GEOLOGICAL AND GEOPHYSICAL REPORT

on the

MERIT M CLAIM (4 UNITS)

Record No. 4159 (11) Slocan Mining Division, British Columbia GEOLOGICAL BRANCH W. Long. 117⁰13'00" ASSESSMENT PEPORT 82 - K - 3E

Owner COLUMBIA ENERGIES INC.

FILMED

705 - 543 Granville Street Vancouver, B.C. V6C 1X8

MINISTRY OF ENERGY, MINES AND PETPOLEUM RESOURCES

Rec'd

HEB 26 1986

Operator 0

MURJOH RESOURCES INC. 705 - 543 Granville Street

Vancouver, B.C. V6C 1X8

SUBJECT -

FILE

VANCOUVER, B.C.

Consultant

BOA SERVICES LTD.

302 - 119 West Pender Street Vancouver, B.C. V6B 1S5

February 19, 1986

Paul P.L. Chung Consulting Geologist

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INTRODUCTION

The Merit M claim consists of a four unit block of mineral claims situated in the Slocan Mining Division, southeastern British Columbia. The property is owned by West Columbia Energies Inc. and is operated by Murjoh Resources Inc. both of suite 705 - 543 Granville Street, Vancouver, B.C. This report, prepared at the request of the directors of Murjoh Resources Inc., describes the 1985 exploration program.

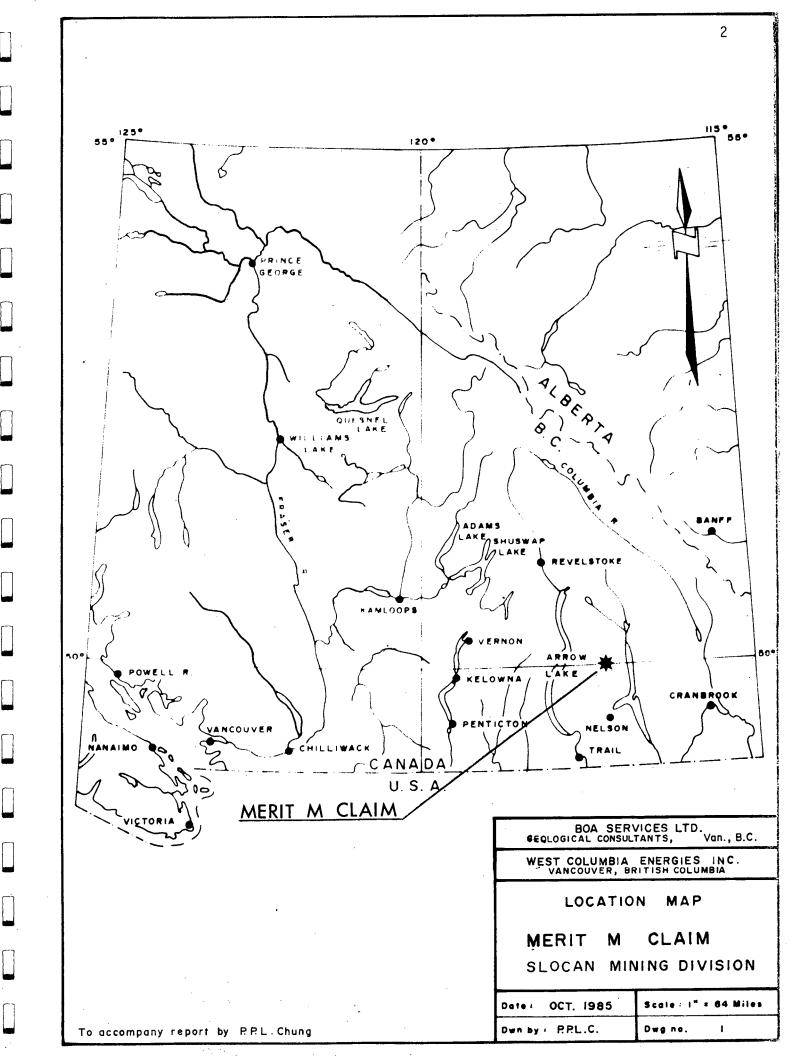
The purpose of the exploration program was to evaluate the exploration potential of the Merit M claim. This assessment work was undertaken between September 26 and October 28, 1985.

SUMMARY

The Merit M property consists of one mineral claim containing four claim units for a total land area of 100 hectares (247 acres), subject to survey.

The ground is located about one kilometre south of Highway 31A between Kalso and New Denver, near the confluence of McGuigan and Seaton Creeks, and about two kilometres south-southwest of the former (now abandoned) Zincton Townsite.

The Town of Sandon is situated some five kilometres to the south of the Merit M claim area.



Metasediments, belonging to the Slocan Group, underlie the property area and have been intruded by acidic rocks of a granitic nature. This group of rocks is the host, particularly in the vicinity of beds of limestone, to several important former silver, lead and zinc producing mines located nearby, such as the Rambler-Cariboo, and the Payne.

