

3024

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 3024 MAP.....

AIRBORNE MAGNETIC SURVEY

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

SHAW CLAIM GROUP

CHURCHILL COPPER AREA, LIARD M.D., B. C.

94K/6W

SEPTEMBER 1970

SHAW Claim Group: 105 miles S80W of Fort Nelson, B. C.

50° 125° SE

N.T.S. 94K/6

Report by:

DAVID G. MARK, B.Sc.
Geophysicist
GEOTRONICS SURVEYS LTD.
514 - 602 W. Hastings St.
Vancouver 2, B.C.

Submitted to:

MUNDEE MINES LTD. (N.P.L.)
404 - 550 Burrard Street
Vancouver 1, B.C.

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RESUMES - 1) David G. Mark, B.Sc.	
2) T. W. Rolston	

MAPS

	<u>Scale</u>	
#1 Location Map	1" = 110 miles	2a
#2 Flight Line Map (Sheet 1)	1" = $\frac{1}{4}$ mile	In pocket
#3 Contour Map (Sheet 2)	1" = $\frac{1}{4}$ mile	In pocket
#4 Contour Map (Sheet 3)	1" = 400 feet	In pocket

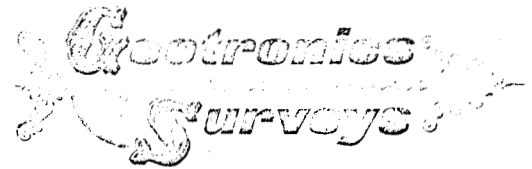
SHAW Claim Group

SUMMARY

An aeromagnetic survey was carried out by Geotronics Surveys Ltd. over the SHAW Claim Group, located near Churchill Copper Mines in the Racing River Area, in early September, 1970. It was anticipated that diabase dykes, associated with copper mineralization in the Racing River Area, could be picked up by the survey. The dykes cut only Windermere type rocks which underlay the northern portion, at least, of the SHAW claims.

The survey area is relatively quiet, a probable result of the sedimentary rocks. However on the northeastern part of the SHAW group are magnetic anomalies that could be reflecting diabase dykes.

The correlation between geology, soil sampling results and aeromagnetic results is the basis for warranting further exploration.



517 - 682 West Hastings Street, Vancouver, British Columbia, Canada K1 Telephone 682-6812

GEOPHYSICAL REPORT ON AEROMAGNETIC SURVEY
ON THE
SHAW CLAIM GROUP
CHURCHILL COPPER AREA, LIARD M. D., B. C.

Submitted to: Munde Mines Ltd. (N.P.L.)
404 - 550 Burrard Street
Vancouver 1, B.C.

INTRODUCTION

An airborne magnetic survey was carried out on the SHAW Claim Group under supervision of the writer and under technical supervision of T. Rolston on September 3, 1970.

The object of the survey was to try to locate diabase dykes which, according to Vail, have a magnetite content of 15% in many cases. These dykes seem to be associated with the copper mineralization in the Churchill Copper mine and the copper showings in the area.

LOCATION AND ACCESS

The claims are located about 105 miles S80W of Fort Nelson, B.C., in the Rocky Mountains, in the Liard Mining District, at the confluence of the Magnum and Delano Creeks, which is about three miles south of the Churchill Copper Mine. Coordinates are $50^{\circ} 28'$ latitude and $125^{\circ} 19'$ longitude. Access is by the Churchill Copper haulage road which leaves the Alaska Highway at Mile 401 and passes through the northern end of the property about 28 miles from the highway.

TOPOGRAPHY

The topography of the whole area, in general, is extremely rugged. The elevation varies from under 3,000 feet in the broad U-shaped river valleys to over 9,000 feet on the mountain peaks. The claim group itself is composed largely of Mount Roosevelt. Towards the northern end flows Delano Creek in an easterly direction and on Shaw claim 34, Magnum Creek joins Delano. From the creek and southwards, is talus slide with an incline from 30° to 45° . The talus slide area is interspersed with minor bluffs and extends for about 1500 horizontal feet to the major bluffs. The rock bluffs are cut by draws through which streams flow northerly towards Delano Creek.

