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SUMMARY

A program consisting of a geophysical VLF-EM survey and some soil and rock sampling has been completed over the CM claim for United Liberty Resources. The CM mineral claim, consisting of 20 units, is situated on the west slope of Glossy Mountain in the Kamloops Mining Division, B.C., some 11 kilometres due south of Ashcroft, B.C. The geophysical survey has identified several northwest trending conductors in the quartz diorite unit near the southwest corner of the grid. These conductors occur in the same area as a total field magnetic anomaly of 1000 gammas revealed in a 1984 survey (Hulme & Dispirito). These conductive zones are probably associated with shears or faults within the quartz diorite to diorite units of the Guichon Creek Batholith.

Due to the prevailing low price of copper on world markets and the low precious metals values observed, further exploration work is not recommended at this time.

Respectfully submitted, Strato Geological Engineering Ltd.

A. E. Hunter, Geop.

August 24, 1987



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1. INTRODUCTION

Pursuant to a request by the directors of United Liberty Resources Ltd., a geophysical survey (VLF-EM) and geochemical sampling were carried out over portions of the CM mineral claim during August, 1987 between the 13th and 21st. The claim comprises 20 units located east of the Thompson River, about 11 kilometres south of Ashcroft, British Columbia.

The intent of the survey work was to obtain additional geophysical information to assist in identifying geology and structure over the previously established grid.

1.1 Location, Access, Topography

The CM mineral claim is located some 11 kilometres south of the city of Ashcroft, British Columbia (Figure 1). Truck access is available by driving south from Ashcroft along the Bethlehem road for 16.4 kilometres to a secondary road 6 kilometres north of the trailer park. A 1.6 kilometre drive, in a westerly direction, along a series of backroads leads to the legal corner post (Figure 2). It is a further 1.65 kilometres in a southwesterly direction from the LCP to Showing A.

The claim is located on the western slopes of Glossy Mountain, on generally gently sloping ground which rises to an elevation of 1300 metres above sea level along the southern boundary.

1.2 Claims

The CM mineral claim is situated in the Kamloops Mining Division, some 11 kilometres due south of Ashcroft, British Columbia. The claim is recorded as follows:

Name	Units	Record No.
СМ	20	5821 (8)
	1	
	· · · · · · · · · · · · · · · · · · ·	STRATO





The claim is shown on British Columbia Ministry of Energy, Mines and Petroleum Resources mineral claim map 921/11W (Figure 3).

1.3 History

The claim covers ground staked in 1969 as the CM and DN claim groups. Grandora Explorations Ltd. conducted geological and geophysical (magnetic) surveys at this time in order to gain further information about two copper showings which were located on the claims. Results indicated that the claims are underlain by intrusive rocks of the Guichon Creek Batholith and by Nicola Group sediments and volcanics, within which the copper mineralization was present. It was determined that the magnetometer survey was useful in delineating the contact between the two units (Ash, 1970).

United Liberty Resources Ltd. staked the area as the CM claim in 1983. A geochemical survey conducted in 1984 located small copper, lead, zinc, gold and silver anomalies in the western claim area. These were interpreted to be associated with the sediment - intrusive contact (Reamsbottom, 1984). A magnetic (total field) survey proved useful in delineating the sediment - intrusive contact.

1.4 Instrumentation and Survey Procedure

A survey consisting of very low frequency electromagnetic (VLF-EM) work was conducted over the CM claim. A survey grid of 12 east-west lines, with an 87.5 metre line separation had been established in August, 1984 over the west central portion of the claim.

The VLF-EM survey was conducted over 10 of the 12 previously established lines, for a total of 10 line kilometres. The instrument used was the Sabre, Model 27, VLF-EM receiver unit employing the transmitter NLK, Seattle, Washington at a frequency of 24.8 kHz and a rated power of 125 KW. Readings were taken at 12.5 metre intervals and stations were flagged at 25 metre intervals at previously established stations. Ground control was maintained by hip chain and compass. Figures 7 and 8 present the results of the VLF-EM survey. Figure 7 shows the dip angle and field strength data in plotplan form. Figure 8 shows the Fraser filtered dip angle data as a contour map.





Two soil samples were collected from the eastern portion of the property. Rock samples were taken from Showing A to test for previous metal content. Analysis was performed for copper, lead, zinc, silver and arsenic by the Inductive Coupled Plasma (ICP) method and for gold by the Atomic Absorption (AA) method. Soil samples were taken from the B horizon at 20 to 25 cm depths and placed in plastic bags. Results are presented on Figures 5 and 6.

