5288

93L/8W

GEOLOGICAL , GEOCHEMICAL

and GEOPHYSICAL

ASSESSMENT REPORT

on 93L/8W

APEX CLAIM GROUP

by

JOHN M. Mc ANDREW, P. ENG.

LOCATION: 8 miles northeast of Houston, B.C.
In OMINECA MINING DIVISION
N.T.S. 93L8W
Latitude 54° 25'
Longitude 126° 25'

CLAIM OWNER: John M. Mc Andrew, Prospector-Geologist

DATE of WORK: October 8 - November 9, 1974

NOVEMBER 28, 1974

CONTENTS

INTRODUCTION

The 20 claims of the Apex Group were staked February 23, 1973 and recorded March 7, 1973. In the course of the 1974 field work it was noted that Apex Fractions 7, 10, 17 and 20 were staked unnecessarily and did not in fact exist. These fractions will be allowed to lapse. Apex 21 and 22 were staked October 16 and recorded October 29, 1974.

	Record Number
Apex 1 - 6	121174 - 121179
" 8 - 9	121181 - 121182
" 11Fr.	121184
" 12 - 16	121185 - 121189
" 18 - 19	121191 - 121192
	Tag Number
Apex 21 - 22	447837M - 447838M
Total 18 claims	

During the period from October 8 to November 28, 1974 $ 7,340.26 was spent on the Apex Group, $ 2,303.85 for a geological survey; $ 2,440.36 for a magnetometer survey and $ 2,596.05 for a geochemical survey.

The field work for all surveys was done by John M. Mc Andrew, P. Engr., F.G.A.C., Prospector-Geologist.

$ 5,400.00 of the $ 7,340.26 spent on the above surveys has been applied as assessment work in the following manner $ 400.00 on claims Apex 3 - 6, 8, 9, 16,18 and 19 (or 9 x $400.00) and $ 200.00 on each of the following claims Apex 1, 2, 11 - 15, 21 and 22 (or 9 x $200.00).

LOCATION and ACCESSIBILITY

The Apex Group is 8 miles northeast of Houston, British Columbia in the Omineca Mining Division. Refer to the 1 inch equals 4 miles Insert Map on the 1 inch equals 400 feet Geological, Geochemical and Magnetometer Surveys Map 1, which accompanies this report and shows the relationship of the Apex Group to Houston.

Access is via the main Houston - Burns Lake highway and gravel and logging roads. One turns southeast off the main highway at Knockholt (4 miles northeast of Houston) follows a gravel road along the southwest side of Aitken Creek for approximately 3 miles then turns left on a logging road. After travelling for 1½ miles due east the west boundary of the Apex Group is reached. A four wheel drive vehicle is necessary for the logging road section during wet periods. Should this portion of the road become impassable due to mud, one can bypass this first turnoff continue for another 3 miles to the China Nose Mountain Ranch and reach the south boundary of the claims by driving northeast 1½ miles from the ranch.

HISTORICAL BACKGROUND

The original copper - lead - barium - strontium showing was uncovered while putting in a logging road. Four additional trenches, two of which reached bedrock, were completed after which exploration stopped. As far as the author has been able to ascertain no detailed geosurveys or additional physical testing has been done on the ground occupied by the Apex Group.

During the staking of the claims in the spring of 1973 due to a foot and a half of snow and frozen ground I was only able to collect a few chips of altered rock from the original showing. This sample was highly anomalous in lead and zinc, moderately so in copper and assayed 19% barium and 0.62% strontium (two important trace elements).

In the summer of 1973 additional specimens rich in magnetite, bornite, chalcopyrite and calcite were obtained from the other two trenches where bedrock is exposed.

On March 22, 1973 Cities Service Ltd., a Canadian subsidiary of a major American oil company, on the basis of the findings of a rock geochemical survey (personal communication) staked the Swan Group, consisting of 80 claims, adjacent to the east boundary of the Apex Group.

In " CIM Special Volume No.11 " L. N. Ovchinnikov and S. V. Grigoryan of the Institute of Mineralogy, Geochemistry and Crystallochemistry of the Rare Elements, Moscow, U.S.S.R. published " Primary Halos in Prospecting for Sulphide Deposits ". This article because of its pertinence and possible relevance to the geological situation on the Apex Group has been appended to this report. Special attention should be given to Figure 1 " The Endogenous Geochemical Halos Around Lead - Zinc Orebodies in Skarns ". A few excerpts from this article follow:

" Zonation of the halos is independent of the geological environment ".

" Barium and silver halos of maximum intensity and width are developed in the <u>upper</u> parts of the section ".

" Intense halos of barium, arsenic and antimony that are typical indicators of supra-ore sections ".

" When in chalcopyrite, it is the indicator in the lower profiles of primary halos " (The original showing is at an appreciably higher elevation than the Pond Trench, where massive chalcopyrite occurs, on the Apex Claims.

Primary Halos in Prospecting for Sulphide Deposits

L. N. OVCHINNIKOV and S. V. GRIGORYAN
Institute of Mineralogy, Geochemistry and
Crystallochemistry of the Rare Elements,
Moscow, U.S.S.R.

ABSTRACT

The paper describes the morphology and nature of primary halos associated with a number of types of mineral deposits, including the lateral and vertical zonation of a number of indicator elements.

Primary halos have proved useful in prospecting for a number of mineral deposits in the Soviet Union. The success ratio attained when primary halos are used is high.

INTRODUCTION

THE PRESENT PAPER deals with the primary geochemical halos occurring around hydrothermal sulphide deposits of the plutonogenic telethermal classes and the skarn group of superimposed ores.

Investigation of the primary geochemical halos has begun only recently, but the available data now make it possible to outline the following basic features of the primary halos, the purpose being to apply them in exploration for ore deposits.

(1) The dimensions of the primary geochemical halos of a number of elements considerably exceed those of the ore deposits around which they are developed.

(2) The vertical extent of primary halos is especially extensive above steeply dipping orebodies. This feature facilitates prospecting for the deeply buried blind orebodies and deposits by means of these halos.

SOME EXAMPLES

Figure 1 shows the primary halos of some elements above a steeply dipping lead-zinc orebody which occurs at a depth of approximately 250 meters in skarn rocks.

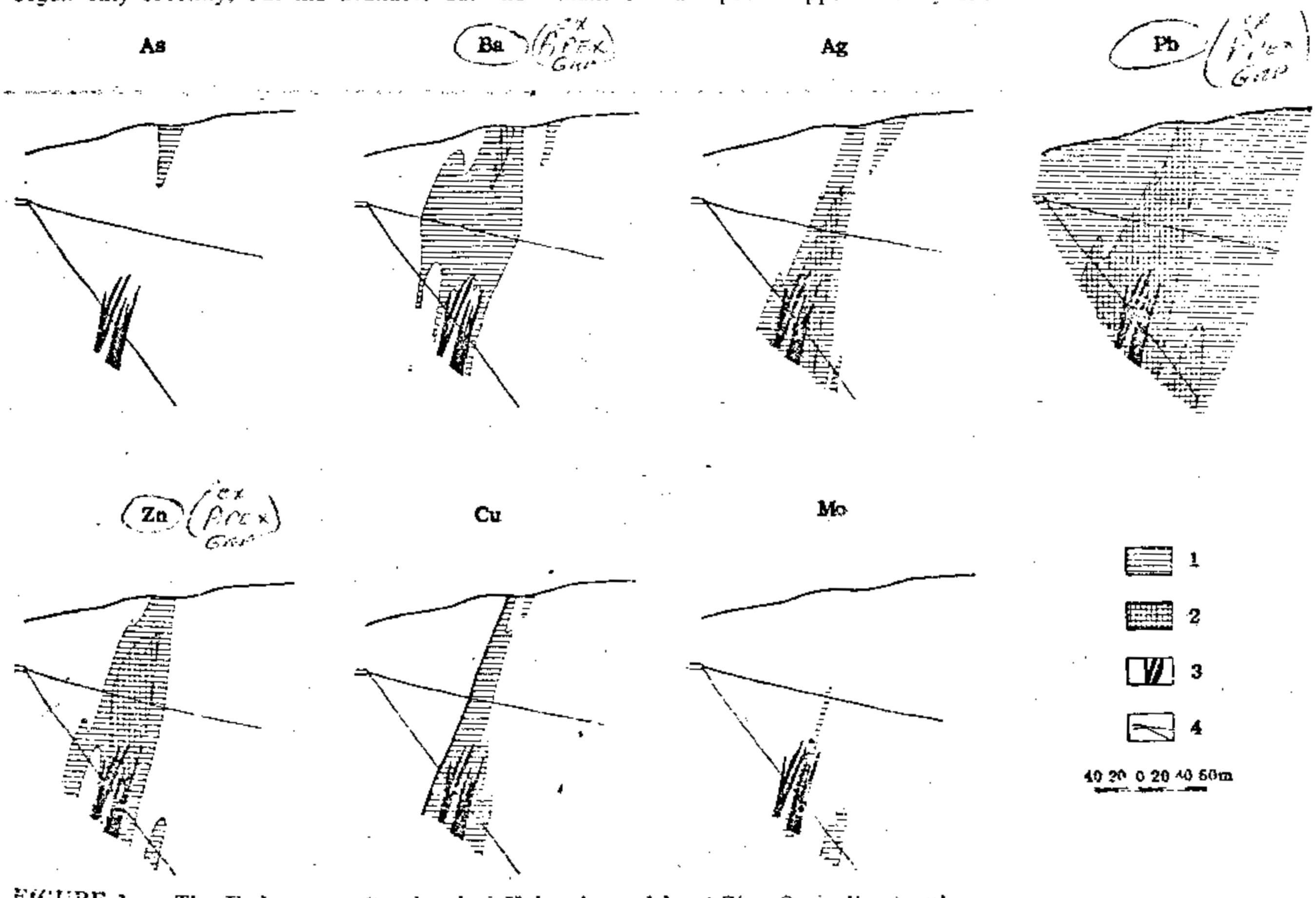

FIGURE 1 — The Endogenous Geochemical Halos Around Lead-Zinc Orebodies in Skarns.
Elemental contents (in per cent) in dispersion halos: 1 — As 0.0015-0.003, Ba 0.01-0.1, Ag 0.00003-0.0001, Pb 0.003-0.01, Zn 0.005-0.01, Cu 0.003-0.05, Mo 0.0003-0.001; 2 — Ba 0.1-0.2, Ag 0.0001-0.008, Pb 0.01-1.0, Zn 0.01-1.0; 3 — orebody; 4 — prospecting boreholes.