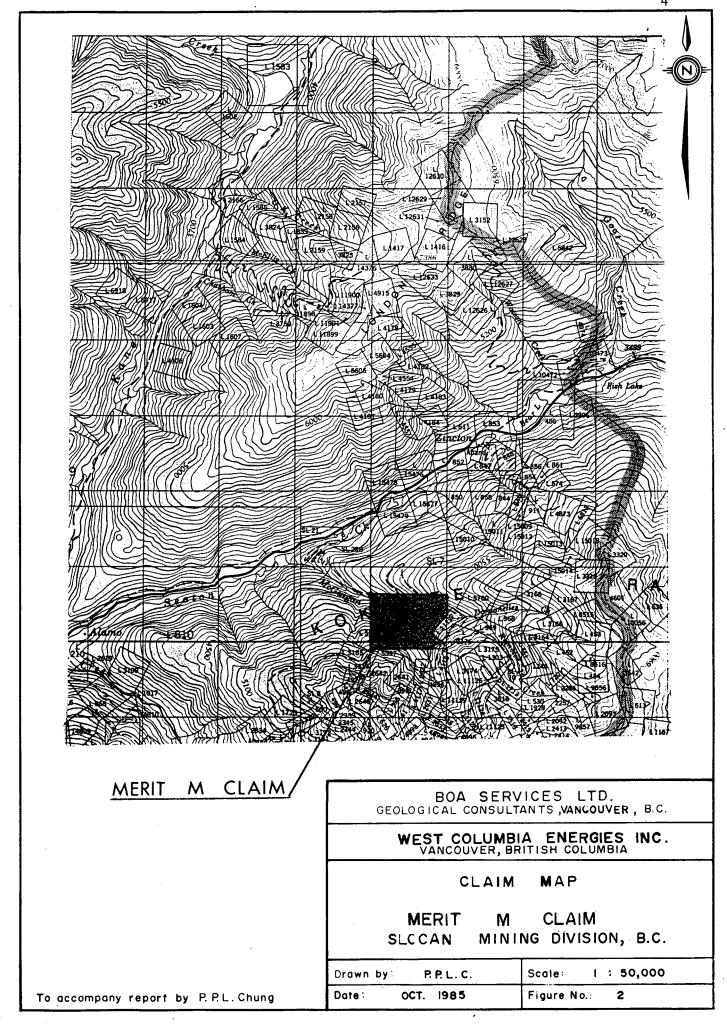
A number of moderate to strong geophysical anomalies have been delineated on the property and further work is warranted to test the property.

PROPERTY AND OWNERSHIP

The Merit M claim comprises four claim units for a total land area of 100 hectares (247 acres), subject to survey, and is located in the Slocan Mining Division, British Columbia

Claim Name	Record No.	Units	Record Date	Record Holder
Merit M	4159 (11)	4	Nov. 29, 1983	West Columbia Energies Inc.

The Merit M claim is shown on the British Columbia Mineral Titles Map M82-K-3E (Figure 2).



LOCATION, PHYSIOGRAPHY AND ACCESS

The Merit M ground is situated some five kilometres north of the Town of Sandon, and some eleven road kilometres northwest of New Denver, Kootney Land District, British Columbia.

The property is located about a kilometre south of Highway 31A and astride McGuigan Creek.

Road access is readily available along Highway 31A from either Kaslo or New Denver to a bush road leading southward along McGuigan Creek to the property.

The topography is steep, north-facing, and travel over the claim area is best on foot.

Elevations vary from about 4500 to about 5300 feet above sea level over the property terrain.

In the environmental sense, the Merit M property area is considered to be moderately sensitive.

HISTORY

The ground now held by the Merit M mineral claim may have been part of the former Payne, Rambler, Cariboo and St. Keverne Groups of claims.

The Payne vein was discovered on September 9, 1891. The property was sold to Scott McDonald and S.S. Bailey, and later,

about 1896, to A.W. McCune. After taking out a large amount of high-grade ore, McCune sold out to the Payne Consolidated Mining Company of Montreal. The company built a concentrator with capacity of 110 tons a day. The property was then sold at an auction around 1909. In 1910, a fire destroyed or seriously damaged all the surface equipment including the mill, tramway, and pipe lines.

Records of production are incomplete. Up to 1905, shipments amounted to over 50,000 tons of silver-lead ore, averaging 120 ounces silver to the ton and 68 percent lead, and some 6000 tons of zinc blende, crude and concentrated. The aggregate value of this ore is estimated at about \$5,000,000.

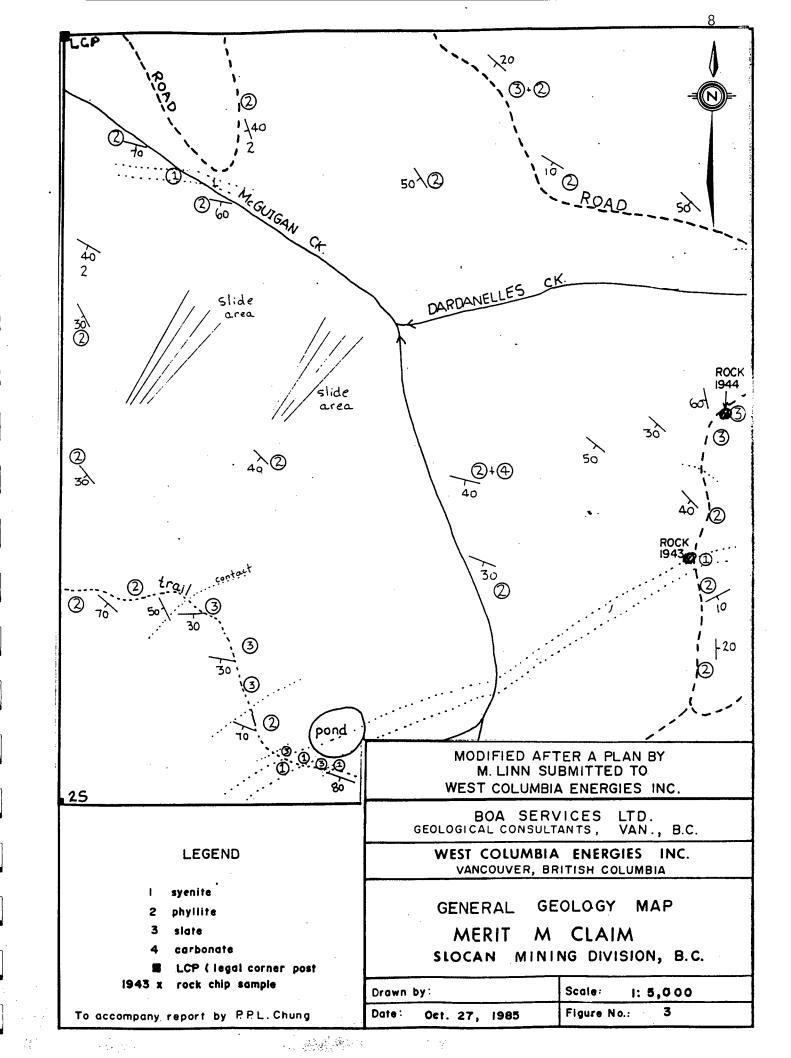
GEOLOGY (Figure 3)

Mr. M. Linn of Kalso, B.C., an independent geologist, was commissioned by Murjoh Resources Inc. to map the Merit M claim in September, 1985. The following is a summary based on the work performed by Mr. Linn.

