GEOPHYSICAL REPORT

AFMAG SURVEY

CLAIMS COVERED	Silvertip B1, B2, B3, B4, B5, B6 & B7. Silvertip C1, C2, C3, C4, C5, C6 & C7. Silvertip D1, D2, D3, D4, D5, D6 & D7. Extention E, F & G.
	59° 130 NE
AUTHOR	Edward P. Chapman, Jr., P.E.
OWNERS	Silvertip B1 through B7 - Andrew Zborovszky Silvertip C1 through C7 - Andrew Meszaros Silvertip D1 through D7 - Stephan Papp Extention E - Andrew Zborovszky Extention F - Peter Timar Extention G - Andrew Meszaros
DATE OF WORK	September 5 through 13, 1960.

104-O/16W

CHAPMAN, WOOD AND GRISWOLD LTD.
MINING ENGINEERS AND GEOLOGISTS
525 VERNON DRIVE
VANCOUVER 6, BRITISH COLUMBIA

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GEOPHYSICAL REPORT
AFMAG SURVEY
SILVERTIP AND EXTENTION MINERAL CLAIMS
LIARD MINING DIVISION
BRITISH COLUMBIA

DESCRIPTION OF AREA

The Silvertip and Extention Mineral Claims are situated on a branch of the Tootsee River approximately 3 1/2 miles east of the eastern tip of Tootsee Lake and 5 1/2 miles south of the boundary between British Columbia and Yukon Territory at approximately 59°55'4"N. latitude and 130°3'46" west longitude. The claims are in the Liard Mining Division and cover a river valley approximately one quarter mile in width at an elevation of about 4500 feet flanked by mountains rising to nearly 6000 feet on both east and west. The river flows in a northeasterly direction within the claim boundaries then turns northwest to join the Tootsee River.

The valley has the typical U-shaped glacial configuration and the walls have moderate to steep slopes. The falley floor is covered with willow and buck brush and in many places is swampy. The hillsides are virtually barren of vegetation.

Climate is typical of northern British Columbia with mild summers and severe cold winters.

GEOLOGICAL SETTING

The claims cover an area of limestone, phyllite and quartzite of upper Devonian or lower Missipian age lying along the western flank of the Cassiar batholith. The rocks are displaced by a complex system of block faults modifying regional fault patterns and accompanied by intense folding. The resulting relationship between beds and formations is difficult to interpret.

Mineralization is exposed in several zones on the claims in the form of bands of gossan crossing E-W ridges. These gossans appear to favor

horizons in dolomitized limestone in which argillaceous bands are prominent. Within the zones lenses of galena, sphalerite and cerussite occur. The galena carries substantial amounts of silver.

DEVELOPMENT

The property was discovered in 1955 and has had a considerable amount of work done on it in subsequent years. Two adits, one at 5123 feet elevation for 500 feet, and a second at 4530 feet elevation for 1200 feet were driven in an attempt to intersect the downward extension of four gossan zones. Several thousand feet of diamond drilling in 20 holes has been done from surface and underground stations.

A road was built to the property covering the 14 miles from Mile 702 of the Alaska Highway. About one third of this road is through swamp and cannot be safely negotiated except in freezing weather. Realignment of the road to sidehill positions would eliminate much of the difficulty.

Three frame buildings and several tent frames provide adequate quarters for exploration personnel.

PURPOSE OF SURVEY

Although a considerable amount of work had been done on this property with disappointing results, careful study of available data disclosed several possibilities that orebodies might be present in areas not explored by either adit nor any drillhole. Among these potentialities are :

1. Relatively flat lying replacement zones in limestone.
2. Mineralized veins in the unexplored area south and east of earlier work.
3. Mineralized structures within the partially explored area offset by faulting to positions not as yet examined.

The geophysical program described herein was designed and carried out to attempt to delineate any such area or areas and to provide a target for additional drilling.

