40 YEAR 8583

GEOPHYSICAL REPORT

on the

COMBINED AIRBORNE ELECTROMAGNETIC

and RADIOMETRIC SURVEY

OVER THE

COMSTOCK - SILVER CUP PROPERTY,

SILVERTON, B.C. AREA

on behalf of

CHOPPER MINES LIMITED

Slocan Mining Division

LAT. 49° 55' N LONG. 117° 10'W N.T.S. 32F/14

Claim Name or C.G.	Record or Lot No.	Anniversary
Silver Cup	1815	Aug. 25
Isabel Fr.	1877	Aug. 25
Kentucky Girl	1818	Aug. 13
Ruby Trust	1804	Aug. 13
TD9-1 & TD9-2	17609H & 17610	July 11
TD9-4 & TD9-5	17627H & 17628H	July 23
Comstock	1814	July 2
Silver Chief	1813	July 2
CSC 1	1611	Nov.
CSC 2	1612	Nov.
CSC 3	1613	Nov.

Survey By: Columbia Geophysical Services Ltd.

Report by: P.P. Nielsen, B.Sc., Geophysicist,
Nielsen Geophysics Ltd.,
Vernon, B.C.

July 25, 1980

TABLE OF CONTENTS

INTRODUCTION

During the period May 24 - June 15, 1980, a combined helicopter-borne Magnetometer, V.L.F.E.M., and Radiometric survey was attempted and ultimately executed over the Comstock-Silver Cup Property near Silverton, B.C.

The survey was carried out on behalf of Chopper Mines Ltd. by Columbia Geophysical Services Ltd. under the supervision of P.P. Nielsen, the writer of this report.

Due to a number of delays caused by inclimate weather and excessive magnetic storms throughout the above time period and the strong likelihood of these conditions continuing indefinitely, the survey was carried out without the aid of the Magnetic component of the survey.

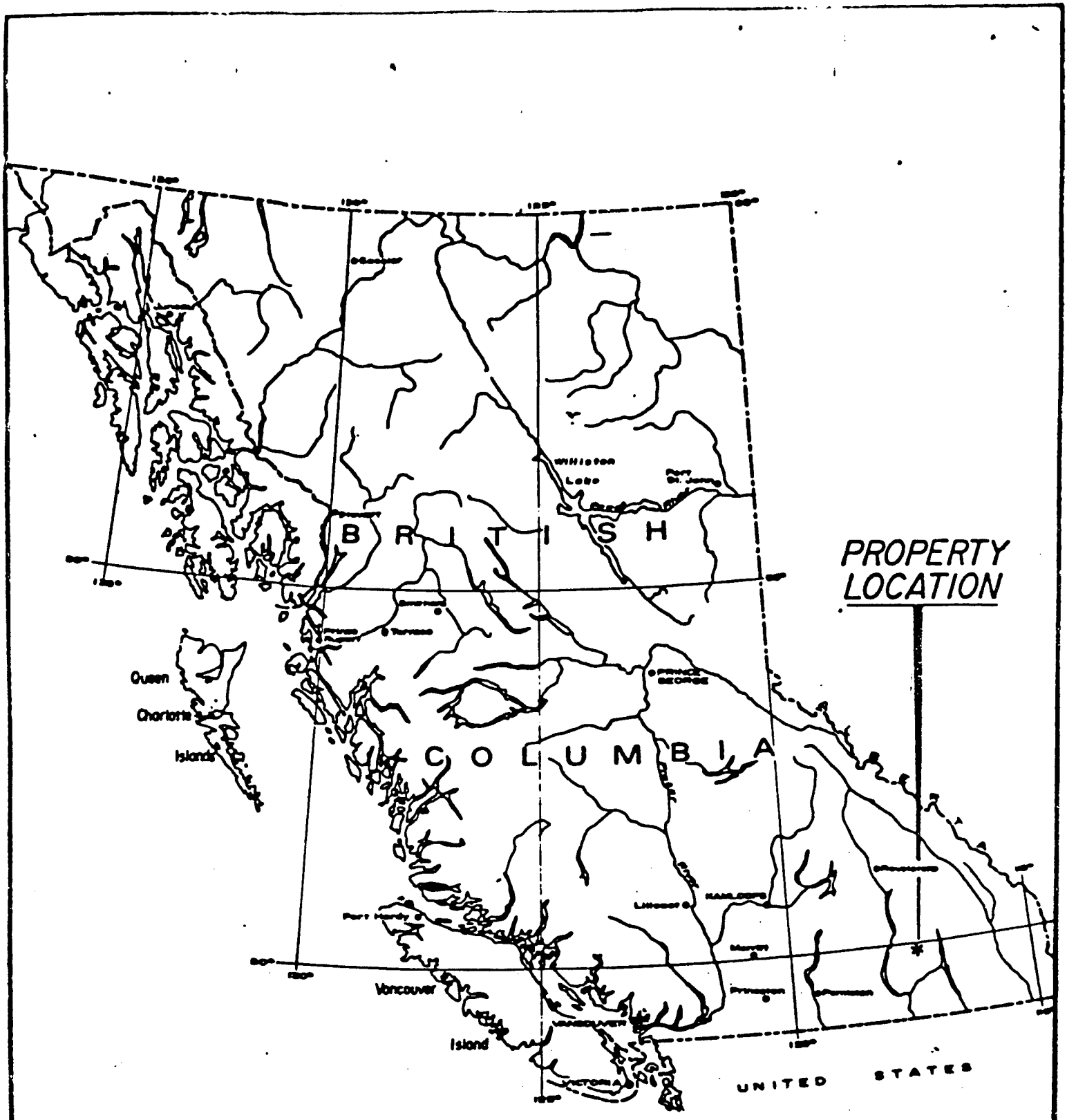
The primary purposes of the survey was to detect Pb-Zn-Ag veins and/or related structures known to exist in an area of rugged terrain and limited ground access to narrow the search to a reasonable ground survey level. The principal tool used was an airborne V.L.F. Electomagnetic instrument. Because of the small additional cost, the possibility of additional information gained and the ready availability, an airborn magnetometer and scintillometer were also installed in the helicopter.

