CORD CLAIMS

GEOLOGY & GEOPHYSICS

1980

N.T.S. 106C-13, 106D-16

C. Campbell
J. McClintock

December 1980

090759

This report has been examined by the Geological Evaluation Unit and is recommended to the Commissioner to be considered as representation work in the amount of

$ 5,000.00

Resident Geologist or
Resident Mining Engineer

Considered as representation work under Section 53 (4) Yukon Quartz Mining Act.

B. B. BAXTER
Supervising Mining Recorder

Commissioner of Yukon Territory

CORD CLAIMS

GEOLOGY AND GEOPHYSICS

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SUMMARY

In July 1980 a combined geological-geophysical study was undertaken on the Cord Claims to determine if there was potential for a massive sulphide deposit similar to that known to occur at Hart River. It had been suggested by others in the mining industry that stratabound zinc-lead mineralization on the Cord Claims occupied a similar stratigraphic position in Helikian rocks as Hart River and, in many ways, resembled suphide mineralization found there.

The 1980 programme consisted of 17km each of horizontal-loop, very-low-frequency electromagnetic and magnetometer surveys. Along with the geophysical surveys, detailed mapping and chip sampling of the mineralized outcrops were carried out.

Geological mapping determined that sulphide mineralization is stratabound to a single, thin, whitish-grey siliceous mudstone bed. This siliceous sulphide bed displays a gradual increase in grade and thickness towards Line 450E and 600E near 150S and is coincident with the best EM response and a zone of high magnetics. To confirm the grade and thickness trends, 5 hand-blasted trenches were dug in late August and early September. Results of trenching confirmed these trends. The presence of increasing grades suggests a down-dip potential for significant increases in grade and thickness of sulphide mineralization.

Results of the geophysical surveys located several EM anomalies and one region of high magnetism. Although

several of the EM anomalies are typical of responses from a thin massive sulphide source, the best EM, and the region of highest magnetic intensities, corresponds with the best surface zinc-lead mineralization.

For 1981, it is recommended that more EM be undertaken to better define the 1980 EM anomalies and to attempt to explore sulphide mineralization at greater depths. It is also recommended that 3 holes, totalling 800m, be drilled to test for a down-dip increase in grade and thickness of sulphide mineralization. The cost of the combined drilling geophysical programme is estimated at $160,000.00.

1. INTRODUCTION

During the period July 12 through July 26, 1980, a programme of approximately 17km of linecutting, horizontal-loop electromagnetic surveying, VLF-EM, magnetometer surveying and detailed geological mapping of zinc-lead mineralized rock outcropping was carried out on the Cord Claims.

The purpose of this programme was to determine the extent of previously discovered zinc-lead mineralization and to ascertain if this surface mineralization improved both in grade and width with depth. Favourable geological and geophysical results prompted trenching during late August and early September 1980. All work to date on the Cord Claims is discussed in the following report.

1.1 Location and Access

The Cord Claims are located in east central Yukon along the northeastern boundary of the Wernecke Mountains, approximately 165km northeast of Mayo, as shown on the location map (Dwg. L-6485). Centred on $134^{0}00'N$, $64^{0}52'W$ the property is 18km southwest of Fairchild Lake and 5km east of the headwaters of Snakehead Creek.

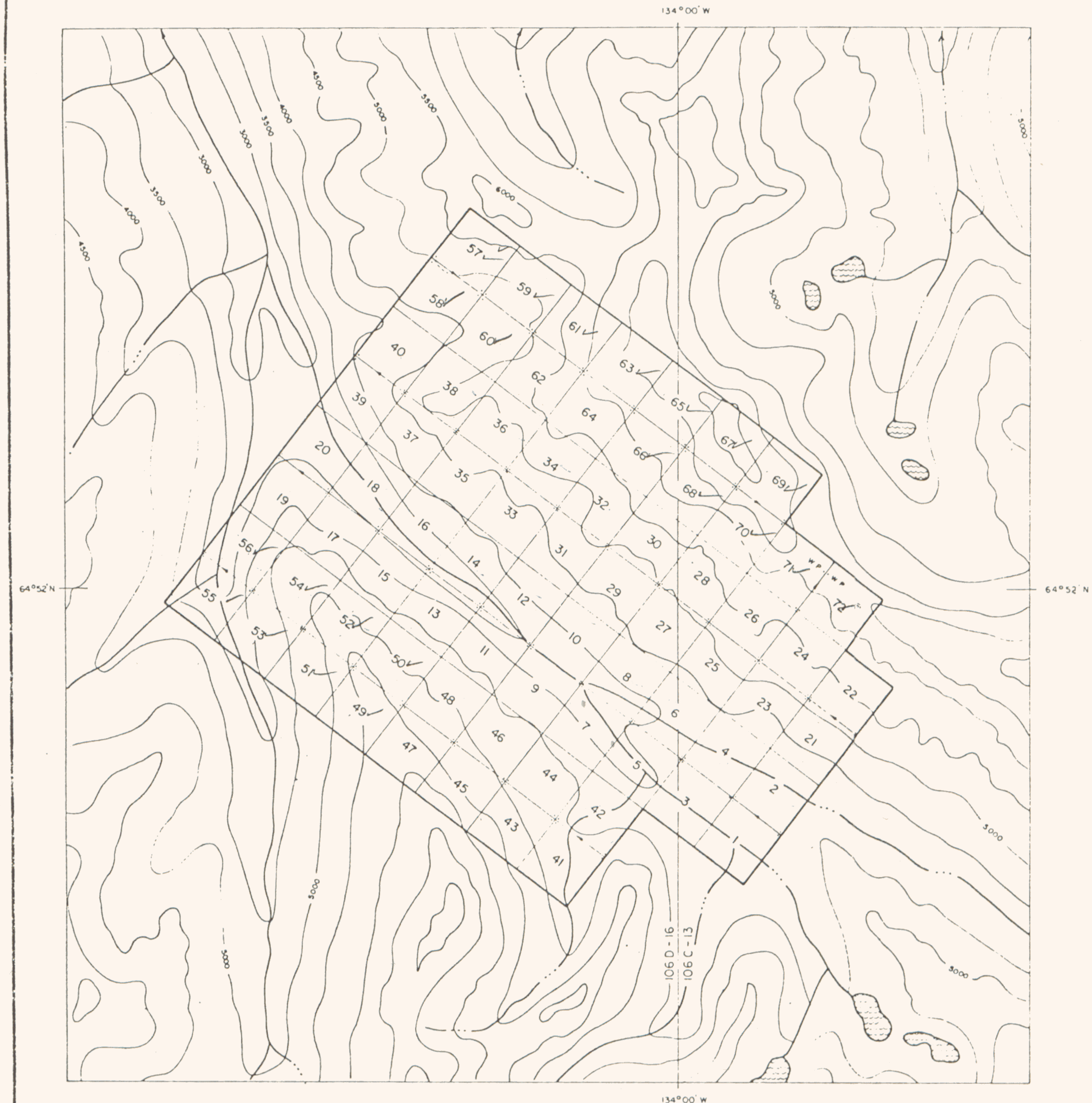
The property is accessible only by helicopter.

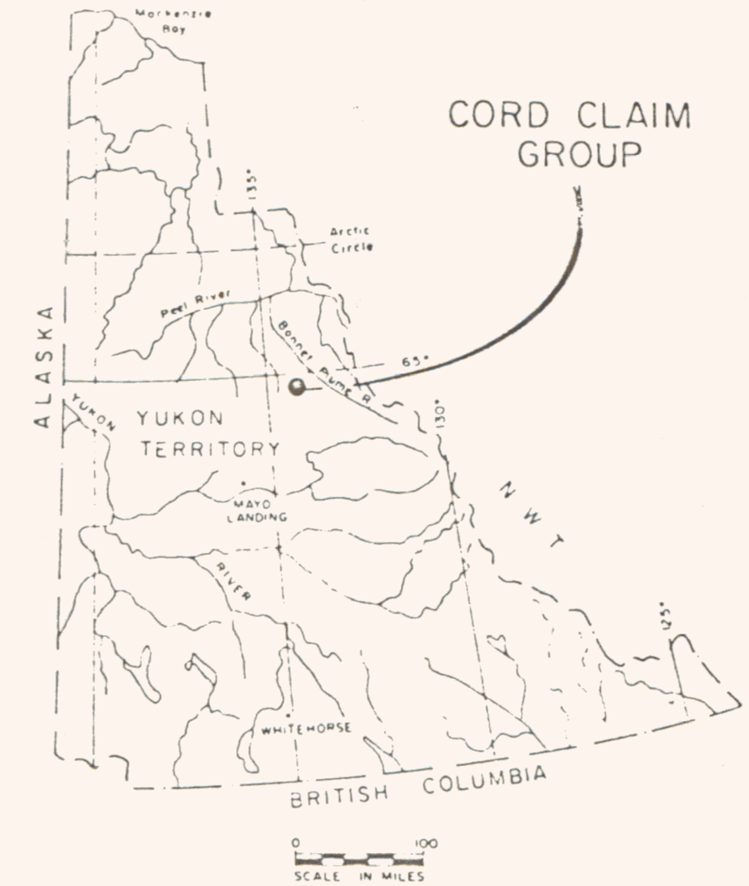
For the 1980 programme, equipment was flown to Fairchild Lake by float equiped fixed-wing aircraft from the village of Mayo, Y.T. Equipment and personnel were then ferried the remaining distance to the claim block by a helicopter which was based at Fairchild Lake. Alternatively, equipment may be flown in by wheel-equipped fixed-wing aircraft to the Bear River strip and from there to the property by helicopter. The Bear River strip can be used by DC-3 aircraft; hence, if large quantities of supplies are to be moved to the claims, considerable savings can be made in this fashion.

1.2 Topography, Vegetation and Climate

The Cord Claims lie within the Wernecke Mountains, transitional between the northeast-trending Mackenzie Mountains and the east-trending south Ogilvie Range. The average relief on the claims is 1220 metres and the maximum elevation is 2140 metres a.s.l. Slopes average forty degrees but in places are near vertical.

