GEOFHYSICAL REPORT

on the

AIRBORNE MAGNETOMETER

AIRBORNE ELECTROMAGNETIC AIRBORNE RADIOACTIVITY

SURVEYS

of the

JAY, HOL and NATIVE CLAIMS

HOLBERG INLET

Nanaimo Mining Division

British Columbia

Latitude 50°37' North; Longitude 127°56' West 92 L / 12 W HOLBERG MINES LTD. (N.P.L.)

Airborne Surveys by: Waterton Airex Ltd Interpretation by: Weymark Engineering Ltd

Z -	5 June 1972
\bigcirc	Department f Lines and Retrolouim Prosources ASSESSMENT REPORT NO. 377 MAP

HOLBERG MINES LTD. (N.P.L.)

Jay, Hol and Native Claims

Nanaimo Mining Division

British Columbia

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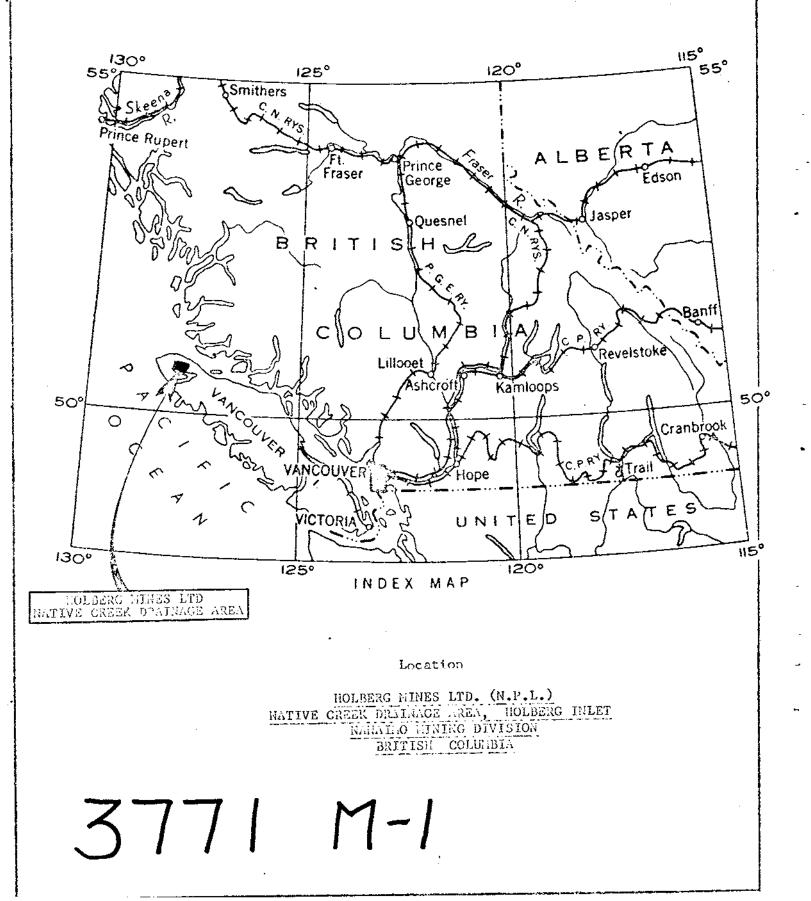
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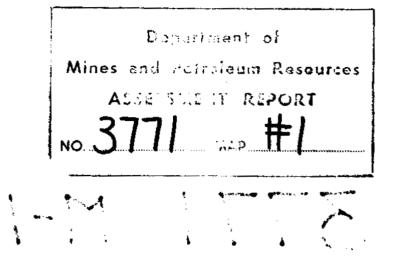
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WEYMARK ENGINEERING LTD.

Consulting Engineers 3310 WESTMOUNT ROAD WEST VANCOUVER, B.C. CANADA

5 June 1972

Holberg Mines Ltd (N.P.L.) 709 Dunsmuir Street Vancouver 1, B.C.

Gentlemen:

Re: Aerial Geophysical Surveys Jay, Hol and Native Claims Native Creek, Holberg Inlet Nanaimo Mining Division British Columbia

I am pleased to submit for your information this Report of the Results of the Aerial Geophysical Surveys completed on the 3rd May 1972 by Waterton Airex Ltd., Sidney British Columbia and the interpretation by W. J. Weymark P. Eng., of the field readings, of the Jay, Hol, Native Claims, Native Creek, Holberg Inlet area, Nanaimo Mining Division, British Columbia.

Background technical references relating to the Jay, Hol, and Native Claims are given in Report entitled Programme of Field Investigation, Native Creek Headwaters Area, Holberg Mineral Property, Nanaimo Mining Dvision, British Columbia dated 15 May 1970 by Weymark Engineering Ltd. These aerial geophysical surveys were conducted in accordance with the recommended programme of field investigations given in that Report.

1.0 Property:

The area covered by the aerial geophysical surveys involved the Jay, Hol and Native Mineral Claims and adjacent areas.

