis and stream discharge measurements in spring, summer and fall are recommended. If the camp is open during winter, a discharge measurement could also be obtained usefully increasing the hydrology data. A dye injection technique will be required because high flows in Sulphurets Creek most of the year prevent wading.

If reading of the staff gauge becomes a problem it may be worth while placing a stream height recorder in Sulphurets Creek. A gauge or recorder in Ted Morris Creek should also be considered as it and Sulphurets Creek are the two most likely drainages to contain tailings impoundments. Good stream flow data will be required for engineering design and to support mine approval.

Once again, at least one year's data is required and two is desirable.

Climate

A small amount of data were collected on temperature and precipitation at the Kerr Property in 1989.

Because of the great variability of weather in the Kerr property area it will be especially important to obtain local data to calibrate regional climatic information from Environment Canada. We recommend measuring precipitation, temperature and wind direction and velocity while the camp is in operation. It will also be desirable to obtain a measure of snow accumulation both at the deposit and in Sulphurets Valley. (This will provide useful information for mine planning as well.) Modified staff gauges could be used for snow depth information. They would need to be put in place before snow fall and read in late winter.

Acid Generation

A survey of deposit rock types was tested using acid-base accounting. All rock types known to be present in the deposit were sampled by eight drill core sections. The results indicated that most rock types have the potential to produce acid. Additional studies are now desirable to determine the rate of acid generation in rocks that have the potential to produce acid and to confirm those rock types that do not have the capability to produce acid. We recommend humidity cell tests for the former and more acid-base accounting tests for the latter. This information will be very important for waste management planning since prevention of acid drainage off a mine site is now required by government regulators. Humidity cell tests require a minimum of twelve weeks and often longer for conclusive results.

I trust this sketch of the required information to provide an environmental baseline for mine permitting will assist you in planning for the Kerr property. We look forward to discussing the requirements for the Kerr property with yourselves or with Placer Dome Inc. and will keep ourselves current with the direction the property is going.

If you have any questions please give me a call.

Yours truly,

NORECOL ENVIRONMENTAL CONSULTANTS LTD.

Bruce S. Ott, Ph.D.
Project Manager

BSO/sip


TEDRAY 13 CLAIM
FAR WEST FAULT
WEST FAULT
A-ZONE FAULT
B-ZONE FAULT
CAMP FAULT
icefield
moraine
grass
talus
West Arm
Sulphurets Glacier
SYMBOLS
Outcrop
Outcrop-noted, but not mapped.
Geological Contact, definite/approximate.
Strike and Dip of S₀
Flow Foliation in Dike with Dip.
Strike and Dip of S₁
Lineation with Plunge.
Fault, major
Fault, minor
Ferricrete
Moraine Ridge Crest
Crevasse
Diamond Drill Hole
Creek
Edge of Surficial Features
Grid Stations
GEOLOGICAL LEGEND
8 Andesite dikes, cut rocks of Units 3 and 4, age uncertain with respect to rocks of Units 5-7
Upper Volcanic-Sedimentary Unit
7 Upper dacite lapilli tuff
6 Upper andesite flow breccia, tuff, minor dacitic layers
6a argillite, argillaceous tuff
6L lapilli tuff
6t tuff
6ts tuffaceous sediments
5 Argillite, dacitic tuff, minor dacite flows
5a argillite, siltstone, thinly bedded
5b dacite flow
Extrusive and Hypabyssal Intermediate Rocks, Domes
4 Latite/Andesite dikes, sills, plugs, domes
4a plagioclase-(hornblende) porphyry
4b finer grained, moderately to weakly porphyritic
4bH with elongate hornblende phenocrysts
4bK with moderately abundant K-feldspar
4c aphanitic to glassy, massive, slightly porphyritic
4d syenodiorite, fine to medium grained, equigranular
Lower Volcanic Sequence
3 Fragmental Dacite/Latite
3L lapilli tuff
3Lz quartz-sericite-(pyrite) alteration
3t fine to medium tuff
3tz quartz-sericite-(pyrite-carbonate) schist
3d dikes, finely laminated flow-banding
3a argillite
3aL argillite with abundant dacite/latite fragments from 1-5 cm in size, grades into 3L along the east side of the property
3ts tuffaceous sedimentary rocks just southeast of the collar of DDH-88-17
Hydrothermal event associated with Unit 3
3p lenses parallel to bedding and dissemination of pyrite
3qp quartz-pyrite veinlets and lenses, in part parallel to bedding and in part subparallel to foliation
3cu quartz with patches and veinlets of pyrite and primary copper sulfides (chalcopyrite, tetrahedrite, and locally bornite); late recrystallized veinlets and patches are of quartz-chalcopyrite-(tetrahedrite)
2 Carbonaceous Sedimentary Rocks
2a argillite, siltstone, minor sandstone; thinly bedded
2b sandstone, greywacke; with minor argillite intervals
2c pebble conglomerate
2d conglomerate; well rounded pebbles, cobbles, and boulders
2e cherty sedimentary rocks; thinly bedded
1 Basement Plutonic/Hypabyssal Rocks
quartz diorite and porphyritic (plagioclase-hornblende) latite inclusions in plugs of Unit 4b/c
SCALE 50 25 0 50 100 150 METRES
NOTE - Map is aligned relative to UTM Grid.
SULPHURETS GOLD CORPORATION
1989
KERR PROJECT
GEOLOGY
SOUTH SHEET
John Payne
J.P., H.H.
5
Oct., 1989
1065
GEOLOGICAL BRANCH ASSESSMENT REPORT
19,541
PART 1 of 3