The claims are completely above tree line with only isolated arctic willow and scrub spruce present in creek





NOTES:

TAG NUMBERS Y 97639 – Y 97710

TOPOGRAPHIC BASE AFTER DEPARTMENT OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT MAPS 106C-13 & 106D-16.

MAGNETIC DECLINATION (1975) 34° 30' E.

SYMBOLS

CLAIM POST LOCATION

WP WITNESS POST

DIRECTION OF LOCATION LINE

RIO TINTO CANADIAN EXPLORATION LIMITED

LOCATION PLAN
CORD 1–72 CLAIMS

SNAKEHEAD CREEK AREA, NTS 106C-13 & 106D-16
MAYO MINING DISTRICT, YUKON TERRITORY

CONTOUR INTERVAL 500'

1500 0 1500 3000 4500 6000 7500 9000 10 500

SCALE IN FEET

D.W.G. L.-6485

DEC. 1977

valleys. Glaciation has modified the shape of river valleys and has left lateral and ground moraines in several areas. To the southeast, permanent icefields and rock glaciers are common. Patterned ground is typical on lower reaches; gelifluction knobs are visible in several areas.

Rainfall is in the order of 40cm annually with about 21cm falling in the summer months. Snowfall averages 160cm per year.

1.3 Regional Geology

The Cord Claims are located at the northeastern edge of the 1:250,000 scale Nash Creek sheet (Green 1961). The geology is described in Geological Survey of Canada Memoir 364. Mapping by the Geological Survey shows that the claims straddle the contact between map Units 1 and 2, both of Helikian age. The lower Unit 1 is described as grey and black argillite, slate and phyllite with minor quartzite, conglomerate and dolostone. Map Unit 2 is described as orange weathering grey dolostone with minor phyllite and quartzite. The contact between Units 1 and 2 is conformable; though, in places, the units are in fault contact.

Subsequent to Green's mapping, detailed local mapping by Bell and Delaney has produced a more detailed geological section within the vicinity of the claim block and has also identified one or more diatremes on the claims. The mapping by Bell and Delaney has relabled rock Unit 1 as Unit B. Unit B is described as a 2100 to 4500 metre thick section of pyritic, silty mudstone with coarsening upward cycles of mudstone- siltstone-sandstone. Green's Unit 2 is relabled Unit C by Bell and Delaney and is described as being a 2000 metre thick section of calcareous argillite, limey lenses within dolostone, cherty dolostone, dolomitic shale and stromatolitic dolostone.

Both the Green and the Bell-Delaney mapping describe the rocks as being severely folded and faulted in both Racklan and Columbian orogenies.

Geological mapping conducted in 1976, 1977 and 1980 has found the Geological Survey's mapping to be reasonably accurate.

2. WORK BY RIOCANEX

In 1974, a regional geochemical silt sampling programme carried out for Riocanex by Cordilleran Engineering Ltd. detected two creeks in the vicinity of the current Cord Claims that contained lead values in excess of 500 ppm and zinc values in excess of 1000 ppm in silt samples.

In order to protect this lead-zinc geochemical anomaly from other companies working in the region, the Cord Claims were staked in 1975. Due to other commitments, no follow-up work was attemped until 1976. A short programme of prospecting and rock and silt sampling was undertaken in 1976 under the direction of A.G. Troup. A full discussion of this programme is available in the Riocanex.

SNAKEHEAD PROPERTY
WERNECKE MOUNTAINS
YUKON TY.
GEOLOGY AND GEOCHEMISTRY
OCT 1976 A.G. Troup

A.G. Troup concluded that the source of the anomalous lead and zinc in silt samples was from black shale horizons and suggested that this association might indicate a potential for shale-hosted lead and zinc mineralization on the claims. The recommendation of the 1976 work was to conduct a detailed soil sampling programme and to undertake a comprehensive geological investigation of the stratigraphic section and structural complexities. This programme was undertaken in 1977 and is discussed in Riocanex Report.

SNAKEHEAD PROPERTY
WERNECKE MOUNTAINS, YUKON
GEOLOGY AND GEOCHEMISTRY

December 1977 J.L. Hardy
H.W. Marsh

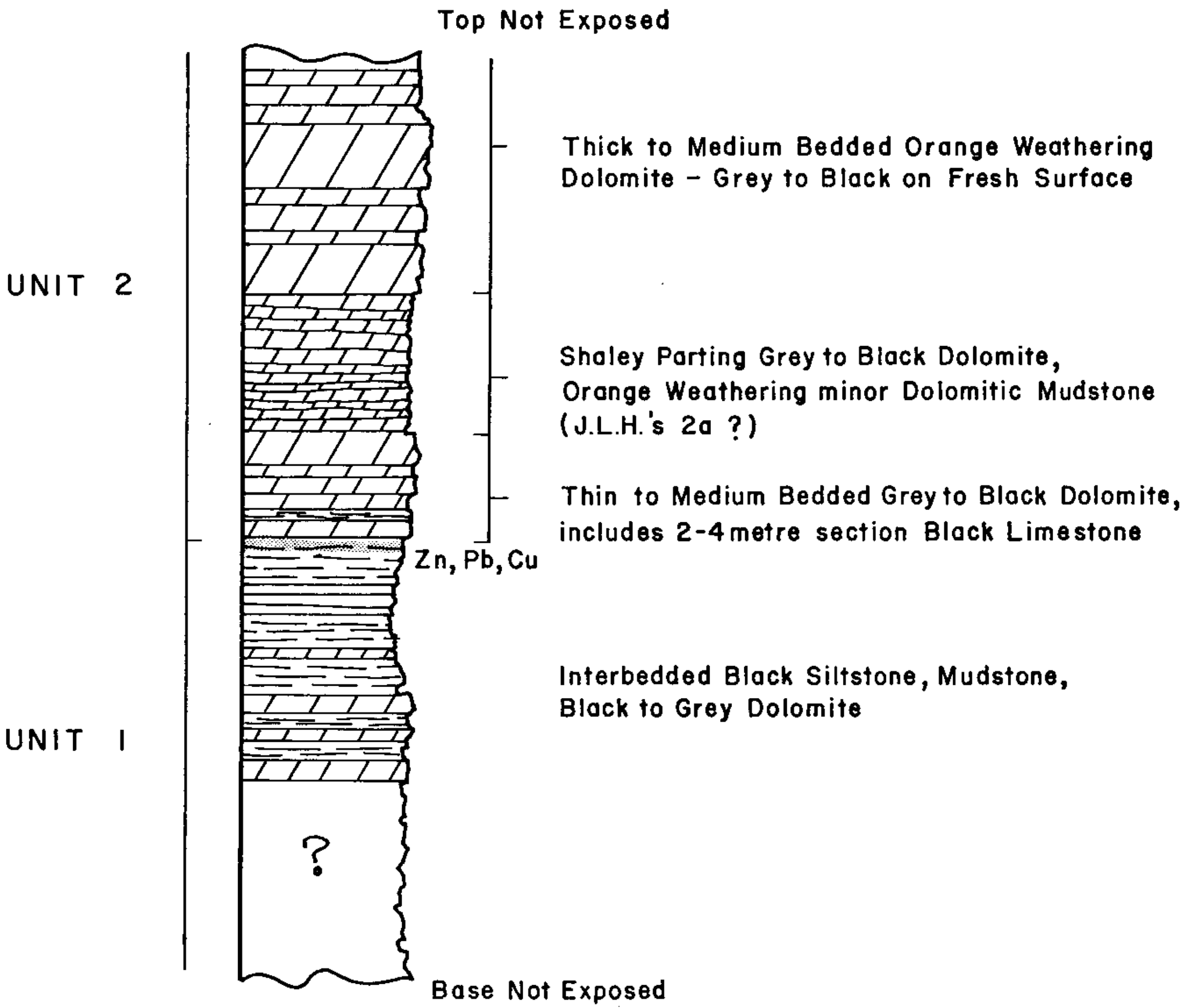
The conclusions of the 1977 work by J.L. Hardy were that while high grades of lead and zinc sulphides are present in several locations, the extent was not of economic importance. Mineralization was suggested to be formed as a metamorphic concentration product from pyritic beds and not to be extensive. No further work was recommended for the Cord Claims.

In 1979 an examination of North Hart Resources Limited's Hart River deposit, located 90km southwest of the Cord Claims, was conducted by J. McClintock. There, a massive sulphide showing occurs within the transition zone between Green's Unit 1 and 2. At present the Hart River deposit has reserves of 577,000 proven tons grading 3.6% Zn, 1.45% Cu, 0.9% Pb, 1.45 oz/ton Ag and 0.041 oz/ton Au, and 600,000 probable tons of similar grade rock.
During the Hart River examination, it was observed that, at the periphery of the deposit, sulphide mineralization consisted of banded pyrite-sphalerite-galena within a chert horizon, and that this mineralization was similar to that on the Cord Claims as described by J.L. Hardy.
In late 1979 it was brought to the attention of Riocanex that at least two companies were interested in acquiring the Cord Claims if Riocanex were to release the ground. The reason for this interest was the presence of lead-

zinc mineralization at a similar position in the stratigraphic section as, and the similarity of this sulphide mineralization with that in the fringe zones of the Hart River deposit.

To test the possibility of a down-dip improvement in surface lead-zinc mineralization, and to explore for possible hidden lead-zinc-copper mineralization, a programme of horizontal-loop and very-low-frequency electromagnetic surveying, magnetometer surveying, and further geological mapping was undertaken in July 1980. Favourable finding of July 1980 work prompted trenching in late August and early September 1980.

STRATIGRAPHIC COLUMN CORD CLAIMS



NOTE: Diagram Not to Scale

FIGURE I

3. GEOLOGY

During a four day period in late July, geological mapping was devoted to re-evaluating the geology and mineralization as well as determining the causes of the horizontal-loop electromagnetic conductors.

