

GEOLOGICAL REPORT

ON THE

ELF GROUP

AKIE RIVER AREA

OMINECA MINING DIVISION

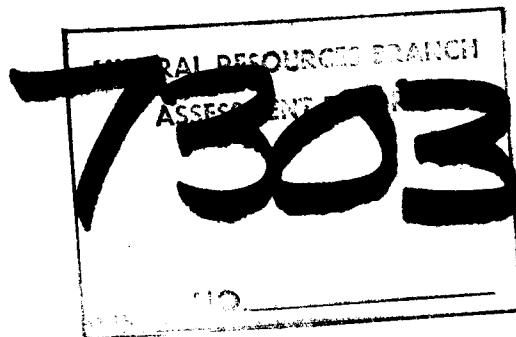
N.T.S. 94 - F - 7

LATITUDE: 57° 18' N

LONGITUDE: 124° 42' W

BY

W. J. ROBERTS



CYPRUS ANVIL MINING CORPORATION

JUNE 15, 1979

FIELD WORK DONE DURING THE PERIOD:

MAY 15 - JUNE 15, 1979.

CYPRUS ANVIL

TABLE OF CONTENTS

	<u>PAGE</u>
LIST OF CLAIMS	
INTRODUCTION	1
LOCATION AND ACCESS	2
REGIONAL GEOLOGY	2
ORTHOPHOTO BASE MAPS	4
GEOLOGY	5
Kechika Group	5
Road River Formation	7
Silurian Siltstone	7
Lower Devonian Shale	7
Black Clastics	7
Gunsteel Formation	8
CONCLUSIONS AND RECOMMENDATIONS	9

FIGURES

	<u>Scale</u>
Figure 1 Location Map	1:250,000

TABLES

Table I Table of Geological Formations	6
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APPENDICES

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

MAPS

		<u>Scale</u>
Map No. 1	Claim Map	1:50,000
Map No. 2	Orthophoto Base Map, ELF GROUP	1:10,000
Map No. 3	Orthophoto Base Map, ELF, 1-5, 7, and 8	1:5,000
Map No. 4	Preliminary Geology Map	1:5,000

GEOLOGICAL REPORT

ON THE

ELF GROUP

INTRODUCTION

The ELF GROUP, totalling 142 units, was staked in early June, 1978, 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.

During the 1978 field season, Cyprus Anvil performed preliminary silt and soil sampling, prospecting and geological mapping followed by detailed grid soil sampling.

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 was completed during the 1978 field season. Nine kilometres 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 metre intervals along the grid lines. Six kilometres of horizontal loop E.M. survey were conducted in an attempt to relate electromagnetic response to geologic units and possibly mineralization.

In March 1979, orthophoto base maps at scales of 1:5,000 and 1:10,000 were prepared for detailed work on the claim group. During the period May 15 to June 15 1979, a base camp was established at Pretzel Lake and a detailed mapping program, on a scale of 1:5,000, was initiated on the ELF 1 - 5, 7 and 8 claims.