GEOLOGICAL LEGEND

8 Andesite dikes, cut rocks of Units 3 and 4, age uncertain with respect to rocks of Units 5-7

Upper Volcanic-Sedimentary Unit

7 Upper dacite lapilli tuff

6 Upper andesite flow breccia, tuff, minor dacitic layers
- 6a argillite, argillaceous tuff
- 6L lapilli tuff
- 6t tuff
- 6ts tuffaceous sediments

5 Argillite, dacitic tuff, minor dacite flows
- 5a argillite, siltstone, thinly bedded
- 5b dacite flow

Extrusive and Hypabyssal Intermediate Rocks, Domes

4 Latite/Andesite dikes, sills, plugs, domes
- 4a plagioclase-(hornblende) porphyry
- 4b finer grained, moderately to weakly porphyritic
  - 4bH with elongate hornblende phenocrysts
  - 4bK with moderately abundant K-feldspar
- 4c aphanitic to glassy, massive, slightly porphyritic

4d syenodiorite, fine to medium grained, equigranular

Lower Volcanic Sequence

3 Fragmental Dacite/Latite
- 3L lapilli tuff
  - 3Lz quartz-sericite-(pyrite) alteration
- 3t fine to medium tuff
  - 3tz quartz-sericite-(pyrite-carbonate) schist
- 3d dikes, finely laminated flow-banding
- 3a argillite
- 3al argillite with abundant dacite/latite fragments from 1-5 cm in size, grades into 3L along the east side of the property
- 3ts tuffaceous sedimentary rocks just southeast of the collar of DDH-88-17

Hydrothermal event associated with Unit 3
- 3p lenses parallel to bedding and dissemination of pyrite
- 3qp quartz-pyrite veinlets and lenses, in part parallel to bedding and in part subparallel to foliation
- 3cu quartz with patches and veinlets of pyrite and primary copper sulfides (chalcopyrite, tetrahedrite, and locally bornite); late recrystallized veinlets and patches are of quartz-chalcopyrite-(tetrahedrite)

2 Carbonaceous Sedimentary Rocks
- 2a argillite, siltstone, minor sandstone; thinly bedded
- 2b sandstone, greywacke; with minor argillite intervals
- 2c pebble conglomerate
- 2d conglomerate; well rounded pebbles, cobbles, and boulders
- 2e cherty sedimentary rocks; thinly bedded

1 Basement Plutonic/Hypabyssal Rocks

quartz diorite and porphyritic (plagioclase-hornblende) latite inclusions in plugs of Unit 4b/c

SYMBOLS

- Outcrop
- Outcrop-noted, but not mapped.
- Geological Contact, definite / approximate.
- Strike and Dip of S_0
- Flow Foliation in Dike with Dip.
- Strike and Dip of S_1
- Lineation with Plunge.
- Fault, major
- Fault, minor
- Ferricrete
- Diamond Drill Hole
- Creek
- Grid Station