Detailed mapping of the central portion of the claim block confirmed the presence of Proterozoic and Helikian dolomites, mudstone and siltstone reported by J.L. Hardy in 1977; however, substantial revisions were made to the distribution and structural setting. Basically, the rocks can be divided into two units; unit 1, consisting of thinly interbedded siltstone, mudstone and dolomite; and unit 2 comprising thinly to thickly bedded orange weathering dolomite (Fig. 1 and Dwg. G-8856). Although it was suggested by Hardy that units 1 and 2 correspond to Green's map units Unit 1 and Unit 2, it is the writer's opinion that both units identified by Hardy are in fact in Unit 2 of Green, at its transition into the underlying Unit 1.

The placement of Hardy's unit 1 into Green's Unit 2 is based on the following two observations: Hardy's unit 1 contains thinly bedded, black, silty dolomite as its dominant rock type, with only subordinant amounts of siltstone, mudstone and chloritic phyllite; secondly, during the 1980 mapping, a similar looking but stratigraphically thinner thinly bedded, black dolomite was observed to be present higher in the stratigraphic section.

The high percentage of dolomite indicates a closer similarity of Hardy's unit 1 to the dolomites of Green's Unit 2 than to the mudstone and siltstones of Green's Unit 1. Further, the presence of a second, similar appearing section of thinly bedded, black dolomite to Hardy's unit 1 higher in the stratigraphic section, suggests that

Hardy's unit 1 is probably one of several sections of thinly bedded mixed dolomite and mudstone within the transition zone from Green's Unit 2 dolomites to his Unit 1 mudstones and chloritic phyllite. The presence of this second section of thinly bedded dolomite stratigraphically above Hardy's unit 1 may have led to the incorrect mapping of unit 2 rocks as unit 1 in certain areas of the Cord Claims by Hardy, particularly in the vicinity of 750 W and the baseline.

Structurally, the mapped area is divided into two different blocks by the Alionis Fault, a left lateral strike-slip fault having a displacement of over 1km. Southwest of the Alionis Fault the rocks are folded into a series of tight, low-amplitude folds which are overturned to the south. These folds have an amplitude of 20m and a wavelength of 50m. Southeast of line 00N these low-amplitude folds plunge to the south while northwest of line 00N the folds plunge to the north indicating that they have themselves been deformed into an anticline that trends easterly (Figs. 2&3). On the northeast side of the Alionis Fault, the units strike 120^0 to 140^0, dip to the southwest and are deformed into a series of warps or monoclines (Fig. 3). A second significant fault is the Ed Fault. This fault has an offset of 50 to 100 metres.

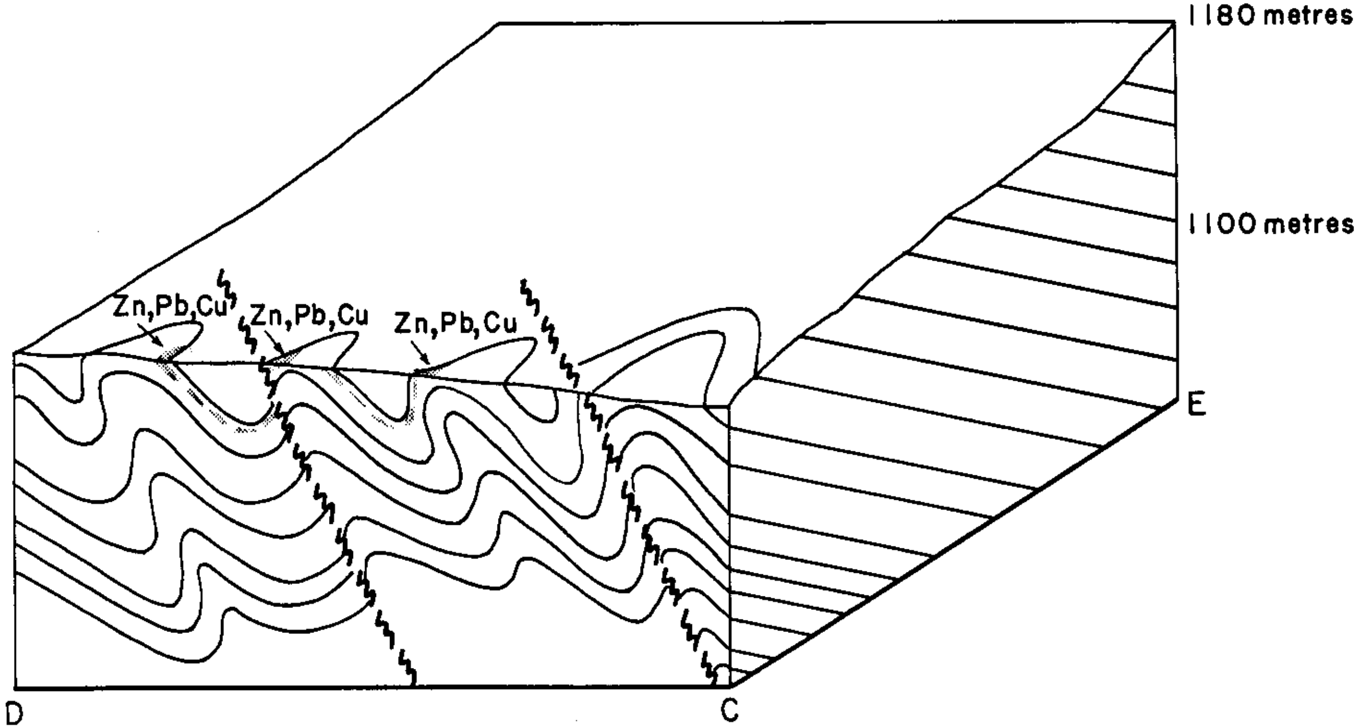
In addition to the two main faults there are numerous normal and strike-slip faults, with offsets rarely more than 10m, that are parallel to sub-parallel to the main faults.

3.1 Mineralization

Sulphide mineralization on the claims consists of two types: minor sphalerite and galena in quartz-

GEOLOGICAL BLOCK DIAGRAM

CAMP CREEK SHOWINGS



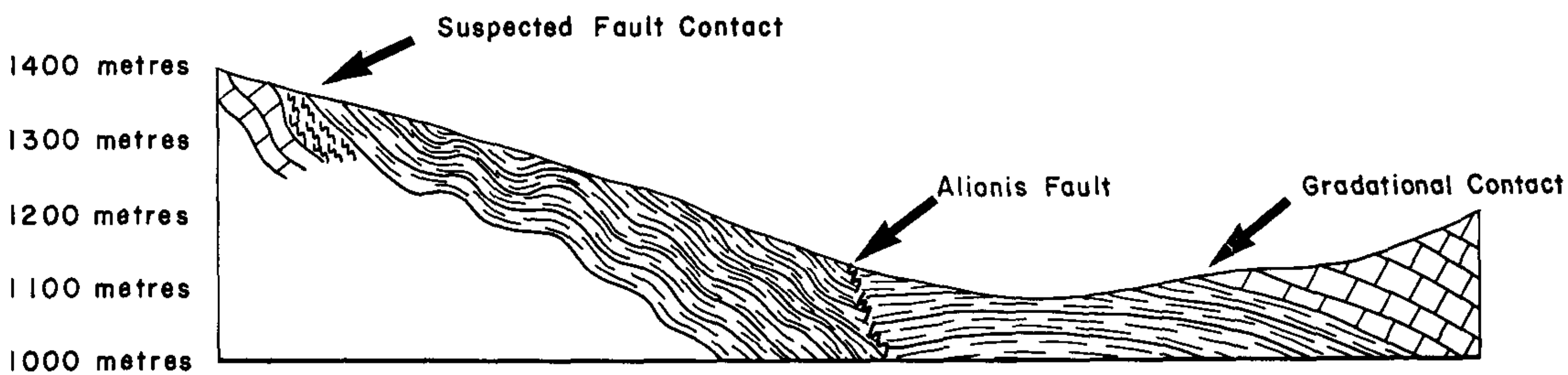
LEGEND

Zn,Pb,Cu ..... Zn,Pb,Cu Mineralization

NOTE: Diagram Not to Scale

FIGURE 2

CROSS SECTION LINE 300E



LEGEND

...... Unit 2 Thin to Thick Bedded Dolostone

...... Unit 1 Mainly Thin Bedded Siltstone, Mudstone, minor Dolostone

NOTE: Diagram Not to Scale

FIGURE 3

calcite veinlets in Unit 2; and beds and laminations of massive pyrite, sphalerite, minor galena and sporadic pyrrhotite within a 0.5 to 4m thick, light grey siliceous mudstone of unit 1 near its contact with Unit 2. The first mentioned type of sulphide mineralization is too widespread and lowgrade to be of interest. Most sphalerite- and galena-bearing veins are less than 10cm in width, are randomly oriented and occur in single isolated locations rarely closer than 5m from each other.

The second type of sulphide mineralization consists of thin laminations of pyrite, sphalerite, minor pyrrhotite, galena and rare chalcopyrite of varying widths stratabound to a siliceous horizon in Unit 1 near its contact with Unit 2. Sulphide laminations range in width from 1mm to 3cm and are separated by 2 to 10cm of siliceous mudstone and chert. This siliceous horizon is formed of interbedded grey to white chert and siliceous, black mudstone. Width of the interbedded chert and siliceous mudstone ranges from 20cm to over 4 metres. The chert is banded and varies in texture from aphanitic to very finely granular in a cherty matrix while the siliceous mudstone differs from the enclosing dolomitic silt and mudstone in the replacement of much of the dolomite by silica. Hanging-wall and footwall contact of the siliceous-sulphide horizon are sharp and marked by the return of dolomitic silt and mudstone.

Relative amounts of chert, siliceous mudstone and massive sulphide in the siliceous horizon vary from location to location and range from 0 to 50% chert. The highest percentage of chert occurs where the siliceous horizon is thickest. Sulphide laminations vary in thickness, spacing and in relative quantities of pyrite, sphalerite, galena and chalcopyrite.Generally, thin and widely spaced laminations contain more sphalerite, galena and chalcopyrite. Absolute sulphide content varies directly with the total chert content.

