

GEOLOGICAL, GEOCHEMICAL AND GEOPHYSICAL REPORT

ON THE

ELF GROUP

AKIE RIVER AREA

OMINECA MINING DIVISION

N.T.S. 94 - F - 7

LATITUDE: 57° 18' N

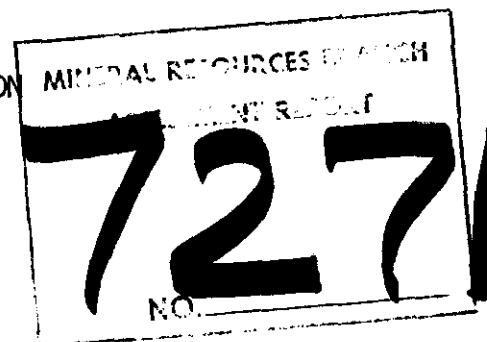
LONGITUDE: 124° 42' W

BY

W. J. ROBERTS

CYPRUS ANVIL MINING CORPORATION

MARCH 8, 1979



FIELD WORK DONE DURING THE PERIOD: JUNE 4 - SEPTEMBER 4, 1978.

TABLE OF CONTENTS

	<u>PAGE</u>
LIST OF CLAIMS	
INTRODUCTION	1
LOCATION AND ACCESS	2
REGIONAL GEOLOGY	2
GEOLOGY	4
<i>Kechika Group</i>	6
Road River	6
Silurian Siltstone	6
Mid-Devonian Limestone	7
Black Clastics	7
Besa River Formation - (Upper Devonian).	7
Gunsteel Formation - (Upper Devonian).	8
Structure	9
ECONOMIC GEOLOGY	10
GEOCHEMICAL SURVEYS	11
GEOPHYSICAL SURVEYS	14
CONCLUSIONS AND RECOMMENDATIONS	16
REFERENCES	18

FIGURES

Figure 1	Location Map	1:250,000	3
----------	--------------	-----------	---

TABLES

Table I	Table of Geological Formations	5
Table II	Regional Silt Sampling Program - Calculated Thresholds	12

APPENDICES

Appendix I	Statement of Qualifications
Appendix II	Summary of Costs
Appendix III	Affidavit Supporting Summary of Costs

ILLUSTRATIONS

		<u>Scale</u>
Map No. 1	Claim Map	1:50,000
Map No. 2	Preliminary Geology Map	1:10,000
Map No. 3	Geochemical Values and Contour Map, Lead	1:5,000
Map No. 4	Geochemical Values and Contour Map, Zinc	1:5,000
Map No. 5	Geochemical Values and Contour Map, Copper	1:5,000
Map No. 6	Geochemical Compilation Map	1:10,000
Map No. 7	Horizontal Loop, Electromagnetic Survey	1:2,500

LIST OF CLAIMS -- ELF GROUP

<u>Claim No.</u>	<u>Record No.</u>	<u>No. of Units</u>	<u>Recording Date</u>
1	1215	6	June 23, 1978
2	1216	6	June 23, 1978
3	1217	4	June 23, 1978
4	1218	10	June 23, 1978
5	1219	4	June 23, 1978
6	1220	10	June 23, 1978
7	1221	4	June 23, 1978
8	1222	18	June 23, 1978
9	1223	8	June 23, 1978
10	1224	8	June 23, 1978
11	1225	12	June 23, 1978
12	1226	1	June 23, 1978
13	1247	20	July 18, 1978
14	1248	20	July 18, 1978
15	1249	2	July 18, 1978
15	1295	9	August 1, 1978

Cyprus Anvil Mining Corporation

330, 355 Burrard Street Telex 04508594
Vancouver, British Columbia
V6C 2G8
Telephone (604) 687-2586

GEOLOGICAL, GEOCHEMICAL AND GEOPHYSICAL REPORT

ON THE

ELF GROUP

INTRODUCTION

The ELF GROUP, totalling 142 units, was staked in early June to cover several moderate lead-zinc anomalies in tributaries of the Akie River and a float occurrence of high grade stratiform barite-lead-zinc mineralization in Elf Creek. The area is underlain by a thick succession of Upper Devonian "Black Clastics", which host potentially economic lead-zinc deposits on the nearby Cirque and Driftpile Creek properties as well as the TOM-JASON claim groups in eastern Yukon.

Cyprus Anvil performed preliminary silt and soil sampling, prospecting and geological mapping followed by detailed grid soil sampling during the period June 4th to September 4, 1978. Total expenditures on this claim group are estimated to be \$31,085.

Preliminary geological mapping, on a scale of 1:10,000, was conducted over the entire claim group. The preliminary geochemical program of 140 stream sediment samples and 350 soils along 8 widely spaced lines to provide control areas for detailed study. Nine kilometers of chain-saw grid was established along two northwest trending base lines and one cross line to provide control for a chain and compass grid between Joel and MacIssac Creeks. Approximately 960 soils were taken at 50 meter intervals along the grid lines. Six kilometers of horizontal loop E.M. survey were conducted in an attempt to relate electromagnetic response to geological units and possibly mineralization.

.... 2

CYPRUS ANVIL

Minor prospecting in Elf Creek failed to locate the source of the high grade float.

LOCATION AND ACCESS

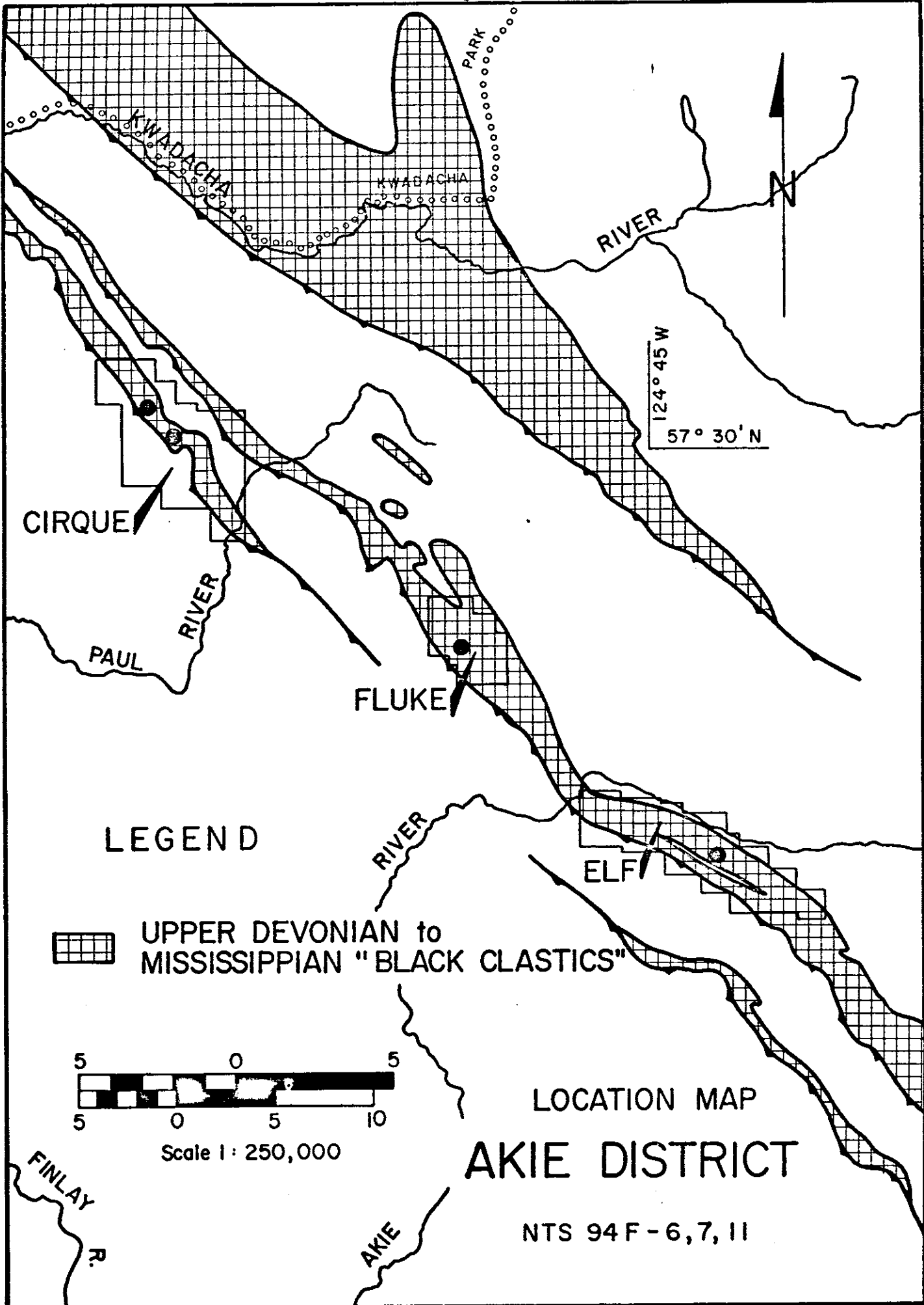
The ELF GROUP is located in the Ft. Ware area in northern British Columbia. The claims cover the south slope of the Akie River valley between the river and interfluvial ridge to the south. The center of the claim group, located at latitude 57° 18' N and longitude 124° 42' W, is roughly 35 kilometers on a bearing of 035 degrees from Akie Mountain and 30 kilometers on a bearing of 260 degrees from Cyclops Peak.