EQUIPMENT AND PROCEDURES USED

The following description of the AFMAG system, a variation from standard EM techniques, is copied verbatim from the AFMAG Operating Manual of McPhar Geophysics Ltd. of Toronto. This company manufactures these instruments under license from Crossland Licensing Corporation Ltd..

" AFMAG is a new system of electromagnetic prospecting which utilizes a natural field source. Thus an artificial field source - a transmitter - is dispensed with. This unique feature leads to greater flexibility in surveys and to a much greater depth of exploration. Although one man can easily carry the equipment and take the measurements, employment of two men usually leads to a more efficient survey. Line cutting is not essential to the performance of a survey.

The origin and characteristics of the natural fields have been described in considerable detail in two earlier articles (Ward et al 1958) (Ward 1959).

From these papers the following summary of the fields has been made:

1. They are due primarily to world-wide thunderstorm activity.

2. They vary in strength throughout the day, being strongest by night and weakest by day.

3. They vary in strength throughout the year, usually being strongest in June and July in the northern hemisphere and believed to be strongest in December and January in the southern hemisphere. In the equatorial belt they are fairly strong all year.

4. During northern winter, the field strengths drop off during the day to a level which is too low for continuous ground AFMAG operation. In latitudes 45° - 65°N, the times of year during which operation is satisfactory at present is limited to the period March 15 to November 15 or thereabouts.

5. For practical prospecting purposes, every frequency in the ranges 10 cps to 500 cps and 5000 cps to 20,000 cps is available in these natural fields. However, in standard ground AFMAG equipment, the two frequencies 150 and 510 cps are employed simultaneously. These two frequencies have been chosen since they provide good responses over massive sulphides in the Precambrian, consistent with minimum responses over extraneous features.

6. At any point in space, a single frequency natural field may be crudely represented by a single vector oriented perpendicular to regional strike and confined to the horizontal plane in the absence of local subsurface conductive bodies. (In actual fact the fields are much more complex than this; they are described in the earlier papers (Ward et al 1958, Ward 1959). (Dr. S. H. Ward, Assoc. Prof. Mineral Exploration, Univ. Calif.)

7. In the presence of a local subsurface conductor (e.g. fault, shear, massive sulphide ore body) the vector is tilted out of the horizontal. Measurements of the tilt of the vector then is a simple means of locating subsurface conductors.

The above characteristics of the natural fields preclude the use of a single receiving coil to determine the plane and azimuth of polarization. Hence it has been found necessary to employ two independent receiving coils in a system whereby true anomalies are readily distinguishable from any time variations in field strengths or polarizations. These coils are fixed at right angles to one another as shown in Fig. 1. This rigid two coil system is rotated about a fixed horizontal axis and the angular deviation of the coil system from its normal "non-anomalous" position is recorded. It is found that by such a procedure, significant variations of angular deviation are recorded in the vicinity of a conductive body.

AFMAG may be employed in the search for conductive and/or highly magnetic mineral deposits. Sulphide ores of copper and lead, pyrrhotite, pyrite, and some oxide iron ores, are typical targets. In addition AFMAG may be of an aid in structural studies where it is desirable to trace faults and shears, map carbonaceous or thick highly porous ionized horizons, and the like. Because the inducing field is horizontal, the disturbing effects of swamps and overlying clay beds are seldom encountered. This of course also means that steeply dipping conductive mineral deposits give rise to larger anomalies than flat lying deposits. The method is not normally suitable for the detection of disseminated sulphide deposits where the metallic mineral grains are discrete - e.g. some supergene deposits. It is suitable for detecting these deposits if secondary processes have created micro or macro stockwork or if these deposits occur in thick highly porous ionized horizons.

Application of the method may be made in areas of deep oxidization, deep uniform overburden, and deep valley fill. Additionally it offers some distinct advantages in any area where great depth of exploration is required.

