

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 4398 MAP

4398

REPORT ON THE ^{94E/6E}
COMBINED AIRBORNE MAGNETIC
AND ELECTROMAGNETIC SURVEY
TOODOGGONE RIVER AREA
OMINECA MINING DIVISION
NORTH CENTRAL BRITISH COLUMBIA
FOR
WHITE RIVER MINES LTD. (N.P.L.)

Gold

BY

PETER K. SMITH, B.Sc.

AND

ASHTON W. MULLAN, P. Eng.

Gold 17-20, 31-36, 49-58, 73-80, 87-100, 102-108, 200 Mineral Claims

NAME AND LOCATION OF PROPERTY:

TOODOGGONE RIVER AREA

"GOLD" MINERAL CLAIMS

OMINECA MINING DIVISION, B.C.

NORTH CENTRAL B.C. 57°17'N - 127°03'W

DATE STARTED: APRIL 26, 1973

DATE FINISHED: APRIL 28, 1973

17-20
014-08

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GENERAL NOTES ON
AIRBORNE MAGNETIC
AND
KEM AIRBORNE ELECTROMAGNETIC
SYSTEMS

A. EQUIPMENT

The proton precession magnetometer and KEM electromagnetic system are the primary instruments employed in this airborne magnetic and electromagnetic survey. Ancillary equipment consists of an altimeter, a frame camera, an intervalometer-fiducial numbering system and a light beam recorder.

1) Proton Magnetometer

A Varian 4937A airborne proton precession magnetometer is used to record the variations in the earth's total magnetic field.

The proton free precession magnetometer operates on the principle of nuclear magnetic resonance to produce a measurement of the earth's total magnetic intensity, i.e., the scalar magnitude of the ambient field. In the proton magnetometer sensor, a uniform magnetic field is created by passing a few amperes of current through a coil about a small volume of proton-rich (hydrogen nuclei) hydrocarbon fluid such as kerosene. The spinning protons act as small magnetic dipoles and align themselves with the applied field. When the field is removed, the protons precess in phase about the direction of the earth's field at a rate proportional to the total magnetic intensity. This rate, or Larmor precession frequency, is determined by the value of the gyromagnetic ratio of the proton (23.4874 gammas per Hz) which is an atomic constant known to an accuracy of 7.5 parts per million. The precession frequency is independent of the direction of the spins with respect to the earth's

field; only the signal amplitude varies, being maximum when the spins are normal, and zero when they are parallel to the direction of the earth's magnetic field.

The precession signal is induced by the motion of the precessing protons in the same coil used for polarizing the sample. Thermal agitation causes the signal to decay in a few seconds from its peak value of a few tens of micro-volts. The frequency of the precession signal, as determined by the gyromagnetic ratio, is approximately 0.04 Hz per gamma, or between 1250 and 3400 Hz, corresponding to an approximate range of 30,000 to 80,000 gammas in the earth's magnetic field.

This instrument has a sensitivity of one gamma when pulsed at one second intervals. The proton magnetometer has the advantage of reading the absolute value of the earth's magnetic field and is almost completely free of drift or variations due to temperature or environmental changes.

2) Kilocycle Electromagnetic System

Electromagnetic prospecting is based on the measurement of fields induced in buried conductive bodies by a primary alternating electromagnetic field.

The McPhar airborne KEM (Kilocycle Electromagnetic) system employs the VLF radio stations operating in the 15 to 30 kilohertz frequency band as a source of primary field. At large distances, from these transmitters, the radiation is trapped in the earth-ionosphere waveguide and has an approximately horizontal magnetic field vector of almost constant amplitude. A conductor will distort this horizontal field and often change the amplitude of the received signal. The McPhar KEM system measures continuously the dip of the resultant field in degrees, as well as the relative field strength and may be regarded as a vertical loop system with the transmitter located at infinity. Conductor characteristics such as geometry and depth can be estimated from the amplitude and shape of the dip angle and field strength profiles.

B. DATA RECORDING & COMPILATION

A light-beam recorder employing a photo-sensitive paper is used to record the data. High-sensitivity galvanometers give almost instantaneous response to the incoming signals and the recorder time lag is essentially zero. The recorder normally employed is the 14 channel Honeywell Visicorder.

With the actual flight record oriented so that the fiducial numbers increase from left to right, the 5.7 inch trace width has been divided by 15 major grid lines with zero at the bottom and 15 at the top. These major divisions are in turn divided by five division lines which appear as lighter lines on the chart. Except where noted on the individual records, the traces are identified as follows:

1) Magnetometer

The magnitude of the earth's total magnetic field is recorded on both a fine scale (0 to 200 gammas) and a coarse scale (0 to 2000 gammas). Each scale is adjusted to provide a full scale deflection of ten major units on the recording chart. The position of the fine and coarse scale zero lines are usually centred on grid Line 3. The exact zero and full scale deflection positions can be checked from the flight calibrations. Since the value of the earth's magnetic field is a five digit number, the operator records the value of the first two digits on the flight report.

2) KEM System

The dip angle trace and relative field strength are recorded continuously on the analogue strip chart. A positive increase followed by a negative deflection (crossover) in the dip angle trace and a noticeable increase in the amplitude of the relative field strength normally indicates a conductor.

The zero degree field angle trace is usually centred on grid Line 5 while the relative field strength is recorded below the dip angle trace.

III) Fiducials

Fiducials are indicated by vertical lines appearing at the bottom of the chart. These lines are interpreted by a reversed marker to indicate every tenth fiducial. Each fiducial marking corresponds with a camera frame, so that the tracking film can be correlated with the data recorded on the chart.

IV) Altimeter

The trace appearing across the upper portion of the chart is a monitor of terrain clearance. The altimeter scale is non-linear. A calibration scale for this trace is recorded for each flight.