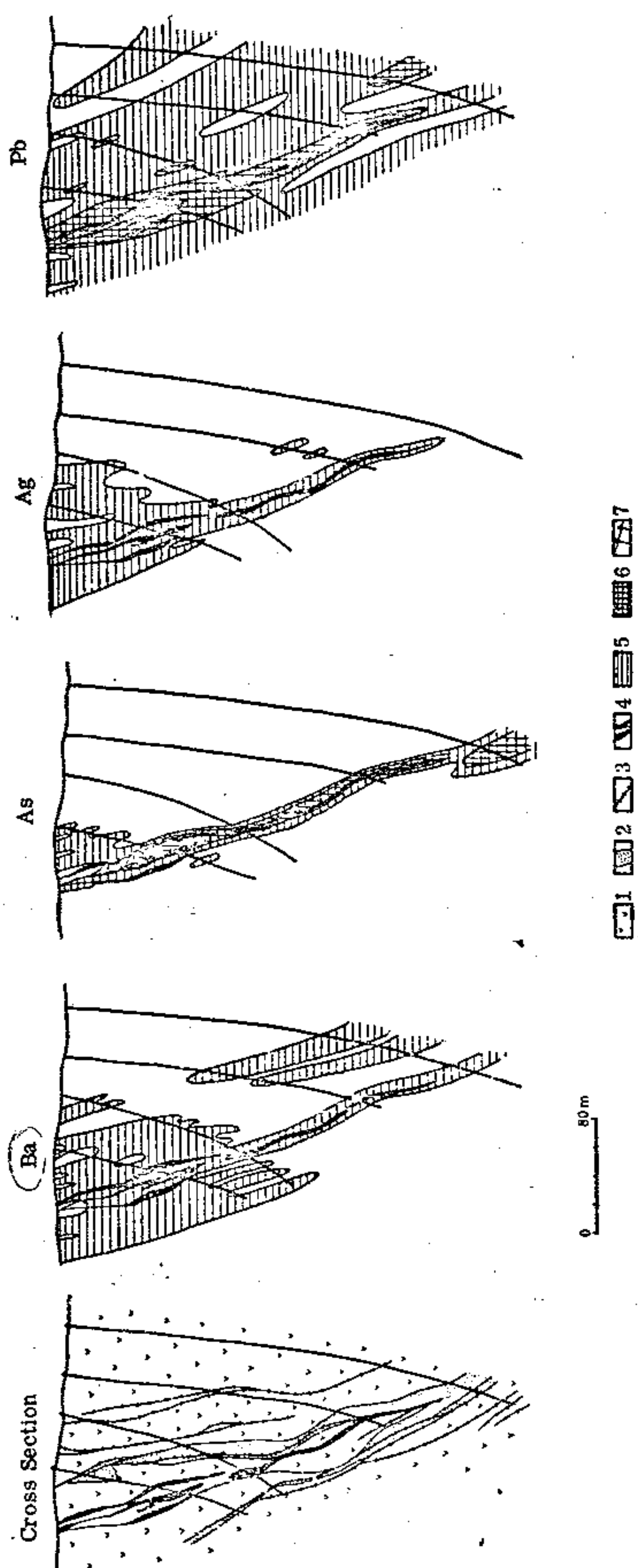

FIGURE 2 — Primary Halos Around the Orebodies of the V. Kanimansur Deposit.
1 — welded tuff (quartz porphyry); 2 — quartz porphyry; 3 — diabasic porphyry (dikes); 4 — orebody. Elemental contents in per cent: 5 — Ba 0.04-0.5, As 0.005-0.01, Ag 0.00002-0.0001, Pb 0.005-0.1; 6 — As 0.01-0.1, Pb 0.1-1.0; 7 — sampling interval.

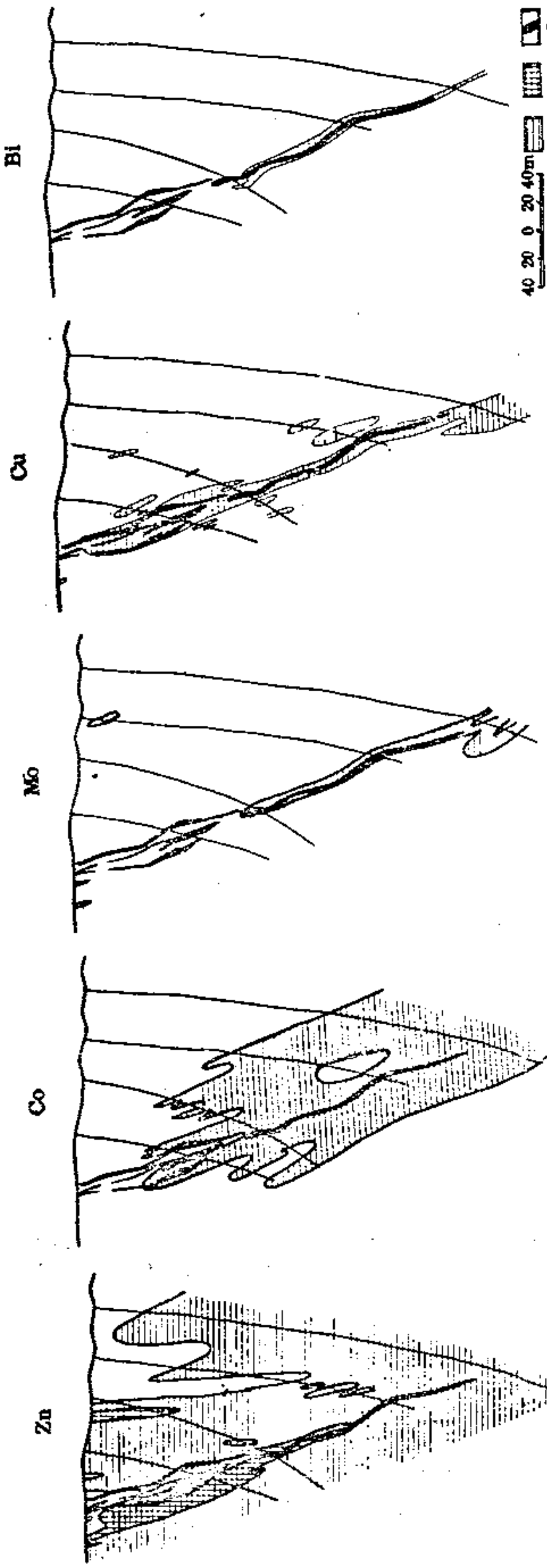

FIGURE 3 — Primary Halos Around the Orebodies of the Main Lode of the V. Kanimansur Deposit.
Elemental contents (in per cent): 1 — Zn 0.005-0.01, Cu 0.005-0.01, Bi 0.00008-0.001, Sn 0.0003-0.02, Co 0.0002-0.006, Mo 0.0001-0.008, U 0.0002-0.0008; 2 — Zn 0.01-0.8, Cu 0.01-0.03; 3 — orebody.

It can be seen that the halos near the surface are very wide and intense. This fact indicates that their vertical extent above the orebody was much greater than that which has been traced at the erosion level.

One of the remarkable features of the primary halos is their zoning, which is most clearly displayed in the direction of flow of the ore-forming solutions.

In the case of steeply dipping orebodies, the vertical zoning manifests itself in the structure of the halos, which is expressed as a differential distribution of elements in vertical section. Some elements form more intense and wide halos in the upper parts of the ore zones; the others are more strongly developed in the lower parts.

The zonation of the halos is independent of the geological environment and is similar to the well-known cases of zoning of the orebodies themselves. The well-known cases of downward gradation of lead ores into zinc ores in polymetallic deposits may be taken as an example. Here, a decrease of the lead-zinc ratio with depth is always observed in the primary halos. This is also the case in a number of other types of hydrothermal deposits. By comparison with the orebodies, zoning of the geochemical halos is more universal. The reason for this is probably the fact that the halos are larger than the orebodies and are characterized by a more uniform structure than the orebodies.

Figures 2 and *3* show the primary geochemical halos around the steeply dipping orebodies of the polymetallic deposit at Kanimansur (Middle Asia). It is obvious that the primary halos display a distinct vertical zoning; the barium and silver halos of maximum intensity and width are developed in the upper parts of the section, whereas those of cobalt, copper and bismuth are in the lower parts.

For ore deposits with a gentle dip, there are some cases of zoning in the primary halos. These are generally concordant with the orebodies. *Figure 4* shows a vertical cross section of the gently dipping orebodies of the Sary-Cheku copper-molybdenum deposits. The orebody wedges out updip in cross section. Primary geochemical halos of copper, molybdenum, lead, zinc, silver and other elements have been detected in a drill hole across the section. The structure of the halos reflects the vertical zoning, caused by 'the displacement' of the halo fields in the direction of the wedging out of the orebody. The silver halo is the most displaced; those of molybdenum and copper are the least. It will also be noted that silver forms a broad and intensive 'cap' in the area of wedging out of the ore deposit, where the molybdenum halo has the minimum width and intensity. The exceptional contrast of the halo zoning of these elements becomes evident with the complete disappearance of the halo fields of high silver concentration in hole No. 40, where the molybdenum halo productivity is the highest.

The linear productivity[1] values of the halos have been calculated for the drill holes in order to quantitatively evaluate the lateral zoning (Table I). Zoning contrast coef-

[1] The linear productivity of a halo (in cross section) is the product of the average content (in per cent) of an element in the halo multiplied by the width of the halo (in meters). The units of the linear productivity are meter - per cent.

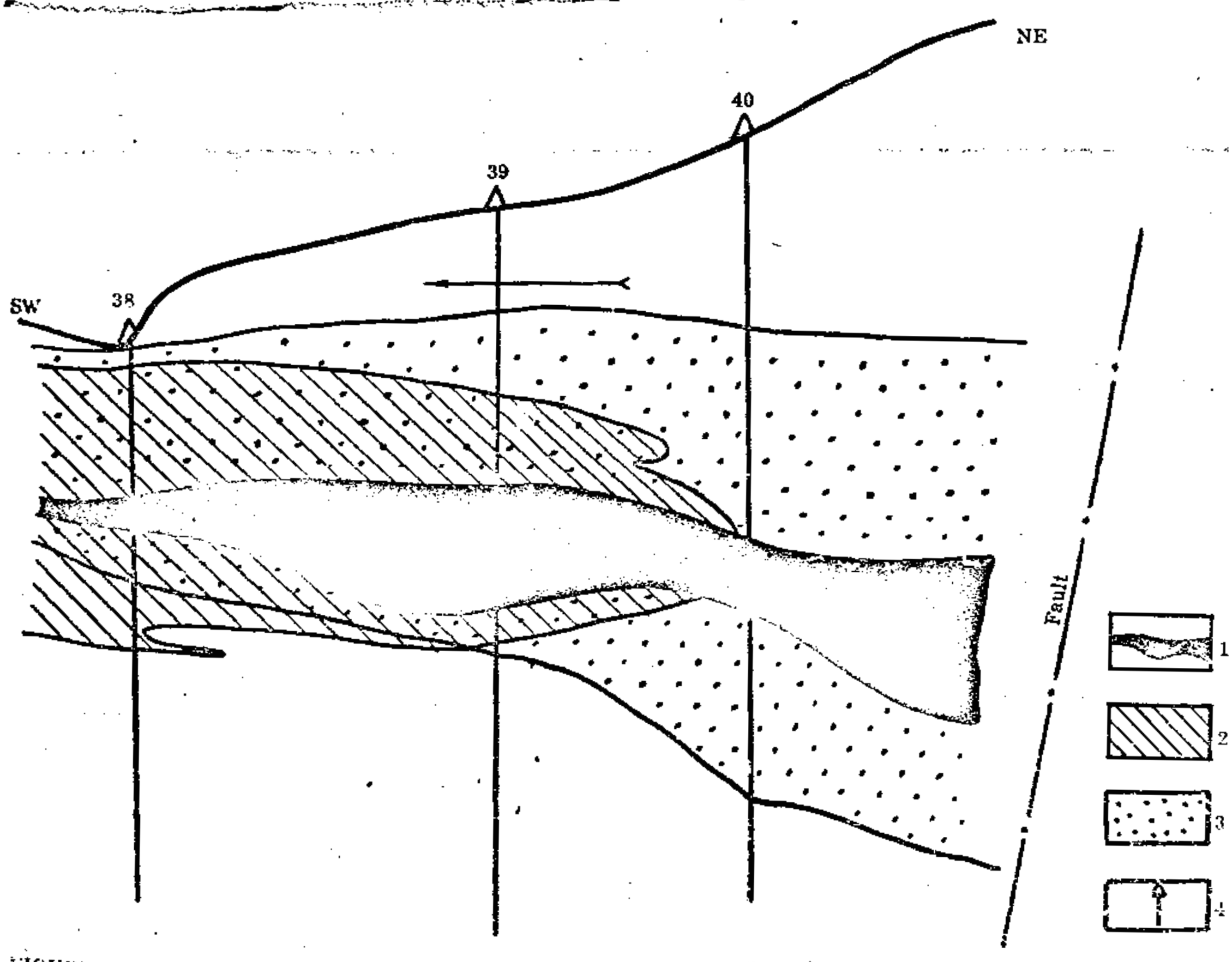

FIGURE 4 — Primary Halos Around the Orebodies of the Sary-Cheku Deposit.
1 — orebody; 2 — silver halos; 3 — molybdenum halos; 4 — boreholes.

ficients are also shown in this table for silver, lead, zinc, copper and molybdenum. This coefficient represents the relationship of the value of paired ratios for holes 38 and 40. The coefficient has a maximum significance for lead and silver and a minimum significance for zinc and molybdenum. This permits separation of the elements into two groups: lead and silver, characteristic of the southwest part of the section; and copper, molybdenum and zinc, characteristic of the northeast part.