The method readily indicates the accurate position and permits estimates of conductivity, depth, depth extent, strike length and dip of a hidden conductive deposit. In areas adjacent to such cultural features as electric power lines, telephone lines and railroads, the method usually can be applied to locate a conductor. Frequently, however, the configuration and conductivity of the body may not be accurately determined if the conductor lies within one to two miles of these cultural developments.

It is in reconnaissance surveys that AFMAG provides its greatest benefits. Since no line cutting is necessary, two men may conduct a compass and pace traverse with ease, stopping for readings at intervals dictated by the size of the target sought. Usually, in purely reconnaissance surveys, a station interval of 400 feet on lines spaced 800 - 1200 feet apart is adequate. If, during the course of such a survey, a conductive body is detected, the station and line spacing may be altered whenever required without any lost effort. The highly portable equipment lends itself nicely to this technique. Surveying of blocks of 50 - 200 claims can be more economically treated in complete detail with ground AFMAG than with airborne electromagnetic surveys, However, where larger blocks

of ground have justified airborne AFMAG or airborne EM, ground AFMAG may prove to be the most satisfactory "follow-up" device available because of its efficiency and range of exploration without pre-cut traverse lines. Simultaneous operation of an AFMAG unit plus a magnetometer by two men has proven particularly effective in this type of operation. "

McPhar Geophysics Ltd. AFMAG Unit Serial No. 5912 was used in the survey. Prescribed instrument checks were made each field day and recorded. Point A-O was used as a base station and observations made at the start and close of each operating day. A base line was laid out on a bearing of S20°E and run for 3,200 feet (point A-320) across four gossan zones, then changed to S60°E and continued an additional 1,600 feet, intersecting a strong fault zone at a high angle. Readings were taken at 400 foot intervals along this line with intermediate readings at 200 and 100 foot spacing near station A-380. Four cross lines were picketed on a bearing of S30°W (approximately parallel to the mean of azimuth readings along the base line) at stations A-120, A-190, A-280 and A-380. Observations along cross lines were taken at 100 and 200 foot intervals.

During the course of the survey natural low frequency fields were sporadic and unreliable. High frequency fields were excellent.

PERSONNEL

The survey was carried out by Chapman, Wood & Griswold Ltd., consulting mining engineers and geologists of Vancouver, B.C.. Persons employed on the project were :

Supervisor:	E. P. Chapman, Jr., P.E.
Operator:	R. J. Perelli - graduate from University of W. Virginia 1959 B.S. in Mining Engineering. Took special training in AFMAG operation under Dr. Stanley H. Ward.
Assistants:	Andrew Zborovszky
	Stephan Papp

INTERPRETATION OF RESULTS

Results were interpreted by Chapman, Wood & Griswold Ltd. and sent to Dr. Stanley H. Ward for confirmation. Dr. Ward was leader of a research team working in Toronto which developed the AFMAG system and is now Associate Professor of Mineral Engineering at the University of California, Berkeley, California.

The following summary sets forth opinions in which we and Dr. Ward are in complete agreement.

1. Three conductive zones are indicated.
   - A. Parallel and coinciding with a creek on lines A-120, A-190 and A-280. Probably a NW-SE fault.
   - B. At 80SW on line A-280 probably of little significance.
   - C. Between O and 40NE on line A-380 and between A-380 and A-440. The most interesting of the three but still not too impressive. May be centered off the two lines on which it appears.
2. No target for drilling has been delineated.
3. Since galena is a comparatively poor conductor and surface mineralization is so strong, anomaly C warrants further investigation.
4. One of the following methods are recommended for indicating whether or not a target for drilling can be delineated in the C anomaly area.
   - (a) Induced Polarization Survey - best depth penetration and most conclusive results. Responds only to sulphides.
   - (b) Large vertical loop EM. Less satisfactory - less depth penetration - responds to graphitic and clay zones - less expensive.

(c) Resistivity - may be best for indicating flat replacement zones - limited depth.

Economic considerations will probably determine the method used, if any, for future work.