Stratabound sulphide mineralization was found at numerous locations on the claims. Location of all showings are plotted on the accompanying map (Dwg.G-8856). It can be seen that with the exception of two, all showings are present to the south of the Alionis Fault. As the Alionis Fault divides the rocks into two structurally different settings, those showings north of the Alionis Fault will be discussed separately from those south of the fault.

North of the Alionis Fault are showings 4 and 5; showing 4 consists of three massive pyrite beds within a 0.8m bed of black siliceous mudstone bounded above and below by bluish dolomitic silt and mudstone. Pyrite is the only sulphide present and is restricted to massive beds from 1 to 4cm thick.

Showing 5 consists of 1 to 2cm thick laminations or bands of pyrite, sphalerite and lesser galena separated by up to 4cm of chert. Width of the sulphide-chert bed is 2.1m. The sulphide-bearing rocks are bounded on the hangingwall and footwall by dolomitic silt and mudstone.

Although both showings 4 and 5 are in Unit 1, extensive faulting, and the absence of the overlying unit 2 in the immediate vicinity for use as a marker, makes it impossible to determine grade or thickness trends between the two showings.

Showings 1, 2, 3, are all present south of the Alionis fault. Showing 1, located at 450E, 105S on the geophysical grid, consists of 1 to 3cm thick laminations of pyrite, sphalerite, minor galena and rare chalcopyrite and pyrrhotite separated by up to 3cm of chert and siliceous dolomitic mudstone. As the mineralized outcrop is talus-covered on both the hanging and footwall contacts, the exact width of the sulphide mineralization could not be accurately determined. That portion of the sulphide-bearing horizon exposed was 2m thick.

Showing 2 consists of beds of massive pyrite, sphalerite, minor galena and rare chalcopyrite in seams or laminations 1 to 4cm in width, separated by 1 to 3cm of grey-white chert and siliceous dolomitic mudstone. As in showing 1, talus covers both foot-and hanging wall contacts of the sulphide-bearing horizons, hence, no accurate assessment of true thickness of mineralization is possible.

Showing 3 consists of four separate 20cm thick, siliceous, sulphide-bearing horizons. Each horizon is separated by up to 50cm of dolomitic silt and mudstone. Within each of the four sulphide-bearing horizons, 0.5 to 1cm thick laminations of massive pyrite are interbedded with 1 to 3cm thick chert and siliceous dolomitic mudstone beds.

At showing 7, the sulphide-bearing section is 2m thick. Sulphide mineralization consists of 1-3mm laminations of pyrrhotite, pyrite, sphalerite, and minor galena separated by 5mm to 2cm wide chert beds. Within the sulphide zone near the footwall contact is a band of massive pyrrhotite, pyrite and sphalerite which varies in width from 4 to 10cm. Thickness variation of this band is caused by remobilization of sulphides into the hinge zones of minor folds. Sharp contacts occur both on the hangingwall and footwall of the sulphide-bearing horizon, with dolomitic silt and mudstone.

The strata in which showings 1, 2, 3 and 7 occur has been folded into a series of folds which all plunge 10 to 15^0 to the south-west. Despite this folding, it was determined by mapping that all of these showings occur at the same distance from the overlying contact of Unit 1 and Unit 2, and in each location, the sulphide-bearing horizons are bounded by identical rock types. It is concluded therefore that all of these showings are part of the same sulphide-bearing bed. From observations made during mapping and chip sampling of the showings it was noted that the thickness and grade of zinc, lead and silver, mineralization improves from showing 3 towards showing 2. (Table 1). At showing 3, the siliceous sulphide-bearing horizon consists of four separate 20cm thick or less beds, having a grade of 1.01% Pb, 0.02% Zn and 0.3 g/t Ag. From showing 3 to showing 2, the siliceous sulphide horizon increases to 3.5m and improves in grade to 1.35% Pb, 0.87% Zn and 1.3 g/t Ag. Showing 1, which is between showings 1 and 3, has thicknesses and grades of sulphide mineralization which fit with this slow increase in grade and thickness of mineralization. A similar, but more subtle increase occurs between showing 3 and showing 7.

TABLE 1

SUMMARY CHIP SAMPLE RESULTS

Sample No.	Showing	Assay Pb(%)	Assay Zn(%)	Assay Ag(g/t)	Assay Cu(%)	Sample Width (metres)
D 4793	(1)	0.06	0.17	<0.3	<0.01	2
D 4794	(2)	0.35	0.87	1.3	<0.01	2.5
D 4795	(4)	0.01	0.02	<0.3	<0.01	0.8
D 4796	(5)	0.53	0.43	<0.3	<0.01	1.4 } 2.1 of 0.35% Pb, 0.33% Zn
D 4797	(6)	0.05	0.12	<0.3	<0.01	0.7
D 4798	1200W 150N	0.01	1.46	<0.3	<0.01	3
D 4799	Camp Zone (cz)	0.12	0.36	<0.3	<0.01	2
D 4800	(2 - 7)	<0.01	0.02	<0.3	<0.01	2

To gain a better insight into the true widths and to ascertain more accurately the lead-zinc grades of the sulphide horizon, a limited trenching programme was undertaken in late August and early September 1980. Locations of the trenches are plotted on Dwg. G-8856 and the assay results are summarized on Table 2.

Trench 1 was blasted on showing 2. Unfortunately, because of slumping of up-hill debris, only 4m of the stratigraphic width could be opened up. The exposed portion of the siliceous sulphide horizon consisted of 3 to 15cm thick interbedded siliceous mudstone and chert. Chert forms 50% of the beds. Pyrite, sphalerite, galena, minor pyrrhotite and rare chalcopyrite form massive seams or laminations ranging in width from 0.5 to 3cm. Minor amounts of pyrite occur as 1 to 3mm disseminations in the rock between sulfide bands. Separation between sulphide bands rarely exceeds 4cm. Best sphalerite-and galena-bearing seams occur within the chert beds. Remobilization of sulphides into fractures which cut the sulphide laminations has occurred.

Trench 2 was blasted on showing 1. Thickness of the siliceous, sulphide-bearing horizon is greater than 2.1m; however, the continual slumping of the talus prevented the full opening up of the mineralization. The sulphide mineralization in trench 2 occurs in siliceous silt and mudstone interbedded with chert. Bedding ranges from 1 to 8cm thick with the thicker beds generally being silt and mudstone. Sulphide mineralization is primarily pyrite, sphalerite, galena and rare chalcopyrite which form massive bands 2mm to 1.5cm in width. These massive bands are separated by 1 to 6cm of siliceous mudstone and chert. The sphalerite and galena occur in highest concentrations in the thicker bands which occur in the chert adjacent to the siliceous mudstone. Sulphide bands in the mudstone are generally thinner and barren of sphalerite and galena. Remobilization of sulphides into fractures which cut the sulphide bands has occurred. Disseminated euhedral pyrite up to 3mm in diameter occurs in the rock between the massive sulphide bands.

Trench 3 was blasted on the siliceous sulphide horizon approximately 30m west of Trench 2. Blasting exposed both the hangingwall and footwall contacts of the sulphide horizon. Here, the sulphide mineralization occurs over 1m. The grey to grey-white chert, common in trenches 1 and 2, is absent except in the first 20cm of the hangingwall contact with overlying dolomitic silt-stone. Stratigraphically beneath this 20cm interval is a 1 to 5cm thick bedded siliceous siltstone and mudstone. Unlike the previously mentioned trenches, sulphide bands consist of equal amounts of quartz and sulphide in bands that are 3 to 5mm thick separated by 1 to 3cm of sulphide-barren siliceous mud and siltstone. At the top of the section, sulphide bands are more closely spaced; with band separation increasing with depth. As in the other trenches pyrite is the most common sulphide, but chalcopyrite and pyrrhotite were not observed. The footwall contact of the sulphide-bearing horizon is sharp and is marked by the disappearance of sulphide bands, the presence of more thickly bedded silty dolomite and the absence of silicification.

Unlike trench 1 and 2, sulphides in trench 3 have remobilized into dolomite-quartz veins which extend beyond the stratigraphic confines of the silceous sulphide horizon. Visible sphalerite and galena, with traces of chalcopyrite are present as 1 to 3mm grains along the walls of dolomite-quartz veins throughout the sulfide bearing horizon. The veins and sulfide-bearing fractures trend at right angles to the bedding and persist into the strata below the sulfide horizon.

The persistance of these veins below the sulphide-bearing horizon, and the perpendicular nature of the veins relative to the sulphide-bearing bands, made representative sampling of the mineralization difficult, and may account for the surprisingly high assays obtained from trench 3.

Mineralization encountered in trench 4 consisted of four separate siliceous, sulphide-bearing beds each 20cm thick over a 2.2m section and separated from each other by 40 to 50cm of sulphide-barren silty dolomite. Within the sulphide-bearing beds are laminations of dolomitic mudstone and grey to grey-white chert. Sulphides, mainly pyrite with traces of sphalerite, are present in the chert laminations and form approximately 50% of the lamina. The chert-sulphide laminations are 3 to 6mm thick and are separated from each other by 1 to 2cm of silty dolomite. No sulphides were noted outside of the four sulphide-bearing beds. All contacts are sharp.

Trench 5 exposed a mineralized section of siliceous, sulphide-bearing rock 2.7m thick. The sulphide-bearing horizon consists of 1 to 3cm thick parting of chert with minor interbedded silicified silt and mudstone restricted to 1cm thick beds randomly dispersed throughout the section. As in the other trenches sulphides are concentrated in laminations which are 0.5 to 1cm in thickness separated by up to 6cm of chert or dolomitic siltstone. Sulphides have been remobilized into fractures cutting the sulphide laminations. Unlike the other trenches, however, pyrite and pyrrhotite are minor in abundance. Sphalerite is the most common sulphide. The footwall of the sulphide-bearing zone is in sharp contact with a brown to grey 1 to 3cm bedded siltstone differing from the blue silty dolomite which underlies the sulphide beds in the other trenches.