Three lithological units underlie the claim area. They are phyllites, slates, and carbonates (limestones) belonging to the Triassic-Jurassic Slocan Group. Acidic intrusives, probably associated to the Nelson Batholith Complex are emplaced into the metasediments.

Slate crops out at the southwestern portion and near the eastern boundary of the claim. A small amount of limestone was found in the central and the northeast portion of the property. The remainder of the claim is underlain by phyllite with occasional granitic dykes. Bedding attitudes tend to strike in a northwesterly direction, but may vary from east-west to northeast. Dips are generally moderately to steeply west, but can change to southern or eastern dip. The variation in primary bedding attitudes is probably due to folding, which in the area, commonly has a northwesterly axis.

Two rock samples (Nos. 1943 and 1944) were taken by Mr. M. Linn and were sent to Chemex Labs for analysis. The results were not encouraging. However, since only two samples were taken, the results cannot be considered as conclusive.



GEOPHYSICAL SURVEY

A combined magnetometer and very low frequency (VLF) survey was carried out over the Merit M claims between October 22 - 28. Due to adverse weather conditions, the survey was terminated before completion and thus only the northern portion of the claim was surveyed. A total of 4.5 line kilometres of survey was carried out. Readings were taken at intervals of 25 metres along eastwest control lines which were 100 metres apart.

Magnetometer Survey

A Barringer GM-122 proton magnetometer (Serial No. 7534) with a standard 5 foot staff for the sensor head was used in the survey. Six-second cycles were used for more consistent measurements.

The area covered by the magnetometer survey (Figure 8) is considered to be relatively "flat" except a single reading magnetic "high" on Line 3+00S at 6+50E. This reading is some 500 gammas above the magnetic intensity of the area surveyed. The reason for this magnetic "high" is unclear, however, it does correspond to an anomaly from the accompanying VLF-EM survey.

VLF-EM Electromagnetic Survey

A Geonics EM-16 VLF Electromagnetometer (Serial No. 18975) was used in the survey. This instrument acts as a receiver only. It utilizes the primary electromagnetic fields generated by VLF (very low frequency) marine communication stations. These

stations operate at a frequency between 15 to 25 KHz, and have a vertical antenna current resulting in a horizontal primary field. Thus, this VLF-EM measures the dip angle of the secondary field induced in a conductor.

For maximum coupling, Cutler, Maine (24.0 KHz) was chosen to be the primary transmitting station, while the Seattle, Washington (24.8 KHz) transmitting station was selected as a secondary, perpendicular transmitter to delineate any cross-cutting structures.

Readings were filtered in the field by the operator, as described by D.C. Fraser, Geophysics Vol. 34, No. 6, (December, 1969). The advantage of this method is that it removes the dc and attenuates long spatial wave lengths to increase resolution of local anomalies, and phase shifts the dip angle data by 90 degrees so that crossovers and inflections will be transformed into peaks to yield contourable quantities.

Figures 5 and 7 show the VLF-EM Fraser filter data for transmitting stations Seattle, Washington and Cutler, Maine, respectively. The percent dip angle data has also been plotted for each transmitting station on Figures 4 and 6.

A study of the Fraser plots and the dip angle plots shows moderate to strong anomalies on Lines 0+00S thru 4+00S in the area of 1+00E and also in the area of 7+00E thru 8+00E.

CONCLUSIONS

The results of the geological and the geophysical surveys are quite encouraging despite the low rock geochemical results. Geological mapping has established competent rocks similar to former producing silver, lead-zinc properties in the area.

The VLF-EM survey was successful in delineating two anomalous zones. It is unfortunate that the survey had to be postponed due to weather conditions, since the anomalies appear to extend eastward beyond the surveyed area.

RECOMMENDATIONS

- Completion of the combined magnetometer and VLF EM electromagnetic survey.
- 2. A soil geochemical survey on existing grid lines should be conducted over areas of the claim deemed acceptable to soil geochemistry (areas uncontaminated by transported overburden).
- 3. Geochemical anomalies should be detailed by closely spaced soil sampling and geological mapping. Areas of geophysical anomalies should also be mapped in detail.

α	DOMENTAL	
1 (12-1)	RSTIMATE	

Completion of	geophysical	survey	and	soil	geochemistry	survey.
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Soil Sampling		\$2,000.00
Analyses		1,500.00
Combined VLF-EM and Magnetom	neter Survey	1,700.00
Vehicle		600.00
Room and Board		400.00
Report and Map Preparation		1,200.00
		7,400.00
	Contingency (10%)	700.00
	TOTAL	\$8,100.00

CERTIFICATE

I, Paul P.L. Chung, of the City of Richmond, Province of British Columbia, DO HEREBY CERTIFY THAT:

- 1. I am a Consulting Geologist with business address office at Suite 302 - 119 West Pender Street, Vancouver, British Columbia, V6B 1S5; and President of Boa Services Ltd.
- 2. I am a graduate in geology with a Bachelor of Science (Major: Geology) degree from the University of British Columbia, in 1981.
- I have practised my profession for the past five years.