COSTS

Rates charged for the entire Chapman, Wood & Griswold Ltd. crew for the AFMAG survey of the Silvertip and Extention Claims were $275 per day. Total cost of the work, including interpretation, came to slightly more than $2,400.

TABULATED DATA

All readings taken during the course of the survey are tabulated below and plotted in plan and profile on attached drawings No. 70 and 71.

Date	Time	Station	Low Frequency Azimuth	Low Frequency Dip	High Frequency Azimuth	High Frequency Dip
Sept. 7	10:10	A-O		8°SW	S20°W	7°SW
	10:30	A-40		6°SW	S20°W	6°SW
	10:50	A-80		N.F.	S16°W	9°SW
	11:05	A-120		10°SW	S5°W	8°SW
	11:30	A-160		14°SW	S20°E	O°
	**12:20	A-190		10°SW	S60°W	23°SW
	12:45	A-240		11°SW	S55°W	20°SW
	13:00	A-280		13°SW	S40°W	20°SW
	**13:20	A-320		O°	S30°W	18°SW
	13:45	A-360		22°SW	S50°W	25°SW
	14:05	A-400		N.F.	S57°W	2°SW
	14:25	A-440		2°NE	S42°W	2°SW
	**14:45	A-480		10°NE	S30°W	9°SW
	15:35	A-340		18°SW	S20°W	12°SW
	15:45	A-360		22°SW	S25°W	15°SW
	16:00	A-380		6°SW	S40°W	5°SW
	16:10	A-370		10°SW	S40°W	13°SW
	16:50	A-160		10°SW	S30°W	12°SW
	17:10	A-180		10°SW	S30°W	14°SW
	17:30	A-190		8°SW	S25°W	20°SW
Sept. 9	8:30	A-0		5°SW	S20°W	7°SW
	9:45	A-380 + 80SW	S30W	7°SW		14°SW
	**10:00	+ 60SW		50°W	S75°E	30°W
	**10:20	+ 80SW		20°W	S80°E	22°W
	**10:40	+ 40SW		40°W	E	37°W
	**11:00	+ 20SW		25°SW	N75°E	29°SW
	**11:10	+ 10SW		0	N75°E	16°SW
	**11:20	A-380		10°NE	N80°E	8°SW

Date	Time	Station	Low Frequency		High Frequency	
			Azimuth	Dip	Azimuth	Dip
Sept. 9	11:40	A-380				
		+ 10NE	N.F.		E	6°W
	**11:55	+ 20NE	10°SW		N75°E	5°SW
	**12:05	+ 30NE	5°SW		N70°E	6°SW
	**12:15	+ 40NE	10°SW		N80°E	7°SW
	**12:25	+ 60NE	20°SW		N75°E	10°SW
	**13:20	A-280	15°SW		N75°E	27°SW
	**13:40	A-280				
		+ 40SW	15°W		E	27°W
	**13:50	+ 20SW	20°W		S85°E	27°W
	**14:00	+ 20NE	20°W		E	25°W
	14:20	+ 40NE	24°SW		N70°E	24°SW
	14:30	+ 60NE	20°SW		N80°E	21°SW
	14:45	+ 80NE	15°SW		N70°E	15°SW
	14:55	+ 100NE	14°SW		N75°E	10°SW
	15:05	A-280				
		+ 120NE	8°SW		N70°E	3°SW
	**15:20	+ 140NE	8°SW		N70°E	3°SW
	15:30	+ 160NE	10°SW		N65°E	7°SW
	15:45	+ 200NE	6°SW		N65°E	6°SW
	**16:30	A-280				
		+ 40SW	35°W		N70°E	26°SW
	16:40	+ 60SW	N.F.		N70°E	26°SW
	**16:55	+ 80SW	20°SW		N50°E	11°SW
	17:10	+ 100SW	N.F.		N65°E	16°SW
	17:20	+ 120SW	N.F.		N55°E	14°SW
	17:50	+ 60SW	N.F.		N55°E	23°SW
Sept. 10	9:00	A-0	N.F.		S20°W	8°SW
	10:50	A-190				
		+ 100SW	11°SW		S10°W	2°SW
	11:05	+ 80SW	11°SW		S15°W	6°SW
	11:20	+ 60SW	6°SW		S15°W	8°SW
	11:50	A-120	13°SW		S20°W	15°SW
	**12:00	A-120				
		+ 20NE	15°SW		S20°W	17°SW
	12:10	+ 40NE	13°SW		S25°W	20°SW
	12:25	+ 60NE	19°SW		S50°W	21°SW
	12:35	+ 80NE	12°SW		S55°W	9°SW
	12:50	+ 100NE	7°SW		S45°W	5°SW
	*15:00	A-190				
		+ 100SW	N.F.		S60°W	16°SW
	*15:25	+ 80SW	N.F.		S25°W	10°SW
	*15:35	+ 60SW			S40°W	
Sept. 11	8:30	A-0	14°SW		S15°W	12°SW
	* 8:45	A-40	N.F.		S40°W	26°SW
	*10:15	A-80	17°SW		S25°W	13°SW
	*10:30	A-120	19°SW		S25°W	13°SW
	*10:45	A-160	15°SW		S30°W	17°SW
	*11:15	A-190	N.F.		S20°W	25°SW
	*11:45	A-190				
		+ 60SW	N.F.		S10°W	
	13:00	+ 20NE	12°SW		S60°W	26°SW
	13:15	+ 40NE	18°SW		S50°W	29°SW
	13:30	+ 60NE	21°SW		S60°W	31°SW