From Table 2, it is apparent that the two grade and thickness trends first recognized in the preliminary mapping and sampling were re-confirmed in the trenching. The only deviation from the pattern was a slightly higher grade in trench 3 than in trench 2, probably due to sampling bias caused by the presence of sphalerite and galena-bearing dolomitic-quartz veins which strike parallel to the sampling directions.

Of these two grade and thickness improvement trends, the trend from trench 4 towards trench 1 is the more interesting. The grade trend from trench 4 towards trench 5 is not held to be as interesting because, to the northeast of trench 5, the Alionis fault, which has an offset of over 1000 metres, cuts off any potential for further grade or thickness increase.

TABLE 2

CHIP SAMPLING RESULTS TRENCHING

Sample No.	Trench	Assay Pb(%)	Zn(%)	Ag(g/t)	Au(g/t)	Width (metres)
D 3301	1	0.95	1.32	2.6	<0.1	4
D 3302	2	0.16	0.67	1.3	<0.1	3
D 3303	3	0.45	1.13	0.6	<0.1	1.2
D 3304	4	0.11	0.16	<0.3	<0.1	2.2
D 3305	5	0.11	0.59	<0.3	<0.1	2.7

The significance of the subtle enhancement of grade becomes more important when the sulphide mineralization on the Cord Claims is compared to that of the Hart River deposit. The Hart River deposit is a massive sulphide deposit containing 577,000 tons proven of 1.45%Cu, 3.6%Zn, 0.9%Pb, 1.45oz/ton Ag and 0.04loz/ton Au plus 600,000 probable tons of similar grade. Sulphide mineralization occurs in approximately the same stratigraphic position within the Helikian-Hadrynian rocks as the Cord Claims. At Hart River, sulphides occur in a lens or disc-like body containing a core of massive pyrite-chalcopyrite thinning towards the rim into thinly laminated pyrite, sphalerite and galena with minor chalcopyrite. In the fringe areas of Hart River, mineralization consists of thinly laminated seams of massive pyrite and sphalerite with lesser galena and siliceous grey mudstone and chert. The mineralization is very similar to that exposed on surface at the Cord Claims. This similarity between the fringe zone of Hart River and the mineralization exposed at surface on the Cord Claims suggests that the Cord mineralization may improve significantly down-dip, a fact also indicated by the surface improvement of lead-zinc-silver grades in the direction of 600E, 160S.

Since extensive faulting at Hart River has cut off the fringe zone sulphides, it is impossible to conclude over what distance the laminated siliceous sulphides extend beyond the Hart River deposit, or the rate of increase in grade towards the massive sulphide core. It is unknown, therefore, how far down-dip a significant improvement in grade may occur, or in exactly which direction that improvement may occur, on the Cord Claims.

4. GEOPHYSICS

An extensive programme of ground geophysics was conducted over the Cord Claims during July, 1980. Purpose of this survey, which used horizontal-loop EM, magnetics and VLF-EM, was to locate and, if possible, to delineate zones of massive sulphide mineralization. Complete procedures and results are described in the following section.

4.1 Geophysical Grid

A geophysical grid consisting of 19 line kilometres was established by means of compass and nylon-chain. This task was performed by two employees of Stirling Expediting Ltd., Ross River, Yukon Territory.

A 2.85km long baseline was run along the valley bottom at a bearing of 131^0. Traverses departed perpendicularly (041^0) from it at intervals of 150 metres and stations were marked by wooden lathes every 25 metres along slope. Chainage and clinometer data were reduced using a programmable calculator to arrive at adjusted station locations. All geophysical data has been plotted with these slope corrections taken into consideration.

4.2 Magnetics

19.6km of magnetics were run utilizing two Scintrex MP-2 Proton Precession Magnetometers (obtained on a rental basis from Scintrex, Toronto).

These digital readout magnetometers measure the earth's total magnetic field to an accuracy of $\pm$ 1 gamma and are essentially independent of instrument attitude and meteorological variables. Diurnal variations in the earth's magnetic field were accounted for by means of a base-station magnetometer and recorder. A Geometrics G-816 Proton Precession Magnetometer (owned by Riocanex) was mounted in a stationary position in a magnetically quiet area. Readings were obtained every 30 seconds throughout the operation day and permanently recorded on paper strip by a MR-10 digital base-station recorder (obtained on a rental basis from Canadian Mining Geophysics Ltd., Ottawa). In this fashion, an accurate track of the diurnal variations in the area is noted to specific times. The magnetometer operator, after synchronizing his watch to the MR-10's internal clock, ensures that field readings are obtained only at the exact time as a particular base-station reading. All traverses were run in a loop mode in order to verify quality of the MR-10 diurnal corrections; tie-in points were generally repeated with an accuracy of less than $\pm$ 5 gamma.

Magnetometer survey results are presented in contoured plan form at a scale of 1:2500 on Dwg. GP 7576. Values plotted are total magnetic field data minus a constant 58000 gamma datum.

The magnetometer map is dominated by a complex magnetic doublet zone located south of the baseline between Line 0 and 750E. This zone, attaining 100 - 300 gammas above background, is slightly arcuate, convex towards the north. An interpretation of this feature indicates a dipping zone, in turn divided into two parallel bands. Dip appears to be moderate to shallow to the southwest. Interpreted widths of the causative features are difficult to establish reliably due to line-to-line variations in profile character. However, widths do appear narrow somewhat less than 10 metres. Magnetization is open to the north but closed to the south. The area of this feature is covered by mixed talus of dolostone and siltstone although an outcrop of banded, fine-grained massive sulphides with erratic pyrrhotite was mapped at about 105S on Line 450E.

A secondary magnetic feature appears to trend almost east-west from Line 1200E, 800N, across Line 750E, 400N to Line 150E, 200N. This narrow elongated feature attains 400 gammas above background and displays a moderate dip to the south. Outcrop has been mapped just off Line 750E, at about 350N-375N. A Pb-Zn showing at 350N consists of 1.4 metres of laminated mineralization (primarily sphalerite). Outcrop at 375N is again primarily sphalerite in a laminated occurrence. Although not reported, it is quite possible that pyrrhotite is also present and is the cause of the magnetic anomaly. Sulphides occur in a fold hinge striking 270^0. Interpretation of the magnetics indicates a thin, shallow (Line 750E, 400N in particular) sheet-like source.

A third minor magnetic anomaly is present and exists as a weak, linear depression, coincident with the main stream course west from Line 300E. The magnetic low, generally on the order of 25 gamma, occurs along a course of minimum overburden and may indicate a fault zone.

4.3 VLF-EM

16.6 km of VLF-EM were run over the Cord grid. Instruments used were two Geonics EM-16's (obtained on a rental basis from Geonics, Toronto) utilizing transmission from Seattle NLK at 18.6 kHz.

The EM-16 uses military and time standard Very Low Frequency (radio) transmissions as primary fields which are generated as a concentric horizontal magnetic field. When these horizontal magnetic fields encounter conductive bodies in the ground, a secondary vertical magnetic field is in turn generated. The total field will then be tilted on either side of a local conductor. This local vertical field is not always in the same phase as the primary field on the ground surface. The EM-16 receiver measures the in-phase and quadrature components of the vertical field.

The VLF raw data has been filtered using the standard Fraser Filter operator:

$$F_{2,3} = (\theta_3 + \theta_4) - (\theta_1 + \theta_2)$$

VLF data is presented in profile form (vertical scale, 1cm:10%, horizontal scale, 1:2500) on Dwg. GP 7578 and in contour form on Dwg. GP 7577.

A primary VLF feature is the linear anomaly trending northwest along the southern margins of the surveyed grid from Line 900E, 475S to Line 150W, 200S. A line of dolostone cliff-bands arising out of steep talus slopes suggest a fault-line along the southern ends of Line 900E - 300E; this correlates well with the VLF feature. Whether or not the next section of the VLF trend is actually part of the same physical cause is, however, uncertain.

A second important VLF anomaly exists to the north, trending northwest somewhat discontinuously along the stream course. This feature has a fair correlation to horizontal-loop EM results in that a thin, irregular conductor is indicated. A reliable interpretation of the VLF profiles is difficult due to effects of extreme topography. However, it is seen that several reverse quadrature/in-phase responses are associated with sulphide occurrences. This characteristic tends to confirm that the sulphides are a primary cause of both the VLF and horizontal-loop anomalies.

Another significant VLF feature trends WNW across the southern portion of Lines 900W - 1350W. Again, some correlation is evident with horizontal-loop data.

Noticeable VLF responses about Line 750E, 250N & 350N correspond to outcrops of massive sulphides. The VLF contour map shows this anomaly converging to the east (Line 1050E) and diverging to the west, possibly being connected with weak features on Line 150E, 175N & 350N. Extreme topography, structure and stratigraphy are probably all contributors to VLF patterns throughout the entire area.

4.4 Horizontal-Loop EM

17.4km of 100 metre coil-spaced horizontal-loop EM were run over the Cord grid. Instrumentation employed was the company-owned Apex Parametrics Ltd. MaxMin II utilizing two frequencies, 444 & 1777 Hz.

The MaxMin II is a two-man EM system designed to measure both the vertical and horizontal in-phase and quadrature-phase components of anomalous fields from electricaly conductive zones. The plane of the transmitter is always kept parallel to the mean slope between Tx and Rx. When the MaxMin II is being operated as a horizontal-loop (maximum coupled) system, the plane of the receiver is kept parallel to the mean slope and measurements of anomalous components perpendicular to that mean slope are made. It is also used as a minimum-coupled system wherein the receiver measures anomalous components parallel to the mean slope between coils. Generally, the MaxMin II is run in the maximum-coupled, horizontal-loop mode with the minimum-coupled mode being used in the few instances where it can improve on the data utilizing the following variables:

(i) five system frequencies (222, 444, 888, 1777 & 3555 Hz) in order to deal effectively with a wide range of overburden and bedrock conductor conductivities.

(ii) six Tx-Rx separations (25,50, 100, 150, 200 & 250 metres) in order to search from large deep conductive zones to the resolution of shallow, parallel conductive zones.