A detailed total field magnetic survey was also made over Showing A. Measurements were taken at 5 metre intervals across the showing. The results are presented as Figure 9.



2. REGIONAL GEOLOGY

lows:

The regional geology is described by Hulme and Dispirito, 1984, as fol-

"The CM mineral claim is situated in an area underlain by the Guichon Creek Batholith, which has intruded sediments and volcanics of the Permian Cache Creek and Late Triassic Nicola groups and is unconformably overlain by Jurassic to Tertiary sedimentary and volcanic strata (Figure 4).

The Guichon Creek Batholith has the shape of an elliptical dome with a surface area of 1000 square kilometres. It has been divided into several concentric phases which become younger toward the batholith's centre and which range in composition from diorite to quartz monzonite. The oldest phase, the border or Hybrid, underlies part of the CM claim. Other phases include the Highland Valley, the Bethlehem, and the Bethsaida.

The Guichon Creek Batholith is the host rock of the Highland Valley porphyry copper district, where the major copper reserves of British Columbia are located. Mineral showings of copper or copper and molybdenum are distributed throughout the batholith, however, all the large deposits occur in or near the contact of the Bethsaida phase and related dykes, or are associated with a dyke swarm north of Highland Valley (Mc-Millan, 1976).

The Cache Creek Group is in contact with the west side of the batholith, and includes greenstone, chert, tuff, argillite, limestone, siltstone, and greywacke. Rocks of the Nicola Group are





well exposed on the northwest side and less well exposed on the south and east sides of the batholith. On the northwest side, the Nicola Group has been divided into six units (Carr, 1962). The lower 5 comprise two-thirds of the section and are composed of tuff, greywacke, siltstone, limestone, chert, breccia, and conglomerate. The upper unit is largely greenstone."



3. PROPERTY GEOLOGY

The property geology as presented by Hulme and Dispirito, 1984 as follows:

"The CM mineral claim is underlain by diorite and quartz diorite of the Guichon Creek Batholith and by limestones, mudstones, siltstones, and greywackes of the Nicola Group. The sediments have been intruded by the quartz diorite, and form a peninsular shaped body in the southwestern area of the claim. Bedrock is well exposed in the western and southeastern portions of the property; the remainder of the property is largely covered by overburden (Figure 5).

3.1 Nicola Group

A thick section of Nicola Group sediments, consisting of limestone, mudstone, siltstone, and greywacke outcrops in the southwest area of the claim. The rocks strike north to northeast and dip 50 to 25 degrees to the west.

The base of the succession is in contact with the batholith, and consists of dark grey volcanic greywacke characterized by angular white feldspar fragments which are up to 4 mm in size. The greywacke is succeeded by thinly bedded (up to 3 mm) grey to grey-green siltstones. The siltstones are in turn overlain by limestones interbedded with mudstones and siltstones. The limestone sequence form prominent cliffs in the southwest claim area; undulating beds as much as 10 metres thick can be seen on the cliff face from the surrounding hills. The limestones can be white, creamy, grey, and black and vary in texture from porcelaneous to sandy. The youngest sediments outcrop



to the west of the limestone cliffs, and are characterized by fine grained greywackes.

3.2 Guichon Creek Batholith

Quartz diorite and diorite of the Guichon Batholith are well exposed in the west central and southeast claim area. The quartz diorite is composed of 50% plagioclase feldspar, 10% quartz, 25% hornblende and biotite, and 5% magnetite and other accessory minerals. The diorite is texturally similar, showing a lesser amount of quartz and a proportionate increase in remaining minerals. Both are medium grained, with a grey to greygreen fresh surface which weathers to a rusty cream colour.

The contact between the batholith and the sediments can be seen at Line 8 + 75S, 5 + 25W, where quartz diorite is in contact with limestone, and approximately 150 m west of post 5S,2W, where quartz diorite is in contact with greywacke. In both instances, the quartz diorite becomes fine grained towards the contact."