The examples in Table I indicate the important effect of structural conditions, particularly the effect of ore-bearing and enclosing structures, on the formation of primary geochemical halos. These examples also indicate the necessity of being aware of these peculiarities in the interpretation of the geochemical anomalies.

The vertical zoning of the primary geochemical halos is of great practical importance in solving one of the most complicated problems in prospecting for deposits, namely the problem of distinguishing supra-ore halos from sub-ore halos. This is of paramount importance in prospecting for blind ore deposits.

Figure 1 illustrates the discovery of blind lead-zinc orebodies on the flank of the Kurusaiskoe deposit (Middle Asia) with the help of endogenic halos. Intense halos of barium, arsenic and antimony that are typical indicators of supra-ore sections were detected in this area as a result of geochemical sampling. These suggested a potential for blind lead-zinc mineralization. Holes drilled to a depth of 150 meters, however, did not locate an orebody. Core sampling of these holes outlined an expansion with depth of the halos of lead and zinc (*Figure 1*), a feature which indicated the deeper occurrence of an orebody. Further exploration has proved this feature to be correct; an economical blind orebody has been discovered at a depth of 250 meters.

TABLE I — The Values of the Halo Linear Productivity Ratios (Sary-Cheku Deposit)

Pairs of Elements	The Linear Productivity Ratios: Hole No. 38	Hole No. 39	Hole No. 40	Zoning Contrast Coefficient
Silver / Copper	0.0006	0.00028	0.00005	11
Lead / Copper	0.043	0.0155	0.00087	43
Zinc / Copper	0.023	0.1	0.015	1.5
Molybdenum / Copper	0.0052	0.00092	0.0019	2.3

We consider that primary geochemical halos are a reliable criterion of blind ore mineralization, and the above example has confirmed this point of view. We also consider that studies of primary halos and their zonation at any given level of an orebody is particularly useful in assessing the depth potential of an orebody. The Kanimansur deposit mentioned above is a good example (*Figures 2* and *3*). The vertical zoning contrast of the primary halos developed on the level of the orebodies in this deposit is illustrated in Table II, where the ratios of the linear productivities of halos are given. These widen the range of the practical application of primary halos.

The comparative investigation of the primary halos of the different hydrothermal deposits has shown that the indicator elements, and particularly the vertical zoning of their distribution, are exactly the same for most metalliferous deposits (viz. copper, lead-zinc, gold-bearing ores, tungsten, molybdenum, copper-bismuth, uranium, tin-bearing ores, mercury, etc.).

Table III shows the lateral and vertical zoning of the primary halos of different deposits. First of all, the similarity of the indicator-element composition of the main ore deposit types, and in effect the absolute identity of the vertical zoning, attract one's attention. Copper is an exception; it may be an indicator of the supra-ore profiles in stratiform lead-zinc deposits and of the sub-ore profiles in other types of lead-zinc deposits. However, copper is typical of both supra-ore and sub-ore profiles in lead-zinc deposits in skarns. Mineralogical zoning is the explanation of this. When copper is contained in tennantite, the element characterizes the upper part of halos; when in chalcopyrite it is the indicator in the lower profiles of primary halos.

In some deposits, copper occurs in the form of both tennantite and chalcopyrite. In this case, a distinct vertical zoning is revealed in the structure of the copper halo, caused by a replacement of tennantite by chalcopyrite in a vertical section.

These examples indicate the necessity of a detailed study of the mode of occurrence of indicator elements in the primary halos, and an awareness of possible mineralogical zoning in the interpretation of the geochemical anomalies.

The composition of the halos influences only their horizontal dimensions (on a plan view); the higher the element content in the halo, the wider the halo. This means that by measuring the dimension of the halos in plan one can determine the relative contents of elements in orebodies.

TABLE II — The Ratios of the Linear Productivities of Halos of Paired Elements (V. Kanimansur Deposit)

Mineralization	The Halo Levels	Ba / Cu	Pb / Cu	Ag / Cu	Ba+Ag+Pb / Bi+Cu+Co
Pb-Ag Ore	Upper	100	45	0.21	10 — 5
	Lower	44	34	0.08	1.6 — 1.0
	Probable Variation	200	18	0.2	7 — 12
Cu-Bi Ore	Upper	3.5 — 1	2.5 — 0.3	0.01 — 0.004	1.0 — 0.5
	Lower	0.9 — 0.04	0.09	0.002	0.2 — 0.05
	Probable Variation	38 — 4	7 — 2.5	0.03	1.5 — 1.0

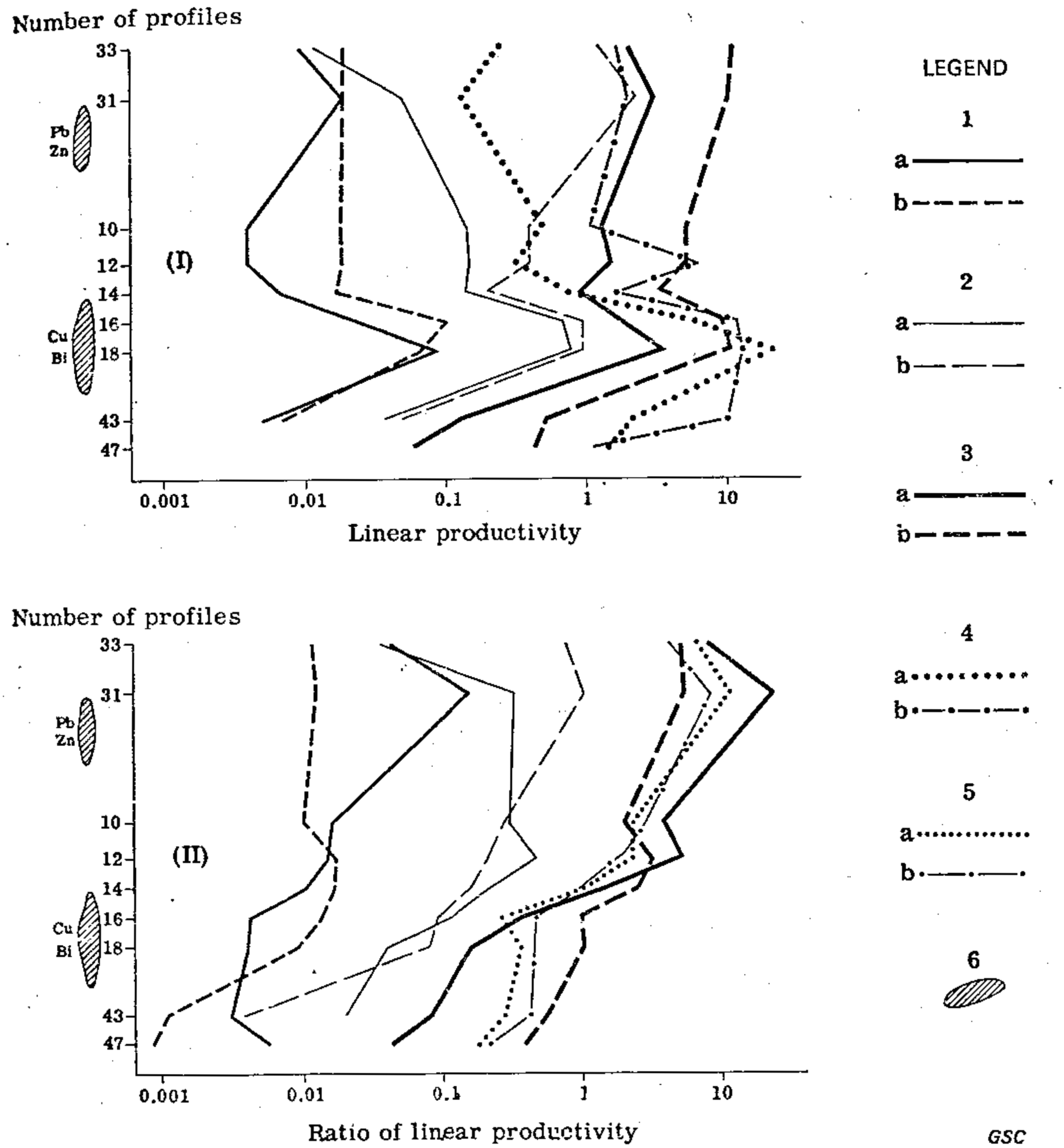

FIGURE 5 — Graphs of Linear Productivities and their Ratios at Different Levels of Erosion on the Shear in the Kanimansur-Aimadonskogo Zone of Fracture.

1 — the silver linear productivities (I) and the ratios of the silver-copper productivities (II) in the primary halos (a) and in the secondary halos (b); 2 — arsenic-copper linear productivity ratios (II) for primary halos (a) and for secondary halos (b); 3 — lead linear productivities (I) and lead-copper linear productivities (II) for primary halos (a) and for secondary halos (b); 4 — copper linear productivities; 5 — the ratios of the summed-up productivities of the supra-ores to the sub-ores (II) (a) in bedrock and (b) in soils; 6 — the conditional boundaries of the ore-bearing intervals.