The following details relate to the mineral claims designations:

Claim Name	Staking Date	Record Number	Record Date
Jay 1-10 incl	26 October 1967	21103 - 12	31 October 67
Hol 1- 6 incl	12 November 1969	30248 - 53	26 Nov. 1969
Native 1-8 incl	. 19 November 1969	30254 - 61	24 Nov. 1969
Native 9-12 "	20 November 1969	30262 - 65	24 Nov. 1969
Native 13-18 "	21 November 1969	30266 - 71	24 Nov. 1969
Native 19-23 "	22 November 1969	30272 - 76	24 Nov. 1969
Native 25	22 November 1969	30278	24 Nov. 1969

The Jay claims are in good standing until 31 October 1972, the Hol Claims until November 26, 1972 and the Native Claims until 24 th November 1972.

Reference is to Figure 1 for general location.

TELEPHONE 922-1536 2.0 Location:

Mining Division, the Rupert Land District, Quatsino Sound, Holberg Inlet, Glerup-Native Creeks area, Vancouver Island, British Columbia. The geographic reference is 127°56" West and 50°37' North approximately. The holdings are about 250 air miles North Westerly from Vancouver and 25 miles South-Westerly from Port Hardy. They are reached by way of automobile road from the village of Holberg via Port Hardy by air service or pick-up type transportation via the restricted road connecting Holberg-Port Hardy-Gold River to Provincial Highway No. 19 at Campbell River.

Reference is to Figures 1,2 and 3 for location

details.

3.0 Geology: The predominant rock formations in the Native Creek area consist of volcanic flows and beds, medium to dark green-gray in colour, sometimes porphyritic or with amygdaloids of calcite, chlorite, quartz, epidote or the zeolite group. An overcap of limestone prevails from elevations of 350 feet above sea level to 1150 feet, which in places has been eroded. The main zone-formation of interest, from a copper bearing point of view is the dillage porphyry intrusive estending southeasterly from Claims Posts #1 of Hol Nos 1 and 2. The intrusive varies in width from 10-15 feet to over 200 feet, Appearing in other sections are related flatlying sills, a few feet in thickness, which may be offshoots from the main body. Copper mineralization occurs within this intrusive body as primary bornite and chalcopyrite. Near the contact with the volcanics are zones containing considerable sulphides as well as hematite rich sections. These altered zones extend for some distance from the intrusive and in places, the fractures and joints are copper bearing with native copper and such secondary minerals as azurite, malachite and bornite.

The geological setting is appropriate for geophysical testing methods for the localizing of metallic sulphide containing host rock formations.

4.0 Geophysical Surveys:

In accordance with the programme of investigations recommended in the Report of 15 May 1970, an airborne geophysical survey of the Holberg holdings and adjacent areas was conducted under contract by Waterton Airex Ltd. of Sidney British Columbia in May 1972. It was completed on the 3rd of May 1972. It consisted of combined aeromagnetic, electromagnetic and radioactivity tests.

The survey covered an area of about 3000 acres, involving 16 runs of 16,500 feet in length. These runs were 500 feet apart and were flown to a true bearing of 116° or alternatively 296°. Readings were taken at every 500-foot interval and flight lines were 500 feet above ground cover.

The plane was captained by Claude Waterton, VRS-536 Senior Commercial, the co-pilot was Gerald Jeronen, both of Sidney British Columbia. The flight plan was filed with the D.O.T. Port Hardy. Figure 2 shows the location of the flight lines and Figure 3 gives the readings for each of the surveys.

Appendix 1 contains details relating to the aircraft and instrumentation used.

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Figure 4 shows the extent and location of the interpreted anomalous zones referenced to ground mapping and Figure 5 shows the profiles.

Referring to Figs 3 and 5, it will be noted that:-

- the variation in Radioactivity readings ranged from zero to 1/100 MR/HR

- the variation in Electromagnetic readings ranged from zero to 15 (x.1 microamps)

- the variation in magnetometer readings varied from -10 to +12 (x 100) gammas. Differences are recorded referenced to a background of 53, 000 gammas.

For the radioactivity and electromagnetic tests, background was dialed out.

<u>Results:</u>

Referring to Figure 5, it will be noted that there is in general a correlation pattern between the magnetometer and electromagnetic readings. The greatest disparity occurs between low magnetometer and high electromagnetic readings such as on:-

Flight lin	ə 1 -	Readings	17,	20,	31,	32					
Flight lin	e 2 -	Readings	ni	L							
Flight lin	• 3 -	Readings	16,	27							
Flight lin	ə 4 -	Readings	3,	12,	13						ļ
Flight lin	₽5 -	Readings	4,	31,	32,	33					
Flight lin	ə 6 -	Readings	5,	17,							
Flight lin	∍7 -	Readings	11,	15,	17,	29,	30				
Flight lin	e 8 –	Readings	23,	33							
Flight lin	• 9 -	Readings	11,	23,	27,	33					
Flight lin	e 10-	Readings	nil								i
Flight lin	e 11-	Readings	7,	8,	9,	11,	12,	14,	25,	29,	32
Flight lin	ə 12-	Readings	4,	5,	14						
Flight lin	e 13-	Readings	5,	7,	12,	22,	26,	27,	31		
Flight lin	e 14-	Readings	8,	11,	14,	22					
Flight lin	ə 15-	Readings	3,	11,	12,	13,	14,	19,	29,	30,	32

Figure 4 depicts the coincidence of the low magnetometer and the high electromagnetic zone readings. The margins represent sections of steep gradients and therefor zones of anomalous characteristics. With the instrumentation used, low readings for magnetometer indicate paths with magnetic included minerals and high electromagnetic readings depict paths with sulphide mineralization. This pattern is confirmed in the mapped areas, as shown on Fig 4 geology.