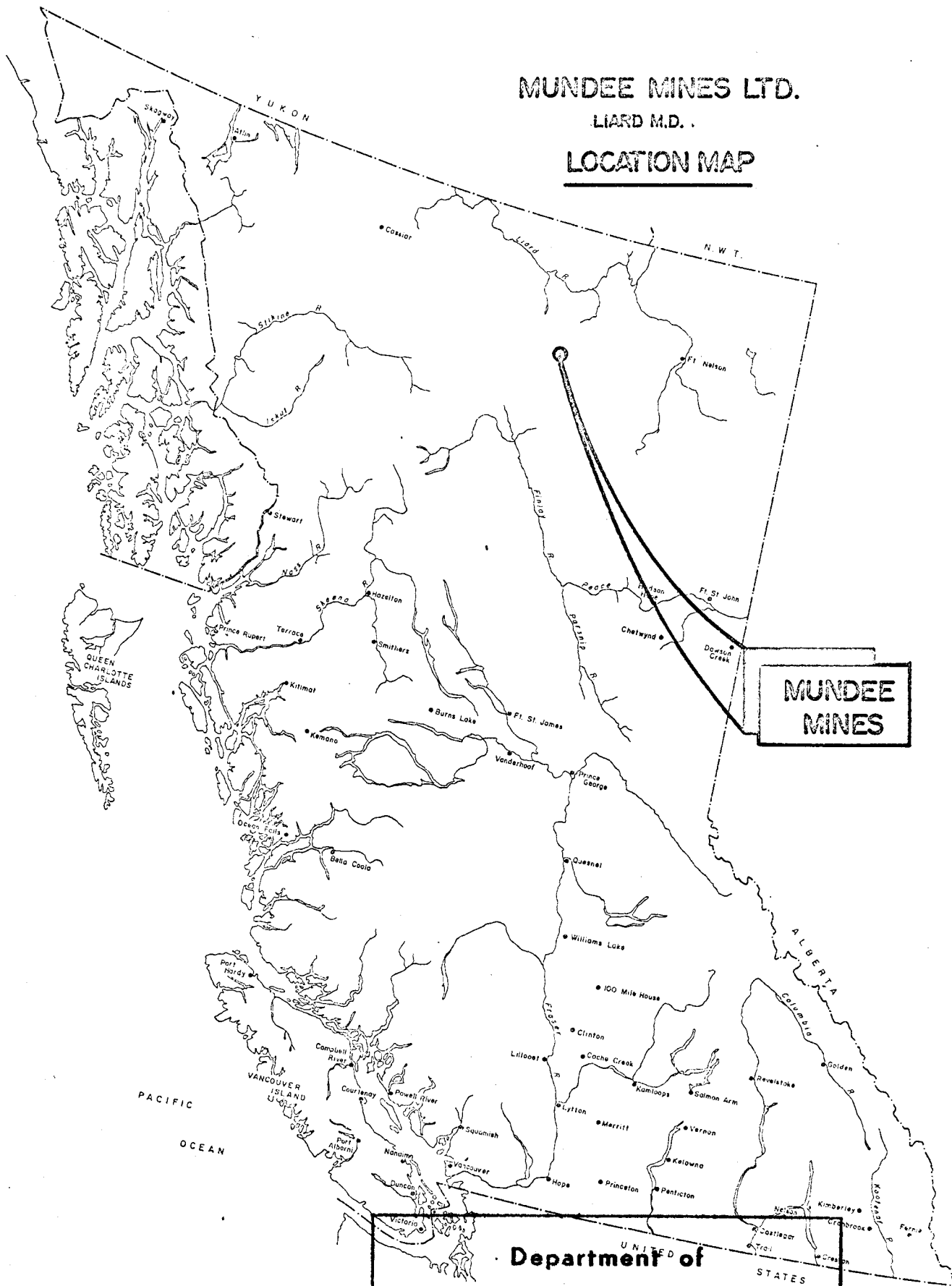
SURVEY PROCEDURE

The equipment was installed in the helicopter at Fort Nelson and test flown over the Fort Nelson Airport area. The survey

MUNDEE MINES LTD.

LIARD M.D.

LOCATION MAP



**MUNDEE
MINES**

SCALE 1" = 110 miles

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grid over the SHAW Claim Group was then flown. Elevation over the local terrain was attempted to be kept at 500 feet. Flight line separation is an average $1/8$ mile. However, it varies from about 400 to 1000 feet due to rough topography and high winds. It is also for these reasons that some of the claims area was not flown. Though an air speed was kept at 60 mph, ground speed varied greatly due to winds.