Date	Time	Station	Low Frequency Azimuth	Low Frequency Dip	High Frequency Azimuth	High Frequency Dip
Sept. 11						
	**13:45	+ 70NE		20°SW	S55°W	29°SW
	14:00	+ 80NE		N. F.	S65°W	24°SW
	14:15	+ 90NE		N. F.	S60°W	19°SW
	14:30	+ 100NE		N. F.	S75°W	22°SW
	14:45	+ 120NE		N. F.	S80°W	15°SW
	15:00	+ 140NE		N. F.	S85°W	13°SW
	15:50	A-120				
		+ 80SW		N. F.	S55°W	17°SW
	16:00	+ 60SW		N. F.	S65°W	16°SW
	16:15	+ 40SW		N. F.	S35°W	17°SW
	16:30	+ 20SW		N. F.	S45°W	20°SW
	16:40	A-120		N. F.	S35°W	21°SW
	16:50	A-0		N. F.	S45°W	11°SW

N. F. - No Fields
* - Very windy - instrument erratic - readings of dubious validity.
** - low frequency fields weak readings not reliable.

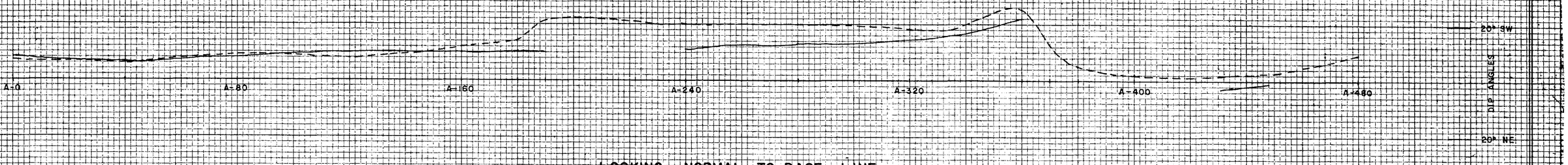
Station numbers X 10 equal horizontal distance in feet from starting point (A-380 is 3,800 feet from A-0).