TABLE III — The Lateral and Vertical Zoning of Endogenous Halos in Different Types of Deposits

Deposits	Lateral Zoning(*)						Vertical Zoning(**)					
Lead-zinc deposits in skarns........	Ba, Ag,	Zn, Cu,	Pb, Sb	As,			Sb, Pb,	Cu, Zn,	As, Cu	Ba	Ag,	
Lead-zinc deposits in acid effusive rocks..........................	Pb, As,	Ba Co	Zn.	Ag,	Cu,		As, Cu,	Ba, Co	Ag,	Pb,	Zn,	
Skarns — scheelite deposits.........	W. Pb	Mo,	Cu,	Ba	Zn,		Ba. Mo	Pb,	Zn,	Cu,	W.	
Gold-quartz deposits...............	Au, Sb,	As, Cu,	Bi, Be,	Ag. Mo.	Pb. Co,	Zn	Sb. Cu.	As, Bi,	Ag. Mo,	Pb, Au,	Zn, Co,	Be
Copper-gold deposits..............	Au,	Cu,	Mo,	Ag,	As.	Sb	Sb.	As,	Ag,	Cu,	Mo,	Au
Copper-bismuth deposits...........	Cu, Ba	Bi, Zn,	Pb, Co	Ag,	As.		Ba. Bi,	Ag. Co	Pb,	Zn,	Cu,	
Uranium-molybdenum deposits......	U, Ag	Mo,	Pb,	Cu,	Zn,		Ag,	Pb,	Zn,	Cu,	Mo,	U
Mercury deposits..................	Hg, Pb,	As, Zn,	Ba, Ni,	Cu, Ag,	Pb. Co		Ba. Ag,	Hg(?). Pb,	Zn,	Sb. Cu,	As Ni,	Co
Sulphide-cassiterite deposits........	Ag, Mo	Zn,	Pb,	Sn,	Cu,		Ag,	Pb,	Zn,	Cu,	Mo,	Sn
Stratiform lead-zinc deposits........	Ag, Co,	Pb, Zn,	Cu, Ni	As,	Ba,		As, Zn,	Ba Co	Ag.	Cu,	Pb,	

(*)Elements are given in decreasing order of the width of their halos in cross section; for example, in lead-zinc deposits in skarns, antimony has the narrowest halo whereas barium has the most extensive.
(**)Reading from the left to the right, the indicators of the supra-ore parts grade or pass downward to the indicators of the sub-ore parts of an ore zone.

Many investigators, geologists and prospectors consider primary halos to be useful only in well-exposed areas, where the bedrock is within reach of sampling. However, as the appropriate researches have proved (Kablukov *et al.*, 1964), primary halos can also serve as effective prospecting criteria where the bedrock is covered by relatively thin eluvial-deluvial deposits. Under such conditions, as a result of the primary halo disintegration, its exogenous analogue has been formed; that is, secondary dispersion halos are developed.

In these areas, prospecting for blind orebodies and the evaluation of the erosional section of mineralization may be carried out using the secondary dispersion halos directly. However, supergene destruction of primary halos causes numerous changes in the distribution of the indicator elements, and therefore special investigations are necessary for an understanding of the correlation between primary and secondary halos in each region.

Our investigations have established that under the conditions that prevail in Middle Asia, the secondary dispersion halos can be used both in prospecting for blind orebodies and in the estimation of the level of erosion of mineralization.

In particular, it has been established that the method of additive halos[1] reveals a closer relation between the primary and secondary dispersion halos.

Figure 5 shows the ratios of the added halo linear productivities of the polymetallic and copper-bismuth mineralization (Kanimansur-Almadenskoe ore region, Rudny Karamazar), from the supra-ore parts to the sub-ore.

In the additive halos, the indicator-element groups have been chosen with regard to their position in the polymetallic and copper-bismuth mineralizations in acid effusive rocks (Table III). In the first group, the indicator elements of the upper parts of the halos include arsenic, barium, silver and lead; in the second group, copper, cobalt, bismuth and tungsten, which form broader and more intensive halos on the lower profiles of the ore zones, are included. The correlation for additive halos is closer, as *Figure 5* shows.

The investigations that have been carried out in the Soviet Union have demonstrated the great geologic and economic efficiency of primary geochemical halo techniques in the evaluation and forecasting of ore potentials of the deeper parts and flanks of known deposits. Thus, in one of the districts of Middle Asia, commercial orebodies have been detected at vertical depths of up to 500 meters in twenty-four out of twenty-six explored areas, which geochemical prospecting had indicated to be promising.

[1]Additive halos are those in which the contents of groups of elements (of sub- or super-ore halos) are summed in units of the geochemical background.

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(2) Grigoryan, S. V., and Yanishevsky, E. M., The Endogenous Halos of Ore Deposits; State Publishing House "Nedra", 1968.

(3) Instructions for Geochemical Methods of Prospecting for Ore Deposits; State Publishing House "Nedra", 1965.

(4) Kablukov, A. D., *et al.*, The Use of Uranium Dispersion Halos and Accessory Elements in the Prospecting and Exploration of Hydrothermal Uranium Deposits; State Publishing House "Nedra", 1964.

PURPOSE of the GEOLOGICAL, GEOPHYSICAL and GEOCHEMICAL SURVEYS

The author has a fairly extensive knowledge of the Houston - Smithers area gained from property evaluation, ownership and consulting. In my opinion the Apex Group is a property with many things in its favour - high grade copper - zinc - lead - silver showings, good geological environment, several inferred strong structural zones and probable barium - zinc - lead - strontium halo zones.

Numerous swamps, streams and small lakes suggest important structures. It has been my experience that draina ge often coincides with structural zones of weakness which have a greater tendency to weather and erode away. Sulfur Lake in Claim Apex 1 in the heat of summer has a strong smell of sulphur (not the typical smell of organic decomposition). This lake may represent the surface expression of a major structure.

The potential of the Apex Group has only been scratched by a few shallow trenches. I believe that only the " apex " or edges of a possible orebody or orebodies has been indicated by the trenching to date. Because of the extensive cover on the claims only by detailed geosurveys could one hope to define additional geophysical and geochemical anomalies or locate more areas of outcrop and hence gain a greater insight into the geological environment in which the mineralized showings occur.

Since there appears to be a close association of magnetite with some of the mineralization, the magnetometer should be a good tool for extending and picking up new areas of covered mineralization. Geochemistry has proved to be a vital tool in prospecting on covered ground. One cannot overemphasise the importance ~~the importance~~ of diligent outcrop prospecting during any exploration program. This often locates mineralization that geochemical and geophysical surveys have missed.

If any geophysical and geochemical anomalies defined by the above surveys were found to be sufficiently significant further surveys and or physical testing would be warranted to determine the economic potential of the covered ground. It is unlikely that newly located zones of mineralization will be sufficiently exposed to physically test prior to support geosurveys.

DETAILS of the SURVEYS

Prior to starting the field work the 1:50,000 scale map of the Apex Group area was blown up to a scale of 1 inch equals 400 feet by Van Cal Reproductions of Vancouver. This was used as a base for subsequent mapping.

Four old logging roads provide excellent access to the ground covered by the Apex Claims. For reference purposes these were named the North, Claim Line, South and Southwest Roads (See Map 1 Geological, Geochemical and Magnetometer Surveys, scale 1 inch equals 400 feet in the back pocket of this report. These roads were mapped by brunton and pace traverses and stations marked by ribbon at 100 foot intervals. The road stations served as tie points when running east-west lines across the property.

Geochemical samples, magnetometer readings and geological observations were taken on east-west lines 200 to 700 feet apart. These lines have stations marked by coloured ribbons at 200 foot intervals. In areas of prime interest magnetometer readings were taken at 50 foot intervals along the lines otherwise they were taken at 100 foot intervals. Soil samples were usually taken at 200 foot intervals unless the sample site coincided with an area of outcrop then no sample was taken. Stream sediment samples were usually taken at points where the base lines crossed drainage systems, particularly if the stream linear was thought to be the surface expression of a concealed fault.

Geochemical soil samples were collected at depths of from 3 inches to 2 feet. Where available, the friable, somewhat oxidized B horizon was sampled. Silt samples were taken from the finest silt available at that particular station.

All geochemical and rock samples were sent to Min-En Laboratories Ltd. in North Vancouver, B.C.

GEOLOGICAL SURVEY

Outcrop areas were mapped using brunton and pace traverses. Specimens were collected of all the various rock types and numbered JM 1, JM 2, etc. and kept for future reference. Specimen collection sites have been marked on the base map.

Dr. B. N. Church of the British Columbia Department of Mines and Petroleum Resources on his Preliminary Map No. 11 " Geology of the Buck Creek Area ", published in May, 1973, shows the area of the Apex Group underlain by Hazelton rocks of Early and Middle Mesozoic age. Southeast and northeast of the Apex Claims approximately 1½ and 2½ miles respectively he showstwo large areas of rhyolite. In the claim area he has drawn 2 topographic lineaments. The larger of these would correspond to the Sulfur-Rhyolite Lakes drainage system and the other to the shattered rock zone in Claim Apex 21.

ROCK TYPES

Seven distinct rock types have been identified on the Apex Group - maroon and green andesite, basalt, argillite, agglomerate, rhyolite and gabbro.

Maroon Andesite This fine grained to aphanitic rock is characterized by its reddish brown or maroon colour. Locally it contains white or pink feldspar phenocrysts. In Apex Claims 5 and 9 outcrop is particularly extensive and consists of massive flows.

Green Andesite The green andesite is a medium to dark green, fine grained, competent rock. Outcrop is abundant west and southwest of the Beaver Pond. Between stations A4 and A5 in Beaver Pond Creek a conformable contact was noted between maroon and green andesites.

Basalt The basalt ranges from aphanitic to medium grained, in colour from dark green to grey-black to black and generally speaking is massive and competent. Locally some flows are vesicular and amygdaloidal with the amygdules being filled with calcite and or white quartz.

Most of the basalt is non magnetic but there are local exceptions - south of the Beaver Pond the basalt carries appreciable magnetite (strong pull on hand magnet) and at 112E on Baseline 56W. The basalt south of the Beaver Pond

Basalt (cont'd) is the coarsest noted and may in fact be another phase of the gabbro mapped further south. There are numerous outcrops of basalt around the south end of the Beaver Pond and in the central portion of the claim group.

Argillite   Argillite outcrops along the lower end of Beaver Pond Creek. It is grey-black, fine grained and highly shattered. Near its contact with the maroon andesite it is notably siliceous, hard and brittle (baked ?).

Agglomerate   The main area of agglomerate outcrop is in northern part of Claim Apex 6. There is one questionable outcrop on Baseline 70N at 132E. The agglomerate consists of rounded and angular volcanic and sedimentary fragments up to several inches in diameter in a dark green, fine grained andesitic groundmass.

Rhyolite   There is extensive outcrop of rhyolite in the east, south and southwest portions of the claims. Abundant float was noted along the Claim Line Road through claims Apex 3 to 9 and in the streambed of Beaver Pond Creek.

The rhyolite is light grey to flesh coloured, fine to medium grained and locally carries anhedral to subhedral pink feldspar crystals. In the author's opinion the rhyolite on the Apex Claims would be classified as intrusive.

Gabbro   A small outcrop of gabbro occurs at station 121E on Baseline 54N. The gabbro (Specimen JM 33) is dark green, medium grained, strongly magnetic and contains minor finely disseminated pyrite. This gabbro resembles other basic intrusives the author has seen associated with mineralization elsewhere in the Houston - Smithers area.

STRUCTURE

Although no faults actually outcrop on the Apex Group the numerous strong topographic stream lineaments suggest that they may be surface expressions of concealed fault zones. Examples of these would be the Sulfur-Rhyolite Lakes drainage system, the Beaver Pond lineament, the swamp in the southeast corner of Claim Apex 16 and the north-south stream flowing through Claims Apex 12 to 14. In the northwest portion of Claim Apex 21 outcrops of shattered rock (fragments a few inches in diameter) partially define a probable northeast trending structural zone.

There are pronounced fracture zones throughout the property. At the south end of the Beaver Pond a strong fracture system strikes N0-5E and dips 60-80 degrees west. These may be tension fractures subsidiary to a major fault nearby.

STRUCTURE (cont'd) A similar situation exists at the Road Showing where northwesterly striking fractures dip 60 degrees northeast. At 100 feet east of station A12 in Beaver Pond Creek occurs a zone of erratic fractures approximately 10 feet wide. All the aforementioned fracture zones carry copper mineralization.