LOCATION AND ACCESS

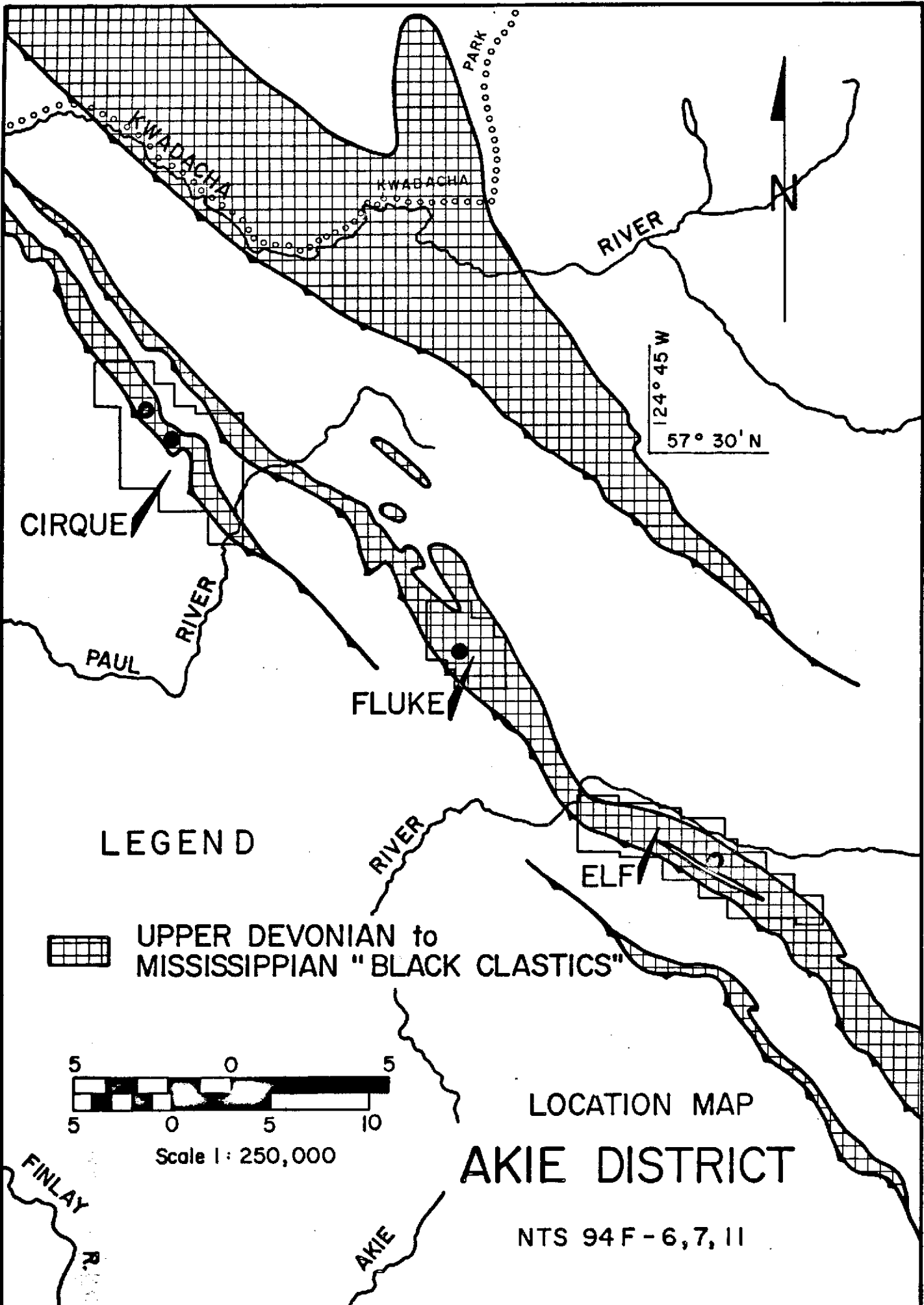
The ELF GROUP is located in the Ft. Ware area in northern British Columbia. The claims cover the south slope of the Akie River valley between the river and interfluvial ridge to the south. The center of the claim group, located at latitude 57° 18' N and longitude 124° 42' W, is roughly 35 kilometres on a bearing of 035 degrees from Akie Mountain and 30 kilometres 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 kilometres to the west. Logistical support was provided by float equipped fixed wing aircraft based at Mackenzie, 250 kilometres 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 kilometres. 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.

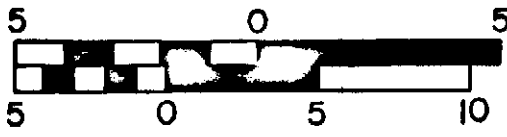
Our mapping program, primarily concerned with the internal stratigraphy of the black clastics, has documented the presence of three widespread lithologic units. The Besa River Formation forms the base of the black clastic succession and consists of an irregular blanket of brown silty shale with interbedded



LEGEND



UPPER DEVONIAN to MISSISSIPPIAN "BLACK CLASTICS"



Scale 1 : 250,000

LOCATION MAP

AKIE DISTRICT

NTS 94F-6,7,11

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.

ORTHOPHOTO BASE MAPS

Two base maps covering the area of interest on the ELF GROUP were prepared by McElhanney Surveying and Engineering Ltd. of Vancouver, B. C. The 1:10,000 scale orthophoto base map, covering the entire claim group, was constructed using the existing Federal Government aerial photography flown at an average scale of 1:30,000 during 1948. Stereo pairs were aerotriangulated

in a Wild A8 autograph and adjusted to the best available ground control derived from the existing 1:250,000 scale map of N.T.S. sheet 94-F.

The contour compilation was done directly at a mapping scale of 1:10,000 with a 20 metre contour interval. In addition to the contours several spot elevations were plotted. The contour compilation was drafted by the scribing technique and one clear contour overlay was reproduced. An orthophoto negative was produced from the existing photography and photo-mechanically enlarged to a scale of 1:5,000 using ground control from the aerotriangulation. The orthophoto mosaic was prepared using all the control points.

A 1:5,000 scale orthophoto base map covering our present area of interest was also constructed to give us better control for the detail geological mapping and diamond drilling program. The 1:5,000 scale orthophoto with 10m contours, constructed from existing 1:20,000 scale British Columbia Provincial aerial photography, was drafted and scribed by similar techniques used to produce the 1:10,000 orthophoto.

GEOLOGY






Detailed mapping on the property, to date, has outlined a thick succession of Upper Devonian to Mississippian black clastics in a northwest trending syncline trending through the central portion of the claim group. Several northwest trending thrust slices of Gunsteel Formation also occur along the southern boundary of the property.