The instrument took a reading every 1.7 seconds. Data was controlled by photographs and topographical points such as creeks and roads.

INSTRUMENTATION

The data was detected using an ELSEC nuclear free precession magnetometer, type 592. This measures the absolute value of the earth's magnetic field intensity. The sensitivity is one gamma and the absolute calibration is governed by a crystal-controlled oscillator so that it cannot drift. The scale used throughout the survey area was 4000 fsd.

Data was recorded analog on a Bausch and Lomb 6" strip chart recorder.

MAP PLOTTING

All data is plotted on Sheet 1, scale $1" = \frac{1}{4}$ mile, with flight lines and topography. This data is contoured on an overlay, Sheet 2, of the same scale. The contour map was blown up to a

scale of 1" = 400', Sheet 3, in order to facilitate the interpretation of the aeromagnetic data with the geochemistry data and geology, both on maps of the same scale.

PREVIOUS WORK

The SHAW Claim Group was staked in the spring of 1969. In September of the same year, a soil sampling survey and geological examination was attempted by the writer but was limited due to prevailing snow conditions.

Mr. E. P. Sheppard, professional engineer, wrote a geological report on the property in October.

GEOLOGY

The whole Racing River area is generally underlain by sedimentary rocks of every type varying in age from Late Precambrian to Upper Cretaceous. Igneous rocks are limited to a few dykes, probably of diabase composition, but called andesitic in the writer's previous reports.

The SHAW Group is underlain, according to Vail's map, by quartzitic rocks of Windermere type and conglomerates of the McDougal Formation. However, on the northern part of the claims, where the writer was only able to examine outcrops, Windermere grey-black argillaceous shales occur (see Sheet 2 of Geochemical-Geological Report) with the odd outcrop of red shale. On the northwest corner of the group were noted diabase dykes striking

approximately northeast dipping approximately vertical.

In the Racing River area, sulphide mineralization in the form of chalcopyrite is found to occur in a quartz and calcitic gangue in contorted beds of argillite (or argillaceous shale) of the Windermere type. The extreme folding seems to be due to nearby (within 200 feet) fault or shear zones. The mineralization occurs near, or on contact with, older diabase dykes that vary in width from 15 to 150 feet and in many cases have a magnetite content up to 15%. It appears that the calcite, quartz and chalcopyrite followed the plumbing system that produced the diabase dykes.

Chalcopyrite float was found on the north-flowing creek on SHAW 2 m.c.

INTERPRETATION

The overall magnetic relief in the survey area is approximately 800 gammas from approximately a minimum of 800 gammas to 1600 gammas. This is relatively low and can be expected considering that the bedrock is almost exclusively sedimentary. The background level is approximately 1100 to 1200 gammas.

Looking at the contour map, Sheet 2, the contours are elongated in a north-south direction throughout most of the map-area. This is due to the bias error produced by the flight lines. Readings are taken along the flight line approximately every 100 feet and flight line separation is around 800 feet. Therefore, contours around any anomalous value will be elongated perpen-

dicular to the flight line direction.

Almost the whole area is approximately around the background level. On the eastern edge of the map-area (Sheet 2), there are a few spotty anomalous readings that could be due to diabase dykes or perhaps, more probably, topographical noise.

On the northwestern part of the SHAW group, there are 3 anomalous zones, 2 going as high as 1600 gammas. The western one is centered over an area carrying a few anomalous copper geochemistry readings. Just to the east of the eastern anomalous zone is another good copper anomalous zone. These magnetic anomalies are relatively small and therefore could quite probably be due to magnetite-carrying diabase dykes. It should be noted here that the diabase dykes themselves do not carry mineralization, but rocks that are nearby the dykes. A possibility exists that they are due to topographical noise, but is not very likely, since the anomalous area is fairly flat along the direction of the flight lines.

There is also another slightly anomalous zone striking just west of north and found on the SHAW 15, 23 and 24 m.c. It could also be due to a diabasic dyke intrusive but does not appear to be within the Windermere shales (according to Vail).