Respectfully Submitted,

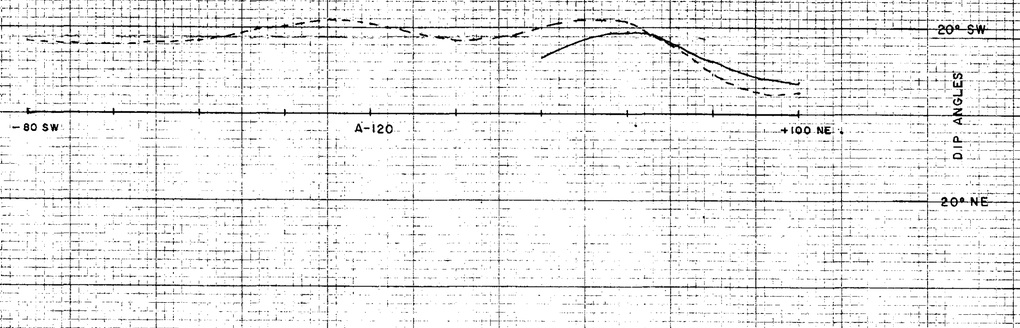
CHAPMAN, WOOD & GRISWOLD LTD.

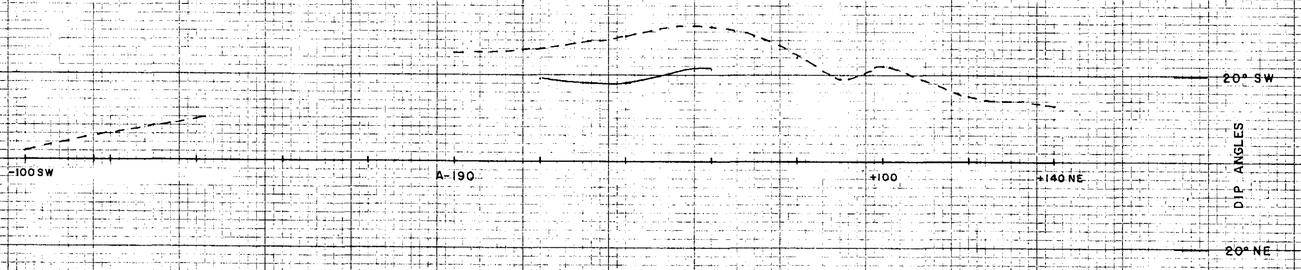
E. P. Chapman, Jr., P. E.