Pre-graduate experience in Geology, Geochemistry, Geophysics in British Columbia and Yukon (1979-1980).

Two years as Exploration Geologist with Sulpetro Minerals Limited conducting geological and geophysical (VLF-EM, magnetometer, I.P. gravity, H.L.E.M.) programs in British Columbia, Yukon, Ontario, Quebec and Nova Scotia. (1981-1982).

Three years as Consulting Geologist with Boa Services Ltd. Active geological and geophysical exploration in British Columbia, Yukon and Western United States.

- I supervised the geophysical survey and conducted the VLF-EM survey on the Merit M claims during the period of October 22-28, 1985; and prepared this report documenting all of the data from the 1985 exploration program. This report is based upon field work and research by the author.
- 5. I own no direct, indirect or contingent interest in the property, nor shares in or securities of WEST COLUMBIA ENERGIES INC. or MURJOH RESOURCES INC.

Paul P.L. Chung Consulting Geologist

faul Chung

Dated at Vancouver, British Columbia, this 19^{th} day of February, 1986.

CERTIFICATE

I Micheal Linn, of the village of Kaslo, Province of British Columbia, hereby certify as follows :

- -- I am a Geologist residing at 660 Arena Avenue, Kaslo B.C., with a mailing address of Box 422, Kaslo, B.C., VOG 1MO.
- -- I graduate with a degree of Bachelor of Science, Major in Geology, from the University of British Columbia in 1970.
- -- I conducted the geological mapping program on the MERIT M claim during September October 1985.
- -- I have no direct, indirect or contingent interest in the securities of West Columbia Energies Inc., or of Murjoh Resources Inc.

Dated at Kaslo, B.C. this 4th day of December, 1985.

Micheal Linn Geologist

STATEMENT OF COSTS

- Establishment of 6 line kilometres of survey control grid
- Combined VLF-EM and magnetometer survey
- Geological mapping at a 1:5000 scale
- Collection and analysis of two rock samples for gold, silver and zinc
- Filing of assessment work with the Mining Recorder's Office at Kalso
- Collection, plotting, drafting, interpretation and documentation of all data from the 1985 exploration program

1. Personnel

	P. Chung: VLF-EM operator 7 days at \$200/day	\$1400.00	
	G. Caulfield - magnetometer operator - 7 days at \$180/day	1260.00	
	M. Linn - geologist 3 days at \$130/day	390.00	
	<pre>J. Settle - geological assist 3 days at \$100/day</pre>	ant 	\$3350.00
2.	Line cutting		1022.00
3.	Vehicles: 1 GMC 4x4 3/4 ton 7 days at \$35/ 450 kms at \$.35	'day \$ 245.00	
	l Datson 4x4 3 days at \$40/	'day <u>120.00</u>	522.50
F	ood		277.24
L	odging		262.15

, , , , ,	50.00 50.00 500.00
Recording Fees for Merit M claim	280.00
Expendable supplies	39.18
Total Field Expense	6253.07
Analyses (Chemex Labs Ltd., Vancouver B.C.) 2 rock samples for Au, Ag, Zn	53.50
pad pagarasa	13.50
Report and Map Preparation	
P. Chung - geologist 4 days at \$200/day 80	00.00
Drafting 3 hours at \$15/hr 4	15.00
Typing 12	27.01
Reproduction and printing 9	93.60 1119.11
Total Expenses for 1985 Exploration Program	\$7372.18

REFERENCES

Information relevant to the Merit M mineral claim is contained in the following publications:

Geological Survey of Canada, Memoirs 173, 184, MAP 273A

Report of the Zinc Commission 1906, pp. 194-197

Annual Report of the Minister of Mines for the years:

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1892, p.
          531;
         1047, 1052, 1058, 1074, 1083;
1893, p.
1895, p.
          679;
            6, 37, 49, 57, 60, 88, 90, 560;
1896, p.
1897, p.
          533;
          688, 843, 846;
1899, pp.
          147, 148;
1902, p.
          186-189, 200;
1904, pp.
          160, 161;
1905, p.
1913, p.
          126;
1914, p.
          286;
1921, pp.
          134;
1928, p.
          308;
1935, pp. E35, A26.
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Report on the MERIT WEST Mineral Claim (4 units) for Aegis Energy Ltd. and dated March 5, 1984 by Donald W. Tully, P.Eng.

Report on the MERIT SOUTH Mineral Claim (8 units) for Kobold Resources Ltd. and dated April 2, 1984 by Donald W. Tully, P.Eng.

Report on the MERIT Mineral Claim (4 units) for Trove Resources Ltd. and dated April 3, 1984 by Donald W. Tully, P.Eng.

Report on the SMOKE #1, #2, #3, #4, SILVER, MERIT M Mineral Claims (14 units) for West Columbia Energies Inc. and dated November 4, 1985 by Donald W. Tully, P.Eng.

APPENDIX I

Chemex Lab Ltd. Certificate of Analysis - Rocks



Chemex Labs Ltd.

212 Brooksbank Ave. North Vancouver, B.C. V7J 2C1

Canada

Phone:

(604) 984-0221

Telex: 043-52597

Analytical Chemists •

Geochemists • Registered Assayers

CERTIFICATE OF ASSAY

: A8517518-001-A CERT. #

INVOICE # : 18517618

DATE

: 25-0CT-85

P.O. #

: NUNE

705 - 543 GRANVILLE ST.

: PROSOURCE MANAGEMENT LTD.

VANCOUVER, B.C.