A total of 95 line-kilometers was surveyed using a Bell 206 Jet Ranger helicopter owned and operated by Highland Helicopters from their base at Castelgar, B.C.

LOCATION AND ACCESS

The property is located between Fennell and Silverton Creeks, eleven miles east of the town of Silverton, B.C. in the Slocan mining division.

The survey was initiated out of Castelgar, B.C. with one re-fueling done near the survey area.



SILVER CUP-COMSTOCK GROUP

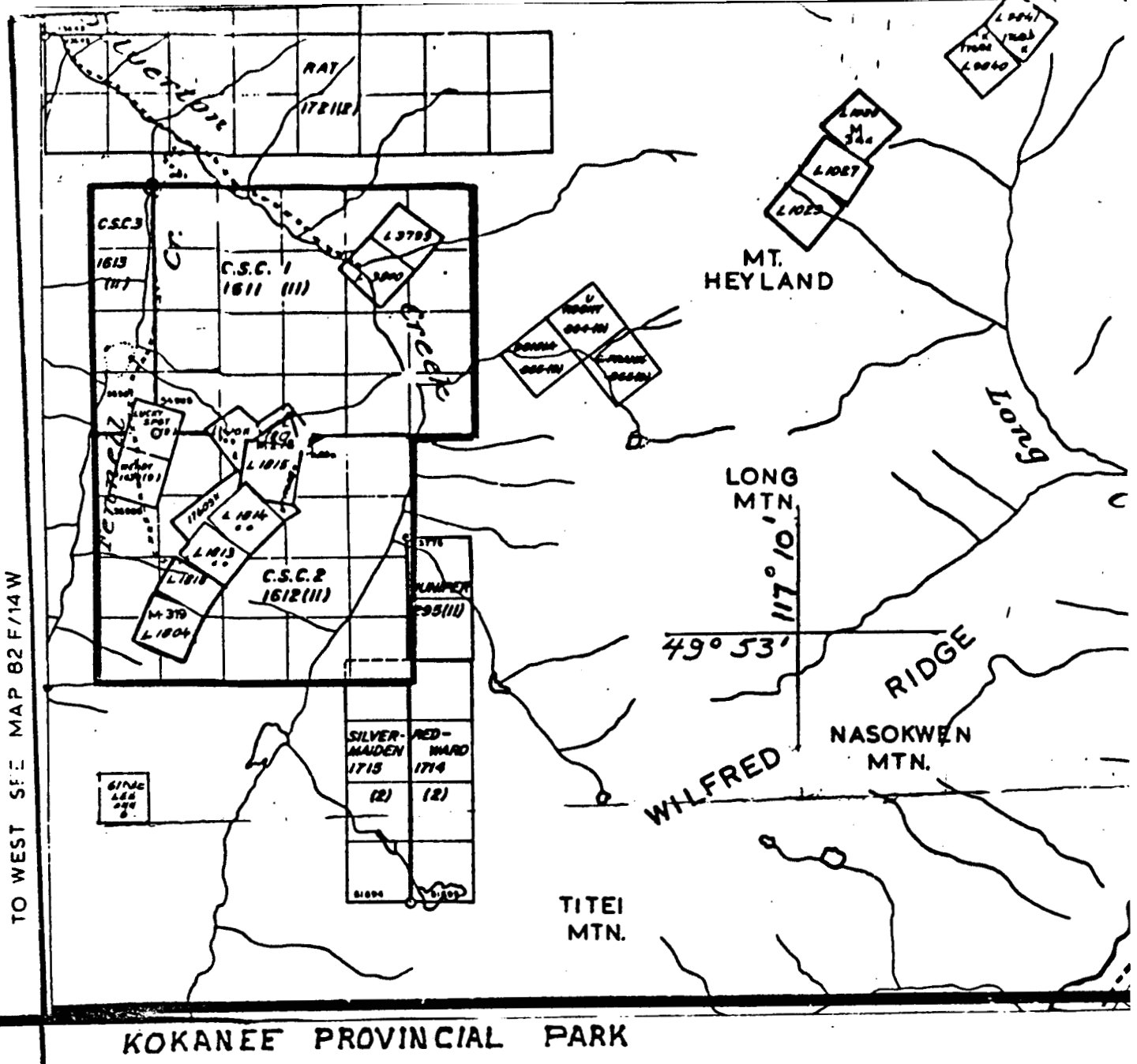
SLOCAN MINING DIVISION, B.C.

LOCATION MAP

SCALE

Km. 100 50 0 100 200 300 400 Km.

Miles 100 50 0 100 200 Miles



4

MINERAL CLAIMS MAP 82F/14

CHOPPER MINES LIMITED
CLAIM LOCATION. JUNE 1980

SCALE :- 1:50,000

PHYSIOGRAPHY and SURVEY CONDITIONS

The survey was carried out over steep to precipitous terrain varying in elevation from 4,500 feet A.S.L. along Fennell and Silverton Creeks to 7,000 feet A.S.L. along the northerly trending ridge through the centre of the survey grid for a total topographic relief of 2,500 feet (762 meters).

This steep topographic gradient coupled with the limiting transmitter direction determined the line orientation which varied from 270 degrees to 360 degrees. A mean terrain clearance of 90 meters was attempted but also varied due to the steep slopes and gusting wind conditions.

HISTORY

(Report by D. Malcolm, Oct. 18, 1979)

The Comstock was first worked in 1897 when a concentrator was built. By 1904 the mine had produced 298 tons averaging 98 oz. per ton silver and 56% lead. Other shipments made up until 1920 totalled 92 tons, in 1970 two dump shipments were made totalling 32 tons averaging 11.4 oz. silver, 4.5% lead and 4.7% zinc per ton.

Road building, bulldozer trenching and prospecting uncovered the Silver Cup extension since that time.

GEOLOGY

(After D.C. Malcolm)

General

The Slocan area is underlain by Kuskanax granodiorite batholith to the north and the Nelson granodiorite batholith to the south. Slocan series sediments lie between these two intrusive bodies.

Younger quartz feldspar porphyry, diorite and lamprophyre dikes, sills and plugs intrude the sediments and older intrusives. Numerous small rich silver bearing galena-sphalerite veins, breccia zones and some replacement deposits have been mined in the sediments and in the intrusives.