Field work on the ELF GROUP was conducted with a helicopter borne program based at Pretzel Lake, 38 kilometers to the west. Logistical support was provided by float equipped fixed wing aircraft based at Mackenzie, 250 kilometers to the south.

REGIONAL GEOLOGY

Three narrow, sinuous, semi-continuous, northwest trending belts of Upper Devonian to Mississippian black clastics have been outlined by regional mapping in northern British Columbia. The belts stretch from Braid Creek, on map sheet 94-L-1, through Gataga Lakes, and the Kwadacha Wilderness Park to the Ospika River, a distance of over 200 kilometers. The black clastics unconformably overlie Silurian dolomitic siltstone and Devonian limestone and are structurally overlain by a thrust slice comprising Kechika Group argillaceous limestone to Silurian dolomitic siltstone.

Our mapping program, primarily concerned with the internal stratigraphy of the black clastics, has documented the presence of three widespread lithologic units. The Besa River Formation forms the base of the black clastic succession and consists of an irregular blanket of brown silty shale with interbedded siltstone. The Gunsteel Formation, consisting of silvery-grey weathering, black siliceous carbonaceous shale, chert and argillite,



conformably overlies the Besa River and is host for all known stratiform barite-sulphide mineralization and most of the large stratiform barren barite deposits in this region. Variations in thickness and facies changes within this unit suggest deposition into two northwest trending troughs preserved in a synformal keel in the east and in thrust panels to the west. The Warneford Formation unconformably overlies the Gunsteel Formation and is comprised of interbedded silty shale and polymictic conglomerate.

The upper and lower units consisting of silty shale, siltstone and conglomerate, are related to two periods of uplift of a landmass to the west. Recognition of debris flows, proximal and distal turbidites and associated facies suggest periods of submarine fan development spreading eastward onto a subsiding Paleozoic carbonate platform. The intervening period of quiescence is marked by a lack of clastic sedimentation and deposition of interbedded black carbonaceous chert and shale along the western edge of the Paleozoic continental platform. Stratiform barite-lead-zinc deposits are located in small third order depositional basins within the west-northwest trending trough. The third order features are recognized by a thickening of the Gunsteel Formation, increased silica and sulphide content of the sediments and increased background values in lead and zinc.

Extensive imbricate thrusts and northeast verging isoclinal folds, resulting from major NE-SW compression during the Laramide orogeny, have obscured much of the depositional history of the Paleozoic succession.

GEOLOGY

Preliminary mapping throughout the property has outlined a northwest trending belt of black clastics unconformably overlying Silurian Siltstone to Mid-Devonian limestone and structurally overlain by several imbricate thrust slices of Silurian Siltstone and Kechika Group argillaceous limestone. Limited mapping within the Upper Devonian to Mississippian "black clastics" has also outlined an anomalous thickening of the Gunsteel Formation coincident with anomalous lead-zinc geochemistry and mineralized float. Structural

TABLE I: TABLE OF GEOLOGICAL FORMATIONS

<u>AGE</u>	<u>UNIT</u>	<u>DESCRIPTION</u>
<u>Gunsteel Formation</u>		
UPPER DEVONIAN - MISSISSIPPIAN	UD _{GS}	- silvery-grey weathering, black siliceous shale.
	UD _{CG}	- brown weathering, black to brown siltstone, greywacke and polymictic conglomerate.
	UD _{PS}	- light grey weathering, soft, friable highly foliated, light grey phyllitic shales.
	UD _{RC}	- silvery blue-grey weathering, black ribbon chert interbedded with black siliceous shale.
	UD _{SQ}	- silvery-grey weathering, black shale interbedded with black quartzite.
<u>Besa River Formation</u>		
	UD _{SS}	- tan brown weathering, brownish black silty shale with interbeds of siltstone and conglomerate.
~~~~~ unconformity ~~~~~		
DEVONIAN	D _{LS}	- light grey weathering, dark grey crystalline limestone.
SILURIAN	S _{SS}	- light orange to buff weathering, massive dark grey, variably bioturbated dolomitic siltstone.
~~~~~ unconformity ~~~~~		
<u>Road River Formation</u>		
ORDOVICIAN - SILURIAN	OS _{RR}	- black to grey weathering, black graphitic, graptolitic variably calcareous shale.
ORDOVICIAN	O _V	- orange weathering, buff, tan and green calcareous volcanics.
<u>Kechika Group</u>		
CAMBRO - ORDOVICIAN	CO _K	- buff to cream weathering, argillaceous wavy banded, silty, nodular limestone to calcareous grey shale.

interpretation suggests the black clastics occur in a broad northwest trending synformal keel. The southwest limb is partially removed by a series of imbricate thrusts of older units.

The following descriptions summarize aerial extent, weathering characteristics and lithologies of the various major rock units mapped on the property.

Kechika Group

The Kechika Group, occurring along the southwest boundary of the claim group in a major thrust slice, consists of a thick monotonous sequence of nodular and shaly light grey argillaceous calcilutite. The sequence well over 500 meters in thickness, is correlated with units mapped as OK₄ and OK₃ by the G. S. C. further to the east (Cecile, Norford, 1979). The characteristic buff weathering nature of this unit is typical throughout the northern Cordillera.

Road River

Black to grey weathering, variably calcareous, black shale, noted on a ridge top southwest of the ELF Group, has been tentatively mapped as the transgressive Road River Formation. This unit is correlative to Unit OR₁ mapped to the northeast by Taylor et al during the 1978 field season (Cecile, Taylor, Norford, 1979). Graptolites were not discovered during the brief examination of the outcrops.

Silurian Siltstone

Unconformably overlying the Road River Formation is a thick sequence of light orange weathering, thick bedded, light to dark grey rhythmically bedded, variably bioturbated dolomitic siltstone. Fan shaped feeding trails are common throughout the section. Siliceous sponge spicules and graptolites noted within the formation have not been dated but Norford (per. comm.) suggests they are probably Middle to Late Silurian in age.

Along the northern border of the claim group, Silurian Siltstone is unconformably overlain by either Middle Devonian limestone breccia or Upper Devonian Besa River silty shale. The northwest trending slivers of Unit S_{SS}, along the southwest boundary of the property, form the base of two thrust slices that structurally overlie Upper Devonian Gunsteel Formation.

Mid-Devonian Limestone

Light grey weathering, grey limestone breccia and conglomerate with transported Mid-Devonian fossils (Taylor, 1979) unconformably overlies the Silurian Siltstone and has been described as a carbonate debris flow originating off the Devonian Platform to the east.

Drastic thinning of the Mid-Devonian carbonate succession across the syncline appears to be due to removal during the Upper Devonian orogeny rather than lack of deposition. This unit represents the last stage of a prograding Paleozoic carbonate platform in the northern Rocky Mountains.

BLACK CLASTICS

A major orogenic event, initiated in the Upper Devonian, evidenced by rapid subsidence and a marine transgression, led to deposition of flysch with associated varying thicknesses of chert, siltstone, and shales along the west coast of North America. This event, termed the "Antler Orogeny" in the western United States and Alaska, has no particular name in the Northern Cordillera but the associated rocks are informally called the "Black Clastics". In the Gataga area, the black clastics can be subdivided into three major units:

the BESA RIVER, GUNSTEEL and WARNEFORD FORMATIONS.

Besa River Formation - (Upper Devonian)

The Besa River Formation, Unit UD_{SS}, unconformably overlies the Road River to Mid-Devonian section and appears to form the base of the black clastic

succession in this region. This unit, representing turbidite deposition, consists of a thick accumulation of recessive, brown-weathering, brownish-black, silty shale with regular interbeds of light brown weathering, tan siltstone varying from 0.5 to 4 meters in thickness. Graded bedding in the siltstones suggest deposition of turbidity flows in a generally quiescent environment. The thickness of the Besa River Formation is estimated to be over 700 meters in the southeast corner of the property. The variable thickness is probably due to synsedimentary faulting, with thick accumulations associated with down dropped blocks. Beds of polymictic conglomerate, noted throughout the section, appear to be related to submarine fan channels developing along scarps formed by synsedimentary faulting. The Besa River Formation probably represents a distal submarine fan deposit in the proposed second order basin or trough, termed the Gataga Depression.