V6C 1X8

^-	Sample	Prep	Zn	Ag oz/T	Au oz/T	 	
<u></u>	Sample description	code	- %	RUSH FA	RUSH FA		
-	1942	236	0.06	0.01	<0.003	 	
	1943	236	0.07	0.16	<0.003	 	
7	1944	236	0.06	0 - 20	<0.003	 	

APPENDIX II

GM - 122 Proton Magnetometer
Principle of Operation
Specifications

GM-122 PROTON MAGNETOMETER

General Description, Principle of Operation

If a proton rich fluid such as kerosene, jet fuel, heptane, etc. is placed into a magnetic field the protons will align along the magnetic field vector. The magnetic field is induced in the sensor upon depressing the pushbutton. Then this field is suddenly removed. Protons which behave as elementary gyroscopes will start precessing around the remaining magnetic field – that of the earth. The precession frequency is directly proportional to the magnetic field of the earth. The magnetometer counts this frequency, divides it by the appropriate constant to obtain a reading in gammas (1 $\gamma = 10^{-5}$ gauss) and displays the reading in the form of a 5 digit number.

Section 1

SPECIFICATIONS

GM-122 PROTON MAGNETOMETER

Range:

20,000 to 99,999 in 12 ranges

Accuracy:

 \pm 1 γ through operating temperature range.

Sensitivity:

 1γ

Gradient Tolerance:

600 γ /ft.

Power:

12 "D" cells

Power Consumption:

50 Joules (Wsec) per reading.

Polarizing Power:

0.8 A @ 13.5 V for 1.5 sec. (3 second cycle).

0.8 A @ 13.5 V for 3 sec. (6 second cycle).

Number of Readings with 1 Battery Set:

2,000 - 10,000 depending on type of batteries

Frequeny of Readings:

1 every 3 seconds. 1 every 6 seconds.

Controls:

Pushbutton switch - Slide switch for 3 and 6 sec. located

on P/C Board.

Output:

5 digit incandescent filament readout.

Indicators:

LED point.

Lock Indicator - last three digits of the display blanked

off when phaselock not achieved.

Segment Function Indicator - all segments light up to

permit visual inspection of the display function.

APPENDIX III Geonics EM-16 Electromagnetometer Principle of Operation Specifications

EM-16 VLF-EM METER

Principles or Operation

The VLF-trensmitting stations operating for communications with submarines have a vertical antenna. The Antenna current is thus vertical, creating a concentric horizontal magentic field around them. When these magnetic fields meet conductive bodies in the ground, there will be secondary fields radiating from these bodies. This equipment measures the vertical components of these secondary fields.

The EM-16 is simply a sensitive receiver covering the frequency band of the VLF-transmitting stations with means of measuring the vertical field components.

The receiver has two inputs, with two receiving coils built into the instrument. One coil has normally vertical axis and the other is horizontal.

The signal from one of the coils (vertical axis) is first minimized by tilting the instrument. The tilt-angle is calibrated in percentage. The remaining signal in this coil is finally balanced out by a measured percentage of a signal from the other coil, after being shifted by 90°. This coil is normally parallel to the primary field.

Thus, if the secondary signals are small compared to the primary horizontal field, the mechanical tilt-angel is an accurate measure of the vertical real-component, and the compensation $\pi/2$ -signal from the horizontal coil is a measure of the quadrature vertical signal.

EM 16 SPECIFICATIONS

Measured Quantity Inphase and quad-phase components of vertical magnetic

field as a percentage of horizontal primary field (i.e.,

tangent of the tilt angle and ellipticity).

Sensitivity Inphase: ±150%

Quad-phase: +40%

Resolution $\pm 1\%$

Output Nulling by audio tone. Inphase indication from

mechanical inclinometer and quad-phase from a graduated

dial.

Operating Frequency 15 - 25 kHz VLF Radio Band. Station selection done by

means of plug-in units.

Operator Controls ON/OFF switch, battery test push button, station selector

switch, audio volume control, quadrature dial,

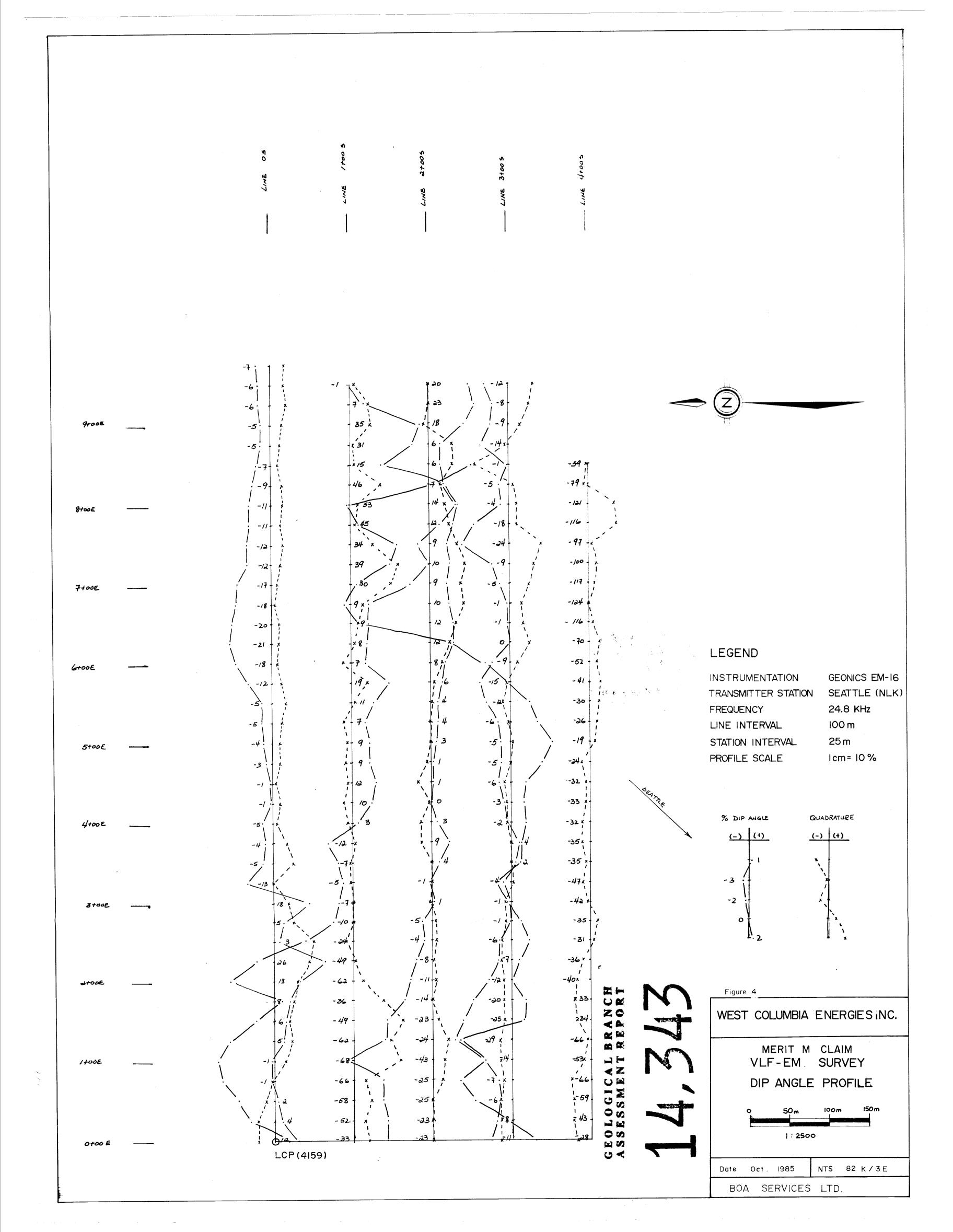
inclinometer.