Local

Although most of the claims are soil covered, rock outcrops along the numerous road cuts reveal a uniform granodiorite near the north contact of the Nelson batholith.

The Comstock-Silver Cup quartz vein follows a strong fault which stikes N35°E to N55°E and dips 35 to 55 degrees to the southeast. The fault contains gouge on both walls with crushed granodiorite quartz and sometimes lamprophyre fillings. Fine grained galena-sphalerite and occasional tetrahedrite occur in crushed rocks.

Parallel veins occur on both sides of the main vein and several east striking lamprophyre dikes and quartz filled veins intersect the main vein.

CLAIMS

The property comprises the following Crown Grants, Mineral Leases and Claims held under option from the owners by Chopper Mines Limited; all are in the Slocan Mining Division of British Columbia.

Claim Name	Record Number	Tax or Expiry Date	Registered Owner
Silver Cup	1815 (ML278)	25 August, 1980	Henry S. Murphy
Isabel Fr.	1817 (ML278)	25 August, 1980	Henry S. Murphy
Kentucky Girl	1818	13 August, 1980	Henry S. Murphy
Ruby Trust	1804	13 August, 1980	Henry S. Murphy
TD9-1	17609 H	11 July, 1980	Henry S. Murphy
TD9-2	17610 H	11 July, 1980	Henry S. Murphy
TD9-4	17627 H	23 July, 1980	Henry S. Murhphy
TD9-5	17627 H	23 July, 1980	Henry S. Murphy
Comstock	1814	2 July, 1980	Victoria Harding
Silver Chief	1813	2 July, 1980	Victoria Harding
C S C 1	1611	Nov.,1980	Chopper Mines Ltd.
C S C 2	1612	Nov., 1980	Chopper Mines Ltd.
C S C 3	1613	Nov., 1980	Chopper Mines Ltd.

THE AIRBORNE GEOPHYSICAL SURVEY

Instrumentation and Theory

1. Electromagnetics

A VLF-EM receiver manufactured by Sabre Electronics of Burnaby, B.C. was used for the electromagnetic portion of the survey. This instrument is designed to measure the current induced in a vertical coil by the primary and secondary fields of a transmitted signal from fixed U.S. Navy transmitter stations. The station used for this particular survey, due to orientation with the suspected and known strike of favourable conductors, was Station NLK Arlington (Seattle), Washington at a frequency of 18.6 KHz.

The variation in the horizontal component of the field strength was measured by the receiver via the coil mounted in a six foot long "bird" towed by a twenty meter long cable from the helicopter.

The primary field transmitted by the U.S. Navy station propagates an alternating primary electromagnetic field which induces an alternating current through a conductive source such as a sulphide body. The current flowing through the conductor in turn sets up a secondary field which distorts the transmitter primary field. It is the degree of distortion which is measured by the receiver and is indicative of the conductivity of the rocks, overburden, and structures over which the receiver passes.

Due to relatively high transmitted frequency used, the unit is capable of detecting low conductivity sources such as clay beds, shear zones or faults containing waterfilled clays and other conductive materials, graphite, carbonaceous sediments, lithological contacts as well as sulphide bodies of economic importance. Because of this phenomenom, airborne conductors must be accurately located on the ground using ground E.M. techniques to determine, if at all possible, the cause of the airborne response in order to separate the conductors related to undesirable sources such as graphite from economically significant targets such as Pb-Zn-Ag veins or lenses.

2. Radiometrics

A Royal Scintillometer Model 118 manufactured by Precision Radiation Instruments Ltd. was used for the radiometric portion of the survey. The detecting element was a 2 inch sodium-iodide crystal also installed in the six foot bird. This instrument measures the total count radiation and was recorded on a 12 cm. analog strip chart recorder. The data was of such constant low intensity that it was not feasible to plot on the 1:10,000 map. As a result, the theory of this survey method will not be discussed.