Gunsteel Formation - (Upper Devonian)

Most of the mapping was done within Unit UD_{GS}, the Gunsteel Formation. The general rock type of this map unit is a light, silvery-grey weathering, finely-bedded, black siliceous shale. The shales noted in the map area are indistinguishable from shales throughout the 200 kilometer length of the belt of black clastics. Bedding is generally only visible on weathered surfaces where siliceous bands weather as fine white lines. Overall silica content is gauged by the grey tones on weathered surfaces. Bedding varies from less than 1mm to over 2m in thickness. Coarse clastics were not observed within this unit.

In the southeast corner of the property, thin bedded Gunsteel shales rest conformably on the BESA RIVER FORMATION and are structurally overlain by thrust sheets of Silurian Siltstone to Kechika Group. Although the top of this unit has been structurally removed, the Gunsteel Formation is estimated to have a thickness in excess of 100 meters.

In the central and northwest portions of the claim group the absence of the Besa River Formation is paralleled by an anomalous thickening of

Unit UD_{GS}. Local thickening of the Gunsteel can be attributed to the presence of two major facies.

Although, Unit UD_{AR}, a thick succession of black, thick-bedded, silty argillite with nodular barite and pyrite horizons, termed the "Pregnant Shale", has not been subdivided from the Gunsteel Formation, it is largely responsible for the anomalous thickening of Unit UD_{GS} on the property. Regional mapping in this district suggests the Pregnant Shale was deposited in fault bounded third order basins and can be compared to the anomalous thickening of the Canol Formation in the Macmillan Graben in eastern Selwyn Basin.

The grey weathering, dark grey to black, thick-bedded, soft, friable, phyllitic silty shale of Unit UD_{PS}, appears to overlie the Pregnant Shale and is restricted to a possible double plunging synformal keel centered on Elf Creek. This unit may represent a distal member of the Warneford Formation, a major submarine fan deposit unconformably overlying the Gunsteel Formation, recognized along the Warneford River, 40 kilometers to the northwest.

Thickness and extent of the Gunsteel in the district suggests slow deposition of carbonaceous material in a deep water marine environment with local anomalous thickening associated with syndimentary faulting.

Structure

Structurally, this area has suffered from one or more periods of intense northeast-southwest compression. An imbricate array of northwest trending thrust faults has isolated northwest trending geological terranes and moved deeper water shales eastward onto the carbonate platform. Several kilometers of crustal shortening may have resulted from this deformation. Various isoclinal parasitic folds are common along the limbs of a major northwest trending syncline of black clastics trending through the center of the ELF GROUP. Folding geometry is determined by the varying competency and reaction of different lithologies. Shales generally have

a well developed axial planar foliation subparallel to the axes of parasitic isoclinal folds.

ECONOMIC GEOLOGY

All major sulphide mineralization, discovered to date, occurs as float boulders in Elf Creek. Massive float of stratiform finely laminated barite, galena and sphalerite, discovered 1 kilometer from the mouth of Elf Creek, assayed 31 to 52 percent combined lead and zinc with 45 to 110 grams per tonne silver. Evidence of soft sediment deformation and isoclinal folding in the mineralized specimens suggests sulphide-sulphate deposition occurred at or near the sediment-water interface. The volume of pelitic material in the sulphate-sulphide facies is almost negligible.

An exhalative-sedimentary model is proposed whereby a barium, lead and zinc rich brine may reach the submarine surface along channelways, provided by synsedimentary faulting, and flow along the existing topology to pool in local depression. Barite-rich laminae may be formed by barite crystals precipitating in the upper oxidizing portion of the brine pool and sinking into the lower reducing environment of sulphide muds.

Several blocks of float containing < 1mm to 1cm thick beds of fine-grained subhedral pyrite were discovered below the gossans located at the thrust contact between the Gunsteel Formation and Kechika Group in the Elf Creek Valley. Limited mapping outlined several pyrite-rich horizons in thick-bedded shales above the gossan. No massive pyrite horizons or traces of lead-zinc mineralization were discovered.

Minor beds and nodules of anhedral pyrite are also common in the thick-bedded Pregnant Shale exposures in Ian and Joel Creeks in the northwest portion of the claim group. No sulphides have been found, to date, within or adjacent to the three large gossans in the extreme southeast corner of the property.

GEOCHEMICAL SURVEYS

During June, 1978, approximately 140 stream sediment and 350 soil samples were taken on the ELF GROUP as a preliminary survey for potential stratiform barite-lead-zinc mineralization. All streams and associated tributaries were sampled at 300 meter intervals. Eight widely spaced soil lines were established to outline possible strike extensions of high-grade float mineralization found in Elf Creek.

Eastern Associates of Whitehorse, Yukon, were contracted to cut two northwest trending baselines and one cross line to provide control for the chain and compass soil grid between MacIssac and Joel Creeks. A total of 960 soil samples were collected at 50 meter intervals along 100 meter spaced lines.

Soils were collected from a poorly developed "B" horizon with soil sample mattocks. All samples were packaged in Kraft sample bags and sent to Acme Analytical Laboratory at 6455 Laurel Street, Burnaby, B. C. The samples were then dried, sieved to -80 mesh, weighed to half a gram, digested in perchloric acid and analysed by atomic absorption for copper, lead and zinc. Lead-rich samples were also analysed by atomic absorption for silver. Silt samples analysed for barium were digested in E.D.T.A., quantitative determinations were also made by atomic absorption. All sample pulps from the ELF GROUP are stored at the Acme Analytical Laboratory in Burnaby.

Sample results from the geochemical program are plotted on the accompanying 1:5,000 scale "Geochemical Values and Contour Maps for Copper, Lead and Zinc", and 1:10,000 scale "Geochemical Compilation Map".

In order to interpret the stream sediment results on both property and regional scales, thresholds for lead, zinc and barium were calculated by cumulative frequency plots to distinguish response of mineralization from background values. The resulting calculated thresholds, which may be noted on the following page, outline the increased background levels for the various units comprising the Gunsteel Formation. Lead response appears to be the best indicator of stratiform barite-sulphide mineralization.

TABLE II:

REGIONAL SILT SAMPLING PROGRAM CALCULATED THRESHOLDS (ALL VALUES IN PPM)

UNIT		LEAD	ZINC	BARIUM
WARNEFORD		19	240	150
GUNSTEEL	CHERT & SHALE	28	680	555
	THICK BEDDED ARGILLITE	63	1240	420
	RIBBON CHERT	35	845	375
BESA RIVER		20	335	380
MID DEVONIAN LIMESTONE		18	310	250
SILURIAN SILTSTONE		21	365	330
ROAD RIVER		20	1640	620

Follow-up of silt sample R108 at the mouth of Elf Creek led to the discovery of stratiform barite-galena-sphalerite float. Silt sampling of other adjacent streams was undertaken after the ELF GROUP was staked. Stream sediments taken in MacIssac Creek are moderately anomalous in lead and barium from Sample GY8I6S to the mouth at the Akie River suggesting the presence of a mineralized horizon crossing the stream between sample sites 15 and 16. Streams sampled further to the east were not anomalous in either lead or barium. The creek draining the three large gossans is extremely anomalous in zinc with values ranging from 2,200 to 22,000 ppm. To date, it is not known what percentage of zinc content is due to the scavenging effect of iron hydroxide in the stream sediment.

Detailed silt sampling along Elf Creek yielded moderately anomalous lead response and low zinc values directly downstream from the gossan. Prospecting led to the discovery of two occurrences of massive barite float with minor recrystallized galena. Highly anomalous lead response and associated blocks of high grade barite-galena-sphalerite float discovered roughly 1 kilometer from the mouth of Elf Creek suggest the presence of a mineralized horizon subcropping the immediate area.

Values obtained from streams draining the western half of the claim group underlain by the Pregnant Shale outline the high lead and barium content of this unit.

Widely spaced soil lines established in the eastern and western portions of the property outlined several areas of moderate lead-zinc response that require detailed grid sampling. The area between Ian and Joel Creeks is of particular interest due to the large size of the anomalous area.

Results of the grid sampling may be noted on the accompanying 1:5,000 scale "Geochemical Values and Contour Maps for Copper, Lead and Zinc. Contour intervals for each element were calculated graphically from cumulative frequency plots.

Copper values are extremely low. The threshold for copper, calculated at mean plus one standard deviation, is roughly 60 parts per million (ppm). Values

over 60 ppm copper are generally associated with zinc response and in only one location coincident with high lead values. The most intense copper anomaly located on lines 101 and 102 West is coincident with very high lead-zinc values that appear to trace a sub-outcrop of galena-sphalerite mineralization. Copper minerals are notably absent from sulphide mineralization found on the ELF Claims.