The trend of the magnetometer influences to the northwest, whereas that for the electromagnetic is more northerly.

Increased radioactivity appears to trend northeasterly and centers on either side of an indicated influence between reading rows 16 and 25. Of particular interest are the anomalous zones outlined in the areas capped with limestone,- lines 2-7, reading rows 17-23. Investigation of metallic mineralization opportunities in these areas will require subsurface investigation techniques.

5.0 Summary Conclusions:

The results of the surveys, as presently interpreted are:

- 1. There is a coincidence between the known metallic mineralization containing formations and the lowmagnetometer and the high-electromagnetometer reading zones.
- 2.Fault structural zones indicate anomalous patterns
- 3.Extensions of anomalous zones under limestone capped formations provide areas of interest because of high intensities implied. Further ground geological information is required.

6.0 Recommendations:

On the bases of the results obtained from the relating geophysical surveys referred to in this report, it is considered that further field investigations are warranted and that the next phases of the programme presented in the 5th May 1971 Réport be initiated in order to assess the metallic mineral potentialities of the Jay, Hol and Native Claims holdings of Holberg Mines Ltd. (N.P.L.), Nanaimo Mining Division, British Columbia.

Respectfully submitt k P. Eng. sident

APPENDICES

CERTIFICATE

I, William James Weymark, P. Eng., Consulting Engineer President of Weymark Engineering Ltd., of the District of West Vancouver, of the Province of British Columbia hereby certify that:

1. I am a graduate of Mining Engineering of Queen's University, Kingston, Ontario, B. Sc., 1940 and have been practising my profession for twenty-five years.

2. I am a practising Consulting Engineer and reside at 3310 Westmount Road, West Vancouver, Province of British Columbia.

3. I am a member of the Association of Professional Engineers of the Province of British Columbia and also of the Consulting Engineers' Division of the Association of Professional Engineers of British Columbia.

4. I am a member of the Canadian Institute of Mining and Metallurgy, of the American Institute of Mining, Metallurgical and Petroleum Engineers and of the American Geophysical Union.

5. I have no direct or indirect interest whatsoever in Holberg Mines Ltd., (N.P.L.) or do I expect to receive any interest, direct or indirect in the properties of Holberg Mines Ltd., (N.P.L.) or any affiliate or any security of the company or affiliate.

6. The findings of the accompanying report are based on my personal examinations of the Jay, Hol and Native Mineral Claims in April 1970 and subsequent review of the available information and of the geophysical readings of the surveys conducted by Waterton Airex Ltd of Sidney, British Columbia.

DATED at West Vancouver, British Columbia this 5th day of June 1972.

William J. Weymark, £ng. President ark Engij eering Ltd.

APPENDIX 11

COST DISTRIBUTION

- Waterton Airex Ltd. conducting airborne magnetometer, electromagnetic and radioactivity readings at 500-ft intervals, 50 miles flight lines Jay, Hol and Native Mineral Claims, Nanaimo Mining Division.....\$ 640.00
- 2. Weymark Engineering Ltd. interpretation of geophysical survey readings, correlations and preparation and submission of Report dated 5 June 1972

Total

\$4040, 60

k P. Eng.

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		1:50,000 reshold + Magnetometer	a d .		HIG <u>Low</u> <u>ELE</u> <u>RAE</u> <u>CROMAGN</u>			21 P S
•	Compute	r Processing Controlled Sensitivity		TAGNE	TOMETE	R. 500 G	Ammas	
	Victoria International		0x 496, SI	DNEY, B.C., CAN	ADA	PHONE 656		
	of accuracy at the base and position A 400 square mile could put your ga exploration progra By the use of the 80% of the unprote the survey which costs to a minime Electromagnetic: Magnetometer: Hadioactivity:	e combination metho luctive anomalies results in keeping am. Waterton quadratu: Tran. on 1,000 CPS Sharpe PMF-3 or M Flux-gate in units Detectron - DR299 Rec. in units of	0. Per 1 verage s ,000. ta or more od and d can be c g the gr re syste S. Rec. cPhar MT s of 10 , 24 tul .001 MR/	ineal mil surveys. aking thre e ahead in ealculated round foll em. in umits 700 modifi to 100 Games.	e includ e weeks their maissacer out of ow up of .1 Mi ed to ou mmas.	ing croamps.		
	Threshold:	McPhar TV-5 Cryst Positions 1.3 - 1	al .63 - 2.	.5 Mev.				
-		scales of 1,000 t the anomalous are		feet per	inch wit	ch clear		
		er mountain areas : on a 500 foot grid on.						
		al miles of reconn eted in 40 differe				970.		
	Operations range	up to 400 miles f	rom base	e.		_		
	Aircraft type:	Cherokee 235 - T	win Coma	unche.				

WATERTON AIREX LTD. AIRBORNE GEOPHYSICS PAT. No. 750303 CANADA (1967)

Our patented method incorporates the combined readings from a flux-gate magnetometer, a nucliometer and a miniaturized electromagnetic unit. The readings are recorded instantly on film and timed electrically to enable the readings to be entered on a grid of a chosen scale.