Survey Procedure

The survey was executed using a Bell 206 Jet Ranger helicopter owned and operated by Highland Helicopters which was mobilized from Castelgar, B.C. The crew consisted of the pilot, navigator, and instrument operator. A mean line spacing of 150 meters was attempted but varied considerably due to rough flying conditions brought on by excessively steep terrain over portions of the claims coupled with cross-gusting wind conditions. Some survey lines had to be abandoned or cut short or approached at a different direction.

Despite these difficulties, reasonably good control was achieved as evidenced by the line-to-line correlation of conductors. Tie points were made from prominent topographic features observed on the ground and confirmed by the navigator's map and pilot's instruments.

As mentioned in the introduction, ten days were lost due to inclimate weather and extreme magnetic storm activity. The magnetic activity would not abate resulting in the abandonment of this part of the survey.

The tie-points were assigned numbers (fiducial points) and were simultaneously marked on the navigator's map and instrument strip charts.

Upon completion of the survey grid lines, a cross or tie line was flown along the ridge roughly through the centre of the survey area which served as a check on the grid lines and for additional navigational control.

The radiometric readings were taken with the scintillometer set on a five second response time whereby the meter would respond to the average total count received over the interval of time. This resulted in a sample length on the ground of about 100 meters.

DATA COMPILATION AND PRESENTATION

The base map consisted of a government topographic map (N.T.S. 82 F/14 Scale: 1:50,000) which was enlarged to a scale of 1:10,000.

The V.L.F.-E.M. and Radiometric data on the strip charts was examined and background levels determined. In the caseof the radiometric portion of the survey, it was determined that no anomalous conditions existed and therefore no compilation of the data was necessary.

Numerous broad and narrow E.M. conductors were observed in the data. With the aid of the fiducial points, the positions of the peaks (maximum amplitude) of these responses were plotted on a mylar copy of the 1:10,000 scale base map after the flight-line locations and fiducial points were transferred from the navigators map. Inter-line correlation of the conductors was then made with constant referral to the character and shape observed on the strip-chart profiles. Due to the nature of the survey (ie. varying ground speed, terrain, clearance and flight-line orientation) no attempt was made to illustrate anomaly width or to indicate conductivity amplitude on the finished map.

The E.M. Conductors are shown as heavy, dashed lines and designated a letter (A, B, C, etc.) for purposes of identification and discussion below.

DISCUSSION OF RESULTS AND INTERPRETATION

1. Radiometrics

As mentioned above, constant radiation intensity believed to represent background level over the entire survey area made plotting of the results superfluous. The flat radiation response must be due to one or more of the following causes:

(a) Overburden or soil cover could be attenuating radiation emmission to a level below instrument detection level.

(b) Terrain clearance was too great and/or scintillometer crystal volume was too small to detect anomalous conditions.

(c) The underlying rock type(s) must be uniform or homogenous.

Reasons (a) and (b) are virtually ruled out due to the fact that readings were taken over parts of the property where rock outcrops were clearly visible on steep slopes and where the speed of the airborne platform was slower and the terrain clearance less than elsewhere yet the response was identical. Therefore, the third possibility appears to be the most likely cause of the flat constant response.

2. Electromagnetics

The V.L.F.-E.M. portion of the survey detected six conductors worthy of comment which are labelled A to F on the map.

A. This conductor follows the north-south topographic ridge from the south boundary of the C.S.C. #2 claim southerly for a distance of about 1600 meters. The strong line-to-line correlation, the associated cross-conductors, and finite strike (ie. does not occur everywhere along the ridge), makes this feature a high priority target for further exploration on the ground.

B. These two sub-parallel conductors occur along the known favourable geo-

logical structure in the immediate vicinity of old workings and are therefore most probably related to the mineralization previously found and mined.

C,D,E & F. These features are isolated one and two line conductors which should be delineated on the ground by prospecting and possibly by geochemistry and/or geophysics.

RECOMMENDATIONS AND CONCLUSIONS

The survey appears to have been successful in detecting conductors associated with known mineralization in the vicinity of the Comstock and Silver Cup mines and has also detected four other conductors which could be of economic significance.

Anomalies A and D should be protected firstly by staking and then be explained by ground electromagnetics such as the E.M. -16 or C.E.M. shoot-back method of reconnaissance.