3.3 Mineralization

Copper mineralization is present in mudstone and siltstone between lines 350S and 437S at 120W (Figure 6, Showing A). A 3 metre deep pit has been sunk in mudstone adjacent to quartz diorite. The mudstone exhibits malachite and azurite stains and contains blebs of pyrite, chalcopyrite and chalcocite. In 1984, a grab sample (SH-A1) from this pit contained 5997 ppm Cu, 2.6 ppm Ag, and 40 ppb Au. This area was resampled in 1987 and the sample contained 5147 Cu, 2.3 Ag, and 67 Au. A smaller pit has been sunk in siltstone, 25 metres east of the main pit. In 1984, a grab sample from here (SH-A3) contained 144 ppm Cu, 0.1 ppm Ag, and 5 ppb Au and was not resampled. The sediments have also been trenched to the north of the main pit and a 1984, grab sample (SH-A2) from this area contained 4625 ppm Cu, 1.6 ppm Ag and 5 ppb Au. This area was resampled in 1987 and the sample



contained 2705 Cu, 0.4 Ag, and 1.0 Au. Hulme and Dispirito, 1984, observed that since outcrops of quartz diorite nearly surround the sediments, and since the bedding strikes east-west and dips southward, the body of sediments may be a large xenolith within the quartz diorite.

Another copper showing (Figure 6, Showing B) is located approximately 1100 metres to the southwest of Showing A, on the hilltop which forms the prominent cliffs in the southwest corner of the property. Hulme and Dispirito, 1984, report two small pits and one trench were made in dark grey to cream coloured limestones; mineralization in the trench consists of chalcopyrite, covellite, and chalcocite. Malachite and azurite stains are common. The trench and the western most pit were sampled in 1984, sample SH-B1 from the trench contained 8500 ppm Cu, 7184 ppm Zn, 34.3 ppm Ag and 5 ppb Au while sample SH-B2 from the pit contained only 60 ppm Cu, 79 ppm Zn, 0.1 ppm Ag and 5 ppb Au.

Hulme and Dispirito, 1984, report that bedding measurements show the limestone to be slightly folded in the area of Showing B, with the mineralization present in the eastern limb. As well, the limestone is dark grey at the western pit and cream coloured at the trench. Individual beds are 3 cm thick. Float exhibiting malachite stains has been located below the cliffs, and it is likely that this is rubble from Showing B.





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4. GEOPHYSICAL SURVEY RESULTS

The very low frequency electromagnetic (VLF-EM) survey tests the ground for conductive zones. A distant transmitter generates a VLF-EM field which is considered to be plane polarized at the survey site. The survey instrument is essentially a sensitive receiver which measures the strength (field strength) and orientation (dip angle) of the magnetic field associated with the transmitted signal. The survey lines are oriented as close as possible to perpendicular to the direction to the transmitter. Conductors cutting across the survey lines are then optimally coupled with the signal. The transmitted VLF-EM signal induces a secondary field in a conductor which produces anomalous field strength and dip angle values. The Fraser filter treatment of the dip angle data smooths the data and converts the negative slopes, associated with crossovers found over conductors, to positive anomalies. The field strength and dip angle data is shown on Figure 7 and the Fraser filter data is presented on Figure 8.

The VLF-EM survey revealed three closely spaced conductors in the southwest corner of the area (Figure 8). The conductors have a northwesterly strike, a length of about 100 metres and are associated with a 1000 gamma magnetic anomaly outlined in a previous total magnetic field survey. The contours of the Fraser filter data reveal a general trend to the northwest. According to Northcote (1969) a northwesterly direction is a prominent direction of structural linears which are probably associated with faults or shear zones in the Guichon Creek Batholith. Thus it is possible that the three conductors revealed by the survey are connected with shear or fault zones in the Guichon Creek Batholith. The geologic units are shown on Figures 7 and 8 and they do not appear to correlate with the VLF-EM data. However, there is a subtle but noticeable increase in noise in the field strength values over the Nicola Group sediments which probably reflects rapid changes in the magnetic properties of the sediments.

A detailed total field magnetometer survey was conducted across Showing A (Figure 9) using a proton precession magnetometer. The survey revealed a 300 to 400 gamma magnetic anomaly around the area of Showing A which probably reflects the sediments of the Nicola Group.



5. CONCLUSIONS AND RECOMMENDATIONS

The CM mineral claim is underlain by Nicola Group volcanic and sediments, and by intrusive rocks of the Guichon Creek Batholith. Two copper showings are present, both within the sediments. Rock samples, taken in 1984, showed small amounts of silver and gold to be present at the showings. Showing A was resampled and the low precious metals values were confirmed. Two soil samples taken from the eastern area of the claim were not anomalous. Ten kilometres of VLF-EM survey was conducted with the Sabre model 27 receiver using the transmitter at Seattle, Washington (NLK) with a frequency of 24.8 kHz and a rated power of 125 KW. The survey revealed several conductors grouped in the southwest corner of the grid and associated with a 1000 gamma total field magnetic anomaly revealed in 1984. The conductors occur in the quartz diorite to diorite of the Guichon Creek Batholith and, according to Northcote (1969), could be associated with shear zones or faults in the batholith.