CONCLUSIONS AND RECOMMENDATIONS

The correlation of correct geology (Windermere shales), copper geochemistry anomalous zones, and, now, aeromagnetic anomalies suggesting diabasic intrusives certainly warrants further ex-

ploration, as noted by Sheppard's report. Additional work that should be of use is as follows:

- 1) A 'downward continuation' filter applied to the aeromagnetic data could be quite useful in evaluating the anomalies further.
- 2) The anomalies should be checked on the ground by a magnetometer.

Respectfully submitted,

GEOTRONICS SURVEYS LTD.



DAVID G. MARK, B.Sc.
Geophysicist

DGM:ly
December 21, 1970

SELECTED BIBLIOGRAPHY

- Mark, David G., Geochemical-Geological Field Report, Shaw Claim Group; for Munde Mines Ltd., Churchill Copper Area, B.C., October, 1969.
- Menzies, M. M., Geology and Mineralogy of the Strangword Copper Property, South Tetsa River, B.C.; University of British Columbia, M.A.Sc. thesis, 1951.
- Sheppard, E.P., Summary Report, Shaw Claim Group, Churchill Copper Area, B.C., for Munde Mines Ltd., October, 1969.
- Vail, John R., Geology of the Racing River Area, B.C., University of British Columbia, M.Sc. thesis, 1957.
- Williams, M. Y., Geology Along the Alaska Highway, Fort Nelson to Watson Lake, 1944, Geological Survey, Canada, Paper 44.28.



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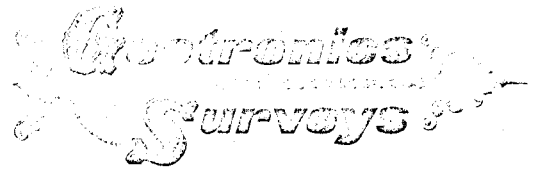
RESUME OF TECHNICAL AND FIELD EXPERIENCE
of
DAVID MARK, B.Sc.

EDUCATION

Graduate of University of British Columbia in Science (B.Sc.)
in Geophysics.

EXPERIENCE IN INDUSTRY

1. Prospecting and geological evaluation for New Taku Mines Ltd. during exploration season of 1965.
2. Field supervisor for geophysical and geochemical work and prospecting for Mastadon - Highland Bell Mines Ltd. during exploration season of 1966.
3. Field supervisor in geochemical work and geological mapping for Anaconda (Canada) Company during exploration season of 1967.
4. Field geophysicist for Geo-X Surveys Ltd. during exploration season of 1968.
5. Presently geophysicist for Geotronics Surveys Ltd., Vancouver, B. C.
6. Experience in various geophysical instrument surveys: magnetometer, electromagnetic, self potential, gravity, induced polarization, resistivity and seismic methods.
7. Member of British Columbia Geophysical Society and Vancouver Branch of The Canadian Institute of Mining and Metallurgy.
8. P. Eng. applied for with Association of Professional Engineers of B. C.



517-502 West Hastings Street, Vancouver, British Columbia, Canada X Telephone 688-4342

RESUME OF TECHNICAL AND FIELD EXPERIENCE OF T. W. ROLSTON

1. Eleven years with the R.C.A.F. as Instrument and Electronic Technician with crew supervisory capacity in various electronic and instrumentation systems.
2. Two years with Kerr-Addison Mines Ltd. as Electronic Technician servicing, repairing and maintaining various types of geophysical instruments. Also 2 seasons as Field Supervisor and Geophysical Instrument Operator in mining exploration, including airborne and ground geophysical surveys, geochemical surveys, geophysical and geochemical drafting and mapping.
3. Three years as Field Supervisor of geophysical and geochemical surveys and Instrument Operator of various geophysical instruments, such as airborne and ground systems magnetometer, electromagnetic, gravity meter, self potential meter, scintillometer and induced polarization.
4. Three years contracting geophysical/geochemical surveys in close association with mining engineers for various mining companies.
5. President and Manager of Geotronics Instruments Ltd., geophysical instrument design, manufacture and distribution.
6. President and Project Manager of Geotronics Surveys Ltd., mining exploration, geophysics and services.
7. Electronics Engineering understudy with Cleveland Institute of Electronics.
8. Member of the B.C. Geophysical Society.