To obtain anomalies of most value level lines are flown in a certain plane and a fixed wing aircraft is chosen as the most suitable vehicle for this purpose.

Any inaccuracy in the timed, readings due to airspeed error is calculated out before the readings are entered on the grid.

The instruments are set on "O" over a predetermined spot near the survey area and this adjustment is made after each $1\frac{1}{2}$ hours. The survey flying is done in certain conditions and at certain times of the day.

Station-keeping is accomplished by electrical counter, reference to topographical features, directional gyro set from compass or astro compass and a set flying technique. Ground checks from over twenty mountainous areas have found the accuracy of this method to be between 250 feet and 500 feet on a 500 foot grid.

Anomalies are plotted from the grid on to transparent sheets and the resulting overlays give us the combination anomalies which, in our experience, have been the most successful.

Magnetometer: PNF-3 Sharpe or McPhar M-700 is used when adjusted to our method. Readings are in units of 100 gammas for mineral reconnaissance and in units of 10 gammas for oil reconnaissance.

Electromagnetic: Built by our company to a miniature scale to enable us to use small aircraft to keep the costof survey to our rates. With the sensitivity set at 30%, dissemenated sulphides usually read in the 3 to 5 range and heavy sulphides in the 10 to 15 range on a scale division of 25.

The transmitted electrical field is from 200 feet of copper wire attached to the bottom of the aircraft in the horizontal plane and power is taken from the aircraft generator and built up to required strength by the field transmitter which operates in the 1,000 CPS range.

A small 10 oz bird is drawn behind the aircraft powered by its own mercury cell and its receiving coll is in the vertical, 90° to the transmitted field. A booster receiver in the aircraft produces the received signal in units of .1 microamperes.

Nucliometer: Detectron - DR299, 24 tubes suited to airborne work to obtain total radioactive readings in units of .001 MR/HR, milliroentgens per hour. Threshold readings are taken from McPhar TV-3B with 3" crystal.

Computer processing is used when requested, but for this the magnetometer average in the areas is set at 3,000 gammas.

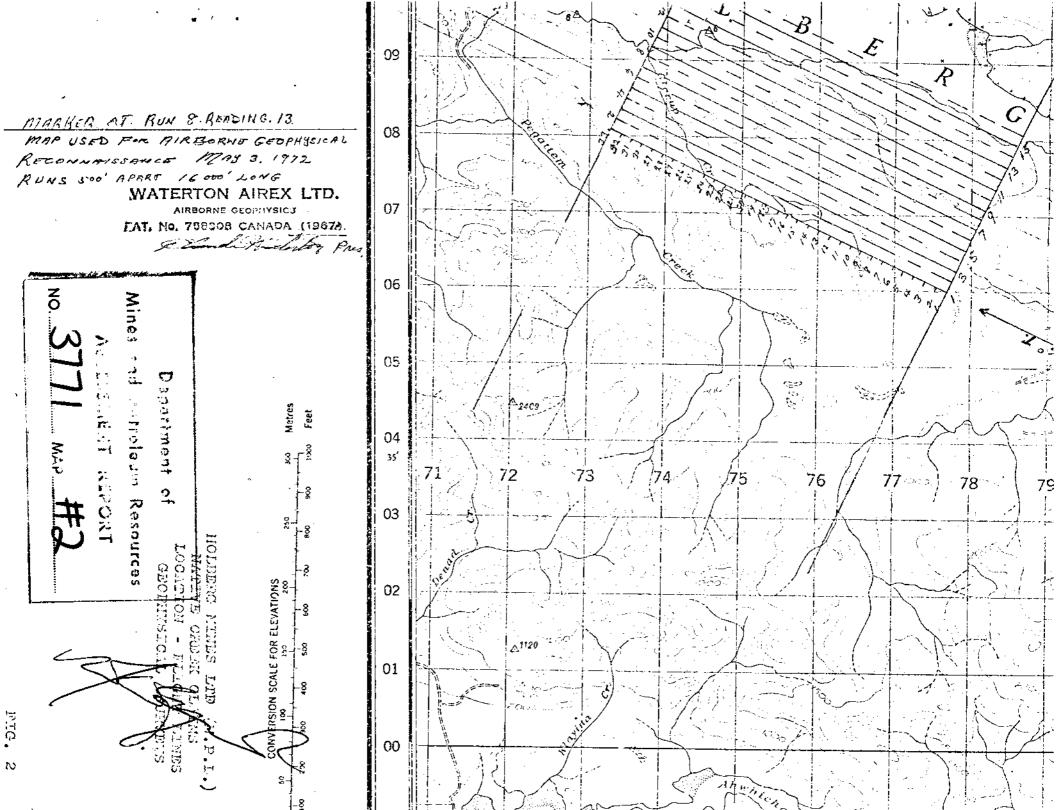
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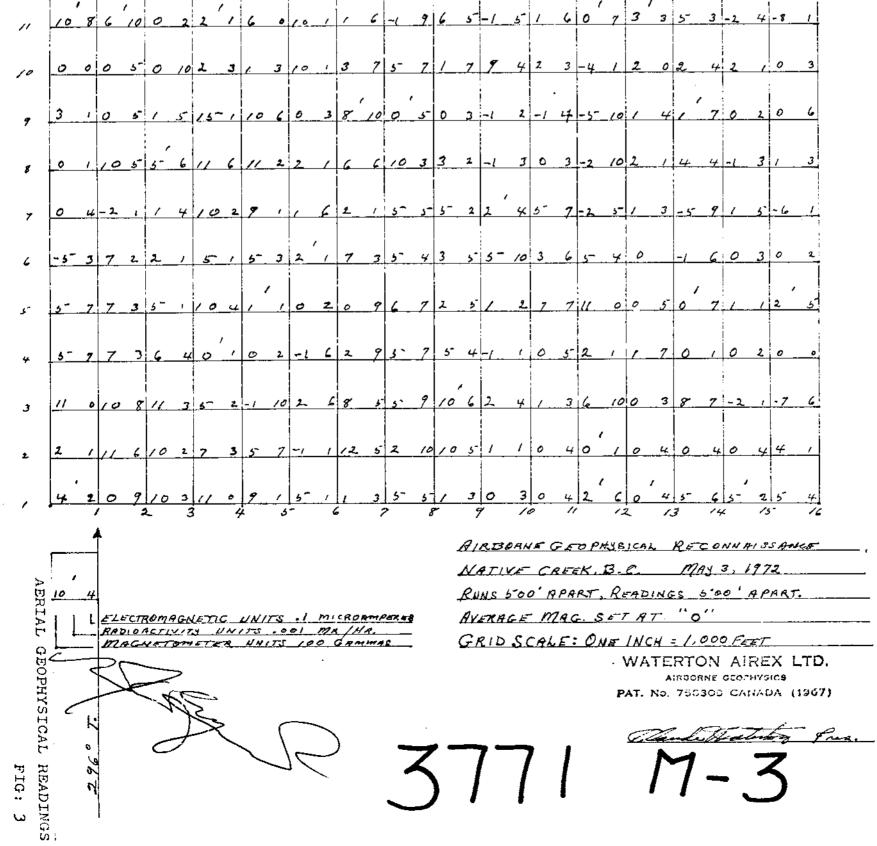
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ILLUSTRATIONS