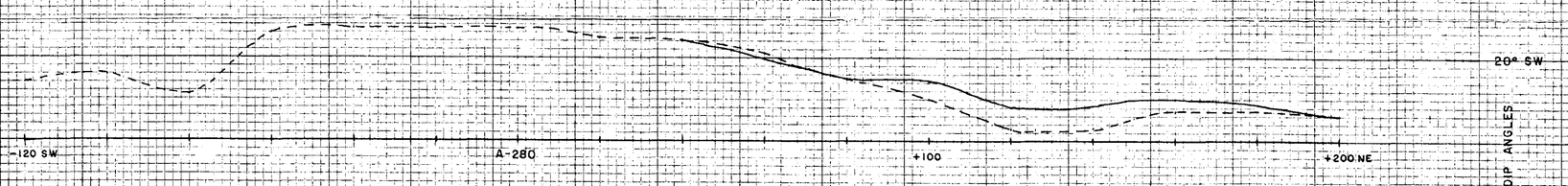
June 2, 1961

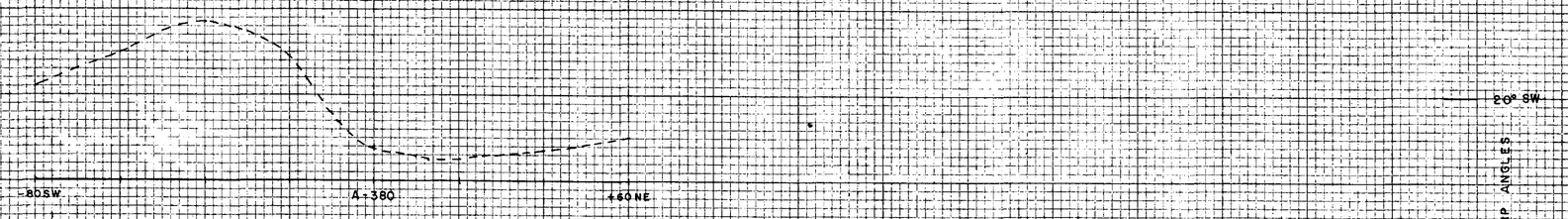


LOOKING NORMAL TO BASE LINE









LOOKING N 60° W

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Department of
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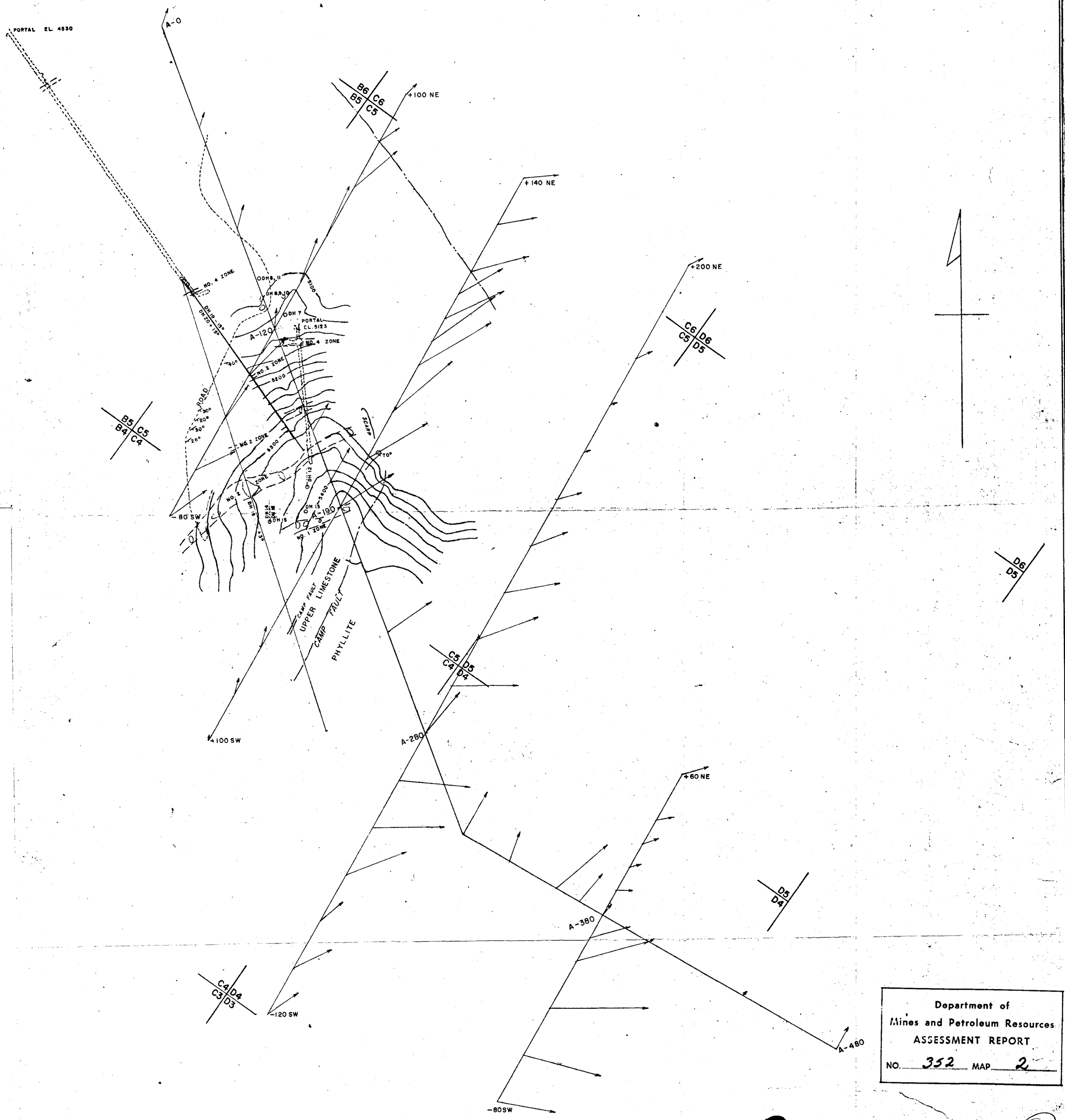
AFMAG PROFILES