Mean slopes between Tx and Rx coils as well as actual coil separations were computed using a programmable calculator. Since the two coils were always operated in a co-planar fashion, only a short or long coil separation correction (arising from rough topography) factor was applied to data. The same program that computed mean slope and actual coil separation also calculated the following:

(i) in-phase correction $= +\left[1-\left(\frac{\text{actual coil spacing}}{\text{nominal coil spacing}}\right)^3\right]100$

(ii) in-phase & quadrature phase correction $= X\left(\frac{\text{actual coil spacing}}{\text{nominal coil spacing}}\right)^3$

The MaxMin II corrected data is presented in profile form (vertical scale 1cm:10%, horizontal scale 1:2,500) on Dwg. GP 7579 & GP 7580. All plotted station locations have been corrected for topographic effects; i.e., they have been reduced to a horizontal plane.

In general two separate areas of geology are shown by the horizontal-loop EM data. The first is a zone of low background resistivity in which highly anomalous EM effects are present. This zone corresponds to map unit 1, bedded siltstones, mudstones and dolostones with minor graphitic limestone. A second zone, in which the background response is much lower and EM anomalies tend to be muted or absent altogether, corresponds to map unit 2, bedded dolostones with occasional siltstones and mudstones.

The principal EM feature, Anomaly A, lies on Line 600E, 225-250S with apparent in-phase/quadrature ratios of 0.5 and 1.4 at 444 and 1777 Hz respectively. Curve characteristics indicate a very thin ($\leq$ 2 metres), shallow, weak conductor dipping northeast. Field geology, however, shows the strata here to be dipping shallowly (10^0 - 15^0) to the southwest.

Apparent discrepancies between first approximation geophysical interpretations and field geology in any particular area is felt to be partially if not wholly explained by extensive folding and subsequent faulting of the strata on axes contrary to strike. Geophysical data must be considered in conjunction with known geological information.

Strata in the vicinity of Anomaly A, for instance, although striking approx. 130^0, have been subjected to minor tight folding with the axial plane plunging perpendicular to primary strike direction. These tight folds have in turn been faulted in such a way to bring conducting limbs or segments to surface on the down plunge side. Thus the geophysical response may be altered to reflect a northeast dipping body. Such extreme structural complexities of stratabound mineralization are common in this area and make geophysical interpretations based on conventional curve analysis uncertain.

Not withstanding the above, Anomaly A is seen to be the optimum response of a linear conducting zone that extends from Line 1050E, 275S to Line 150W, 50N. This linear geophysical feature is certainly associated with bedded sulphides which are mapped in the immediate vicinity. Given the present geological model of a thin bed of stratiform massive sulphides, the horizontal-loop EM anomalies are compatible; however it is not inconceivable that geophysics in this case is actually mapping out a conductive zone in which massive sulphides are only contributing a portion of the overall conductivity. The question remains to be resolved by further trenching or drilling and testing.

Anomaly B, Line 750E, 250N, is a poor HLEM conductor although correlating well to VLF results. The anomaly appears to continue to Line 900E, 250N and may extend northwest as well. Massive sulphide (pyrite only) is reported in the immediate vicinity consisting of three thin beds over a 0.8 metre interval. Graphite coatings on bedding surfaces are also reported.

Anomaly C, focused about Line 0, 350N, may be a northwest continuation of Anomaly B. Anomaly C also correlates to a VLF trend discussed in the previous section. Horizontal-loop EM data indicates again a very thin, weak conductor of indeterminate dip. Weakly developed sulphides coupled with shearing have been suggested as a source.

Anomaly E lies along the baseline traverse between 200W and 300E. High frequency response is significantly better than that of the low. Although the anomalous response is very broad, it should be remembered that the baseline traverse is essentially run along strike. Two individual lows, within an overall anomalous feature, occur at 50W and 200E. The response centred about 50W correlates to Line 0, 100N while the response about 200E is more uncertain in its correlation to the perpendicular traverse lines. A complex conductive source area overall is indicated, in which, if massive sulphides are present, the anomalous EM effects are severely modified both by conductive host rocks and structure.

Anomaly I, focused about Line 150E, 325S is another thin, shallow, weak conductor, that correlates well to a VLF feature. It extends northwest through Line 0 and 150W. HLEM characteristics are highly variable, with a positive quadrature-phase component being manifested on Line 150W. A shear zone cause is likely with sulphide accumulations possible, particularly around Line 150E.

Anomalous activity occurs on Line 750W and further to the northwest, all in map unit 2. It is felt however, that the causative bodies lie in unit 1 under a thin cover of unit 2. HLEM responses are again highly variable with at best thin, weak conductors being indicated. Two individual trends, D & F, are identified; both correlate to separate VLF features striking approximately northwest. Wide variations in background response levels, as well as the confused characteristics of horizontal-loop activity, indicate a situation of probable conductive overburden and extreme structural effects such as multiple folding, faulting, etc. Minor stringer-like sulphide sources are felt to be a probable cause, although not necessarily entirely so, of anomalous EM features.

5. CONCLUSIONS

Geological mapping has identified stratabound lead-zinc mineralization within a whitish-grey siliceous bed in thinly bedded siltstones, mudstones and dolostones of unit 1 near their contact with overlying thick to thinly bedded dolostones of unit 2. Lead-zinc mineralization, although low-grade and confined to widths of 4m or less, is very similar to mineralization on the periphery of the Hart River massive sulphide deposit. Surface sulphide mineralization at the Cord Claims displays a gradual increase in both grade and thickness towards 600E, 160S. This similarity in mode and occurrence to Hart River, and the gradual build-up in grade and width indicates that there is potential on the Cord Claims for a massive sulphide deposit of several million tons having grades of 1.5%Cu, 1.5oz/ton Ag, 1%Pb and 3%Zn down-dip from the showings at 600E, 160S.

The geophysical survey conducted over the Cord Claims detected several EM anomalies concluded to be associated with thin occurrences of laminated sulphides. Due to the extreme structural complexities and the overall high conductivity of the sulphide host-rocks, definitive conductor parameters are difficult to establish. It is apparent from the EM data, however, that no single anomaly typical of a massive sulphide source of significant proportion or depth extent is present within the upper 50m of rock explored by the EM survey.

Anomaly A, with its magnetic associations, remains the most attractive geophysical target from among the various EM anomalies. It occurs over Lines 450W and 600W and is coincident with the highest grade and thickest surface lead-zinc sulphide showing.

6. RECOMMENDATIONS

Since detailed geological mapping indicates a potential for a significant improvement in grade and thickness of lead-zinc-silver mineralization, and geophysical EM results indicate that any significant improvement programme is recommended:

(1) further geophysical work be undertaken and to consist of fill-in and detailed EM using short (50m) coil-spacing and multi-frequencies in the horizontal and vertical-loop mode.

(2) three diamond drill holes totalling 800m be drilled down-dip from the surface showings at 600E, 160S.

Additional EM work is believed warranted to test the various EM features at greater depths and in greater detail. Most of the additional geophysical work would be conducted over previously detected conductors in regions where no encouragement was gained from geological mapping.

The first drill hole would be planned to intersect the sulphide mineralization at a depth of 200m, approximately 300m down-dip from the surface showing. Subsequent drill holes would be contingent on the results of the first hole.

J. McClintock

C. Campbell

APPENDIX I

CLAIMS STATUS

CLAIMS	GRANTS	NEW EXPIRY DATE
Cord 1-18	Y97639-497656	Jan. 5, 1982
Cord 21-38	Y96659-496676	"
Cord 41-54	Y97679-Y97692	"

STATEMENT OF QUALIFICATIONS

J. A. McClintock

1) I am a geologist residing at 32841 Ashley Way, Clearbrook, British Columbia and am currently employed by Rio Tinto Canadian Exploration Ltd. of #520 - 800 W. Pender Street, Vancouver, B.C.

2) I graduated from the University of British Columbia in 1973 with a BSc honors degree in Geology and have practiced my profession since that time.

3) I supervised the 1980 field work for Rio Tinto Canadian Exploration Limited which form the basis of this report.

4) I am a member of the Professional Engineers of British Columbia.

Rio Tinto Canadian Exploration Ltd.

John McClintock

John A. McClintock, P.Eng.

STATEMENT OF QUALIFICATIONS

Christopher J. Campbell

1. I am a geophysicist residing at 4505 Cove Cliff Road, North Vancouver, British Columbia and am currently employed by Rio Tinto Canadian Exploration Limited of 520-800 West Pender Street, Vancouver, British Columbia as their Regional Geophysicist, Western Canada.

2. I graduated from the University of British Columbia in 1972 with a B.Sc. degree in Geophysics and have practised my profession continuously since that time.

3. I supervised and directed the 1980 geophysical field work for Rio Tinto Canadian Exploration Limited which forms the basis of this report.

4. I am an active member in good standing of the Society of Exploration Geophysicists, the Canadian Society of Exploration Geophysicists as well as the British Columbia Geophysical Society.

RIO TINTO CANADIAN EXPLORATION LIMITED

Christopher Campbell

Christopher J. Campbell

LEGEND

PROTEROZOIC

3 — DIATREME : Discordant heterolithic rubble breccia, surrounded by zones of silicification and / or carbonatization.

HELIKIAN

2 — UNIT 2 : Grey dolostones, well bedded to massive. Local chert lenses.
- 2(a) : Siltstones and mudstones, black, locally pyritic and highly carbonaceous.

1 — UNIT 1 : Black mudstone and siltstones, commonly carbonaceous, locally siliceous
- 1(a) : Pyrite / pyrrhotite - rich mudstones and siltstones
- 1(b) : Dark green - grey phyllites, locally pyrite or chlorite rich
- 1(c) : Black dolostones, locally stromatolitic, rare white to pink dolostone
- 1(d) : Black limestones
- 1(e) : Silica - rich lithologies, possibly of metasomatic origin. Includes "siliceous mudstone", "banded cherts", "bleached siliceous dolostones" and "siltstones".