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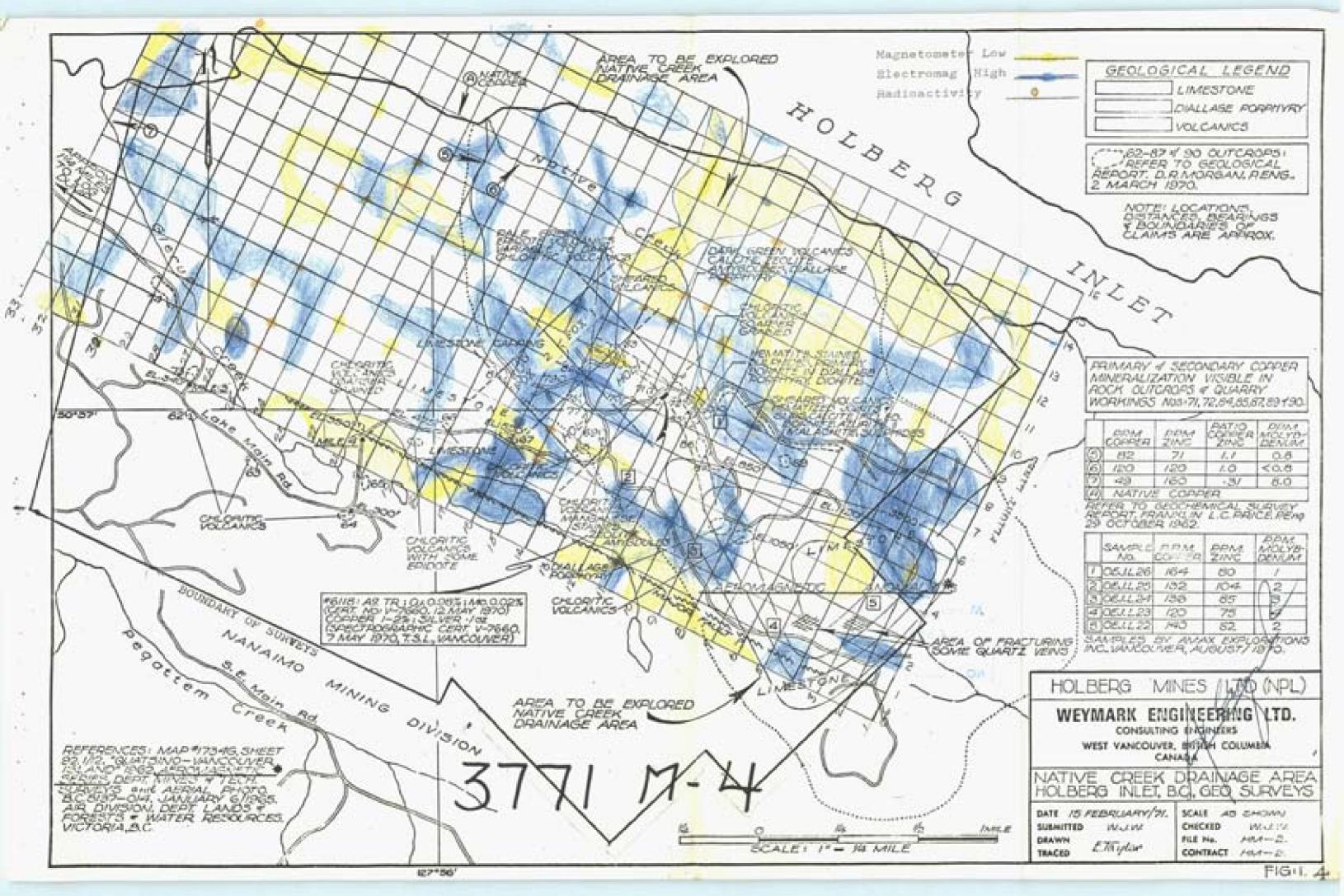