SILVERTIP PROSPECT
LIARD MINING DIVISION, B.C.

SCALE IN FEET
0 200 400 600 800 FT

LOW FREQUENCY HIGH FREQUENCY

C.W.B.G. LTD. DRAWING No. 70 SEPTEMBER, 1960



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LEGEND

CONTOUR INTERVAL – 20 FEET

AFMAG VECTORS: 1" = 20° OF DIP
(HIGH FREQUENCY SHOWN)

E. P. Chapman Jr.

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 352 MAP 2

AREAL PLAN

(M2)

SILVERTIP PROSPECT
LIARD MINING DIVISION, B.C.

TOPOGRAPHY TRACED FROM PLAN BY T. HORSLEY DATED JULY, 1957

GEOLOGY AND WORKINGS TRACED FROM BRALORNE MINES LTD. PLAN OF FEBRUARY, 1959

AFMAG BY C,W & G LTD., SEPTEMBER, 1960

SCALE IN FEET

0 200 400 600 800

C,W & G LTD. DRWG. No. 71 SEPTEMBER, 1960

DOMINION OF CANADA:

PROVINCE OF BRITISH COLUMBIA.

TO WIT:

In the Matter of EVIDENCE OF EXPENDITURE INCURRED IN CONNECTION WITH AFMAG SURVEY - SILVERTIP B, C & D GROUPS AND EXTENTION GROUP -

I, **Edward P. Chapman, Jr.**

of **525 Vernon Drive, Vancouver, B. C.**

in the Province of British Columbia, do solemnly declare that **I am the president of Chapman, Wood & Griswold Ltd., consulting mining engineers and geologists of Vancouver, B. C.; that our company was retained to perform a geophysical survey on the aforementioned mineral claims in the Liard Mining Division; that the following persons were employed on the survey at the rates of fees and wages set forth:**

Name	Position	Days	Rate per day	Total
E. P. Chapman, Jr.	Supervisor	Sept. 5-13, 1960	$150	$1,350
R. J. Perelli	Operator	" " " "	$ 75	675
A. Zborovszky	Assistant	" " " "	$ 30	270
Stephan Papp	Assistant	" " " "	$ 20	180
		Total Field		$2,475

that the following fees were paid for office compilation, evaluation and interpretation of field data:

Name	Days	Hours	Rate per hour	Total
E. P. Chapman, Jr.	Sept. 19, 23, 26, 27	6	$20	$120
R. J. Perelli	Sept. 14, 15, 16, 18 19, 20	30	$ 7.50	$225
S. H. Ward	Sept. 29, (all 1960)			$ 50
		Total Evaluation		$395
		Total Fees Paid		$2,870

that the expenditures set forth above were made in behalf of the owners of the aforementioned mineral claims, include only fees for performance of the geophysical work and its evaluation

And I make this solemn declaration conscientiously believing it to be true, and knowing that it is of the same force and effect as if made under oath and by virtue of the "Canada Evidence Act."

Declared before me at the City of Vancouver, in the Province of British Columbia, this 9th day of June 1961, A.D.

Edward P. Chapman Jr.

~~A Commissioner, etc.~~
A Commissioner for taking Affidavits within British Columbia or
~~*A Notary Public in and for the Province of British Columbia.*~~