Very few strikes and dips of bedding were obtained due to the fractured and shattered nature of most outcrops. But an outcrop of green andesite due west of the Beaver Pond displays distinct flow banding which strikes N40E and dips 70NW. The massive, competent nature of some of the volcanic units also made it difficult to obtain strikes and dips from poorly exposed outcrops.

MINERALIZATION and ALTERATION

FeOx and Manganese Staining Invariably, on the Apex Group, where the various rock types are fractured, shattered or brecciated there is an abundance of earthy limonite and or hematite which occurs as disseminations, fracture filling or staining. The limonite is usually light to medium brown and the hematite blood red to dark reddish brown. In most areas FeOx is accompanied by appreciable manganese staining. Areas of abundant FeOx and manganese staining have been noted on Map 1.

Primary sulphides were rarely observed and doubtlessly been leached out or oxidized in the surface exposures. Because of the highly fractured nature of many outcrops the effects of weathering have probably extended to a considerable depth.

The large area of rhyolite in the southwest portion of the claims is remarkable for the abundance of light to medium brown disseminations and seams of limonite. Some of the rhyolite is locally brecciated and the interstices of the breccia are filled with limonite. No primary sulphides were noted. In this area the rhyolite shows clay alteration and has a strong odour of kaolin. G. Delane of Getty Mines Ltd. when he examined the property with the author on November 3, 1974 took a composite grab sample of the FeOx rich rhyolite at station SWR 35 plus 50N on the Southwest Road which assayed 143 ppm Mo, 21 ppm Cu, 158 ppm Pb, 390 ppm Zn, 6.0 ppm Ag, 2,500 ppb Hg and less than .01 ppm Au

Calcite and Quartz Strigers and Veins Commonly in areas rich in FeOx and manganese staining there are an appreciable number of calcite stringers and occasionally quartz stringers and or veins. Some of the quartz stringers and veins are mineralized but this will be discussed later under mineralization. Calcite and quartz also occurs as amygdule fillings in the basalt.

Calcite and Quartz Stringers and Veins (cont'd) Generally speaking the calcite and quartz stringers are more abundant around the gabbro which occurs in Claim Apex 15. A barren, milky white quartz vein at least 6 inches thick occurs at station SWR52N on the Southwest Road. Areas of abundant calcite and quartz stringers and veins have been marked on Map 1.

Some rhyolite float picked up on the Claim Line Road and in the streambed of Beaver Pond Creek contains numerous quartz stringers.

Specular Hematite Due west and northwest of the Beaver Pond some of the outcrops carry considerable disseminations and seams of specular hematite. In the Middle Trench, although it it badly sloughed and half full of water, the " oldtimers " were obviously opening up a fracture zone rich in specular hematite with minor malachite staining. Specular hematite was noted in outcrops elsewhere on the property and some of the earthy hematite pits and seams are doubtlessly a result of the oxidation of specular hematite.

Pyrite Disseminated pyrite occurs in rhyolite float picked up along the Claim Line Road and in the vicinity of the NW Trench.

The gabbro in Claim Apex 15 contains minor finely disseminated pyrite.

Maroon andesite float dug out of the soil sample hole at station 71N on Baseline 142E carries appreciable finely disseminated pyrite.

Magnetite The gabbro in Claim Apex 15 is strongly magnetic due to finely disseminated magnetite.

Locally the basalt carries magnetite but in general is non magnetic. The strongly magnetic outcrop south of the Beaver Pond is an exception. This basalt may in fact be another phase of the gabbro intrusive or a metagabbro.

Chalcopyrite Although usually in structural zones minor disseminated chalcopyrite has been noted within host rocks suggesting that some of the mineralization may be syngenetic. Several examples of this are the basalt outcrop at station 112 plus 50E on Baseline 54N and the green andesite outcrops due west of the Beaver Pond from which specimens JM 24 and 29 were collected.

At 115E on Baseline 62N disseminations and blebs of chalcopyrite occur in a few quartz-calcite stringers and veinlets.

MINERAL SHOWINGS

To date three significant mineral showings have been mapped on the Apex Claims.

Road Showing The Road Showing consists of disseminated chalcopyrite, chalcocite, galena, malachite and azurite in a fracture zone in Claim Apex 9. Associated with the copper mineralization are steeply dipping barite veins up to 1 foot thick. On November 3, 1974 G. Delane of Getty Mines Ltd. took a composite grab sample of this mineralization which assayed 1 ppm Mo, 1310 ppm Cu, 760 ppm Pb, 5050 ppm Zn, 3.9 ppm Ag, 8,400 ppb Hg, less than .01 ppm Au, 9.58% Ba and 0.156% Sr. During the staking of the claims in the winter of 1973 the author had taken a grab sample of this mineralization which assayed 2 ppm Mo, 90 ppm Cu, 90 ppm Pb, 505 ppm Zn, 0.8 ppm Ag, 22 ppm As, less than .01 ppm Au, 19% Ba, and 0.625% Sr. Prior to Delane's sampling the showing had been opened up more by hand trenching. Unfortunately when the " oldtimers " did their trenching instead of stripping the Road Showing they went down below the road where they got into deep overburden (8 feet plus) in the Road Trench and failed to uncover bedrock. The host rock of the Road Showing is a maroon coloured andesite with anhedral crystals of pink feldspar. Mineralization appears to be getting richer as one digs into the showing. The author was surprised at the thickness of some of the barite veins.

Pond Trench Showing This showing consists of magnetite, chalcopyrite, bornite, malachite and calcite in strong fractures that strike N0-5E and dip 60-80 degrees west in an amygdaloidal basalt at the south end of the Beaver Pond. This was probably a flashy showing at one time but the " oldtimers " have dug most of the high grade mineralization out of the surface fractures and piled it beside the area of trenching. Over the years numerous specimens have probably been taken from these piles. The author is of the opinion that the fractures controlling this mineralization may be tension fractures subsidiary to a major fault nearby.

Beaver Pond Creek Showing In the streambed of Beaver Pond Creek 100 feet east of station A12 there is a zone of fracturing approximately 10 feet wide that contains appreciable copper mineralization in quartz veins, fractures and the basalt host rock. Although the zone needs proper opening up, over widths of about 1 foot there is some high grade chalcopyrite, bornite and malachite. Chalcopyrite is the main copper mineral and occurs as seams, disseminations, blebs and blobs. This may be a new find. There was no evidence that any trenching had been done in the past.

Proceeding downstream from this showing to station A9 there are numerous small copper showings (refer to Map 1) At A12 a siliceous rhyolite (?) dike 3 feet wide, striking northeast and dipping 40 degrees southeast carries an occasional seem of chalcocite. The area from A9

Beaver Pond Creek Showing (cont'd) to A12 plus 100 feet is particularly interesting because of the number of copper showings. Due south of these showings at 115E on Baseline 62N there are mineralized quartz-calcite stringers and veinlets and further southeast the gabbro intrusive.

Rhyolite Mineralization Although disseminated pyrite has been seen in some rhyolite float no primary sulphides have been seen in any of the areas of outcrop inspite of abundant disseminations and seams of FeOx. Fifty feet east of station A7 in Beaver Pond Creek float specimen JM 11 occurs which carries malachite and manganese stain along minute fractures. The source of this float is unknown but it is encouraging to locate copper bearing rhyolite on the claims. One observation the author has made about the rhyolite, which may be a superficial one, is that the richer the rhyolite is in potassium feldspar the richer it is in manganese. Another observation is that the rhyolite float carrying disseminated pyrite is very leucocratic whereas that carrying abundant FeOx and manganese (and the malachite bearing float) is usually light to dark flesh coloured (abundant potassium feldspar).

GEOCHEMICAL SURVEY

Analytical Methods After drying the samples at a low temperature soils were screened by 80 mesh sieve to obtain the the minus 80 mesh fraction for analysis.

For analysing Mo, Cu, Zn, Pb, Ag and As 1.0 gram of the samples are digested for 6 hours with HNO_3 and $HClO_4$ mixture.

After cooling samples are diluted to standard volume. The solutions were analysed by atomic absorption Spectrometers.

Copper, zinc, lead and silver were analysed using the C_2H_2 - Air flame combination but the molybdenum determination was carried out by C_2H_2 - N_2O gas mixture.

For arsenic analysis a suitable aliquote is taken from the above 1 gram sample solution and the test is carried out by Gutzit method using $AgCS_2N(C_2H_5)_2$ as a reagent. The detection limit obtained is 1 ppm.

Gold analysis was carried outon a 5 gram sample and digested by aqua regia solution and after completeness of digestion gold is extracted with methyl iso-butyl ketone. With a set of suitable standard solutions gold is analysed by atomic absorption instruments. The obtained detection limit is 0.01 ppm.

Mercury is also analysed by atomic absorption spectrophotometer using the flameless analytical technique.

Analytical Methods (cont'd) The detection limit of this technique is 5 ppb.

Results All the soil and sediment samples were analysed for copper. In areas of topographic lineaments they were also analysed for mercury. Some samples which assayed high in copper were run for zinc, silver and arsenic. Two rock samples taken by G. Delane of Getty Mines Ltd. were also assayed for molybdenum, lead and gold. And one of these samples was run for barite and strontium.

The limited number of samples taken during this survey do not permit a proper statistical treatment for frequency distribution analysis of the elements but the necessary background and threshold levels given in this discussion are based on the writer's experience in the Houston - Smithers area and on the literature (Rock Geochemistry of the Owen Lake, Goosly Area by Dr. B. N. Church and John J. Barakso). The following background values can be considered.

Element	Soils, Silts	Rocks
Cu	25 ppm	14 ppm
Hg	25 ppb	5 ppb
Zn	75 ppm	65 ppm
Ag	1.0 "	1.1 "
As	4 "	1 "
Mo	3 "	1 "
Pb	20 "	17 "
Au	-	0.01 "

The threshold levels can be obtained with approximate values by multiplying the given background numbers by 2.

All geochemical sample results have been plotted on the 1 inch equals 400 feet Geochemical Survey Map 2, which accompanies this report. Because of the limited number of samples taken and their wide separation it was felt that an attempt to contour results wouldbe unsatisfactory. A colour codewas established which illustrates the assay range of each element at each sample site.

Copper The highest copper assays were obtained along the Claim Line Road and southof Baseline 78N in Claim Apex 4, where soils run as high as 260 ppm.

Another area of copper highs occurs in the swamp and large clearing in Claim Apex 14 where one organic soil assayed 215 ppm copper.

Soils carrying more than 100 ppm copper are scattered throughout the property, examples - BL 56N 102E (160 ppm) and 118E (103 ppm), A73 (102 ppm) and A74 (124 ppm) on the north boundary of Apex 1, BL 42N 108E (133 ppm), BL 73N 138E (145 ppm) and 140E (141 ppm) and BL 67N 130E (118 ppm).

Mercury   Quite a few of the topographic lineaments sampled exceeded 100 ppb in mercury. The sediment from the swamp linear in the southeast corner of Apex 16 assayed 510 ppb mercury.

The rhyolite and Road Showing sampled by Delane were extremely high, mercury 2,500 and 8,400 ppb respectively.

Zinc, Silver and Arsenic   Samples that assayed high in copper usually carried abundant zinc, silver and arsenic. Exceptions to this were on BL 47N at 93E where a soil ran 515 ppm zinc but only 21 ppm copper and on BL 73N at 133E where another soil ran 335 ppm zinc and 21 ppm copper.

The rhyolite sampled by Delane assayed 390 ppm zinc and 6.0 ppm silver but only 21 ppm copper.

Molybdenum   Rhyolite rock sample 39628 which assays 143 ppm molybdenum can be considered highly anomalous.