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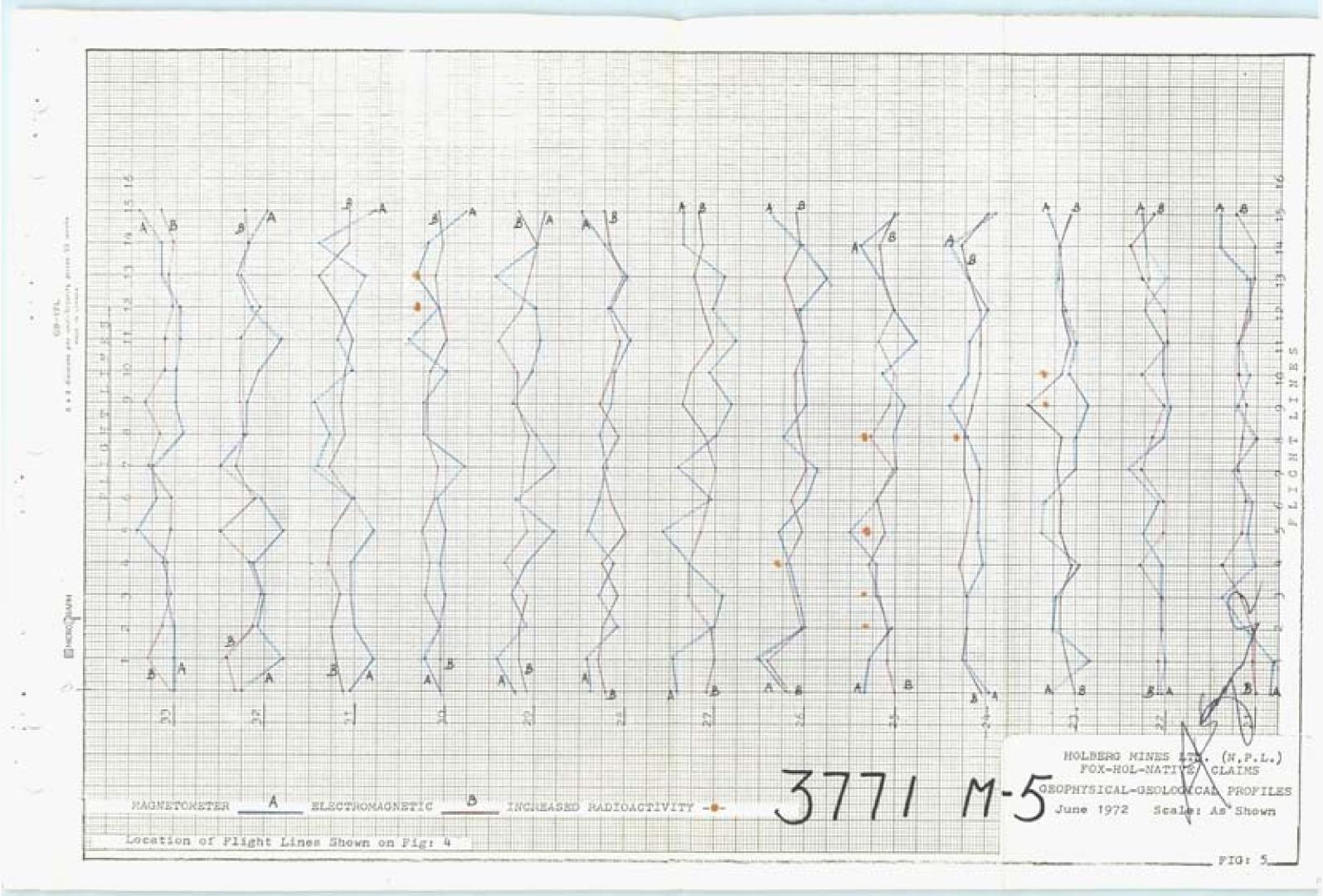
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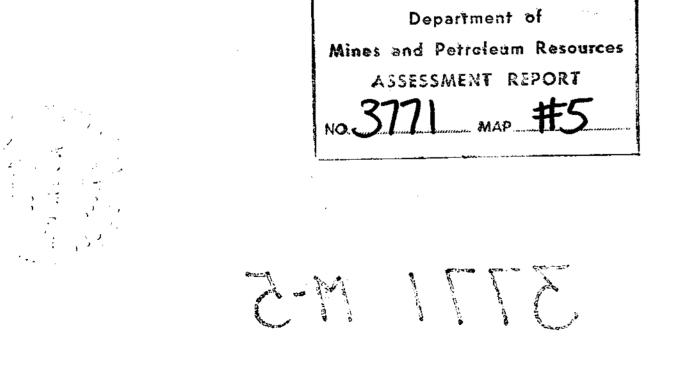