The large lead anomaly in the Elf Creek Valley, peaking at 57,000 ppm, is likely due to a northwest trending mineralized horizon subcropping between station 197+50 N on line 102 W and station 197 N on line 101 W. Test pits and hand trenches will be sited slightly uphill from the anomaly in an attempt to determine thickness, grade and attitude of the mineralization. Orientation of the anomaly with topography indicates the mineralized horizon dips to the north. Small isolated moderately anomalous lead values located along the banks of Elf Creek further downstream are probably related to float distribution. Isolated moderately anomalous lead anomalies in the western portion of the grid have not been explained and will be prospected early in 1979. The grid will be completed to Joel Creek in June, 1979.

Overall zinc response appears to coincide with lead response. The most intense anomaly is coincident with extremely high lead values between lines 99 and 102 W. Major trends of discontinuous moderately anomalous zinc response between 197 N, 112 W and 197+50 N, 102 W as well as 204+50 N, 118 W and 200 N, 107 W appear to outline the general surface trace of a weakly mineralized horizon which is presumed to be the stratigraphically lower portion of the Pregnant Shale. Several low priority zinc anomalies between Elf and MacIssac Creeks have no associated lead response but some associated small copper anomalies. Source of copper-zinc response has not been determined to date.

GEOPHYSICAL SURVEYS

A total of 6 kilometers of horizontal loop electromagnetic survey was completed on six widely spaced flagged lines to give us some preliminary results with respect to the number of conductors and conductor intensity of the black clastic succession in the grid area. It was hoped that this electromagnetic

survey would provide us with a mapping tool in large areas of vegetation cover. It was also hoped that the stratiform barite-sulphide horizon could be traced along strike using this configuration and the vertical loop mode.

Survey Method

The MaxMin unit was used in the horizontal loop mode with a cable length of 50 meters. The 1777 Hz frequency was read at each station and periodic checks were made by reading 444 Hz. Readings were taken at 50 meter intervals and at 25 meter intervals in anomalous areas. Slopes were measured using an inclinometer and the receiver and transmitter coils were aligned using the built-in tilt meters.

Instrumentation

The Apex MaxMin II electromagnetic system manufactured by Parametrics Limited, Markham, Ontario, was used on the entire claim block. Specifications for the instrument are shown below:-

APEX MAXMIN II EM SYSTEM SPECIFICATIONS

OPERATING FREQUENCIES:	222, 444, 888, 1777 and 3555 Hz.
COIL SEPARATIONS:	50, 100, 200, 250 meters.
MODES OF OPERATION:	(a) Tx coil plane and Rx coil plane horizontal (Horizontal loop mode). (b) Tx coil plane horizontal and Rx coil plane vertical (Minimum coupled mode).
PARAMETERS MEASURED:	In-Phase and Quadrature component of the secondary field.
READOUTS:	Automatic, direct readout on 3½" size meters.
SCALE RANGES:	In-Phase: ±20% normal, ±100% by switch. Quadrature: ±20% normal, ±100% by switch. Inclinometers: ±50% tilt.
READING REPEATABILITY:	±½% to ±1%.

Results and Interpretation

Excellent conductors were located on all lines. Vertical loop crossovers were not attempted due to very wide line spacing and dense vegetation. Conductors are tentatively orientated parallel to the overall northwest trending structural-stratigraphic grain of the underlying units. Similar configuration and intensity of electromagnetic response on lines 105 W, 110 W and 115 W suggests the presence of three semi-parallel conductors. The broad intense conductive zone on the south ends of lines 120 W and 115 W is probably due to shallow dipping, graphitic, thick-bedded argillite noted in outcrop northwest of line 120 W. Detailed geological mapping is required in the grid area to conclusively interpret the electromagnetic response.

CONCLUSION AND RECOMMENDATIONS

A northwest trending belt of Upper Devonian "Black Clastics", unconformably overlying Mid-Paleozoic shale, siltstone and limestone, has been outlined in an imbricate thrust slice in the Gataga area in northern British Columbia. Regional mapping and preliminary wide spaced silt sampling along this thrust panel resulted in the discovery of high grade stratiform barite-lead-zinc float on the ELF GROUP.

Preliminary mapping on the property has outlined an anomalous thickening of the Gunsteel Formation, which hosts high-grade stratiform barite-sulphide float. The Pregnant Shale, a thick-bedded argillite appears to be intimately associated with the stratiform mineralization.

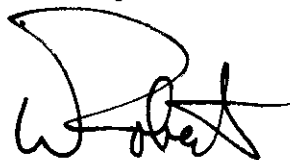
Wide spaced soil lines established throughout the claim group have outlined a semi-continuous 12 kilometer lead-zinc anomaly that is related to near surface exposures of stratiform mineralization and the enclosing lead-zinc rich Pregnant Shale. Grid soils have successfully delineated near surface lead-zinc mineralization in the Elf Creek Valley.

Several test lines of Horizontal Loop E.M. survey successfully outlined strong conductors that cannot be correlated with possible stratiform sulphides or

carbonaceous horizons until detailed geological mapping of the property is completed.

A program of continued grid establishment, soil sampling, electromagnetic surveys, prospecting, detailed geological mapping and diamond drilling is recommended for the 1979 season. Expenditures for 1979 are estimated to be \$180,000.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'W. J. Roberts'. The signature is stylized with a large, sweeping initial 'W' and a long horizontal stroke extending to the right.

W. J. Roberts.

March 8, 1979.

REFERENCES

- Cecile, M. P. and Norford, B. S. (1979):
Basin to platform transition, lower Paleozoic strata of Ware and Trutch map-areas, northeastern British Columbia; in Current Research, Part A, Geological Survey of Canada, Paper 79-1A, Report 36.
- Gabrielse, H. (1977): Geological map of Ware W $\frac{1}{2}$ and Toadoggone River map-areas; Geological Survey of Canada, Open File Report 483.
- Morrow, D. W. (1978): The Dunedin Formation; A Transgressive Shelf Carbonate Sequence. Geological Survey of Canada, Paper 76-12.
- Norford, B. S., Gabrielse, H., and Taylor, G.C. (1966):
Stratigraphy of Silurian carbonate rocks of the Rocky Mountains, northern British Columbia; Bulletin of Canadian Petroleum Geology, v. 14, no. 4, p. 504-519.
- Norford, B. S. (1979): Lower Devonian graptolites in the Road River Formation, northern British Columbia, 94-B, C, F; in Current Research, Part A, Geological Survey of Canada, Paper 79-1A, Note.
- Taylor, G. C., and MacKenzie, W. S. (1970):
Devonian stratigraphy of northeast British Columbia; Geological Survey of Canada, Bulletin 186.
- Taylor, G. C., and Stott, D. F. (1973):
Tuchodi Lakes map-areas; Geological Survey of Canada, Memoir 373.
- Taylor, G. C., Cecile, M. P., Jefferson, C. W., and Norford, B. S. (1979):
Stratigraphy of the Ware E $\frac{1}{2}$ map area; in Current Research, Part A, Geological Survey of Canada, Paper 79-1A, Report 37.
- Taylor, G. C. (1979): Geological Map of Ware E $\frac{1}{2}$ and Trutch map-areas; Geological Survey of Canada, Open File Report 606.

- Thompson, R. I. (1976): Some aspects of stratigraphy and structure in the Halfway River map-area, 94 B, British Columbia; in Report of Activities, Part A, Geological Survey of Canada, Paper 76-1A, p. 471-477.
- (1978): Geological maps of the Halfway River map-area, 94 B, 1:250,000 and 1:50,000; Geological Survey of Canada, Open File Report 536.

STATEMENT OF QUALIFICATION

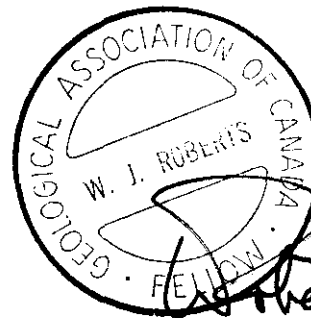
I, WAYNE J. ROBERTS, Geologist, with business address in Vancouver, British Columbia, and residential address in Coquitlam, British Columbia, hereby certify that:

1) I graduated from the University of British Columbia in 1968 with a BSc majoring in Geology.

2) From 1968 to the present I have been actively engaged as a geologist in mineral exploration in British Columbia and the Yukon Territory.

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

4) I personally participated in the field work on the ELF GROUP and have interpreted all data resulting from this work.



WAYNE J. ROBERTS.