Lead   The Road Showing ran 760 ppm lead but this was not surprising since disseminations of galena were observed in the outcrop.

Barium and Strontium   Sample 39629 from the Road Showing assayed 9.58% barium and 0.156% strontium. Mc Andrew's 1973 sample assayed 19% barium and 0.625% strontium. The amount of barium and strontium in any particular sample from this showing would be in direct proportion to the number of barite stringers, veinlets or veins in that sample.

Gold   Although the two rock samples taken to date are not anomalous in gold this does not rule out the possibility that some of the other mineralized showings on the property are auriferous.

MAGNETOMETER SURVEY

A McPhar M700 instrument was used to carry out a magnetometer survey over the grid and access roads. All readings were corrected for diurnal and temperature variance using a base station at station SR97E on the South Road.

The McPhar M700 magnetometer measures the vertical field with a direct readout in gammas. It is a self-levelling unit with 5 scale ranges of 1,000 to 100,000 gammas and a maximum readability of 5 gammas.

Anomalies expressed by magnetic contours are dependent on the variable magnetic intensities of the underlying rocks and may be due to conditions near, or at unknown depths below the surface. High magnetic anomalies normally indicate the presence of basic rocks or concentrations of magnetic minerals.

SECTION 1

INTRODUCTION

McPHAR M700 MAGNETOMETER

The M700 Magnetometer is a vertical field magnetometer employing the flux gate principle. The instrument is self-levelling, and a self-cancelling circuit permits rapid, accurate measurement of the earth's magnetic field from a meter, without adjustments or calculations.

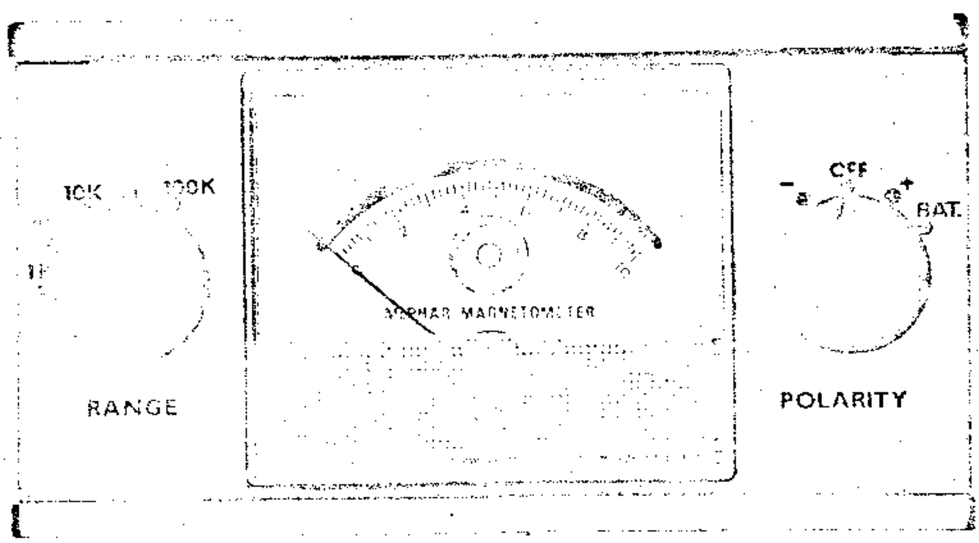
The self-levelling feature of this electronic magnetometer eliminates the need for bulky tripods and time consuming fine levelling procedures. Further, the instrument is practically insensitive to orientation. Errors are as low as 25 gammas for 180 degree rotation in a 15,000 gamma horizontal field.

Since the instrument can be adjusted electronically to measure vertical fields from plus 100,000 gammas to minus 100,000 gammas, there is no need for auxiliary magnets or complicated latitude adjustments.

The operation of the M700 is very simple. The reading on the meter is set to zero at a chosen base station by operating the latitude adjustment control. This can be done to an accuracy of 5 gammas. Next, as successive stations are occupied, the instrument is held roughly level, and the increase or decrease in the vertical component of the earth's magnetic field is read directly from the meter. Five scale ranges are available and on the most sensitive range the accuracy is 5 gammas.

The M700 Magnetometer is the result of extensive engineering based on rugged field requirements. It incorporates the latest advances in solid state components and has built in temperature stability. The instrument provides rapid, accurate, repeatable measurements.

An accessory socket broadens the applications of the M700. Optional accessories available from McPhar permit the same console to be used, for example, as a base station monitor or an airborne recording magnetometer.



SECTION 3

GENERAL DESCRIPTION AND APPLICATIONS

The field sensitivity of the M700 magnetometer originates in a flux gate element mounted so that its axis of maximum sensitivity is maintained in the vertical plane. The flux gate element contains an excitation winding and a detector winding. In addition there are auxiliary windings around the element which carry D.C. currents. With the auxiliary windings, a D.C. flux is created to cancel the earth's field. **Latitude adjust control and automatic cancelling.**

The flux gate element is continuously excited between saturation levels by an A.C. current. A detector winding consisting of differentially wound coils, picks up zero voltage when the resultant D.C. flux through the elements is zero.

When the external D.C. field changes in magnitude, a corresponding phase-reversible second harmonic output voltage is produced across the detector winding. The second harmonic output voltage is fed to a phase sensitive rectifier system and used to provide a cancelling D.C. current to oppose the external field attempting to unbalance the flux gate element.

The system therefore is a self-cancelling one and at all times approximates a condition of zero flux about the flux gate element.

The D.C. current fed back to maintain the zero flux condition is measured on the display meter and is directly proportional to the change in the earth's field. The meter, then, can be calibrated directly in gammas.

Five meter ranges are provided to permit the measurement of a change of field of up to 100,000 gammas. Because the field at any new measurement station may increase or decrease, a polarity reversal on the on-off switch is provided.

The main application of the instrument is for general ground surveying. Because of the lack of any set-up requirements and the rapid direct meter read out, it provides the fastest and most economical geophysical surveying available compared to any other type of instrument or technique.

With the accessory receptacle the M700 lends itself to many other applications. These are covered in Section 8, under Extended Applications.

Results All corrected magnetometer readings were plotted on the accompanying 1 inch equals 400 feet Magnetometer Survey Map 3. Magnetic contour lines were drawn on this map at 500 gamma intervals. In certain portions of the claims where readings were few and widespread no contouring was attempted.

There are 15 areas of high magnetic relief on the Apex Claims. Within 4 of these areas magnetic readings exceed 1,500 gammas. The most pronounced areas of magnetic highs are due south of the Beaver Creek copper showingsand straddling the Claim Line Road in Claims Apex 3 and 4.

Three areas of magnetic lows have been located on the property. One area is on Baseline 64N at 96E (-50 gammas).

The other two flank the magnetic high in Claims Apex 3 and 4 to the east and west. The low east of the high reaches -540 gammas, the one west of the high -1,400 gammas.

CONCLUSIONS

Based on Geology The Apex Group is underlain by Hazelton rocks, favourable hosts for mineralization in the Houston - Smithers area. These rocks are intruded by rhyolite and gabbro also associated with mineralization in the Houston - Smithers area (exs. Poplar Group, Sam Goosly). A sample of the gabbro is being sent to Dr. B. N. Church of the B.C. Department of Mines in an attempt to learn how it compares to the Sam Goosly gabbro.

The rhyolite is generally rich in earthy limonite and hematite and manganese staining. Locally it contains abundant pyrite, quartz stringers and malachite (but only in float). Samples rich in molybdenum, silver and zinc have been obtained from the rhyolite in the southwest portion of the claims. Have the copper values been leached out or oxidized in these outcrops?

There are numerous copper showing on the claims, many of these are poorly exposed. The Road Showing with its many barite veins and high percentage of strontium suggests the upper limit or " apex " of a concealed orebody. The mineralized fractures in the Pond Trench may be offshoots of a larger and more heavily mineralized concealed structure. Both the aforementioned showings may be closely related to the same concealed mineral system. The relationship of the Apex mineralization to the rhyolite and gabbro has not been determined but it is noteworthy that numerous copper showings occur due northwest of the small gabbro outcrop.

The shattered outcrops in Claim Apex 21 probably represent a major fault which strikes northeast.

It is worth mentioning that outcrops of from 5 to 10 feet in diameter had to be somewhat exaggerated to show up on the 1 inch equals 400 base map. Only outcrop

Based on Geology (cont'd) areas surrounded by dots are the actual size measured in the field. From the coloured geological map one gets the impression that there is a greater percentage of outcrop on the Apex Claims than there actually is.

Based on Geochemistry There are numerous areas moderately to highly anomalous in copper, mercury, zinc, lead, silver, amd arsenic on the Apex Group. The rhyolite in the southwest portion of the claims is highly anomalous in molybdenum. The Road Showing contains abundant barium and strontium.

Without knowing the thicknesses of overburden in the various areas or the mobility of the various metallic ions in different parts of the claims it is difficult to weigh the significance of one anomalous area against another. Needless to say weak bedrock mineralization under shallow cover may cause a higher soil anomaly than rich bedrock mineralization under deeper cover. Many factors can impede the mobility of metallic ions, examples of these - impervious clay layers, carbonate rich soils will percipitate copper ions. Inspite of these unknown factors on the Apex Claims, the anomalous area in Claims 3 to 6 which has soils assaying as high as 260 ppm copper, 610 ppm zinc and 4.0 ppm silver appears to be the most impressive anomaly on the property from a soil sampling point of view. The bedrock conditions causing the soil highs in the other parts of the claims are unknown.

The numerous mercury highs along topographic stream lineaments are probably indicating underlying structural zones. The 510 ppb mercury in the swamp in the southeast corner of Apex may be indicating a mineralized structure since this same stream linear runs through the anomalous swamp in Claim Apex 14 where one soil sample over the linear assayed 215 ppm copper. The high mercury content of the Road Showing accompanied by a high percentage of barium and strontium may be indicating a halo condition over a concealed orebody.

The high molybdenum content (143 ppm) of the rock sample taken from the southwest rhyolite and the soil sample high in zinc (515) at 93E on Baseline 47N suggests that perhaps the original copper mineralization (if any) of the rhyolite has been leached out or all oxidized. Because of the highly fractured, shattered and brecciated nature of most of the rhyolite outcrop weathering may extent to quite a depth. Another consideration not to be overlooked, the FeOx rich rhyolite may be a weathered pyritic halo of a zone of copper mineralization beneath or to one side of the mapped exposures. The mercury high from the rock sample of the rhyolite could be just another indication of a halo situation.

Based on Magnetometer Survey There are 2 large areas on the Apex Group that are magnetically highly anomalous. One of these is due south and southeast of Beaver Pond Creek and the other lies within Apex Claims 3 to 6. I would like to hypothesize on the possible reasons for these interesting anomalous patterns.

Although the basalt south of Beaver Pond Creek is only locally magnetite the one small outcrop of ~~basalt~~ located in this area is highly magnetite.
gabbro
This suggests to me that the gabbro intrusive is concealed beneath the basalt flows. Where we get extreme highs and local magnetite enrichment of the basalt the gabbro is probably closer to the surface and has less basalt cover. The magnetic high that extends north of Beaver Pond Creek and probably extends through to the west side of the Beaver Pond may represent a concealed dike of gabbro. It may be more than coincidental that the Pond Trench mineralization is due east of this supposed dike.

The magnetic high flanked by magnetic lows in Apex Claims 3 to 6 suggests a zone of mineralization surrounded by a zone of alteration. At the Bradina Mine intense alteration of the wallrocks, around the mineralized veins and adjacent fissures, are characterized by low magnetic susceptibility.