Conductor C appears to occur in unstaked ground but should be examined prior to staking and ground geophysics.

Anomalies B, E and F are safely within the claim boundaries and should be examined at some future date after correlation with the known geology in that area.

Respectfully submitted,

P. P. Nielsen, B.Sc.
NIELSEN GEOPHYSICS LTD.

PERSONNEL

P. P. NIELSEN, Geophysicist, supervisor and author of report	-	NIELSEN GEOPHYSICS LTD.
E. MAAS, Helicopter Pilot	-	HIGHLAND HELICOPTERS LTD.
T. ROLSTON, Instrument Operator	-	COLUMBIA GEOPHYSICAL SERVICES LT
J. RADAVICH, Navigator	-	COLUMBIA GEOPHYSICAL SERVICES LT

STATEMENT OF AUTHOR'S QUALIFICATIONS

I DO HEREBY STATE:

1. I am the author of this report which is compiled from data obtained from a combined airborne Radiometric and Electromagnetic survey carried out by Columbia Geophysical Services Ltd. during the first half of June, 1980.

2. I have been actively practising my profession for the past eleven years and have been involved in mineral geophysics for the past fifteen years.

3. I am a graduate of the University of British Columbia and hold a B. Sc. degree in Geophysics (1969).

4. I am the president of Nielsen Geophysics Ltd. with business address at:

   # 203, 2910 - 30th Avenue
   Vernon, B. C.

5. I am a member of the S.E.G., C.I.M.M. and the B.C.G.S.

Signed _____

P.P. Nielsen, B. Sc.

Date _____

CHOPPER MINES LTD.

TELEPHONE 684-2291

201 - 744 WEST HASTINGS STREET
VANCOUVER, B.C.
V6E 1A5

Statements of Expenses for Claim Assessments

Engineering (Pacific Survey Corporation)		
To produce scribed mapping @ 1:2500 with		
10 metre contours from existing photography.		
To compile ortho photos @ 1:2500 with 10		
metre contours.		$ 2227.18
Airborn Geophysical Survey,		
May 25 to June 1, June 13 to 20th 1980		
(total 16 days)		
Contracted date April 28 1980		$ 5,000.00
Helicopter: 3.8 hrs. @ $363.80/hr.		$ 1,382.44
1. Survey Supervision:		
(A) P. Nielsen, Geophysicist 1 day @ $225/day		$ 225.00
(B) Transportation		$ 78.00
(C) Food and accomodation		$ 90.00
(D) Reports		$ 600.00
Location Surveys - Rates		
Two man crew plus supervision	$ 305.00/day	
Equipment (transit & EDM)	$ 50.00/day	
Room and board	$ 70.00/day	
Vehicles	$ 40.00/day	
Location Survey of access roads (including		
azimth determination)	4 days	
Location Survey of northwest corner of		
Comstock mineral claim	1/2 day	
Location Survey of Legal Corner		
Posts of CSC claims	1 day	
Location of existing portal	2 days	
Volume determination of Portal	1/2 day	
No. 8 Plotting and Calculations	4 days	
Location Survey of Access Roads		
Survey Personnel D.Brownett		
W. Sawada		
Supervision: V. Ryback-Hardy B.C.L.S.		$ 1,830.00
Room and board		$ 420.00
Equipment		$ 300.00
Vehicles		$ 240.00
Location Survey of Claim Posts		
Survey Personnel (as above)		$ 686.25
Room and board		$ 157.50
Equipment		$ 112.50
Vehicles		$ 90.00

CHOPPER MINES LTD.

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201 - 744 WEST HASTINGS STREET
VANCOUVER, B.C.
V6E 1A5

2/

Location Survey of Existing Portals and Volume Determination	
Survey Personnel (as above)	$1,143.75
Room and board	$ 262.50
Equipment	$ 187.50
Vehicles	$ 150.00
Central Technical Services Ltd.	$ 961.56
Total	$ 16144.18