SUMMARY OF COSTSCYPRUS ANVIL MINING CORPORATIONELF GROUP Expenditure SummaryJune 4 - Sept 4, 1978

SALARIES AND WAGES

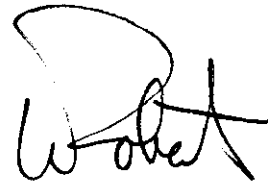
W. Roberts	June 4, 5, 7, 10, 11, 15 July 21, 22 Aug 15-17	11 days @ \$100/day	\$ 1,100.00
J. Cook	July 16-23 Aug 9-17	16 days @ \$ 45/day	720.00
D. Jarecki	Aug 13-17, 19, 25-27	9 days @ \$ 45/day	405.00
M. Kilby	Aug 14-22, 25-28	12 days @ \$ 40/day	480.00
D. MacIssac	Aug 14-17, 19, 25-29	10 days @ \$ 35/day	350.00
G. Melange	Aug 20	1 day @ \$ 31/day	31.00
I. Montgomery	Aug 8, 14-17, 19, Aug 25-28	10 days @ \$ 37/day	370.00
J. Posener	Aug 20	1 day @ \$ 45/day	45.00
J. Johnston	July 1 day Aug 6 days	7 days @ \$ 78/day	546.00
D. Kilby	June 7 days July 5 days Aug 6 days	18 days @ \$102/day	1,836.00
			<hr/> \$ 5,883.00
LINE CUTTING	Eastern Associates Ltd., Whitehorse, Y. T. 9km @ \$240/km		2,160.00
GEOPHYSICAL SURVEYS	Apex Parametrics Rental from July 24-Aug 23/78		477.60
			<hr/> \$ 8,520.60
	CARRIED FORWARD		

SUMMARY OF COSTS - Continued

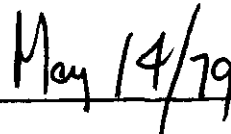
BALANCE BROUGHT FORWARD		\$ 8,520.60
ASSAYS AND GEOCHEMICAL ANALYSIS		
	Acme Analytical Laboratories 1450 samples @ \$2.00/sample including analysis and sample preparation	2,900.00
FIELD EQUIPMENT AND SUPPLIES		487.92
CAMP. MAINTENANCE		2,630.92
TRANSPORTATION		
Fuel	925 gallons @ \$1.00/gal	925.00
Rotary Wing	Okanagan Helicopters 36.7 hours @ \$260.90/hr	9,575.03
Fixed Wing	N. T. Air 1480 miles @ \$1.75/mi	2,590.00
Miscellaneous Transportation		1,288.70
		<hr/>
		14,378.73
TOTAL DIRECT FIELD COSTS		<hr/> <u>\$ 28,918.17</u>
REPORT WRITING, RESEARCH, DRAFTING, ETC		
W. Roberts	Oct 1-7/78 Jan 28-31/79 Mar 15, 16, 19-21/79	15 days @ \$100/day
		1,500.00
C. L. Cory	51.3 hours @ \$8/hr	410.67
Vanca1 Reproductions		248.29
Dominion Blueprint		8.46
		<hr/>
		2,167.42
TOTAL COST		<hr/> <u>\$ 31,085.59</u>

AFFIDAVIT SUPPORTING SUMMARY OF COSTS

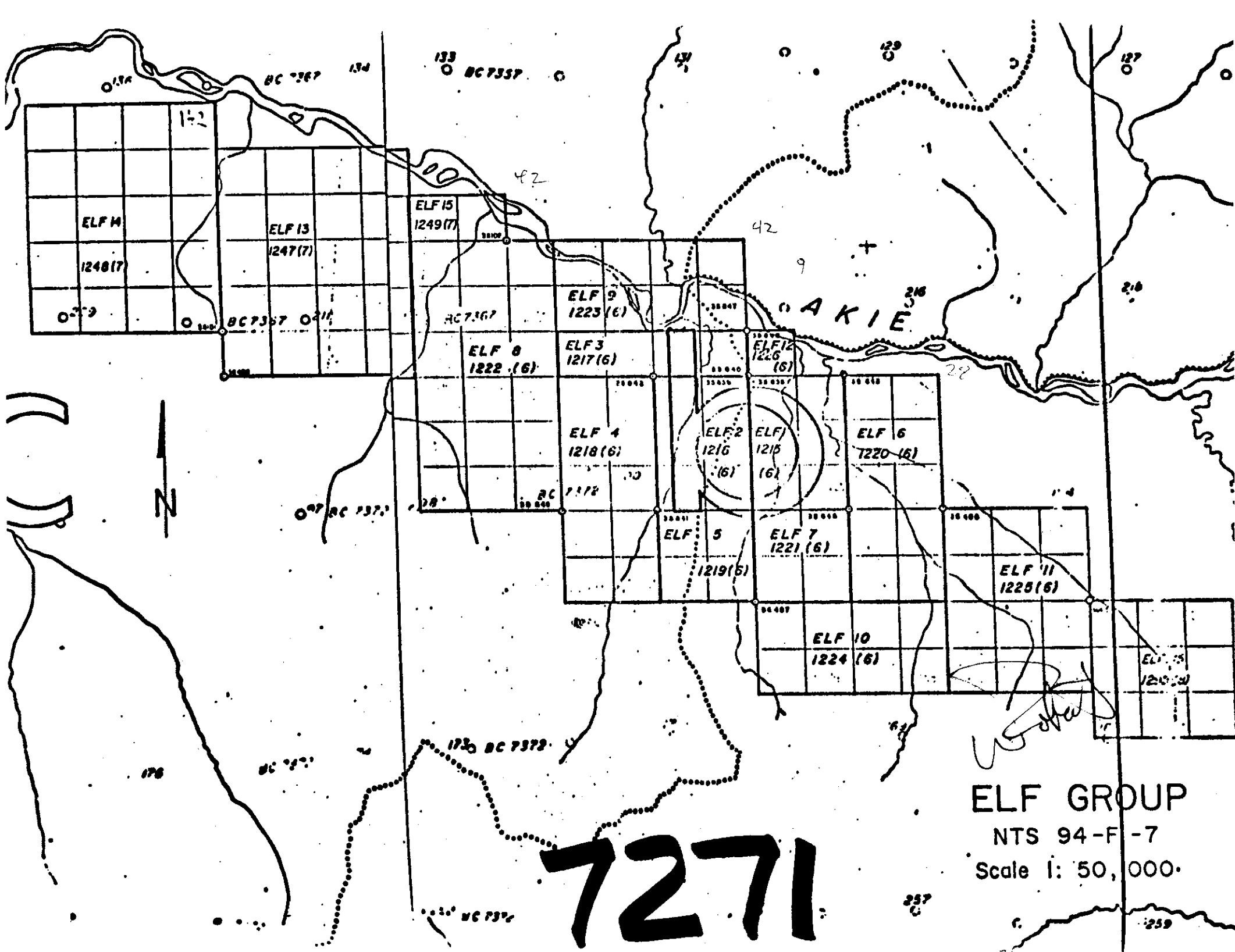
I, WAYNE J. ROBERTS, Geologist, Cyprus Anvil Mining Corporation, of Vancouver, British Columbia, do hereby state, that, to the best of my knowledge and belief the Statement of Costs in this report (GEOLOGICAL, GEOCHEMICAL AND GEOPHYSICAL REPORT on the ELF GROUP) is a true account of expenditures incurred from exploration on the ELF property.