The magnetic low north of the pond in Claim Apex 22 coincides with the northeasterly extension of the shatter zone in Apex 21 and probably indicates a major fault zone. It would not take much imagination to extend this possible structural zone through the magnetically anomalous area in Claims Apex 3 to 6.

The other magnetic highs on the Apex Group because of a lack of outcrop remain unexplained.

In summary findings to date on the Apex Claims are very encouraging. When one can locate coincident geochemical and geophysical anomalies it is a good sign. Additional geosurveys and physical testing are now merited.

RECOMMENDATIONS

1) Complete magnetometer survey of claims.

2) Complete geochemical survey. In areas of highs, take samples at 100 foot centers and fully delimit anomalous areas.

3) Additional geological mapping on lines no more than 200 feet apart.

4) Sample shatter zone in Apex 21 and if merited open uplater with trenching.

RECOMMENDATIONS (contd)

5) Do rock geochemical survey in an attempt to define possible halo zones. Consult with geochemist prior to this to determine correct metallic elements to assay for.

6) Assay all copper showings for gold.

7) Discuss all Apex Group rock specimens with Dr. B. N. Church of the B.C. Department of Mines, particularly the gabbro, rhyolite and mineralization.

8) Run an induced polarization survey on the claims.

9) Physically test by trenching and or drilling -
   a) The Road Showing.
   b) The geochemically and geophysically anomalous area in Claims Apex 3 to 6, along the Claim Line Road.
   c) The copper showing 100 feet east of A12 in Beaver Pond Creek.
   d) The magnetic highs south and southeast of Beaver Pond Creek.
   e) Any significant anomalies defined by the above program.

JOHN M. Mc ANDREW, P. ENGR.

PROSPECTOR - GEOLOGIST

212 - 14840 - 105TH AVE.

SURREY, BRITISH COLUMBIA

NOVEMBER 28, 1974

John M. Mc Andrew
Nov 28, 1974

CERTIFICATION OF JOHN M. MCANDREW

Suite 212, 14840 - 105 Ave., Surrey, B. C. Phone: 588-8072

1) Registered as a Professional Engineer by the Association of Professional Engineers of B. C.

2) A fellow of the Geological Association of Canada.

3) B. Sc. in Geology from the University of Alberta, Edmonton, Alberta; post graduate courses in surveying McGill University, Montreal, Quebec.

4) Prior to consulting the author spent seventeen years in exploration property evaluation, mine geology and production with the following companies.

Anaconda American Brass Limited - Copper, Molybdenium
Silver Titan Mines - Silver, Lead, Zinc.
Columbia Iron Mining Co. - Coal
Newmont Exploration Ltd. - Nickel, Copper
Iron Ore Company of Canada Ltd.-Direct Shipping Iron ore
N. W. Byrne Company - Gold
Quebec Cartier Mining Co. Ltd. - Concentrating Iron Ore
Eldorado Mining and Refining Co. - Uranium
International Nickel Co. - Nickel, Copper.

November 28, 1974
John M. McAndrew

STATEMENT of COSTS

CANADA
Province of British Columbia

IN the MATTER of

TO WIT: Geological, geochemical and geophysical report on behalf of John M. Mc Andrew, Prospector - Geologist

I John M. Mc Andrew of 212-14840-105th Ave. of Surrey in the Province of British Columbia Do Solemnly Declare that geological, geochemical and geophysical surveys were conducted on the Apex 1-6, 8-9, 11Fr, 12-16, 18-19, 21 and 22 mineral claims in the Omineca M.D. located 8 miles northeast of Houston, B.C. during the period October 8 to November 9, 1974 and a report describing these surveys was prepared during the period November 12 to 28, 1974. The following expenses were incurred:

1. Maps, drafting supplies, stationery	$ 139.83
2. Field equipment, bush gear, hardware	383.41
3. Room, meals, medical supplies	918.78
4. Vehicle rental, mileage, fuel, repairs	706.34
5. Travel, freight, sample shipments	163.20
6. Mc Phar magnetometer rental	136.50
7. 132 soil and sediment assays, 2 rock assays	292.20
8. Wages - John M. Mc Andrew, Professional Engineer October 8 -November 9, 1974 - 31 days November 12 - 28, 1974 - 15 " 46 days at $ 100/day	4,600.00
	$ 7,340.26

AND I make this solemn Declaration conscientiously believing it to be true, and knowing that it is of the same force and effect as if made under oath, and by virtue of the Canada Evidence Act.

Declared before me

at Vancouver

in the Province of British Columbia

this 29 day of

November A.D. 1974

Joan [signature]

Sub-mining Recorder

John M. Mc Andrew [signature]

COMPANY: John M^c^Andrew

PROJECT No.: Apex Group

GEOCHEMICAL ANALYSIS DATA SHEET

MIN - EN Laboratories Ltd.

FILE No. 1060

DATE: Oct 31 1974

Posted

Sample Number	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ni ppm	Co ppm	Ag ppm	Fe ppm	Hg ppb	As ppm	Mn ppm	Au ppm			
56N100E		29													
102E		160													
104E		38													
106E		32													
108E		24													
114E		19													
116E		30													
118E		103													
120E		30													
122E		24													
124E		70							510						
126E		33													
A 1		55													
A14		82							130						
47N83E		29													
85E		21													
87E		33													
89E		18													
91E		21													
93E		21													
52N95E		18													
56N85E		21													
87E		28													
89E		17													
91E		26													
93E		42													
95E		29													
CL#1 68E		32													
70E		36													
78E		27													

CERTIFIED BY A. Hanke

COMPANY: John M^c Andrew

PROJECT No.: Apex Group

Posted!

GEOCHEMICAL ANALYSIS DATA SHEET

MIN - EN Laboratories Ltd.

File No. 1060

DATE: Nov 5 1974

6 Sample. Number 81 86	10 Mo ppm 90	15 Cu ppm 95	20 Pb ppm 100	25 Zn ppm 105	30 Ni ppm 110	35 Co ppm 115	40 Ag ppm 120	45 Fe ppm 125	50 Hg ppb 130	55 As ppm 135	60 Mn ppm 140	65 Au ppm 145	70 150	75 155	80 160
56N100E				250			12								
102				230			29								
104				122			12								
106				160			11								
108				96			08								
114				134			10								
116				215			12								
118				200			18								
120				215			11								
122				134			10								
124				138			20								
56N126E				180			11								
A1				148			15								
A14				210			10								
47N83E				142			11								
85				148			10								
87				106			11								
91				144			10								
47N93E				515			14								
52N95E				82			13								
47N89E				132			08								
56N85E				122			14								
87				78			10								
89				155			10								
91				144			10								
93				140			19								
56N95E				86			12								
CL#168E				101			14								
70				108			17								
78				158			12								

Page 28

CERTIFIED BY A. Hanke

COMPANY: John M^c Andrew

PROJECT No.: Apex Group

POSTED!

GEOCHEMICAL ANALYSIS DATA SHEET

MIN - EN Laboratories Ltd.

FILE No. 1060

DATE Oct 31 1974

Sample Number	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ni ppm	Co ppm	Ag ppm	Fe ppm	Hg ppb	As ppm	Mn ppm	Au ppm			
CU #1 80E		42													
A15		31							35						
A16		12							90						
A17		22							50						
A18		54							140						
A19		20													
A20		35							60						
A21		66													
A22		42							50						
A23		38													
A24		36							20						
A25		19													
A26		20							15						
A27		22													
A28		162q													
A29		105													
A30		44													
A31		180													
A32		56													
A33		54													
80N83E		108													
85E		83													
87E		27													
89E		33							50						
91E		172													
93E		260													
95E		120													
97E		148													
99E		131													
101E		146													

CERTIFIED BY A. Hanke

COMPANY: John McAndrew

PROJECT No.: Apex Group

Posted !

GEOCHEMICAL ANALYSIS DATA SHEET

MIN - EN Laboratories Ltd.

FILE No. 1060

DATE: Nov 5 1974

Sample Number (6)	Mo ppm (10)	Cu ppm (15)	Pb ppm (20)	Zn ppm (25)	Ni ppm (30)	Co ppm (35)	Ag ppm (40)	Fe ppm (45)	Hg ppb (50)	As ppm (55)	Mn ppm (60)	Au ppm (65)	(70)	(75)	(80)
CL#1 80E				160			1.2								
A15				92			1.1								
A16				22			0.6								
A17				110			1.1								
A18				104			1.4								
A19				86			1.1								
A20				114			1.3								
A21				142			1.7								
A22				122			1.2								
A23				123			1.0								
A24				94			0.9								
A25				84			0.6								
A26				131			0.7								
A27				111			1.1								
A28				265			2.8								
A29				280			2.6								
A30				180			1.7								
A31				430			3.1								
A32				245			1.9								
A33				255			1.6								
80N83E				156			1.7								
85				440			1.6								
87				255			1.2								
89				118			1.3								
91				125			25			14					
93				600			35			14					
95				610			20			15					
97				430			34			23					
99				255			40			32					
80N101E				380			40			26					

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Page 30

COMPANY: John M^c^Andrew

PROJECT No.: Apex Group

Posted!

GEOCHEMICAL ANALYSIS DATA SHEET

MIN - EN Laboratories Ltd.

FILE No. 1060

DATE: Oct 31 1974

Sample Number	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ni ppm	Co ppm	Ag ppm	Fe ppm	Hg ppb	As ppm	Mn ppm	Au ppm
A43		18										
A50		58							90			
A51		74							130			
A66		79										
A67		49										
A68		27										
A69		90										
A71		44							100			
A72		23										
A73		102										
A74		124										
A75		48										
A76		82							120			
A77		49							100			

CERTIFIED BY

COMPANY: John M^c Andrew

PROJECT No.: Apex Group

Posted!

GEOCHEMICAL ANALYSIS DATA SHEET

MIN - EN Laboratories Ltd.

File No. 1060

DATE: Nov 5 1974

Sample Number	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ni ppm	Co ppm	Ag ppm	Fe ppm	Hg ppb	As ppm	Mn ppm	Au ppm
A43				147			0.6					
A50				180			1.5					
A51				225			2.0					
A66				650			1.6			8		
A67				540			1.4			11		
A68				164			1.1					
A69				270			2.1					
A71				148			1.4					
A72				148			1.1					
A73				335			2.1					
A74				176			1.9					
A75				163			1.6					
A76				103			1.7					
A77				140			1.4					

CERTIFIED BY A. Vanke

COMPANY: John McAndrew

PROJECT No.: Apex Group

Posted

GEOCHEMICAL ANALYSIS DATA SHEET

MIN - EN Laboratories Ltd.

FILE No. 1063

DATE: Nov 1 1974

Sample Number	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ni ppm	Co ppm	Ag ppm	Fe ppm	Hg ppb	As ppm	Mn ppm	Au ppm			
49N103E		38													
105		50													
107		56													
112		24													
114		39													
116		21													
118		29													
120		47													
124		35													
126		16													
128+50E		62							125						
130		48													
132		29													
134		15													
136		17													
49N138E		24													
138E45N		31													
A78		12							10						
42N101+80E		28							65						
42N106E		21													
108		133													
110		26													
112		50													
115		53													
117		32													
126		19													
128		11													
130		79													
132		215													
134		26													

CERTIFIED BY A. Hanke

COMPANY: John McAndrew

PROJECT No.: Apex Group

Posted!