The following descriptions summarize the aerial extent and lithologies of the 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 metres in thickness, is correlated with units mapped as

TABLE I: TABLE OF GEOLOGICAL FORMATIONS

<u>AGE</u>	<u>UNIT</u>	<u>DESCRIPTION</u>
UPPER DEVONIAN - MISSISSIPPIAN 	UD _{GS}	- undivided Gunsteel Formation, silvery-grey weathering, black siliceous shale and chert.
	UD _{SH}	- silvery-grey weathering, black highly siliceous shale.
	UD _{NP}	- black siliceous shale with pyrite nodules and barite strain shadows.
	UD _{NB}	- black siliceous shale with white barite nodules.
	UD _{BS}	- buff to light grey weathering, massive stratiform barite with galena, sphalerite, and pyrite.
	UD _{RC}	- black ribbon chert with black graphitic shale partings.
	UD _{IB}	- silvery-grey weathering, laminated siliceous shale and intraformational shale chip breccia.
	UD _{ST}	- dark grey weathering, dark grey to black massive siltstone.
	UD _{TB}	- light grey to greenish-grey weathering, soft, highly foliated, thick-bedded laminated silty shale.
	 unconformity 	
DEVONIAN	LD _{SH}	- black variably calcareous shale.
SILURIAN	S _{SS}	- light orange to buff weathering, massive dark grey, variably bioturbated dolomitic siltstone.
	 unconformity 	
ORDOVICIAN - SILURIAN	OS _{RR}	<u>Road River Formation</u> - black to grey weathering, black graphitic, graptolitic variably calcareous shale often with interbedded calcareous turbidite sequences.
CAMBRO - ORDOVICIAN	CO _K	<u>Kechika Group</u> - buff to cream weathering, argillaceous wavy banded, silty, nodular limestone to calcareous grey shale.

OK₄ and OK₃ by the G.S.C. further to the east. The characteristic buff weathering nature of this unit is typical throughout the northern Cordillera.

Road River Formation

Black weathering, black variably calcareous shale with calcareous turbidite sequences, noted in Elf Creek near the southern boundary of the claim group, has been tentatively mapped as the Road River. This unit appears to overlie the Kechika Group and underlie the Silurian Siltstone. Graptolites were not noted during 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. Graptolites noted within the formation have not been dated but are probably Middle to Late Silurian in age.

Lower Devonian Shale

Black weathering, non-siliceous, variably calcareous black shale, overlying Silurian Siltstone in Elf Creek, appears to underlie the black clastic succession and has been tentatively mapped as Lower Devonian shale. Fossils have not been found to accurately date this unit. Further work is planned during the 1979 field season.

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 shale 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.

Limited geological mapping on the property to date has not been sufficient to accurately determine the black clastic stratigraphy in this area. The relationship of the thick succession of thick-bedded, laminated silty grey shale, Unit UD_{TB}, to the Gunsteel Formation is presently unknown. This unit is similar to various regional facies of both the Warneford and Besa River Formations. Presuming there is an absence of thrust faults within the black clastics, Unit UD_{TB} would appear to underlie both a siltstone unit and the Gunsteel Formation. Further mapping is required throughout the property to determine the stratigraphic position of this unit.

The massive bedded black siltstone, Unit UD_{ST}, trending northwest through the center of the claim group appears to underlie the Gunsteel Formation and provides us with an excellent marker bed. The presence of a thrust fault at the base of the siltstone cannot be discounted.

Gunsteel Formation

The general rock type of this map unit is a silvery-grey weathering, finely-bedded, black siliceous shale. The shales noted in the map area are indistinguishable from shales throughout the 200 kilometre length of the belt of black clastics. Bedding is generally only visible on weathered surfaces where siliceous bands weather as fine white laminations. Overall silica content is gauged by the grey tones on weathered surfaces. Bedding varies from less than 1mm to over 2m in thickness. The high silica content and lack of siltstone beds is common throughout the Gunsteel Formation. This unit unconformably overlies the Silurian Siltstone along the southern boundary of the claim group and is intimately associated with all known barite-lead-zinc stratiform mineralization. The following brief descriptions summarize some of the rock units that comprise the Gunsteel Formation in this area.

Silvery-grey weathering laminated siliceous shale with several limited exposures of intraformational shale chip breccia occur near the base of the Gunsteel Formation in the southern portion of ELF Claim number 8. Black ribbon chert noted in Elf Creek on the ELF Claim number 3 is very similar to the chert underlying stratiform barite, lead and zinc mineralization on the nearby CIRQUE Claims. Silvery-grey weathering, black siliceous shale with nodular pyrite and barite mineralization in the southern portion of ELF Claims 4 and 8 is also identical to the units that directly overlie mineralization on the CIRQUE property.

A four metre thick exposure of massive barite-galena-sphalerite mineralization interbedded with several black shale horizons was discovered in the Elf Creek valley. A soil geochemical anomaly and associated float mineralization suggests a northwest trending surface trace of mineralization as shown on the accompanying "PRELIMINARY GEOLOGY MAP" as Unit UD_{BS}. The showing has not been channel sampled to date but visual estimates would suggest a grade in excess of 15 percent combined lead and zinc over a thickness of 4 metres. This showing does not appear to be the source for the high grade barite-lead-zinc float previously discovered in Elf Creek at approximately 1.5 kilometres from the Akie River.