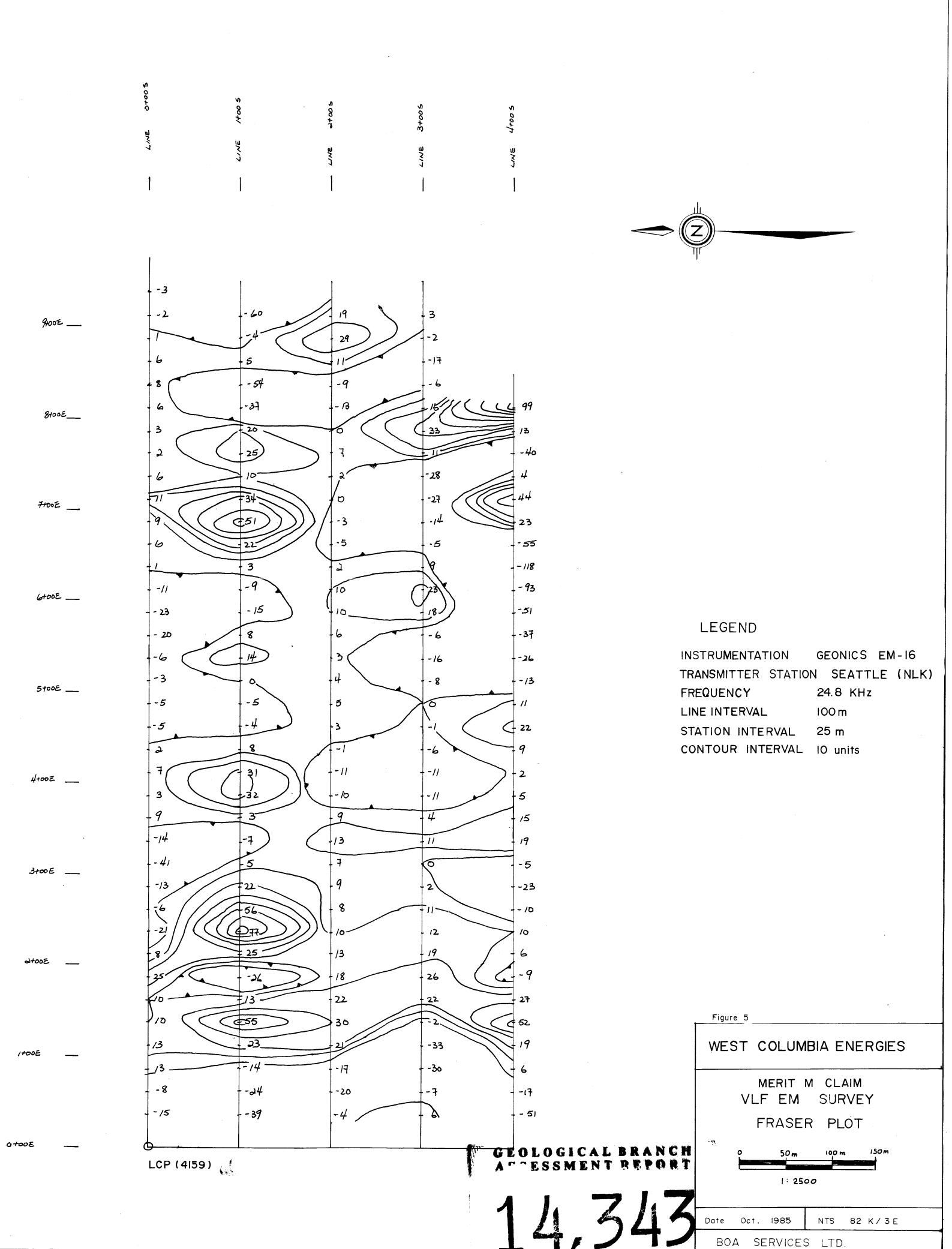
Power Supply 6 disposable 'AA' cells.