WAYNE J. ROBERTS

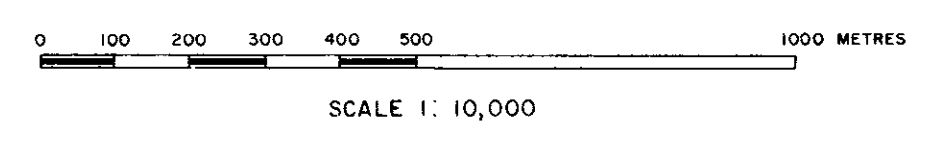
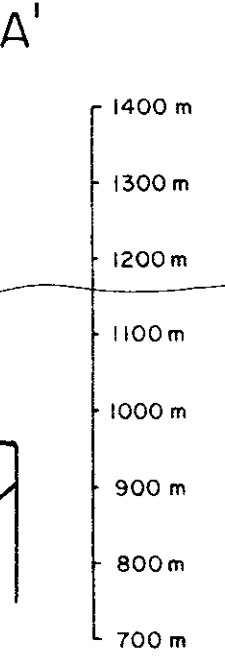
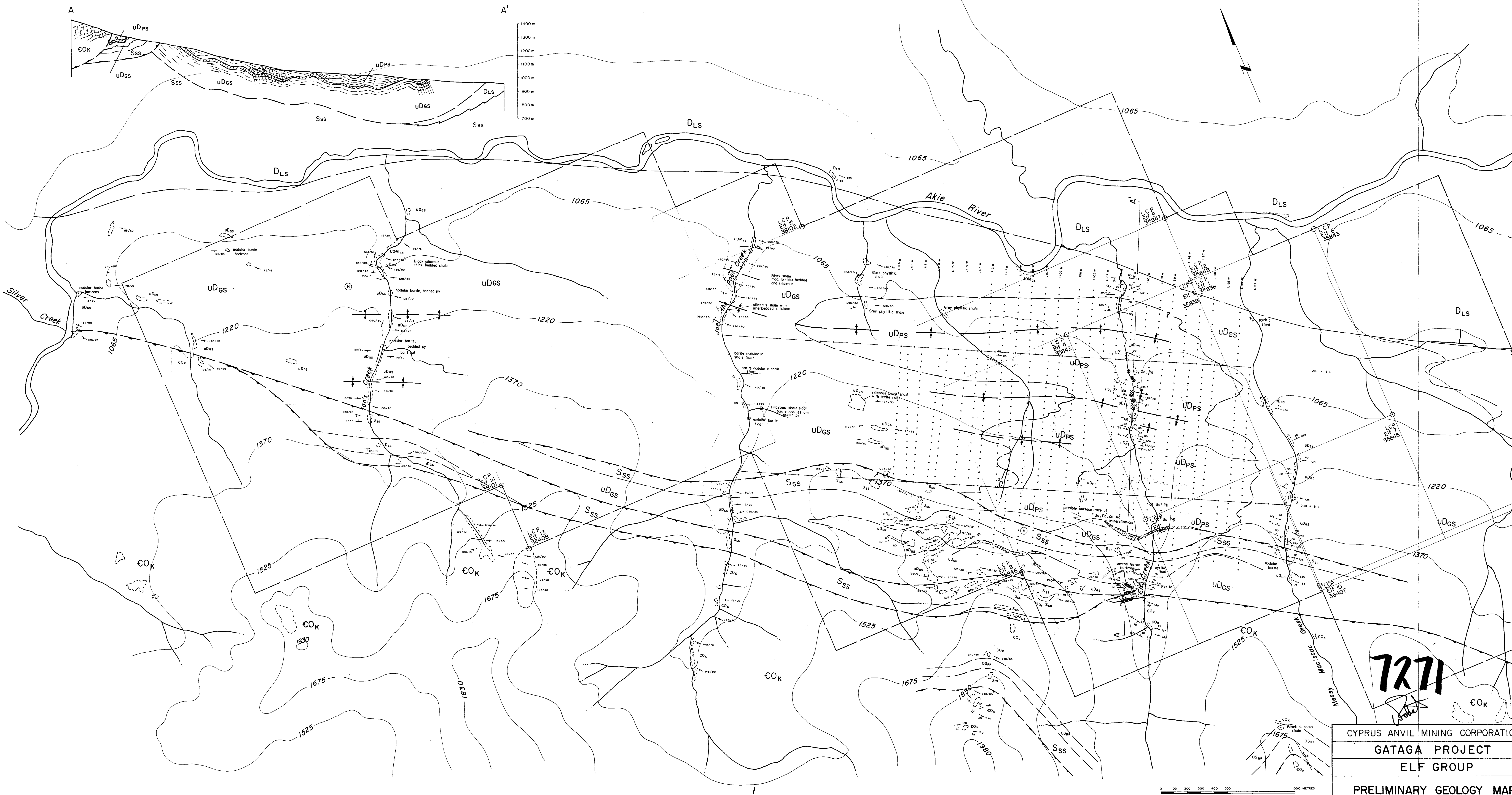