GEOCHEMICAL ANALYSIS DATA SHEET

MIN - EN Laboratories Ltd.

FILE No. 1063

DATE: Nov 1 1974

Sample Number	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ni ppm	Co ppm	Ag ppm	Fe ppm	Hg ppb	As ppm	Mn ppm	Au ppm			
42N136E		52													
42N138E		28													

CERTIFIED BY A. Hanke

COMPANY: Mr. McAndrew

GEOCHEMICAL ANALYSIS DATA SHEET

MIN - EN Laboratories Ltd.

FILE No. 184

PROJECT No.: Apex Grp

DATE: Mar. 7, 1973.

Road Trench – Frozen could only get few chips

	Sample Number	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ni ppm	Co ppm	Ag ppm	Fe ppm	Hg ppb	As ppm	Mn ppm	Au ppm	Ba – Barium PPM	Sr – Strontium PPM	
Rock	AP 1	3	10	21	82			1.3			12		.02	540	[illegible]	
"	AP 2	2	90	90	505			.8			22		<.01	19000	6250	Few

Also 19% Barium
0.6% Strontium

Strontium – Strontianite $SrCO_3$ – occurs in veins in eruptive rocks
as small crystals in metallic veins
formed by direct crystallization
from waters containing strontium
bicarbonate or by the action of
alkaline carbonate solutions on
celestite.
Use – strontium compounds.

Strontianocalcite $SrCO_3$
Strontium sulphate $SrSO_4$ – fireworks, refining sugar
Strontiopotite – K_2SrO
(or Kermanite) found with [illegible] in India

Barium – Barite $BaSO_4$ – assoc. with ores of Pb, Cu, Fe, Zn, Ni, Co, Mn
(strontium sulphate often present) Use – refining sugar, as pigment.

CERTIFIED BY [signature]

COMPANY: J. Mcandrew

PROJECT No.: Apex Group

Posted

GEOCHEMICAL ANALYSIS DATA SHEET

MIN - EN Laboratories Ltd.

FILE No. 1081

DATE: Nov 15 1974.

Sample Number	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ni ppm	Co ppm	Ag ppm	Fe ppm	Hg ppb	As ppm	Mn ppm	Au ppm
73N125E		33		103			1.0					
129E		30		205			1.1					
130+50E		38		107			1.3					
133E		21		335			1.1					
135E		51		165			1.7		125			
138E		145		290			3.0					
140E		141		410			2.1					
142E69N		42		118			1.0					
71N	[redacted]	40		200			1.6					
67N130E		118		135			2.2					
132E		29		225			1.5					
134E		67		134			1.7		150			
136E		59		225			1.7					
138E		39		108			1.0					
140E		35		230			1.0					
142E		39		142			1.2					
40N130E		15		164			1.5					
132E		16		132			1.1					
134E		17		175			1.4					
136+50E		54		146			1.7					
138E		87		265			1.8					
46N130E		89		270			2.6					
132E		61		260			2.1					
134E		78		200			2.4					
136E		48		205			2.2					
138E		120		340			2.7					

CERTIFIED BY Gilbert V. Hemmville

COMPANY: Getty Mines Ltd.

PROJECT No.: Apex Group

Posted

GEOCHEMICAL ANALYSIS DATA SHEET

MIN - EN Laboratories Ltd.

FILE No. 1076

DATE: Nov 8 1974

Sample Number	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ni ppm	Co ppm	Ag ppm	Fe ppm	Hg ppb	As ppm	Mn ppm	Au ppm	Remarks
39628	143	21	158	390			6.0		2500			<.01	SNR 35+50 N
39629	1	1310	760	5050			3.9		8400			<.01	Road showing (with barite)

John McAndrew's Apex Claim Group – Houston Area, B.C.

Page 36

CERTIFIED BY A. Hanke

MIN-EN LABORATORIES LTD.
705 WEST 15TH STREET
NORTH VANCOUVER, B.C.
Phone: 980-5814

Getty Mines, Limited
NOV 13 1974
FILE

Certificate of Assay

TO: Getty Mines Limited
614-510 W. Hastings St.
Vancouver, B.C.

PROJECT No. Apex Group
Posted.

DATE Nov. 8/74

File No. 1076

SAMPLE No.	% Ba	% Sr		
39629	9.58	0.156	Road showing - Apex Grp	

John McAndrew's Apex Group Houston, B.C.

MIN-EN Laboratories Ltd.

CERTIFIED BY A. Hanke


NORTH ROAD
APEX 1
APEX 2
APEX 3
APEX 4
APEX 5
APEX 6
APEX 8
APEX 9
APEX 11
APEX 12
APEX 13
APEX 14
APEX 15
APEX 16
APEX 18
APEX 19
APEX 21
APEX 22
SULFUR LAKE
CLAIM LINE ROAD
POND
BEAVER POND
MIDDLE POND
Beaver Pond Creek
RHYOLITE LAKE
3500'
2800'
126° 25' 14"
54° 26' 34"
54° 25' 14"
True N
SOUTH ROAD
SOUTHWEST ROAD
CHINA NOSE MTN. RANCH
AITKEN CREEK
TO KNOCKHOLT AND HOUSTON 6 AND 10 MILES RESPECTIVELY
INSERT LOCATION MAP OF APEX GROUP
HOUSTON, B.C.
SCALE 1" = 4 MILES
Houston
Apex Group
Aitken Crk
CHINA NOSE MTN 4472'
LEGEND
Maroon Andesite
Green Andesite
Basalt
Agglomerate
Argillite
Rhyolite
Gabbro
Quartz Vein
Mineralization
Fractures
Bedding
Float
M21 Bedrock Specimen
A8 Mapping Station
Soil Sample
Sediment Sample
Sample Results Stacked Thus Copper, Mercury, Zinc, Silver, Arsenic. Additional elements special notation. All results in parts per million except mercury parts per billion
MAGNETOMETER COLOUR LEGEND
>1500 gammas
1000-1500
500-1000
0-500
0--500
<-500
500 — 500 gamma contour
Magnetometer Base Station
Grid Station — Reading in Gammas
Claim Post
Stream
Swamp
Beaver Dam
Department of Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 5288 MAP #3
APEX CLAIM GROUP
HOUSTON, B.C.
OMINECA M.D.
5288
MAGNETOMETER SURVEY
M3
Scale in feet
400 0 400 800
November 1974
Surveys by: John M. Mc Andrew, P. Engr. Prospector-Geologist 212-14840-105 Ave. Surrey, B.C.
TO ACCOMPANY: Geological, Geochemical and Geophysical Assessment Report on Apex Claim Group Dated November 28, 1974 By: John M. Mc Andrew P. Engr.
MAP 3


NORTH ROAD
APEX 1
APEX 2
APEX 3
APEX 4
APEX 5
APEX 6
APEX 8
APEX 9
APEX 11
APEX 12
APEX 13
APEX 14
APEX 15
APEX 16
APEX 18
APEX 19
APEX 21
APEX 22
SULFUR LAKE
CLAIM LINE ROAD
POND
BEAVER POND
Beaver Pond Creek
3500'
2800'
RHYOLITE
LAKE
SOUTH ROAD
SOUTHWEST ROAD
CHINA NOSE
MTN. RANCH
AITKEN CREEK
TO KNOCKHOLT AND HOUSTON 6 AND 10 MILES RESPECTIVELY
54° 26' 34"
54° 25' 14"
126° 25' 14"
True N
INSERT LOCATION MAP OF
APEX GROUP
HOUSTON, B.C.
SCALE 1" = 4 MILES
LEGEND
MAROON ANDESITE
GREEN ANDESITE
BASALT
AGGLOMERATE
ARGILLITE
RHYOLITE
GABBRO
Quartz Vein
Mineralization
Fractures
Bedding
Float
M21 Bedrock Specimen
A5 Mapping Station
SOIL SAMPLE
SEDIMENT SAMPLE
SAMPLE RESULTS
STACKED THUS COPPER, MERCURY, ZINC, SILVER, ARSENIC ADDITIONAL ELEMENTS SPECIAL NOTATION. ALL RESULTS IN PARTS PER MILLION EXCEPT MERCURY PARTS PER BILLION
GEOCHEMICAL COLOUR LEGEND
BLANK BLUE YLL ORG RED
COPPER 0-25ppm 26-50 51-100 101-200 > 200 ppm
MERCURY 0-25 ppb 26-50 51-100 101-200 > 200 ppb
ZINC 0-75 ppm 76-150 151-300 301-600 > 600 ppm
SILVER 0.0-1.0 " 1.1-1.5 1.6-2.0 2.1-3.0 > 3.0 "
ARSENIC 0-4 " 5-8 9-16 17-32 > 32 "
ADDITIONAL ELEMENTS SPECIAL NOTATION
COLOURS PLOTTED THUS:
MAGNETOMETER BASE STATION
GRID STATION – READING IN GAMMAS
Claim Post
Stream
Swamp
Beaver Dam
Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 5288 MAP #2
APEX CLAIM GROUP
HOUSTON, B.C.
OMINECA M.D.
GEOCHEMICAL SURVEY
5288
M2
Scale in feet
November 1974
Surveys by: John M. Mc Andrew, P. Engr.
Prospector - Geologist
212-14840-105 Ave.
Surrey, B.C.
TO ACCOMPANY: Geological, Geochemical and Geophysical Assessment Report on Apex Claim Group Dated November 28, 1974
By: John M. Mc Andrew P. Engr.
Nov 28, 1974
MAP 2

NORTH ROAD
APEX 1
APEX 2
APEX 3
APEX 4
APEX 5
APEX 6
APEX 8
APEX 9
APEX 11
APEX 12
APEX 13
APEX 14
APEX 15
APEX 16
APEX 18
APEX 19
APEX 21
APEX 22
SULFUR LAKE
CLAIM LINE ROAD
POND
BEAVER POND
Beaver Pond Creek
RHYOLITE
LAKE
3500'
2800'
54° 26' 34"
54° 25' 14"
126° 25' 14"
True N
SOUTH ROAD
SOUTHWEST ROAD
CHINA NOSE
MTN. RANCH
AITKEN CREEK
TO KNOCKHOLT AND HOUSTON 6 AND 10 MILES RESPECTIVELY
INSERT LOCATION MAP OF APEX GROUP
HOUSTON, B.C.
SCALE 1" = 4 MILES
Houston
Knockholt
Apex Group
Aitken Crk
CHINA NOSE MTN
LEGEND
Maroon Andesite
Green Andesite
Basalt
Agglomerate
Argillite
Rhyolite
Gabbro
Quartz Vein
Mineralization
Fractures
Bedding
Float
M21 Bedrock Specimen
A5 Mapping Station
Soil Sample
Sediment Sample
Sample Results Stacked Thus Copper, Mercury, Zinc, Silver, Arsenic additional elements special notation. All results in parts per million except mercury parts per billion
Magnetometer Base Station
Grid Station – Reading in Gammas
Claim Post
Stream
Swamp
Beaver Dam
Department of Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 5288 MAP #1
5288
APEX CLAIM GROUP
HOUSTON, B.C.
OMINECA M.D.
M1
GEOLOGICAL, GEOCHEMICAL AND MAGNETOMETER SURVEYS
Scale in feet
November 1974
Surveys by: John M. Mc Andrew, P. Engr.
Prospector - Geologist
212 - 14840 - 105 Ave.
Surrey, B.C.
TO ACCOMPANY: Geological, Geochemical and Geophysical Assessment Report on Apex Claim Group Dated November 28, 1974
By: John M. Mc Andrew P. Engr.
MAP I