Outcrop
Float
Geological contact (observed, inferred)
Fault (definite, approximate, assumed)
Cu, Pb, Zn (2) ...... Copper, Lead, Zinc (Showing No.)
Chl ...... Chlorite, more than 5%, present on slip and bedding plane surfaces
Stromal ...... Stromatolitic, biostrome

90°, 90° ...... Strike and dip of bedding, clevage
63° ...... Strike and dip of Axial plane (minor fold)
Shear zone
Trench and No.
Axis of EM Conductor (Max - Min)

N.T.S. 106 - C - 13, 106 - D - 16

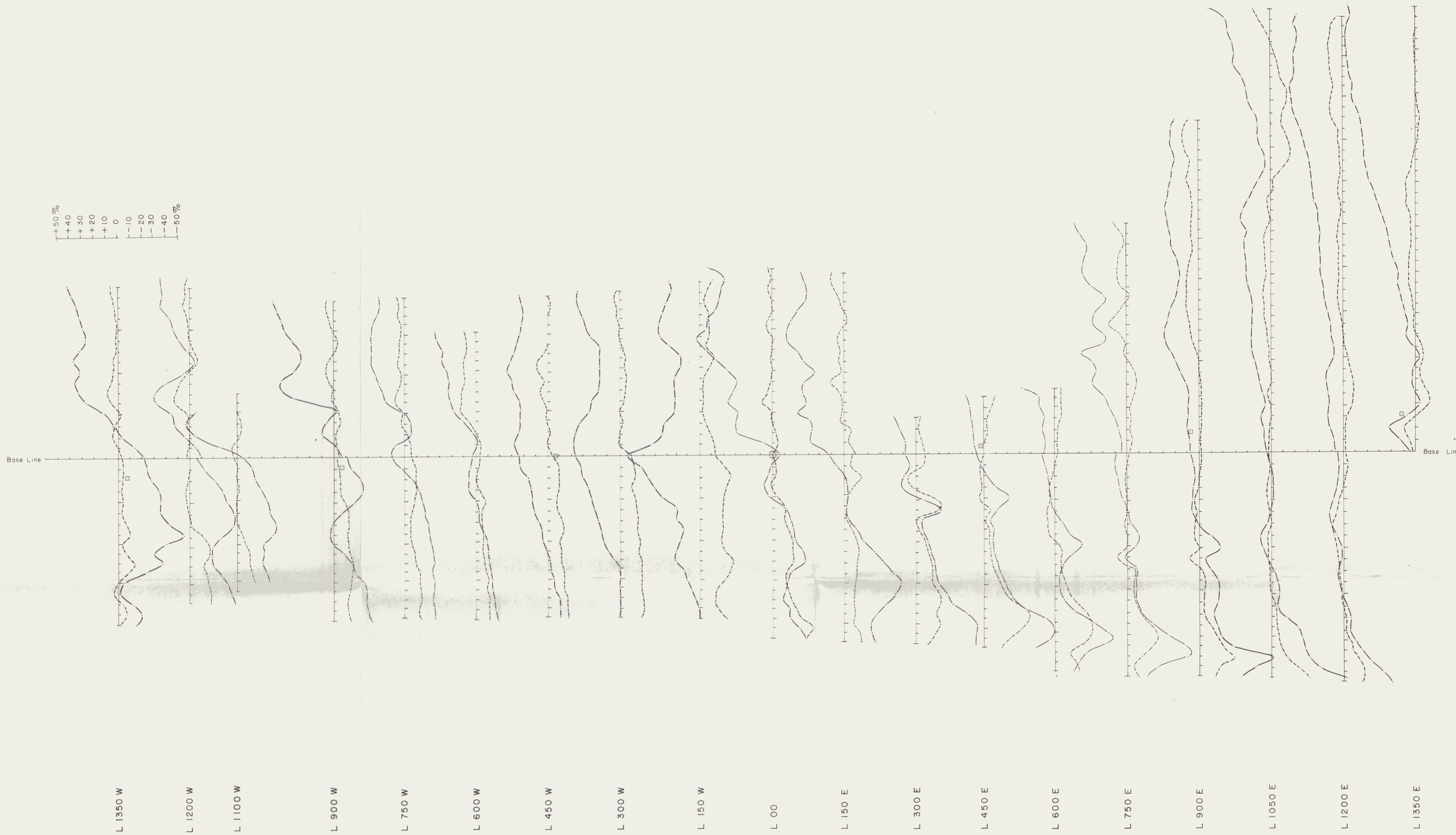
SCALE 1:5000

FEET 500 250 0 500 1000 1500 FEET

METRES 100 50 0 100 200 300 400 METRES

CONTOUR INTERVAL 20 METRES

RIO TINTO CANADIAN EXPLORATION LIMITED		
SNAKEHEAD PROPERTY		
GEOLOGY		
JAN. 1981	J.A.M./d.a.g	DWG. G 8856



N
152° 58'
1987 km
NLK

LEGEND

VLF-EM Survey Conducted Via Transmission from Seattle NLK, 18.6 kHz

Positive Angles (%) Denote West Dip

Negative Angles (%) Denote East Dip

Vertical Scale ...... 1cm = 20 %

Station Interval .... 25 metres Along Slope

Plotted Positions Corrected for Topography

N.T.S. 106C/13, 106D/16

SCALE 1:5000

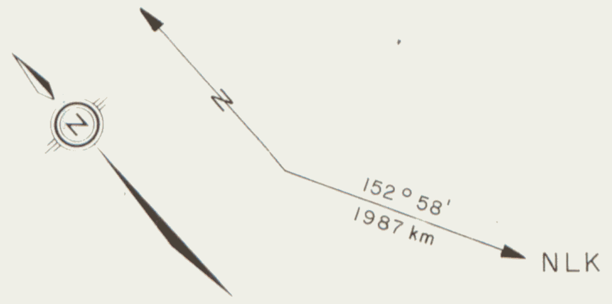
100 50 0 100 200 300 400 Metres

RIO TINTO CANADIAN EXPLORATION LTD.

CORD CLAIMS

VLF-EM PROFILES

DATE	DRAWN BY	DWG
DEC. 80	CJC/dag	GP 7578



LEGEND

VLF-EM Survey Conducted Via Transmission from Seattle NLK, 18.6 kHz

Data Filtered Using Standard Fraser Filter: $F_{2,3} = (\theta_3 + \theta_4) - (\theta_1 + \theta_2)$

Contour Interval 10%

Station Interval ..... 25 metres Along Slope

Plotted Positions Corrected for Topography

N.T.S. 106C/13, 106D/16

SCALE 1:5000

100 50 0 100 200 300 400 Metres

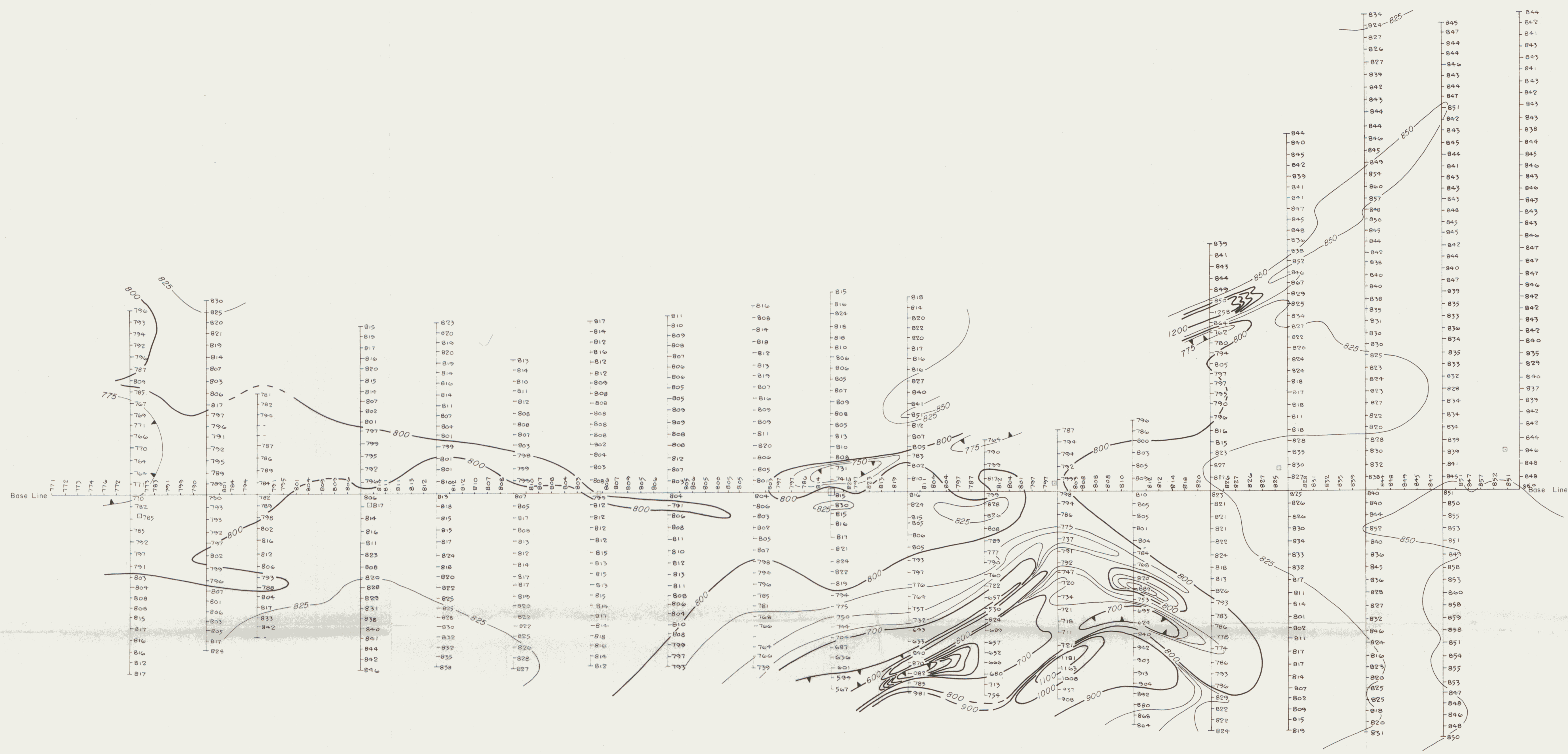
RIO TINTO CANADIAN EXPLORATION LTD.