GEOLOGICAL BRANCH
ASSESSMENT REPORT

19,541

PART 1 of 3

SCALE 50 25 0 50 100 150 METRES
1:2500

SULPHURETS GOLD CORPORATION

1989
KERR PROJECT
TEDRAY AREA
GEOLOGY
NORTH SHEET

(2)

John Payne	Oct., 1989
, J.P.	
1065	6

Sample No.	Gold	Silver	Copper	
5409	30ppb	0.91oz/st	0.13%	Zinc=1706ppm
5410	490ppb	3.8ppm	1.5%	
5411	350ppb	6.21oz/st	0.07%	Lead=2.71%, Zinc=1859ppm
5412	560ppb	7.0ppm	0.99%	
5413	n.d.	0.6ppm	0.10%	
8286	795ppb	5.4ppm	12501ppm	

GEOLOGICAL BRANCH
ASSESSMENT REPORT

19,541

PART 1 of 3

SULPHURETS GOLD
CORPORATION

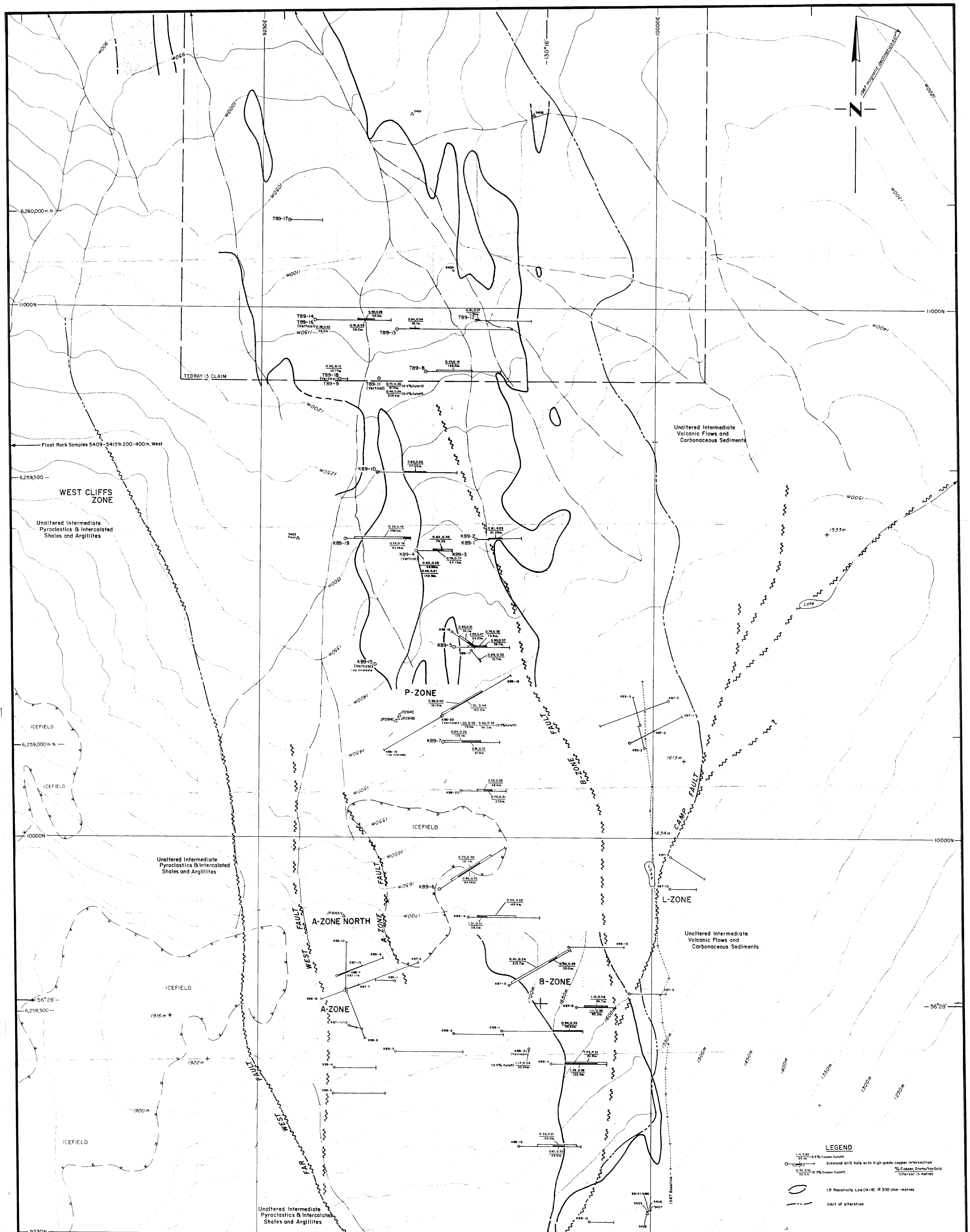
1989 KERR PROJECT

PROPERTY GEOLOGY

COMPILED BY: J. PAYNE

3

REPORT No. 1065 FIGURE No. 7



1989 SURFACE ROCK SAMPLES

SAMPLE No.	INTERVAL	AREA	GOLD PPB	SILVER PPM	COPPER PPM	
5401	Grab	Tedray	50	1.2	216	
5402	Grab	Tedray	80	0.7	121	
5403	Float	P Zone	2800	34.8	>20,000	
5404	2.0m.	Tedray	<0.005 oz/st		0.02%	
5405	1.8m.	G Zone	<0.005 oz/st		0.07%	
5406	2.0m.	G Zone	<0.005 oz/st		0.04%	
5407	2.0m.	G Zone	<0.005 oz/st		0.09%	
5408	Grab	G Zone	<0.005 oz/st		6.91%	
5409	Float	West Cliffs	30	0.91 oz/st	0.13%	Zinc = 1706 PPM
5410	"	" "	490	3.8	1.50%	
5411	"	" "	350	6.21 oz/st	0.07%	Lead = 2.71% Zinc = 1859 PPM
5412	"	" "	560	7.0	0.99%	
5413	"	" "	n.d.	0.6	0.10%	
JP 284A		P Zone	40	4.3	16036	
JP 284B		P Zone	30	5.3	>20,000	
JP 284C		P Zone	120	5.2	>20,000	
JPANXV		P Zone	1010	15.4	2522	Lead = 1303 PPM Zinc = 4629 PPM