E. P. SHEPPARD & ASSOCIATES LTD.

CONSULTING GEOLOGISTS

314-402 WEST PENDER STREET,
VANCOUVER 3, B.C.

May 12, 1971

Geotronics Surveys
517-602 W. Hastings Street
Vancouver, B. C.

Attention: Mr. David G. Mark
Geophysicist

Dear Mr. Mark:

At your request I have reviewed the references cited below and examined your report of December 1970, "Airborne Magnetic Survey, Munde Mines Ltd. (N.P.L.), Shaw Claim Group, Churchill Copper Area, Liard M.D., B. C."

The 34-claim group is located approximately 105 miles S80W of Fort Nelson, B. C., near Churchill Copper Mines. The claims are accessible by the Churchill Copper Mines road which leaves the Alaska Highway at Mile 401.

The topography is rugged. Elevations vary from less than 3000 feet in the broad U-shaped river valleys to more than 9000 feet on the mountain peaks.

Geology. The area is underlain by Windermere type grey-black argillite shale, cut by near-vertical green basic dykes trending SW-NE. The series exhibits 3 sets of fracturing. The principal deposits of the area - Churchill Copper, Davis-Keays, Largo Mines - are vein deposits containing chiefly chalcopryrite in quartz-calcite veins. They are associated with basic dykes over 100 feet in width, striking SW-NE which corresponds to the direction of one set of fractures.

Airborne Magnetic Survey. This survey was carried out over the claims group in September 1970. It was anticipated that the diabase dykes associated with copper mineralization in the Racing River area contained sufficient magnetite to be detected by airborne magnetic equipment. Any anomalous condition found would then be a target for intensive prospecting and perhaps narrow the target area for copper mineralized veins.

The overall magnetic relief in the survey area is approximately 800 gamma, from a minimum of 800 to 1600 gamma. This is relatively low relief and relates to a bedrock that is mainly sedimentary and contains relatively low amounts of magnetite. The survey area was found to be quiet and this condition is attributed to the sedimentary rocks underlying the area.

Three anomalous zones, two of which are over 1600 gamma, occur on Shaw claims 31, 1 & 2; another occurs on Shaw 15, 23 & 24. These magnetic anomalies are relatively small and could be attributed to magnetite-carrying basic dykes. It was expected that the dykes, being lineal and steep dipping, would show more definite magnetic relief. However, the terrain effects may have masked the outlines.

The areas outlined by the anomalies should be thoroughly prospected for quartz-calcite veins which usually carry copper mineralization.

The geophysical report and maps submitted show careful preparation and professional presentation. I am satisfied that the field work performed was of the high quality associated with your surveys.