Silverton Saleries - Paid by Chopper Mines	
Supervision - Jim Szakacs	
May 1 - Nov. 15 @ $2000.00 per month	$13,000.00
Labour - R.Reder	
June 1 - Aug. 15 @$800.00 per month	$ 1.200.00
- Tom Szakacs	
- June 1 - Aug. 18 @ $800.00 per month	$ 2,000.00
- J.I. Szakacs	
Sept. 1 - Oct. 31 @ $2,000.00 per month	$ 4,000.00
TOTAL	$20,200.00

Road Construction and Rehabilitation	
-Silverton Transport	
- Renata Contractors	
- Grizzly Contractors	
- Ferr Holdings	
- Meadow Creek Contractors	$33,460.00
Feild Supplies	$ 2,270.00
Fuel	$ 1,880.00
Travel	$ 7,900.00
TOTAL	$45,510.00
Accumulative Total	$81,854.18

Steven J. Carevere.

(abandd)

BRIDGE LINE

Fennell

Fishermaiden Lake

Ridge Line

L24 L23 L22 L21 L20 L19 L18

TO ACCOMPANY REPORT BY:-

P.R. NIELSEN, B.Sc., GEOPHYSICIST

LEGEND

FLIGHT LINE

EM Conductor

Mean Terrain Clearance at 90 metre

49°55' N. LAT. 117° 10' W. LONG. NTS. 82F/14

Seattle 533 mi

858

CHOPPER MINES LTD.

COMSTOCK-SILVER CUP PROPERTY

SLOCAN M.D. B.C.

AIRBORNE ELECTROMAGNETIC SURVEY
type of survey

FLIGHT LINE MAP Showing E.M. Conductors

scale	date	job no.	sheet no.	drawn by
1:10000	AUG. 1980	B025	1	TMR.

COLUMBIA GEOPHYSICAL SERVICES LTD.

SILVERTON

L 3799

L 3800

C.S.C. 3
1613
(11)

C.S.C. 1
1611 (11)

CREEK

LUCKY SPOT

17610 H

17629 H

L 1817

L 1815

WENDY
1430 (9)

17609 H

L 1814

17628 H

C.S.C. 2
1612 (11)

C.S.C. 4
2025
(7)

L 1813

L 1818

M 319
L 1804

C.S.C. 7
2028 (7)

N

CHOPPER MINES LTD.

SILVERTON PROPERTIES

SOLCAN M.D. B.C.

MINING DIVISION
8583

SCALE IN METRES

100 50 0 100 200 300 400

CANADA

82 F/14 — 1:50,000 — EDITION 3 — 82 F/14

Joins 82 K/3 15'

Refer to this map as: 82 F/14 EDITION 3 MCE SERIES A 721

117°30' 465000m. E. 66 67 68 69 25' 71 72 73 74 75 20' 77 78 79 80 81 83 84 85 86 87 10' 89 90 91 92 93 05' 95 96 97 98 499000m. E. 117°00'

50°00' 5537000m. N.

New Denver · Silverton · Slocan · Enterprise · Kaslo · Lardeau

VALHALLA PROVINCIAL FOREST

SLOCAN PROVINCIAL FOREST

LARDEAU PROVINCIAL PARK

SLOCAN RANGES

SELKIRK MOUNTAINS (COLUMBIA MOUNTAINS)

GOAT RANGE

SLOCAN LAKE · KOOTENAY LAKE

Joins 82 F/13 · Joins 82 F/15

49°45' 5512000m. N.

Joins 82 F/11

SLOCAN

KOOTENAY LAND DISTRICT

BRITISH COLUMBIA

Scale 1:50,000 Échelle

Miles 1 0 1 2 3 Miles

Metres 1000 0 1000 2000 3000 4000 Mètres

Yards 1000 0 1000 2000 3000 4000 Verges

Roads: Routes:

hard surface, all weather	pavée, toute saison	dual highway, 2 roadways separated — more than 2 lanes, plus de 2 voies
hard surface, all weather	pavée, toute saison	2 lanes, 2 voies — less than 2 lanes, moins de 2 voies
loose or stabilized surface, all weather	gravier agglomérié, toute saison	2 lanes or more, 2 voies ou plus — less than 2 lanes, moins de 2 voies
loose surface, dry weather and unclassified streets	de gravier, temps sec et rues hors classe	
cart track	de terre	
trail or portage	sentier ou portage	

Produced by the SURVEYS AND MAPPING BRANCH, DEPARTMENT OF ENERGY, MINES AND RESOURCES, Updated from aerial photographs taken in 1969. Culture check 1970. Printed 1974

Copies may be obtained from the Canada Map Office, Department of Energy, Mines and Resources, Ottawa, or your nearest map dealer.