GEOLOGICAL BRANCH ASSESSMENT REPORT

19,541

PART 1 of 3

SULPHURETS GOLD CORPORATION

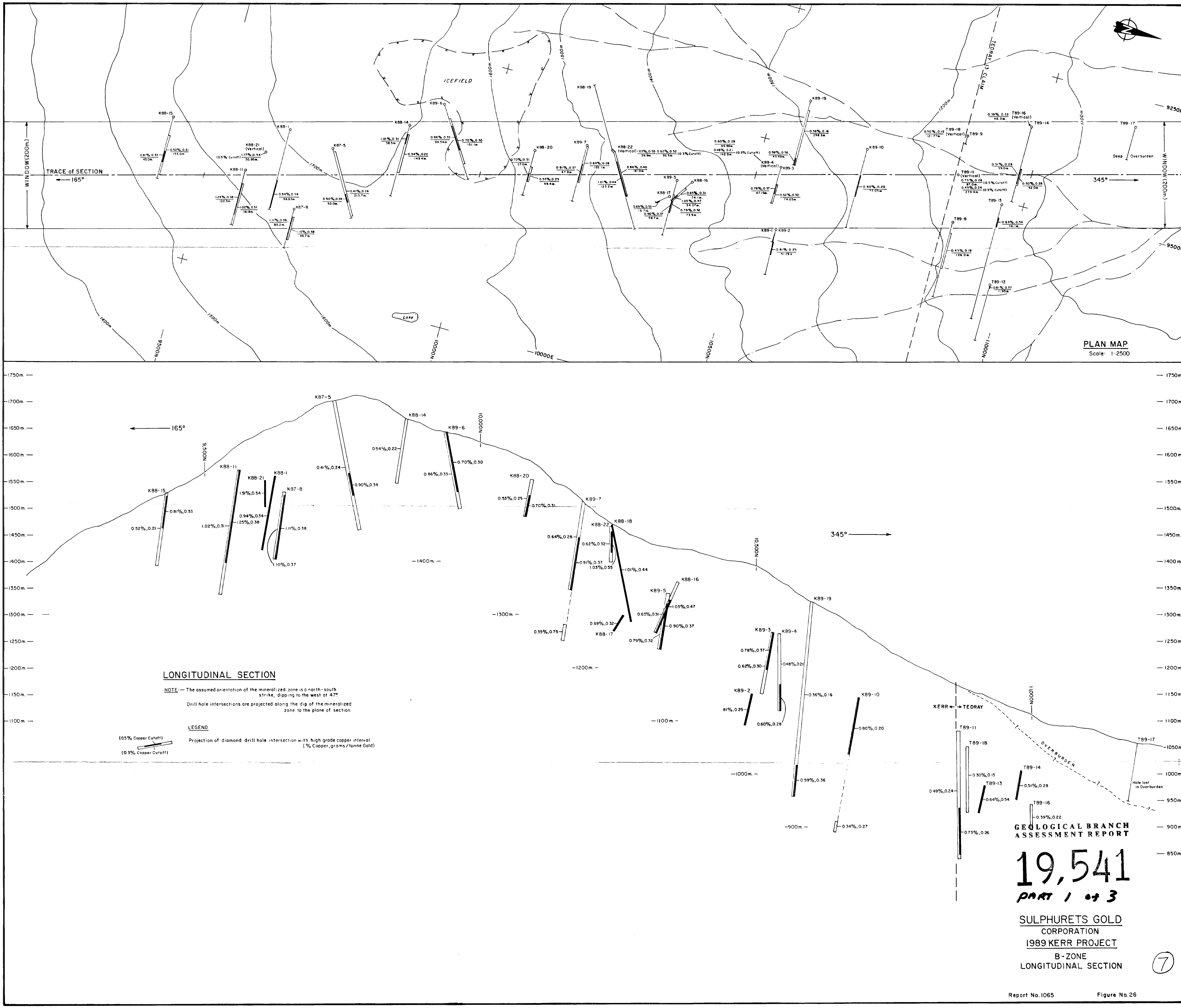
1989 KERR PROJECT COMPILATION MAP

4

Compiled by: B.B., R.H., S.C., H.H.	Date: Nov., 1989
Drafted by: H.H.	N.T.S. 104B/8 (FRANK MACKIE GLACIER)
Figure No. 8	Report No. 1065

Sulphurets Lake
BASELINE (10,000E)
TIELINE 10,700E ~650m East of Baseline
TEDRAY GRID BASELINE
KERR BASELINE 10,000W
TEDRAY 13 CLAIM
LCP TEDRAY 14 CLAIM (2E+2N)
Camp
GEOLOGICAL BRANCH
ASSESSMENT REPORT
19,541
PART 1 of 3
LEGEND
DIAMOND DRILL HOLE
Contoured at 35 & 40 mv/volt
SCALE 1:5000
SULPHURETS GOLD CORPORATION
1989 KERR PROJECT
IP SURVEY
PLAN MAP
CHARGEABILITY
N=4
REPORT No. 1065 FIGURE No. 16


Sulphurets Lake
TEDRAY GRID BASELINE
TIELINE 10,700E
KERR BASELINE 10,000W
Camp
Icefield
LEGEND
DIAMOND DRILL HOLE
Resistivity Contours at 100,150, & 300 Ohm-Metres
SCALE 1:5000