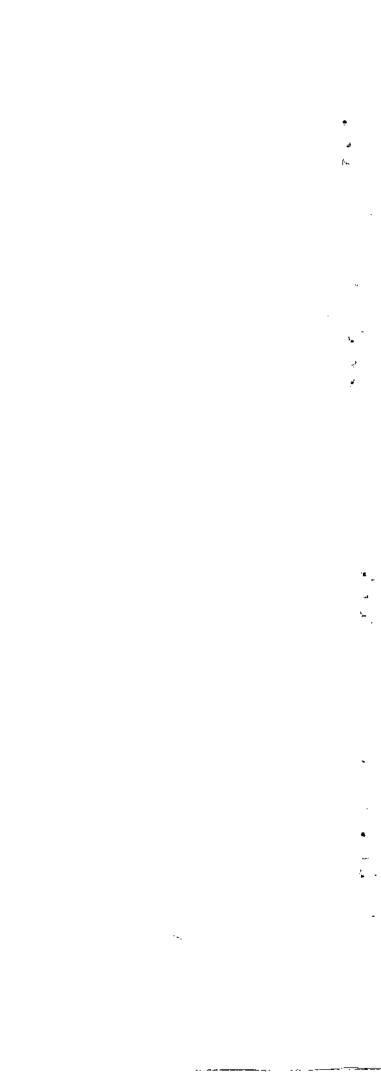
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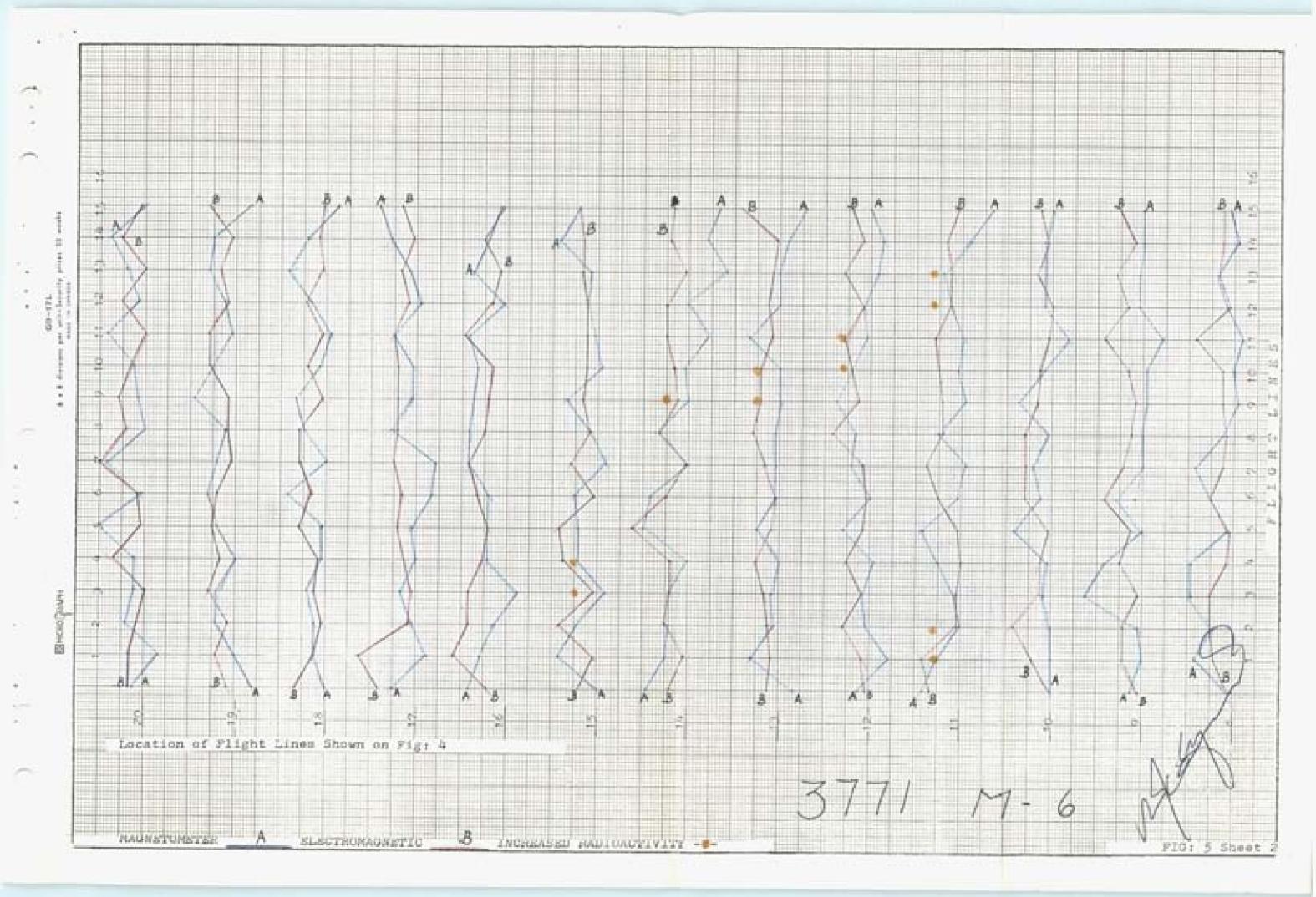
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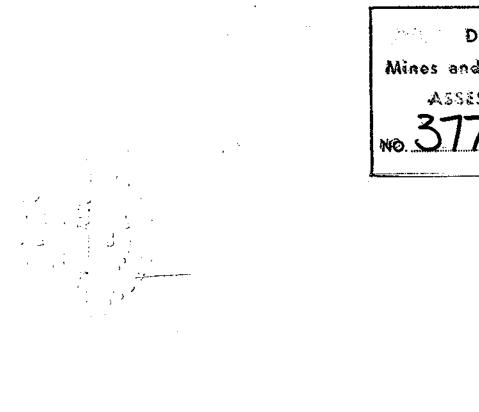
Department of Mines and Petroleum Resources ASSESSMENT REPORT MAP NO