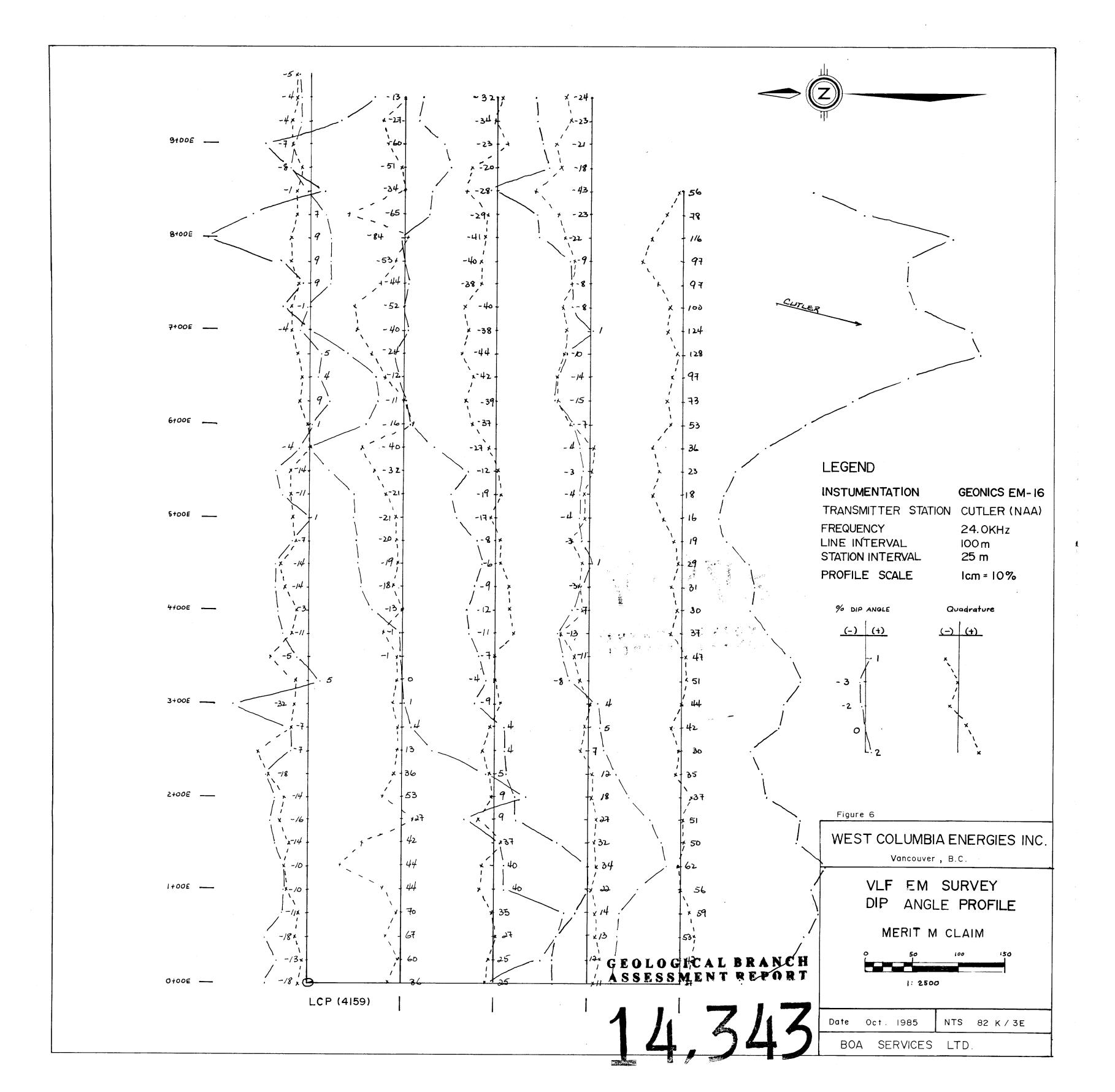
Dimensions $42 \times 14 \times 9 \text{ cm}$.