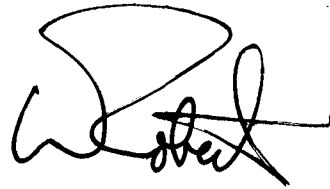
CONCLUSIONS AND RECOMMENDATIONS

The prepared 1:10,000 and 1:5,000 scale orthophotos will provide excellent base maps for control of detailed surveys planned for the 1979 field season on the ELF GROUP.

Detailed geological mapping, to date, has outlined a showing of high grade stratiform barite-galena-sphalerite mineralization in the Elf Creek valley. Various facies of the Gunsteel Formation noted adjacent to the stratiform mineralization are similar to lithologies intimately associated with stratiform sulphides on the CIRQUE Claims.

A continued program of detailed geologic mapping, line cutting, grid soil sampling, and diamond drilling will be undertaken during the period June 15th to September 15th.

Respectfully submitted,

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

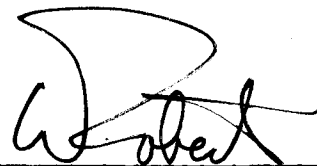
W. J. Roberts.

June 15, 1979.

STATEMENT OF QUALIFICATIONS

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 SummaryMay 15 - June 15, 1979.SALARIES AND WAGES

W. Roberts	May 27-31, June 1-13	18 days @ \$155/day	\$ 2,790.00
D. Kilby	June 5-15	11 days @ \$120/day	1,320.00
C. Jefferson	June 1-15	15 days @ \$80/day	1,200.00
B. Youngman	May 22-31, June 1-10	20 days @ \$44/day	880.00
K. McKimmon	June 1-10	10 days @ \$45/day	450.00
			<hr/>
			\$ 6,640.00

ORTHOPHOTO BASE MAPS

1:5,000	contract price from McElhanney Engineering	3,790.00
1:10,000	contract price from McElhanney Engineering	3,675.00
		<hr/>
		7,425.91

FIELD EQUIPMENT AND SUPPLIES

1,309.75

CAMP MAINTENANCE

1,213.11

FUEL

1,028.10

TRANSPORTATION

Rotary Wing	Northern Mountain Helicopters 5.5 hours @ \$330/hour	1,810.50
	Viking Helicopters 27 hours @ \$285/hour	7,695.00
		<hr/>
		9,505.50

CARRIED FORWARD

\$ 27,122.37

SUMMARY OF COSTS - Continued

BALANCE BROUGHT FORWARD \$ 27,122.37

Fixed Wing	N.T. Air		
	4 Otter trips Pretzel Lake to McKenzie		
	330 miles @ \$1.85/mile	\$ 2,442.00	
	1 Beaver trip McKenzie to Pretzel Lake		
	330 miles @ \$1.45/mile	478.50	
			<hr/>
			2,920.50

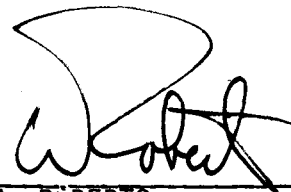
REPORT WRITING AND DRAFTING

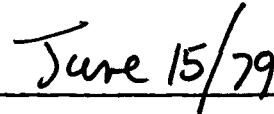
W. Roberts	June 14, 15	2 days @ \$155/day	310.00
Drafting		10 hours @ \$12/hour	120.00
			<hr/>
			430.00