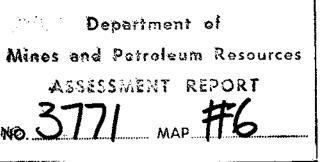


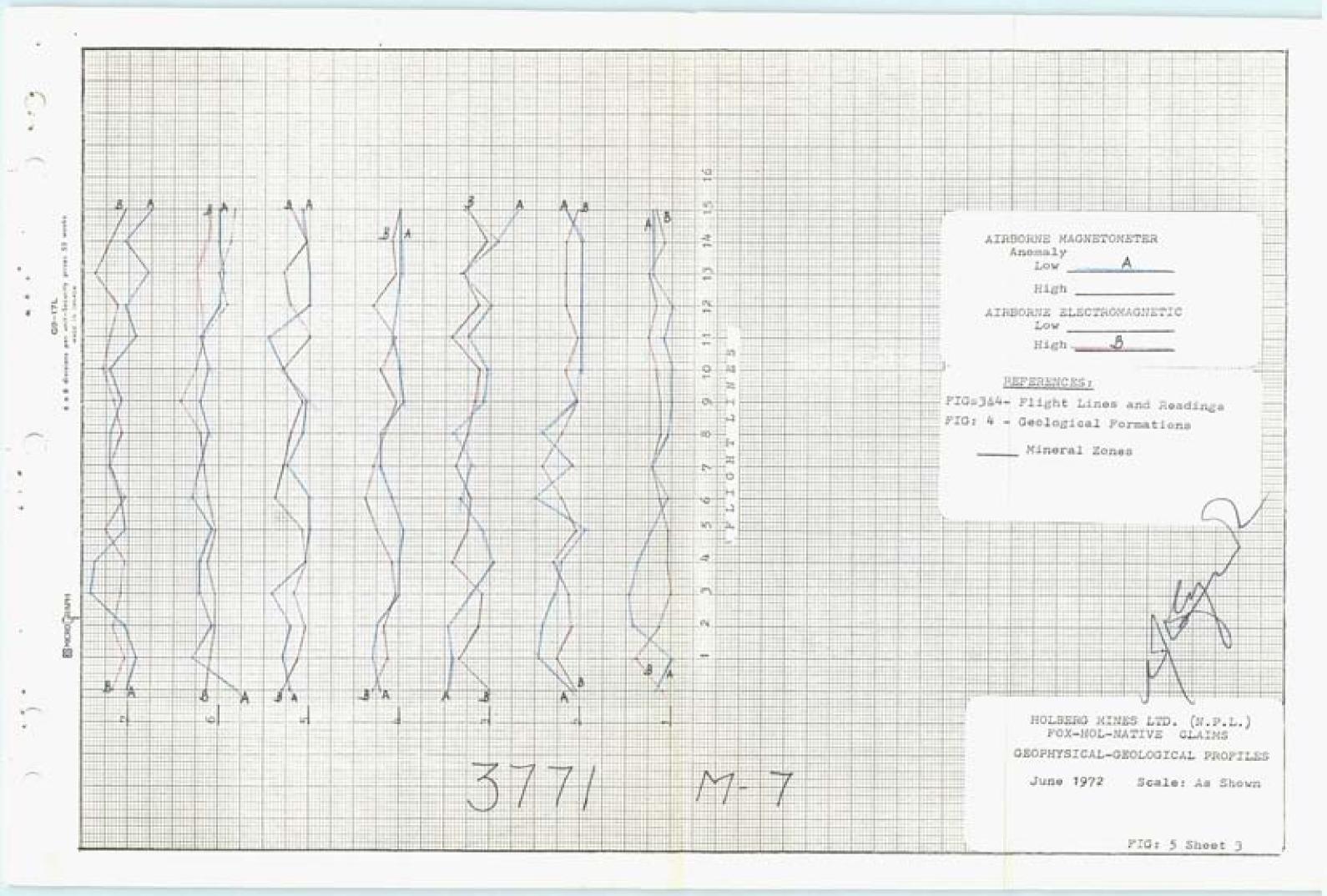












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