DATE



7271

ELF GROUP
 NTS 94-F-7
 Scale 1: 50,000

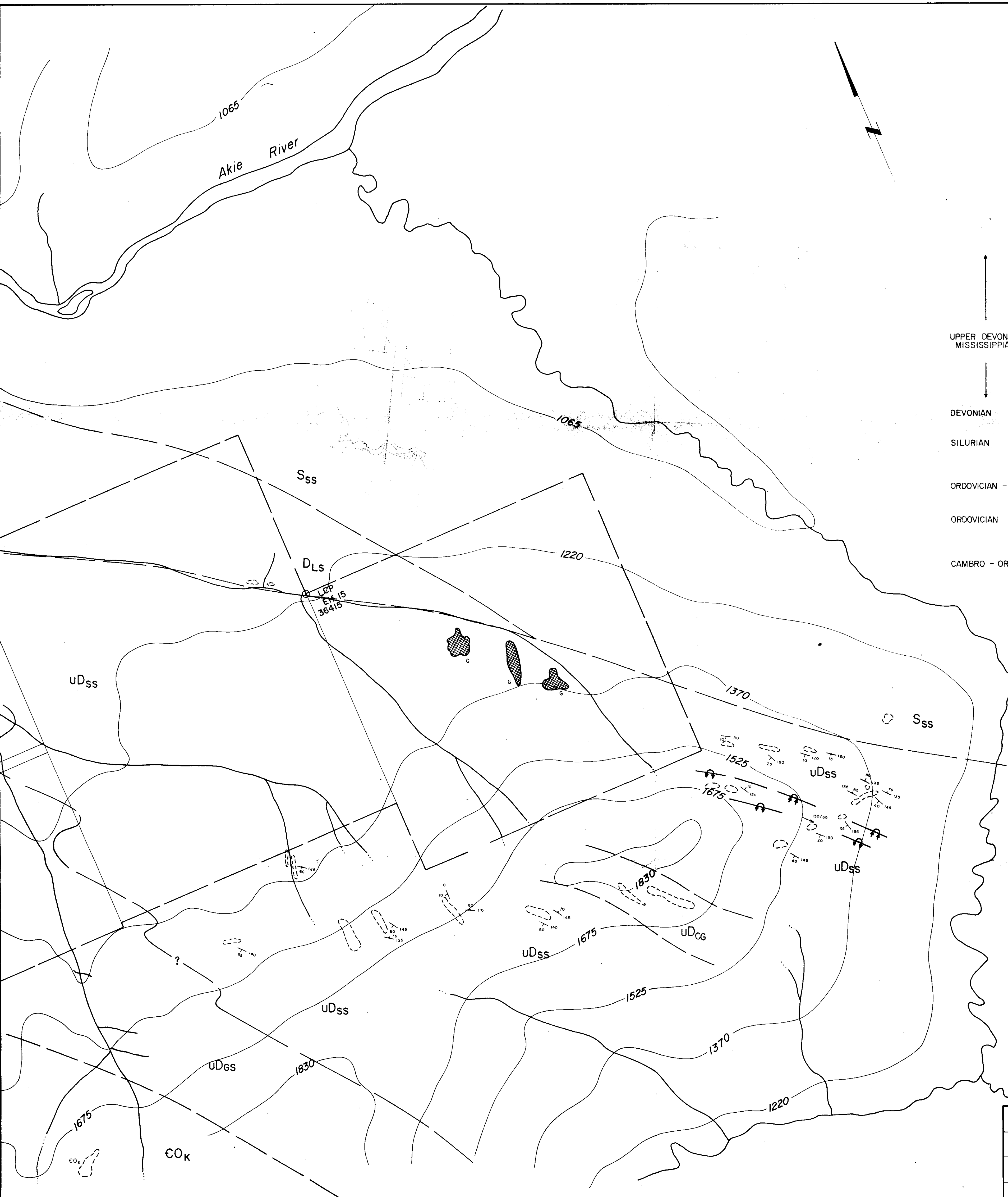


7271

CYPRUS ANVIL MINING CORPORATION
GATAGA PROJECT
ELF GROUP
PRELIMINARY GEOLOGY MAP

N.T.S. 94-F-7
 DESIGNED BY: W. J. ROBERTS
 DRAWN BY: C. L. CORY

DATE: SEPT. 1976
 GEOLOGY BY: W. J. ROBERTS
 SHEET 1 of 2



LEGEND

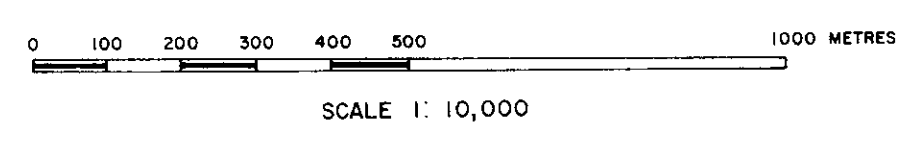
- | | | | |
|--------------------------------|---|-------------|---|
| UPPER DEVONIAN - MISSISSIPPIAN | ↑ | UDGs | GUNSTEEL FORMATION
SILVERY GREY WEATHERING, BLACK SILICEOUS SHALE. |
| | | UDCG | BROWN WEATHERING, BLACK TO BROWN SILTSTONE, GREY - WACKE AND POLYMICCTIC CONGLOMERATE. |
| | | UDPS | LIGHT GREY WEATHERING, SOFT, FRIABLE HIGHLY FOLIATED, LIGHT GREY PHYLLITIC SHALES |
| | | UDRC | SILVERY BLUE - GREY WEATHERING, BLACK RIBBON CHERT INTERBEDDED WITH BLACK SILICEOUS SHALE. |
| | | UDsq | SILVERY GREY WEATHERING, BLACK SHALE INTERBEDDED WITH BLACK QUARTZITE. |
| | | UDSS | TAN BROWN WEATHERING, BROWNISH BLACK SILTY SHALE WITH INTERBEDS OF SILTSTONE AND CONGLOMERATE. |
| DEVONIAN | | DLs | LIGHT GREY WEATHERING, DARK GREY CRYSTALLINE LIMESTONE |
| SILURIAN | | SSs | LIGHT ORANGE TO BUFF WEATHERING, MASSIVE DARK GREY, VARIABLY BIOTURBATED DOLOMITIC SILTSTONE. |
| ORDOVICIAN - SILURIAN | | OSRR | ROAD RIVER FORMATION
BLACK TO GREY WEATHERING, BLACK GRAPHITIC GRAPTOLITIC VARIABLY CALCAREOUS SHALE. |
| ORDOVICIAN | | Ov | ORANGE WEATHERING, BUFF, TAN AND GREEN CALCAREOUS VOLCANICS. |
| CAMBRO - ORDOVICIAN | | COk | KECHIKA GROUP
BUFF TO CREAM WEATHERING, ARGILLACEOUS WAVY BANDED, SILTY, NODULAR LIMESTONE AND CALCAREOUS GREY SHALE. |

Symbols

- | | |
|--|---|
| | LIMIT OF OUTCROP |
| | GEOLOGICAL CONTACT, DEFINED, APPROXIMATE |
| | BEDDING (S _b) |
| | FOLIATION (S _f) |
| | FOLD AXIS (F _i) |
| | LINATION (L _i) |
| | ANTICLINAL FOLD AXIS |
| | SYNCLINAL FOLD AXIS |
| | THRUST FAULT |
| | ⊕ Pb, Zn
FLOAT MINERALIZATION |
| | SURFACE PROJECTION OF MINERALIZED HORIZON |
| | GOSSAN |

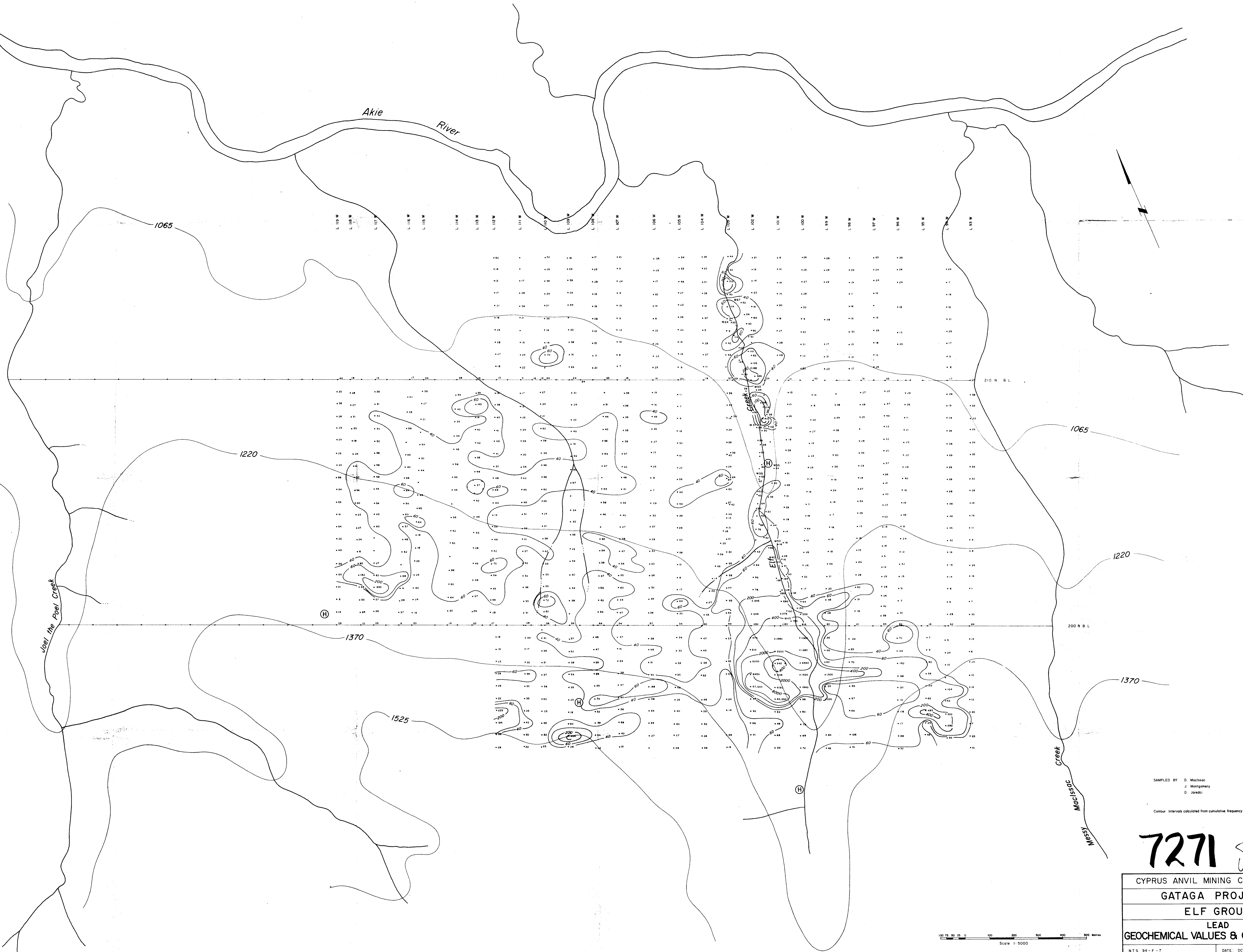
7271

CYPRUS ANVIL MINING CORPORATION
GATAGA PROJECT
ELF GROUP
PRELIMINARY GEOLOGY MAP



N.T.S. 94 - F - 7
 DESIGNED BY: W.J. ROBERTS
 DRAWN BY: C. L. CORY

DATE: SEPT. 1978
 GEOLOGY BY: W.J. ROBERTS, D. KILBY
 SHEET 2 of 2 MAP No. 2

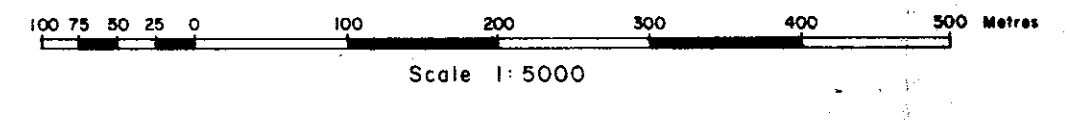


SAMPLED BY: D. MacIssac
 J. Montgomery
 D. Joradi

Contour intervals calculated from cumulative frequency plots

7271

CYPRUS ANVIL MINING CORPORATION	
GATAGA PROJECT	
ELF GROUP	
LEAD	
GEOCHEMICAL VALUES & CONTOUR MAP	
NTS: 34-F-7	DATE: OCT 13, 1978
DESIGNED BY: W. J. ROBERTS	SHEET 1
DRAWN BY: C. L. CORY	MAP No. 3



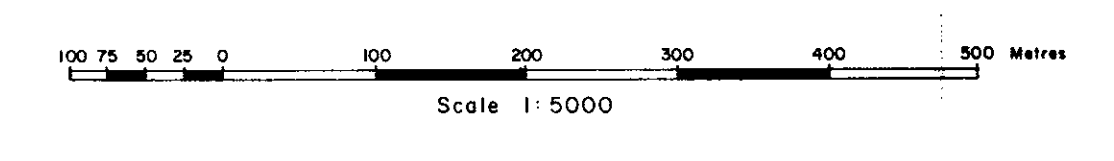


SAMPLED BY: D. Mactisac
 J. Montgomery
 D. Jarecki

Contour intervals calculated from cumulative frequency plots.