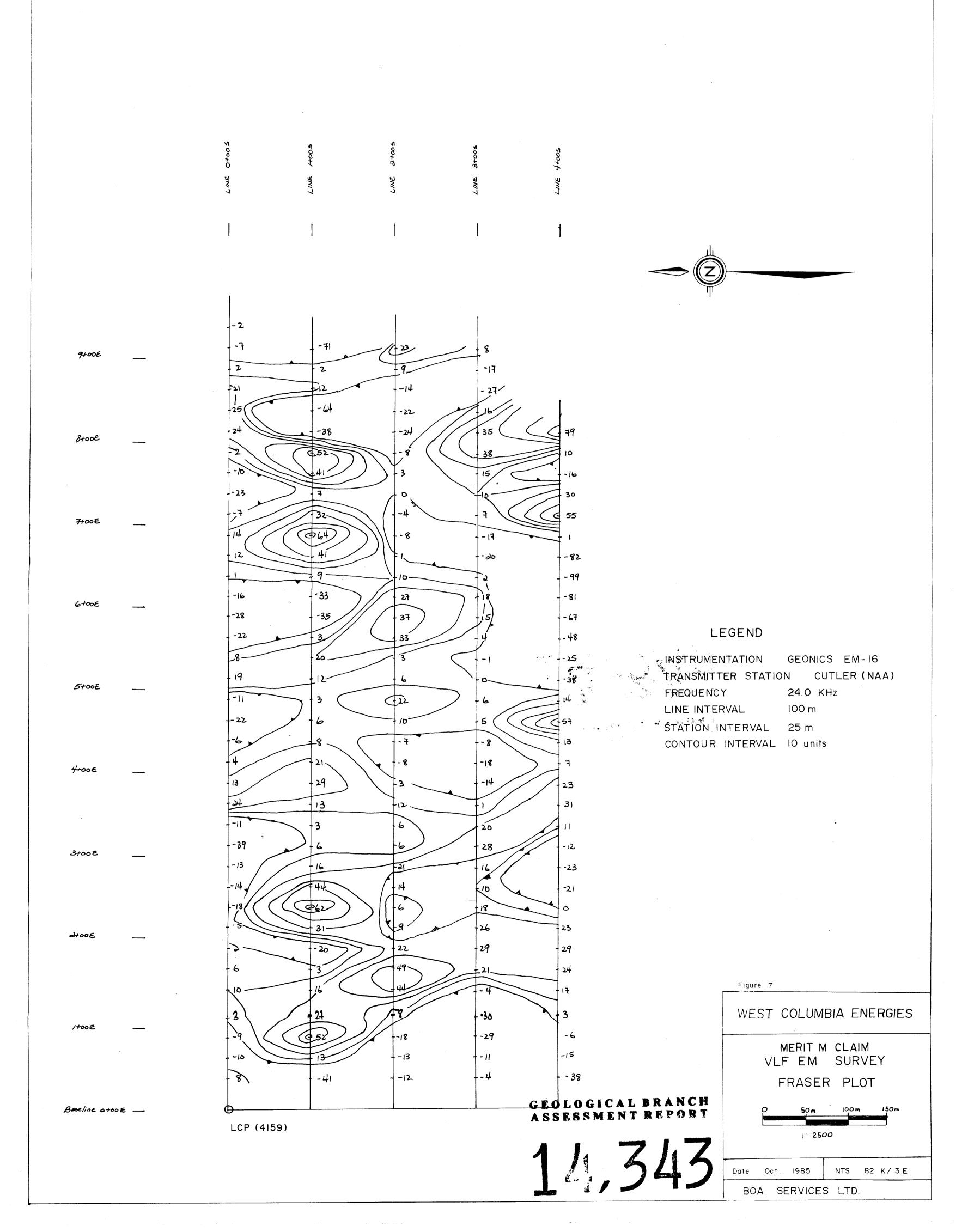
Weight Instrument: 1.6 kg

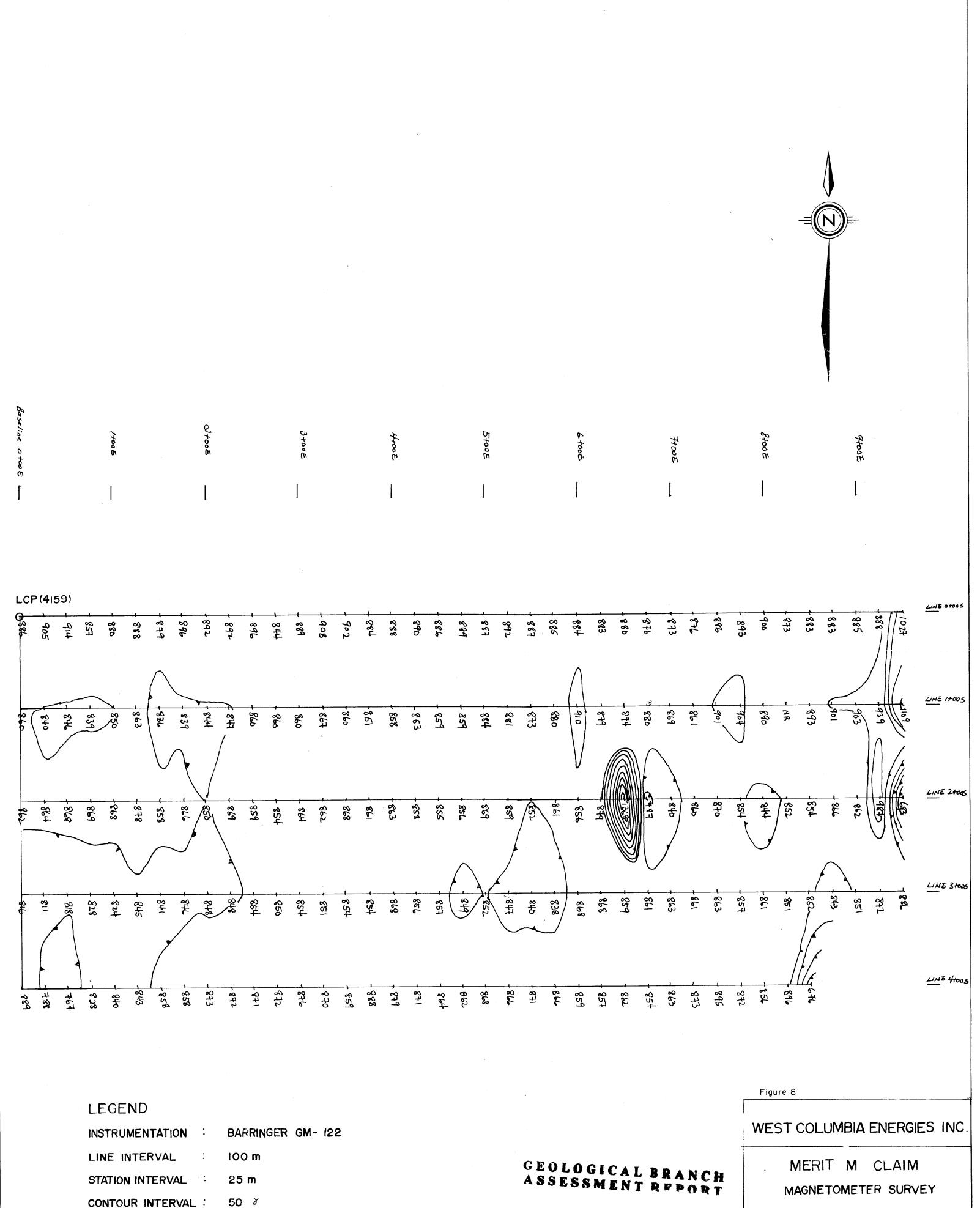
Shipping: 5.5 kg.











DATUM SUBTRACTED

57000 Y

PERSONNEL

G. CAULFIELD