The area is conducive to large low grade copper deposits. Any such deposit would have to underlie the CM mineral claim at depth. The current low price of copper would make the pursuit of a copper mine uneconomic without the presence of significant amounts of precious metals. Therefore, no further exploration work is recommended at this time.

Respectfully submitted, Strato Geological Engineering Ltd.

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A. E. Hunter, Geop.

August 24, 1987



6. **REFERENCES**

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Report on Geological, Geophysical and Geochemical Surveys on the CM Claims, Kamloops, M.D., for United Liberty Resources Ltd.



7. CERTIFICATE

I, Al E. Hunter, of Vancouver, British Columbia, Canada, do hereby certify the following:

- 1. I am a geophysicist, employed by Strato Geological Engineering Ltd. of 3566 King George Highway, Surrey, B.C.
- 2. I completed the Bachelor of Applied Science program in Geological Engineering with a specialization in Geophysics at the University of British Columbia, Vancouver, British Columbia in 1981.

3. Since leaving university I have practised my profession in western and northern Canada and in the western U.S.A. for approximately 6 years.

3. I have no direct, indirect or contingent interest, nor do I expect to receive any such interest, in the securities or properties of United Liberty Resources Ltd.

DATED at Surrey, British Columbia, this 24 day of August, 1987.

A. E. Hunter, Geophysicist



APPENDIX A Rock Sample Descriptions

UNITED LIBERTY RESOURCES LTD. CM CLAIM ROCK SAMPLE DESCRIPTIONS

SAMPLE

LOCATION

SH-A1

3m deep pit at Showing A.

DESCRIPTION

mudstone, malachite stains, chalcopyrite, chalcocite, pyrite.

SH-A2

Trench at Showing A.

mudstone, malachite, azurite stains, chalcopyrite, chalcocite, pyrite.

APPENDIX B Geochemical Assay Results

ACME ANALYTICAL LABORATORIES DATE RECEIVED: AUG 24 1987 852 E. HASTINGS ST. VANCOUVER B.C. V6A 1R6 PHONE 253-3158 DATA LINE 251-1011 DATE REPORT MAILED:

GEOCHEMICAL ICP ANALYSIS

.500 GRAM SAMPLE IS DIGESTED WITH JML 3-1-2 HCL-HN03-H2D AT 95 DEG.C. FOR ONE HOUR AND IS DILUTED TO 10 ML WITH WATER. This leach is partial for MN FE CA P LA CR NO BA TI B W AND LIMITED FOR NA AND K. AU DETECTION LIMIT BY ICP IS 3 PPM. - SAMPLE TYPE: SOIL/ROCK AU+ ANALYSIS BY AA FROM 10 GRAM SAMPLE.

ASSAYER: N. . Chif. T. DEAN TOYE, CERTIFIED B.C. ASSAYER

STRATO GEOLOGICAL File # 87-3542

SAMFLE#	CU	PB	ZN	AG	AS	AU*
	PPM	PPM	PPM	PPM	PPM	PPB
CM-51 CM-52 SH-A1 SH-A2	43 33 5147 2705	14 13 26 7	133 128 127 48	.1 .1 2.3 .4	8 25 21	1 1 67 1

APPENDIX C Time-Cost Distribution

APPENDIX C

TIME-COST DISTRIBUTION

A mineral exploration program, comprised of geological mapping, soil geochemistry, and magnetic surveys were carried out by Strato Geological Engineering Ltd., during the period August 12 through August 19, 1987. A listing of personnel and distribution of costs is as follows:

Personnel

A.E. Hunter

Geophysicist

Cost Distribution

-	Geophysicist - wages 7 mandays @ 220/d	\$1,54	0.00
-	Room and Board 6 days @ 55/d	- 33	0.00
-	4WD Truck (incl. gas, oil, milage, etc) 7 days @ 105/d	, 7 3	5.00
-	MP 2 Magnetometer & VLF-EM Receiver rental 7 days @ 65/d	44	5.00
-	Sample Analysis - Cu, Pb, Zn, Ag, As, Au	5	4.20
-	Data processing, drafting, reproduction, copying, typing, etc.	34	2.00
_	Assessment Report	90	0.00

TOTAL

\$4,356.50

Signed Strato Geological Engineering Ltd.

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