TOTAL EXPENDITURES \$ 30,472.87

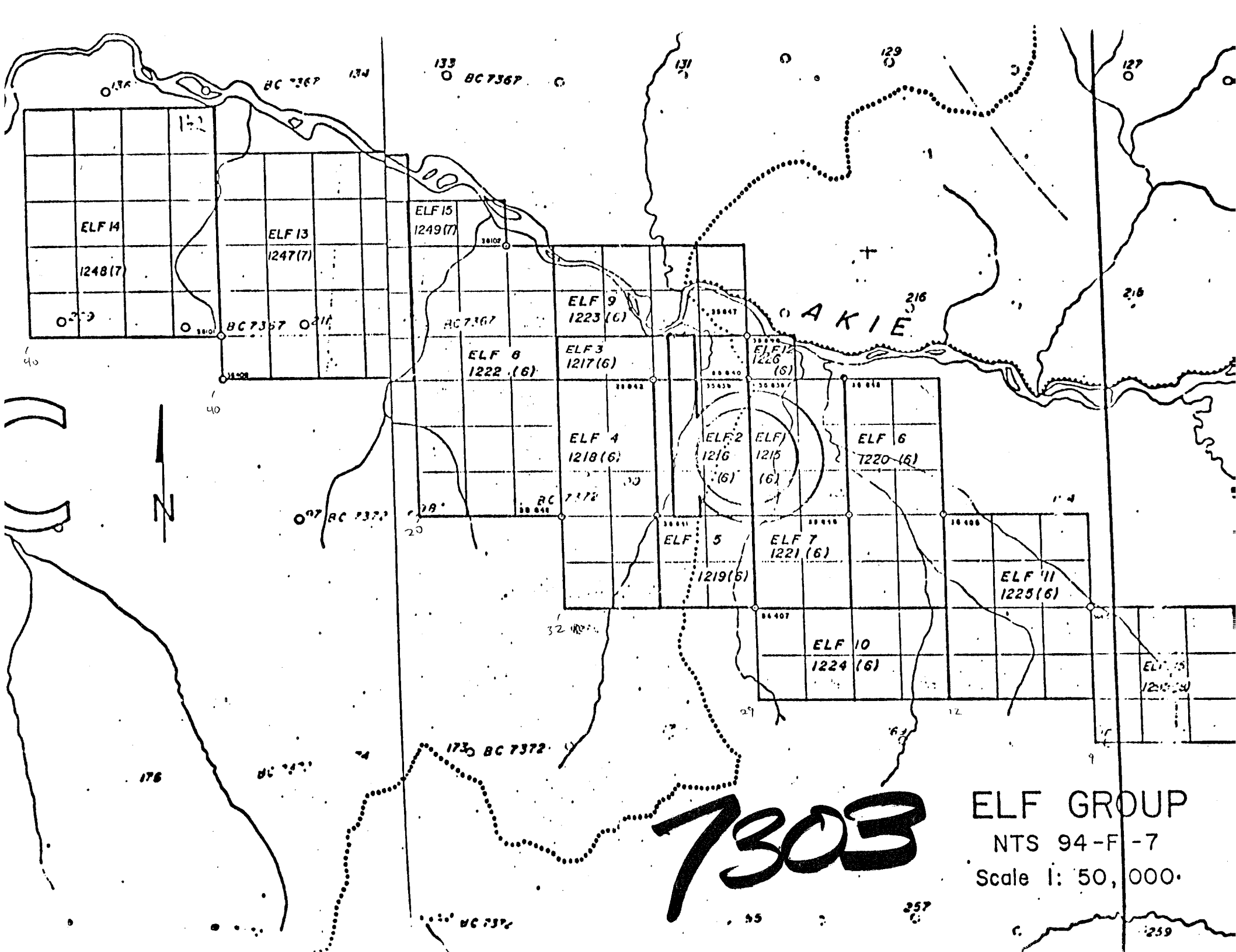
AFFIDAVIT SUPPORTING SUMMARY OF COSTS

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 (GEOLOGY REPORT on the ELF GROUP) is a true account of expenditures incurred from exploration on the ELF property.



WAYNE J. ROBERTS

DATE



7303

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



 2
SHEET INDEX



Scale and elevation datum based on limited ground control resulting in good relative, but uncertain absolute map accuracy.
Compiled from aerial photography at an approximate scale of 1" = 6 200 feet flown in 1974



McElhanney

McElhanney Surveying & Engineering Ltd.
1200 West Pender Street, Vancouver B.C., Canada

Scale - 1:10 000
Contour Interval - 20 Metres
Date - May 1979
Job No. - 06573-0
Sheet No. - 1 of 2, MAP No. 2