7271

CYPRUS ANVIL MINING CORPORATION	
GATAGA PROJECT	
ELF GROUP	
ZINC	
GEOCHEMICAL VALUES & CONTOUR MAP	
N.T.S. 94-F-7 DESIGNED BY: W.J. ROBERTS DRAWN BY: C.L. CORY	DATE: OCT. 13, 1978 SHEET: 1 MAP No. 4





SAMPLED BY: D. MacIssac
 J. Montgomery
 D. Jurado

60 ppm contour calculated as mean plus one standard deviation of background population

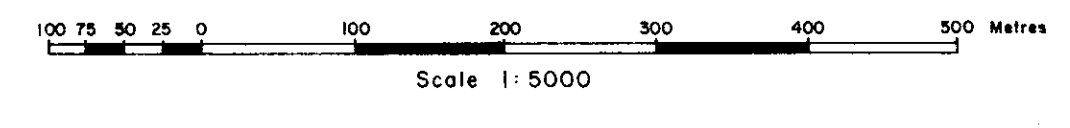
7271

W. J. Roberts

CYPRUS ANVIL MINING CORPORATION
GATAGA PROJECT
ELF GROUP
COPPER
GEOCHEMICAL VALUES & CONTOUR MAP

NTS 96-F-7
 DESIGNED BY: W. J. ROBERTS
 DRAWN BY: C. L. CORY

DATE: OCT 13, 1978
 SHEET: 1
 MAP No. D





7271

CYPRUS ANVIL MINING CORPORATION
GATAGA PROJECT
ELF GROUP
GEOCHEMICAL COMPILATION MAP

N.T.S. 94-F-7
 DESIGNED BY: W. J. ROBERTS
 DRAWN BY: C. L. CORY

DATE: SEPT. 1978
 SHEET 1 of 2
 MAP No. 6

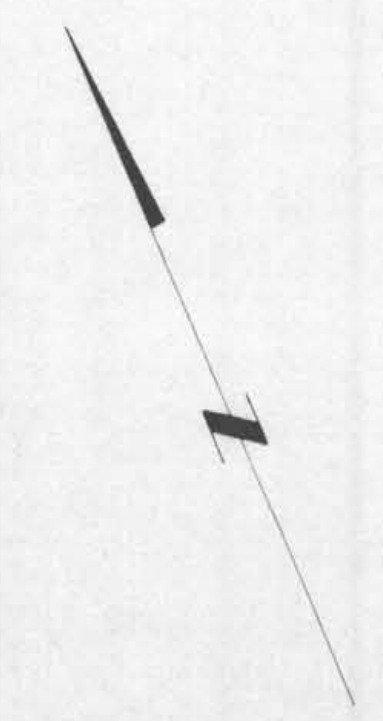
SAMPLED BY:
 D. MACISSAC
 M. KILBY
 G. MELANGE

J. POSNER
 D. JARECKI
 I. MONTGOMERY

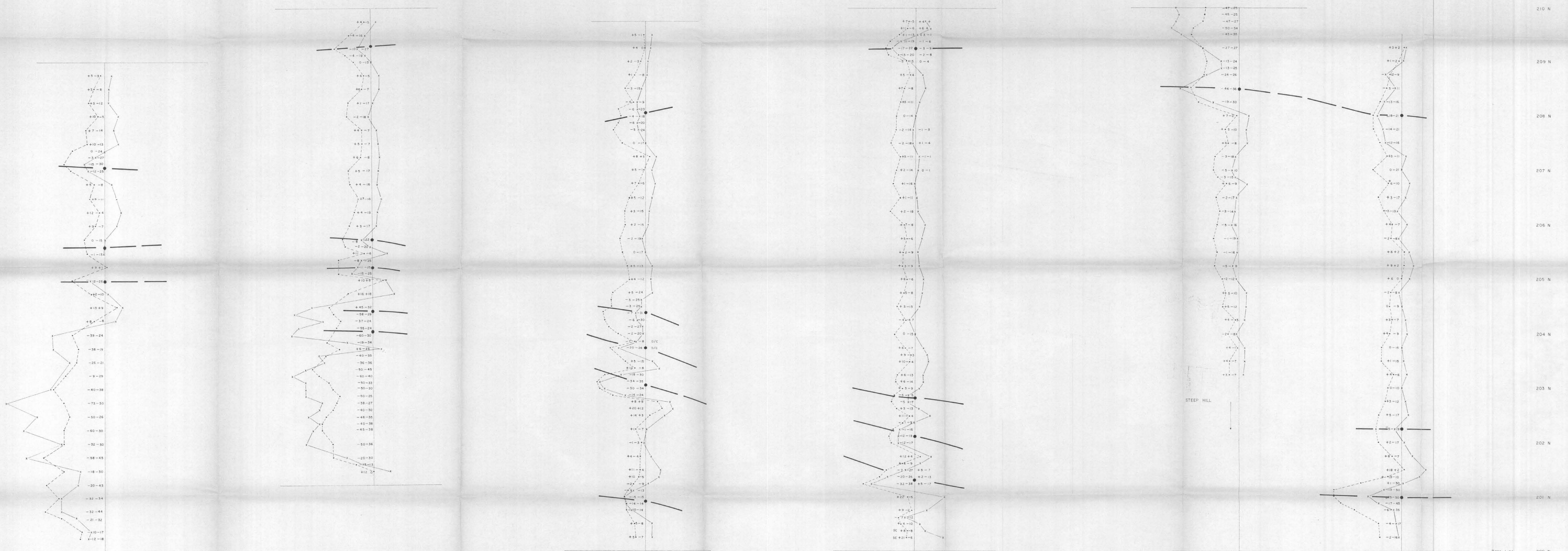
— Cu
 — Pb
 - - - Zn

• 50, 35, 250, 5, 1000
 Cu, Pb, Zn, Ag, Ba
 All values in parts per million (ppm)

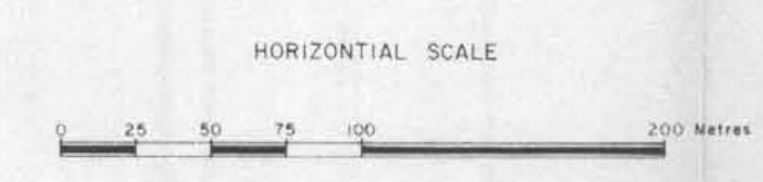
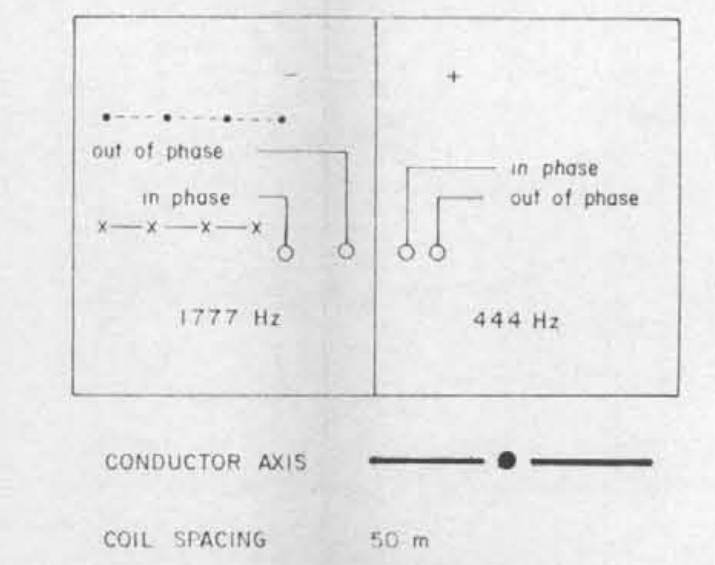
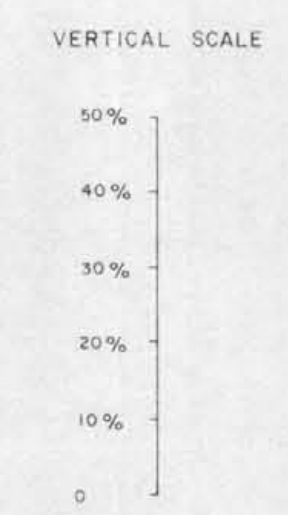
0 100 200 300 400 500 1000 METRES
 SCALE 1:10,000



L 120 W L 115 W L 110 W L 105 W L 100 W L 99 W L 96 W



210 N
209 N
208 N
207 N
206 N
205 N
204 N
203 N
202 N
201 N
Base Line 200 N



7271 *WJ*

CYPRUS ANVIL MINING CORPORATION
GATAGA PROJECT
ELF GROUP
HORIZONTAL LOOP
ELECTROMAGNETIC SURVEY

N.T.S. 94 - F - 7
DESIGNED BY W. J. ROBERTS
DRAWN BY C. L. CORY

DATE OCT 18, 1978
GEOPHYSICS BY J. JOHNSTON, D. JARECKI
M. KELBY
SHEET MAP No. 7