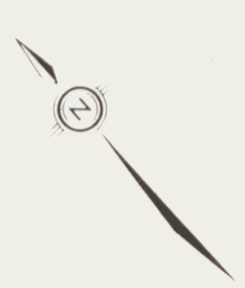
CORD CLAIMS

VLF-EM PROFILES

FRASER FILTER CONTOUR MAP

DATE	DRAWN BY	DWG.
DEC. 80	CJC/dag	GP 7577





LEGEND

Ground Magnetometer Survey Conducted with Proton Precession Magnetometer:

– Magnetic Values Represent Total Magnetic Field.

Magnetic Datum 58000 gamma

Contour Interval ...... 25 & 100 gammas

Station Interval ...... 25 metres Along Slope:

Plotted Positions Corrected for Topography

N.T.S. 106C/13, 106D/16

SCALE 1:5000

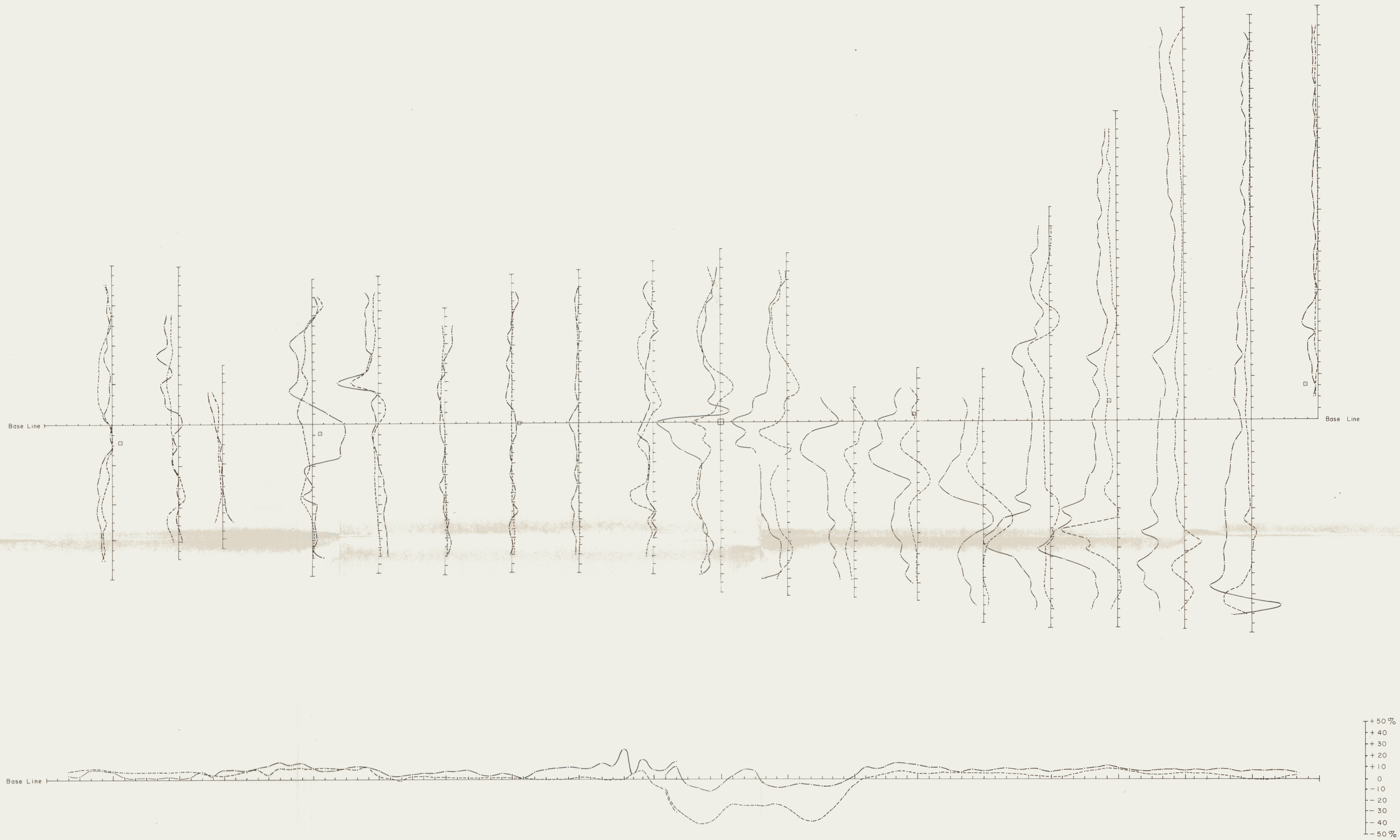
100 50 0 100 200 300 400 Metres

RIO TINTO CANADIAN EXPLORATION LTD.

CORD CLAIMS

MAGNETOMETER SURVEY
TOTAL MAGNETIC INTENSITY

DATE	DRAWN BY	DWG
DEC. 80	CJC/dag	GP 7576



LEGEND

HLEM Survey : MaxMin II
Coil Separation . . . 100 metres
Vertical Scale . . . 1cm = 20%

444 Hz ——— In-Phase
444 Hz – – – – Quadrature

N.T.S. 106C/13, 106D/16
SCALE 1:5000

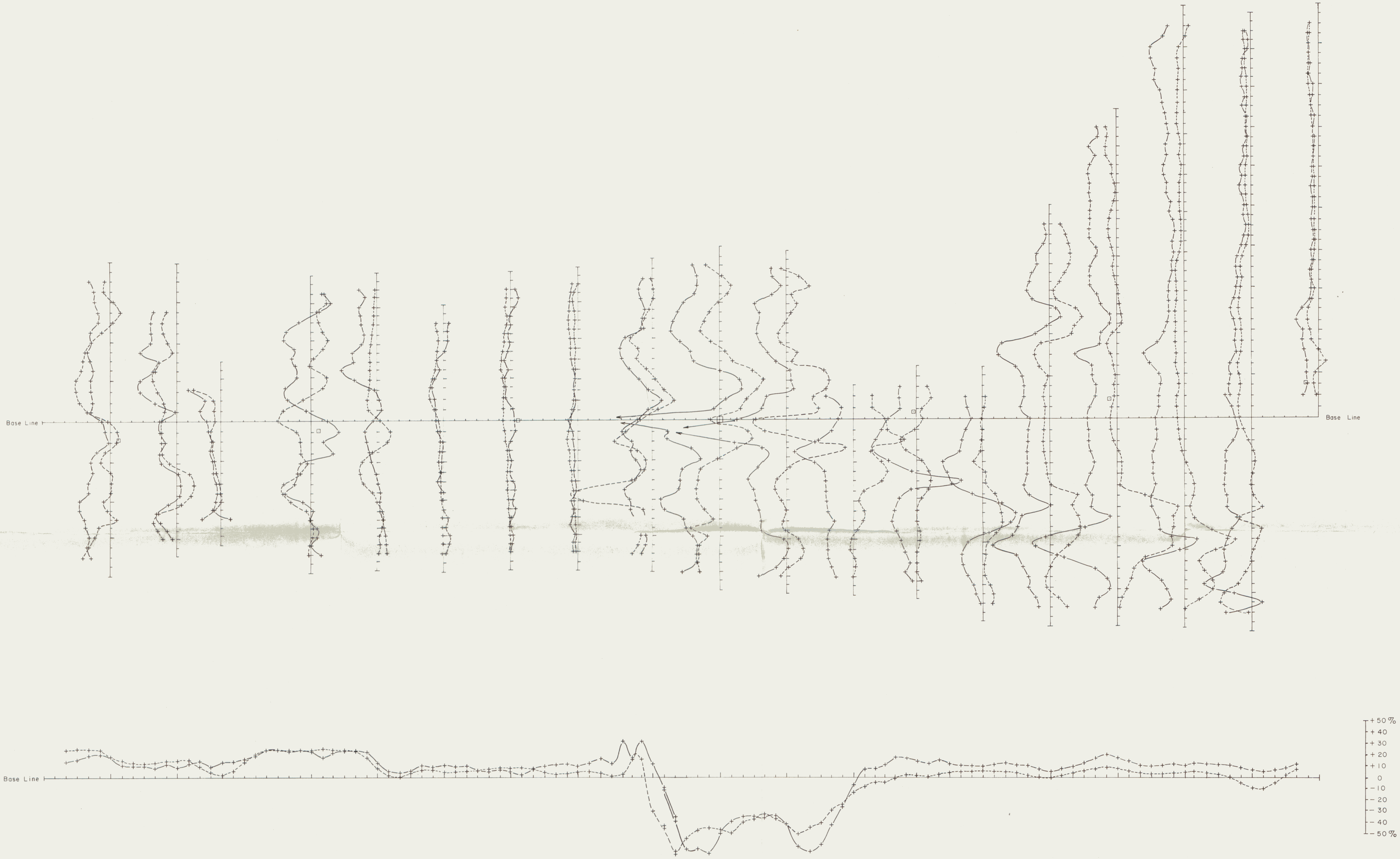
100 50 0 100 200 300 400 Metres

RIO TINTO CANADIAN EXPLORATION LTD.

CORD CLAIMS

HORIZONTAL-LOOP EM PROFILES
– 444 Hz –

DATE	DRAWN BY	DWG.
DEC. 80	CJC/dag	GP 7579



LEGEND

HLEM Survey : MaxMin II

Coil Separation . . . 100 metres

Vertical Scale . . . 1cm = 20%

1777 Hz
+——+ In-Phase
+- - - -+ Quadrature

N.T.S. 106C/13, 106D/16

SCALE 1:5000

100 50 0 100 200 300 400 Metres

RIO TINTO CANADIAN EXPLORATION LTD.

CORD CLAIMS

HORIZONTAL-LOOP EM PROFILES
-1777 Hz-

DATE	DRAWN BY	DWG.
DEC. 80	CJC/dag	GP 7580