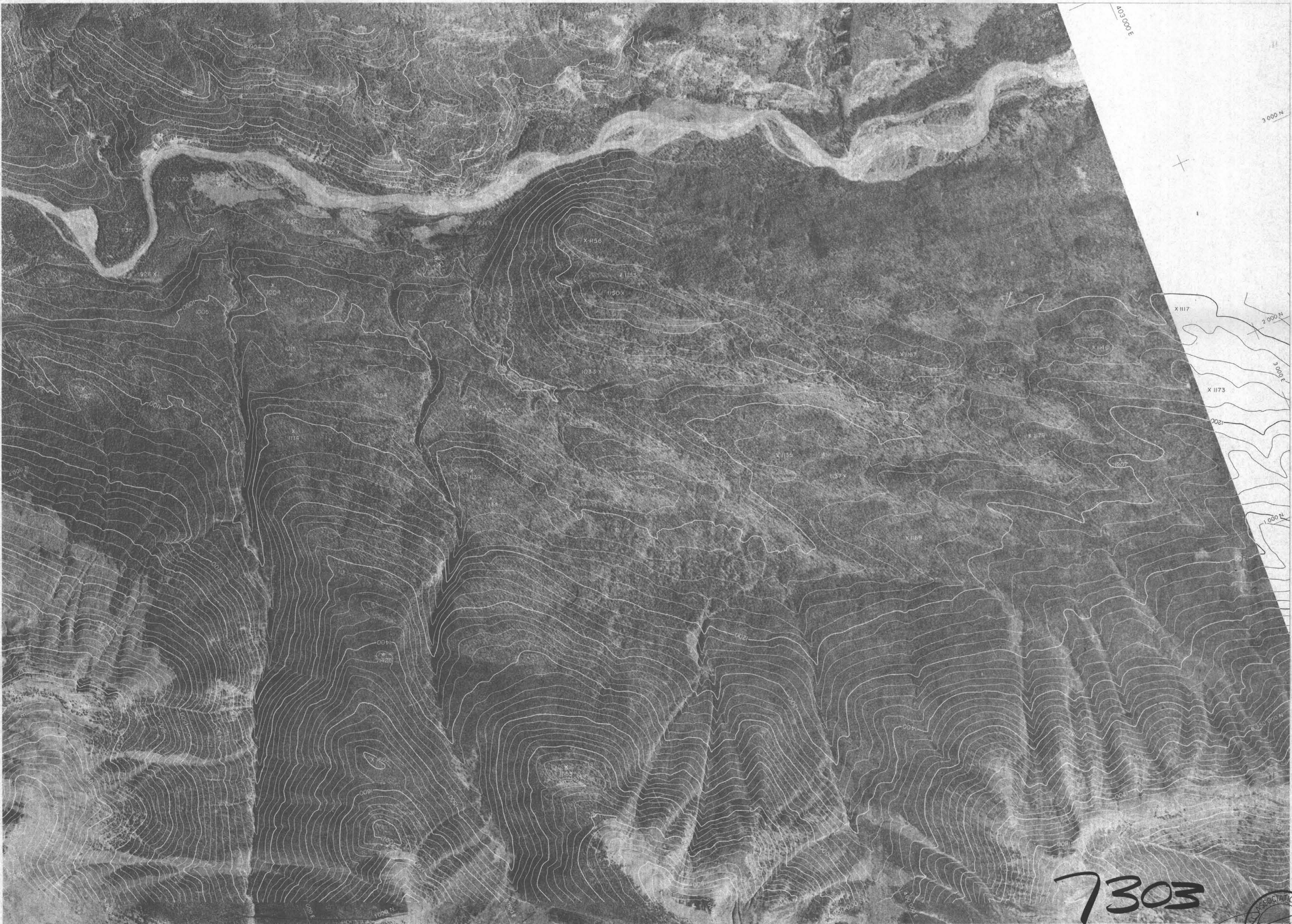
CYPRUS ANVIL MINING CORP.

ELF CLAIM

PRELIMINARY RECONNAISSANCE TYPE MAPPING



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7303


SHEET INDEX



Scale and elevation datum based on limited ground control resulting in good relative, but uncertain absolute map accuracy.
Compiled from aerial photography at an approximate scale of 1" = 6 200 feet flown in 1974