GEOLOGICAL BRANCH ASSESSMENT REPORT
19,541
PART 1 of 3
SULPHURETS GOLD CORPORATION
1989 KERR PROJECT
IP SURVEY PLAN MAP
RESISTIVITY
N=4
REPORT No. 1065 FIGURE No. 17
6


PLAN MAP
Scale: 1:2500
TRACE of SECTION
165°
345°
WINDOW (200m.)
ICEFIELD
TEDRAY 3 CLAIM
Lake
9250E
9500E
10000E
9500N
10000N
10500N
11000N
LONGITUDINAL SECTION
NOTE:- The assumed orientation of the mineralized zone is a north-south strike, dipping to the west at 47°.
Drill hole intersections are projected along the dip of the mineralized zone to the plane of section.
LEGEND
(0.5% Copper Cutoff)
(0.3% Copper Cutoff)
Projection of diamond drill hole intersection with high grade copper interval (% Copper, grams/tonne Gold)
KERR ← → TEDRAY
OVERBURDEN
Hole lost in Overburden
GEOLOGICAL BRANCH
ASSESSMENT REPORT
19,541
PART 1 of 3
SULPHURETS GOLD
CORPORATION
1989 KERR PROJECT
B-ZONE
LONGITUDINAL SECTION
7
Report No. 1065
Figure No. 26