Respectfully submitted,

E. P. Sheppard

E. Percy Sheppard, P.Eng.
Consulting Geologist

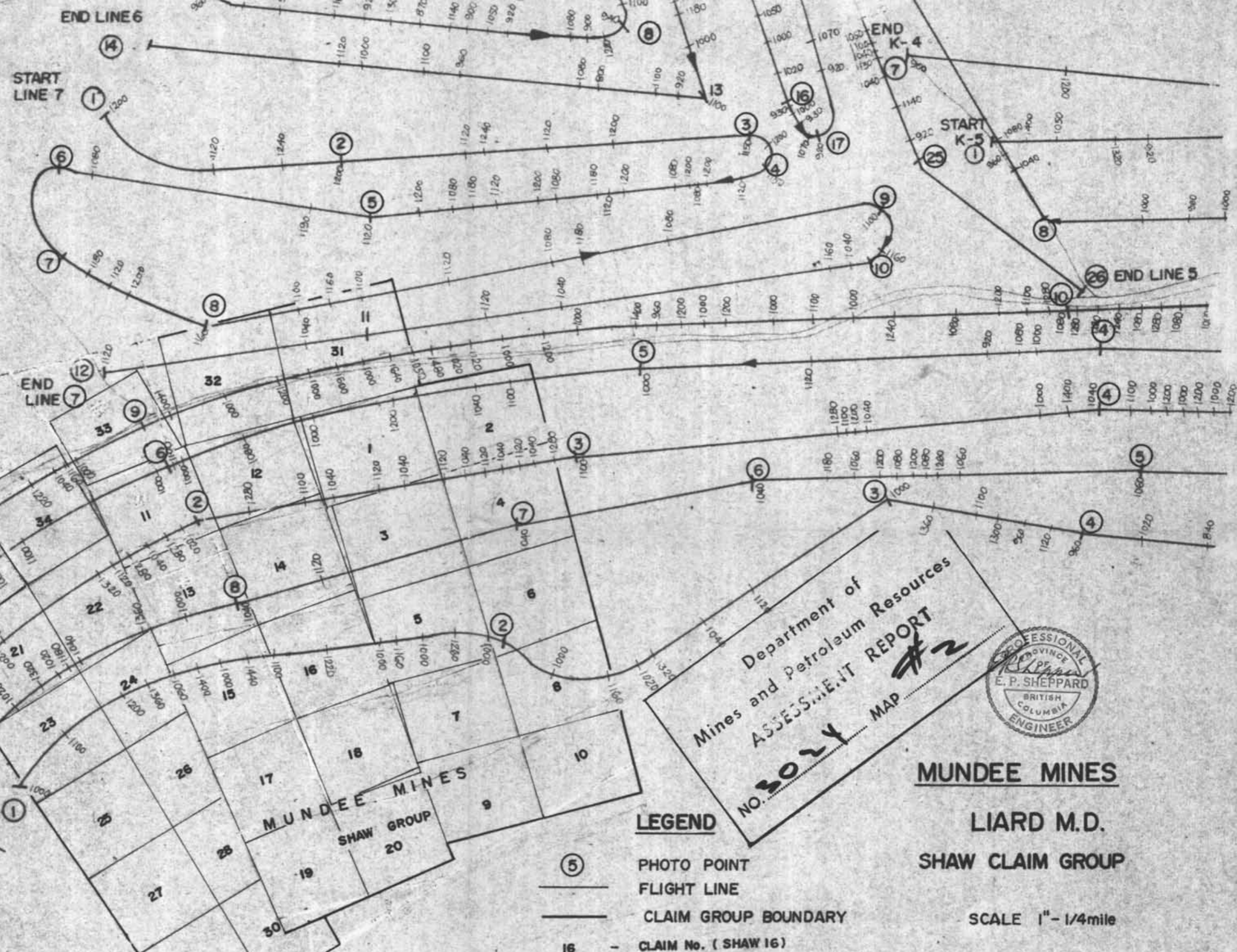


REFERENCES:

- Menzies, M.M., Geology & Mineralogy of the Strangword Copper Property, South Tetsa River Area, B.C., 1951
- Vail, John R., Geology of the Manning River Area, B.C., 1957
- Williams, M.Y., Geology Along the Alaska Highway, Ft. Nelson to Watson Lake, 1944, GSC, Paper 44.28.

* * *

S:d



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ASSESSMENT REPORT
NO. 3024 MAP #2



MUNDEE MINES
LIARD M.D.
SHAW CLAIM GROUP

LEGEND

- (5) PHOTO POINT
- FLIGHT LINE
- CLAIM GROUP BOUNDARY
- 16 - CLAIM No. (SHAW 16)

SCALE 1" = 1/4 mile

**FLIGHT LINES & CLAIM LOCATION
MAP**

SHEET 1

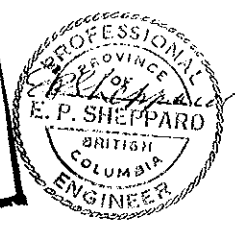
M-2

PDT - DRAFTING, DEC. 1970

3024



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ASSESSMENT REPORT
NO. 3024 MAP #3