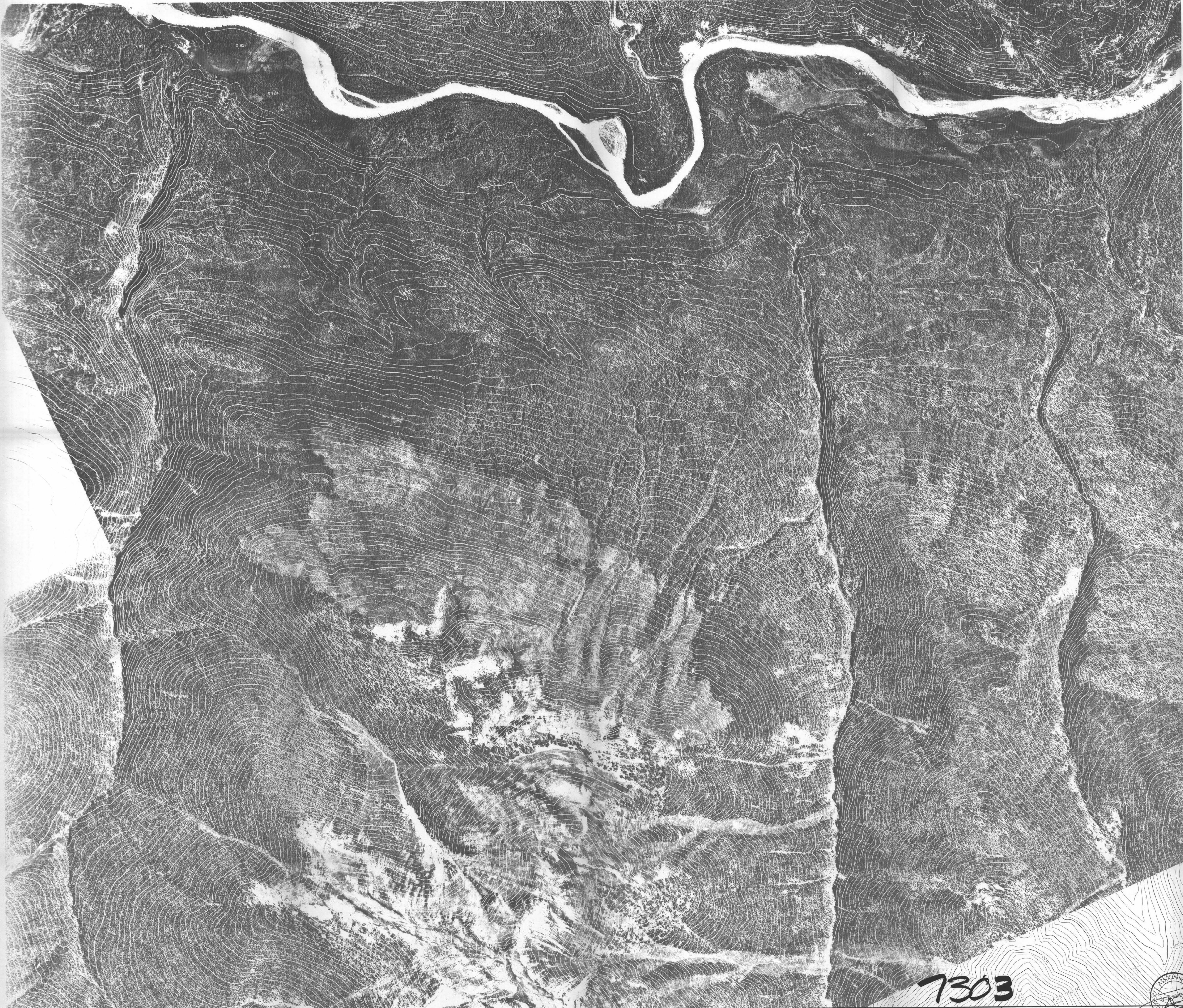


McElhanney Surveying & Engineering Ltd.
1200 West Pender Street, Vancouver B.C., Canada



Scale - 1:10 000
Contour Interval - 20 Metres
Date - May 1979
Job No. - 06573-0
Sheet No. - 2 of 2, MAP No. 2