This Provisional Map is equivalent to a standard map in accuracy of content.

Some names on this map are not yet official. Corrections or additions are invited by the Surveys and Mapping Branch.

CONTOUR INTERVAL 100 FEET
Elevations in Feet above Mean Sea Level
North American Datum 1927
Transverse Mercator Projection

Cette carte provisoire équivaut une carte régulière au point de vue précision de l'information

Certains noms inscrits sur cette carte ne sont pas encore officiels. La Direction des levés et de la cartographie saurait gré au public de lui signaler corrections et additions.

ÉQUIDISTANCE DES COURBES 100 PIEDS
Élévations en pieds au-dessus du niveau moyen de la mer
Système de référence géodésique nord-américain, 1927
Projection transverse de Mercator

Établie par la DIRECTION DES LEVÉS ET DE LA CARTOGRAPHIE, MINISTÈRE DE L'ÉNERGIE, DES MINES ET DES RESSOURCES. Mise à jour à l'aide de photographies aériennes prises en 1969. Vérification des ouvrages en 1970. Imprimée en 1974.

Ces cartes sont en vente au Bureau des Cartes du Canada, ministère de l'Energie, des Mines et des Ressources, Ottawa, ou chez le vendeur le plus près.

CONVERSION SCALE FOR ELEVATIONS

Feet 0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200 2300 2400 2500 2600 2700 2800 2900 3000 3100 3200 3300

Metres 0 50 100 150 200 250 300 350 400 450 500 550 600 650 700 750 800 850 900 950 1000

T.N.

0°11' W. of 3 Mils — 22°09' 394 Mils

Grid North — Magnetic North

Use diagram only to obtain numerical values.
APPROXIMATE MEAN DECLINATION 1972
FOR CENTRE OF MAP
Annual change decreasing 2.7'

ONE THOUSAND METRE
UNIVERSAL TRANSVERSE MERCATOR GRID
ZONE 11

GRID ZONE DESIGNATION	100,000 M. SQUARE IDENTIFICATION
11U	MF

EXAMPLE OF METHOD USED TO GIVE A REFERENCE TO NEAREST 100 METRES
THE FOLLOWING GRID REFERENCE IS A SAMPLE ONLY AND DOES NOT REFER TO A POINT ON THIS MAP

REFERENCE POINT	CHURCH	(as above)
EASTING: Read number on grid line immediately to left of point	97	
Estimate tenths of a square from this line eastward to point		5
NORTHING: Read number on grid line immediately below point	98	
Estimate tenths of a square from this line northward to point		4
EXAMPLE MILITARY GRID REFERENCE 975984		

Nearest similar grid reference 100,000 metres (about 62 miles)

- REHABILITATED ROAD.
CHOPPER MINES LTD.

82 F/14
EDITION 3

BLUEPETER
L. 1816

SILVERCUP
L. 1815

COMSTOCK M.C.
L. 1814

L. 1813

PORTAL #6
ELE. 1920-24

PORTAL #8
ELE. 1818-03

PORTAL #7
ELE. 1825.71

PORTAL #9
ELE. 1772-69

COMSTOCK
NW CORNER

SPIKE

SHEET 1

SHEET 2

SHEET 3

START OF NEW ROAD

EXISTING ROAD

EXISTING ROAD

CSC #1

CSC #2

CSC #3

CSC #4

CSC #5

CSC #6

LCP #1

LCP #2

LCP #3

SCALE 1:2500

MINERAL RESOURCES BRANCH
ASSESSMENT REPORT
8583

CHOPPER MINES

KEY PLAN

SCALE: 1:2500	FILE NO.: 5072
DATE: SEPT. 1980	
DRAWN: E.N.	

Hinterland Resource Services Ltd.
11691 Trumpeter Drive
Richmond, B.C. V7E 3X4

CENTEC