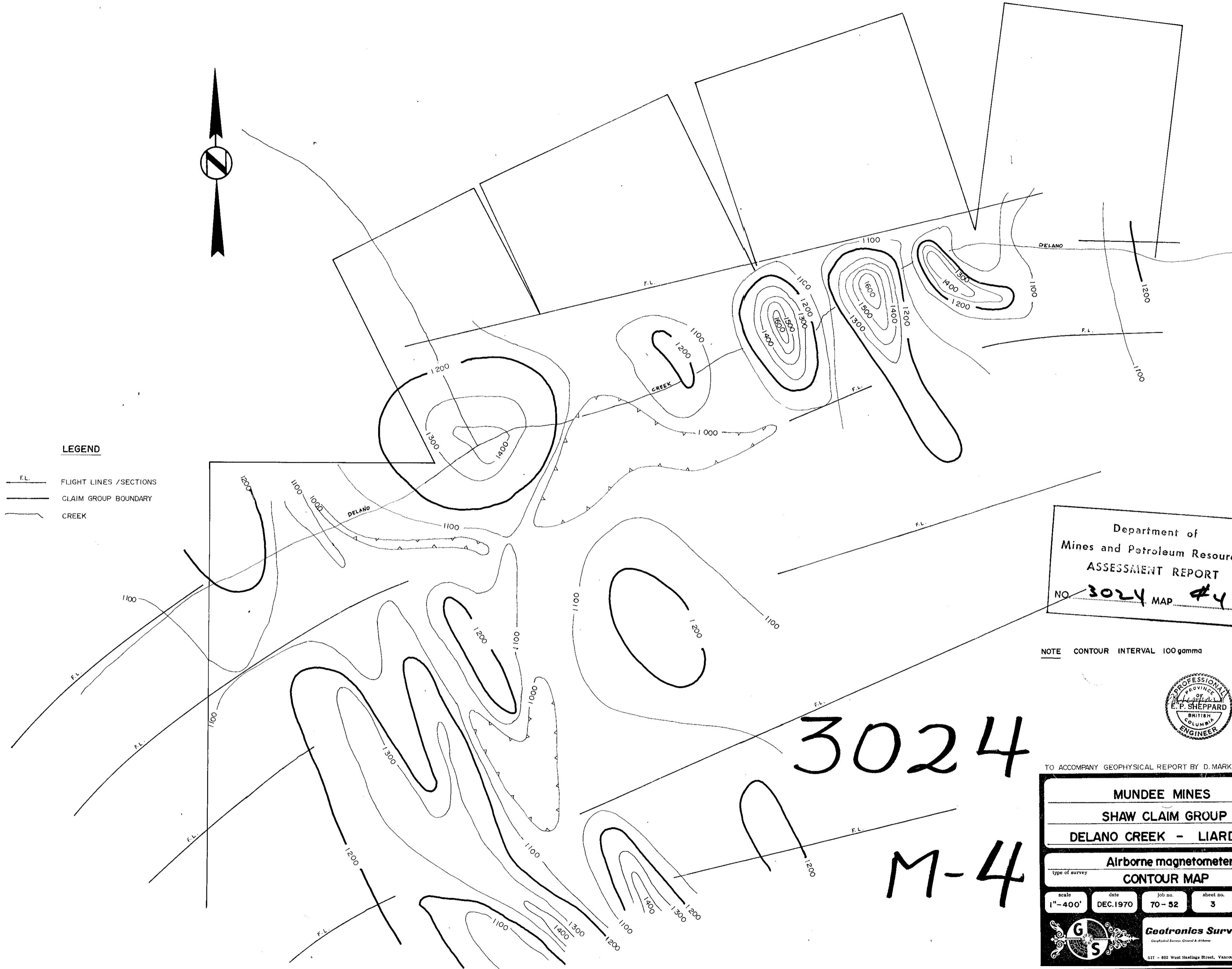
NOTE:
CONTOUR INTERVAL
100 gamma

MUNDEE MINES
SHAW CLAIM GROUP
RACING RIVER AREA - LIARD M.D.

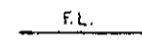

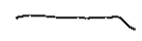
CONTOUR MAP
AEROMAGNETIC SURVEY

SCALE 1" - 1/4 mile
PDT, DECEMBER 1970

3024 M-3



LEGEND

-  F.L. FLIGHT LINES / SECTIONS
-  CLAIM GROUP BOUNDARY
-  CREEK

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NOTE CONTOUR INTERVAL 100 gamma



3024

M-4

TO ACCOMPANY GEOPHYSICAL REPORT BY D. MARK, B. Sc.

MUNDEE MINES				
SHAW CLAIM GROUP				
DELANO CREEK - LIARD M.D.				
Airborne magnetometer				
CONTOUR MAP				
scale 1" = 400'	date DEC. 1970	job no. 70-52	sheet no. 3	drawn by P.P.
		Geotronics Surveys Ltd. <small>Geophysical Surveys, Ground & Airborne</small>		
<small>611 - 602 West Hastings Street, Vancouver, British Columbia.</small>				