CYPRUS ANVIL MINING CORP.
ELF CLAIM
PRELIMINARY RECONNAISSANCE TYPE MAPPING

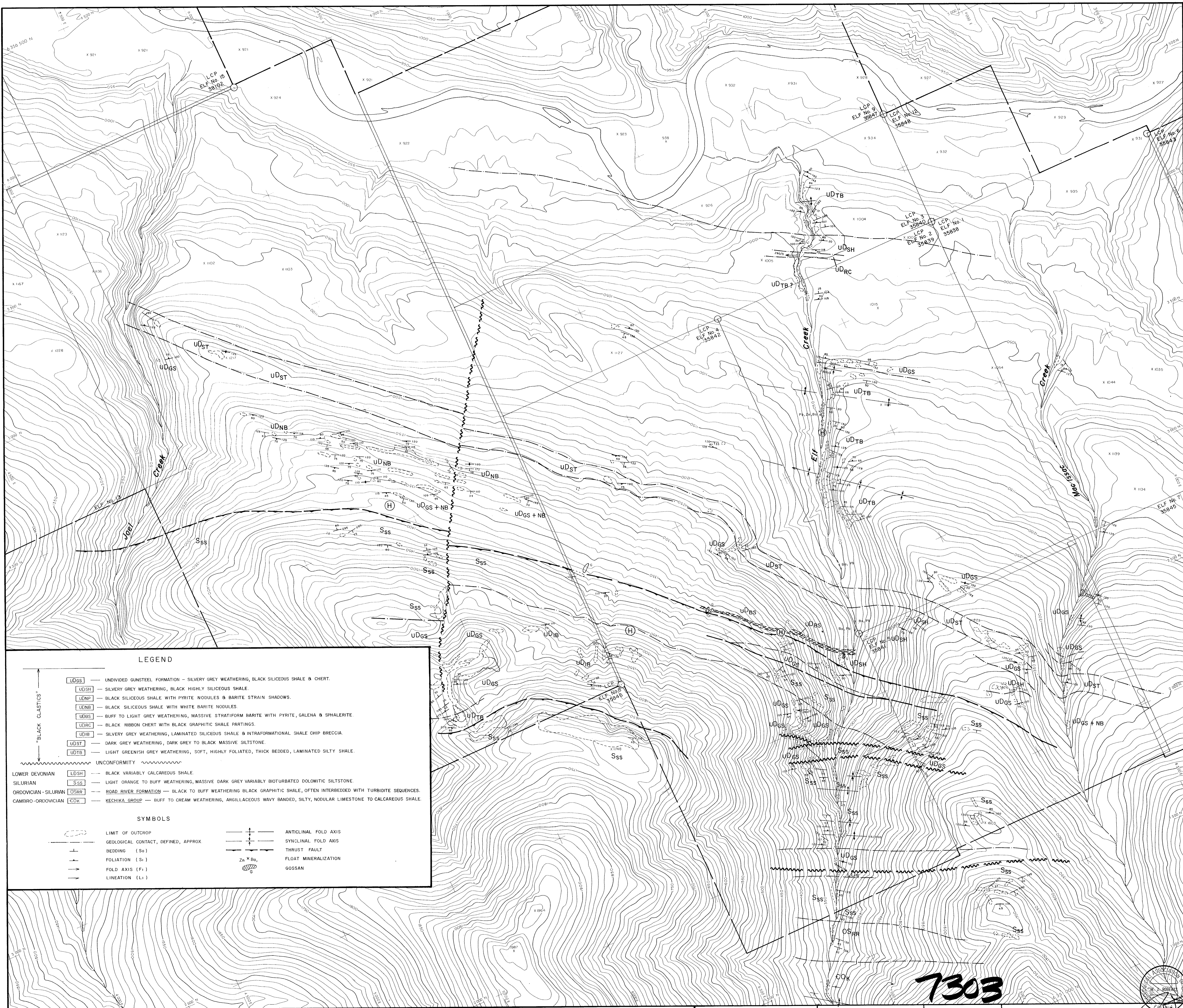




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 <p>Scale and elevation datum based on limited ground control resulting in good relative, but uncertain absolute map accuracy. Compiled from aerial photography at an approximate scale of 1:20,000 flown in 1977.</p>	 <p>McElhanney McElhanney Surveying & Engineering Ltd. 1200 West Pender Street, Vancouver B.C., Canada</p>	Scale: 1:5000	<p>CYPRUS ANVIL MINING CORP.</p> <p>ELF CLAIM</p> <p>PRELIMINARY RECONNAISSANCE TYPE MAPPING</p>
		Contour: 10 Metres Interval	
		Date: May 1979	
		Job No.: 06573-2	
		Sheet No.: 1 of 1	MAP No. 3





LEGEND

- | | |
|--------------|--|
| UDGS | UNDIVIDED GUNSTEEL FORMATION - SILVERY GREY WEATHERING, BLACK SILICEOUS SHALE & CHERT. |
| UDSH | SILVERY GREY WEATHERING, BLACK HIGHLY SILICEOUS SHALE. |
| UDNP | BLACK SILICEOUS SHALE WITH PYRITE NODULES & BARITE STRAIN SHADOWS. |
| UDNB | BLACK SILICEOUS SHALE WITH WHITE BARITE NODULES. |
| UDBS | BUFF TO LIGHT GREY WEATHERING, MASSIVE STRATIFORM BARITE WITH PYRITE, GALENA & SPHALERITE. |
| UDRC | BLACK RIBBON CHERT WITH BLACK GRAPHITIC SHALE PARTINGS. |
| UDIB | SILVERY GREY WEATHERING, LAMINATED SILICEOUS SHALE & INTRAFORMATIONAL SHALE CHIP BRECCIA. |
| UDST | DARK GREY WEATHERING, DARK GREY TO BLACK MASSIVE SILTSTONE. |
| UDTB | LIGHT GREENISH GREY WEATHERING, SOFT, HIGHLY FOLIATED, THICK BEDDED, LAMINATED SILTY SHALE. |
| UNCONFORMITY | |
| LDSh | BLACK VARIABLY CALCAREOUS SHALE. |
| Sss | LIGHT ORANGE TO BUFF WEATHERING, MASSIVE DARK GREY VARIABLY BIOTURBATED DOLOMITIC SILTSTONE. |
| OSRR | ROAD RIVER FORMATION - BLACK TO BUFF WEATHERING BLACK GRAPHITIC SHALE, OFTEN INTERBEDDED WITH TURBIDITE SEQUENCES. |
| COK | KECHIKA GROUP - BUFF TO CREAM WEATHERING, ARGILLACEOUS WAVY BANDED, SILTY, NODULAR LIMESTONE TO CALCAREOUS SHALE. |

SYMBOLS

- | | | | |
|--|-------------------------------------|--|----------------------|
| | LIMIT OF OUTCROP | | ANTICLINAL FOLD AXIS |
| | GEOLOGICAL CONTACT, DEFINED, APPROX | | SYNCLINAL FOLD AXIS |
| | BEDDING (So) | | THRUST FAULT |
| | FOLIATION (Si) | | FLOAT MINERALIZATION |
| | FOLD AXIS (Fi) | | GOSSAN |
| | LINEATION (Li) | | |

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<p>GEOLOGY BY: W. Roberts C. Jefferson D. Kibby</p> <p>Scale and elevation datum based on limited ground control resulting in good relative, but uncertain absolute map accuracy.</p> <p>Compiled from aerial photography on an approximate scale of 1:20 000.</p>	<p>SCALE IN METRES (1:5000)</p>	<p>Scale: 1:5000 Contour Interval: 10 Metres</p> <p>Date: June 15, 1979</p> <p>Job No. _____ Drawn by: C.L.C.</p> <p>N.T.S. 94-F-7 Map No. 4</p>	<p>CYPRUS ANVIL MINING CORP</p> <p>ELF GROUP</p> <p>PRELIMINARY GEOLOGY MAP</p>