C. DATA PRESENTATION

1) Magnetometer Results

The magnetic data are presented in contour form. The contours represent lines of equal intensity of the earth's magnetic field. A contour interval of 20 gammas has been used where the gradient of the earth's magnetic field permits.

2) KEM Results

The letters "A", "B" and "C" are generally used to indicate the shape of the recorded dip angle trace. An "A" category anomaly would indicate a distinct crossover with a relatively high peak to peak amplitude, whereas a "B" category anomaly indicates a lesser response such as that expected from a source at depth. The "C" category anomalies are those that may be questionable, i.e. possibly due to swamps, conductive lake bottom sediments, cultural noise, or topographic effects. The peak to peak amplitude of the dip angle trace is recorded. Regardless of the sensitivity (i.e. the amount of deflection that represents 1 degree) the amplitude indicated on the final map is always in degrees.

McPHAR GEOPHYSICS LIMITED

REPORT ON THE
COMBINED AIRBORNE,
MAGNETIC AND ELECTROMAGNETIC SURVEY,
OVER THE "GOLD" MINERAL CLAIMS
IN THE
TOODOGGONE RIVER AREA
OMINECA MINING DIVISION, B.C.
FOR
WHITE RIVER MINES LTD. (N.P.L.)

1. INTRODUCTION

During April 1973, a combined Airborne Magnetic and Electromagnetic survey was carried out in the Toodoggone River Area, Omineca Mining Division, B.C., over the "Gold" mineral claims for White River Mines Ltd. (N.P.L.).

The purpose of the survey was to outline broad geologic features as well as to map any anomalous magnetic or electromagnetic responses that might aid in prospecting for economic mineral deposits.

2. SURVEY DETAILS

Figure 1 illustrates the relative location of the "Gold" mineral claims, owned by White River Mines, approximately 170 miles due north of Smithers, B.C. The claim group lies at $57^{\circ}17'N$ latitude and $127^{\circ}03'W$ longitude 2.5 miles north of Black Lake. Survey coverage consists of approximately 137 line miles of traverse along east-west flight lines at a one-eighth mile flight line interval, of which 26 line miles are within the boundaries of White River

Mines "Gold" Claim Group. The average length of the flight lines is 7 miles. Continuous photography provided flight line location control and a mean terrain clearance of 450 feet was attempted in the rough topography. The survey was carried out utilizing a Bell Jet Ranger II 206B helicopter operating from the airstrip at Elack Lake.

The KEM electromagnetic and the magnetic data were recorded simultaneously. Descriptions of these systems may be found in the notes preceding this report.

The survey was carried out over the following claims which are believed to be owned or held under option by White River Mines Ltd. (N.P.L.).

<u>Claim</u>	<u>No.</u>	<u>Record No.</u>	<u>Recording Date</u>
Gold 17-20	(4)	109420-423	May 17, 1972
Gold 31-36	(6)	109434-439	May 17, 1972
Gold 49-58	(10)	109452-461	May 17, 1972
Gold 73-80	(8)	109476-483	May 17, 1972
Gold 87-100	(14)	109490-503	May 17, 1972
Gold 102-108	(7)	109505-511	May 17, 1972
Gold 200	(1)	109512	May 17, 1972
Total Claims	<u>50</u>		

3. PRESENTATION OF RESULTS

The results of the airborne magnetic survey have been contoured at a 20 gamma contour interval wherever the gradient of the total magnetic field permitted. These results are presented on Map Sheet AM7307.

KEM electromagnetic results are presented in the manner outlined in

the notes illustrating anomaly shape category and peak to peak anomaly tilt angle amplitude in degrees. These results are presented on Map Sheet AK 7307.

4. GEOLOGY

The general area is underlain by the Upper Triassic Takla Group which is intruded by granitic stocks and overlain by Toodoggone Volcanics. A sequence of non-marine, continental sedimentary rocks - the Sustut Group - overlies this succession unconformably. The regional geologic trend is northwest and is exemplified by both Takla Group and Omineca Intrusions. A lesser structural element hosting quartz veins of economic importance crosses this regional trend nearly at right angles.

Recently published mapping in the area by N.C. Carter, P.Eng., B.C. Mineralogical Branch, indicates that "Gold" mineral group is underlain principally by Toodoggone Volcanic rocks described as dacite and latite porphyries. Several granodiorite to quartz-monzonite plutons, roughly aligned northeasterly, extend both ways from the property, breaking the major northwesterly Cordilleran Trend.

High grade gold-silver mineralization, associated with quartz veins and low grade, bulk tonnage type gold-silver mineralisation associated with certain Toodoggone porphyries are the main objects of intensive exploration work now being carried out on the adjoining property to the southwest. Although the main mineralised vein is cut off by faulting and the extension northeast, if any, has not been found, the property is regarded as well located geologically for the occurrence of either related or unrelated gold-silver veins.

5. DISCUSSION OF RESULTS

The contoured magnetic results within the area covered by White River

Mines "Gold" claims outline a north-northwest geologic trend. There is a high magnetic relief throughout this area with somewhat lower relief noticeable in the western portion of the claim group. In general, the higher gradients suggest that most of the claim area is underlain by volcanic rocks and that the geology of the area is complex. Several localized magnetic anomalies, such as those centred on Line 26W, Line 23E, Line 21W and Line 19W, should be investigated further on the ground. Although it is difficult to locate the Chappelle deposit, as the mosaic is known to be distorted, it is worthwhile noting that a magnetic anomaly having similar characteristics was recorded in the vicinity (centred on Line 17E).

Within the eastern portion of the "Gold" claim group an elongated magnetic low extending from Line 20E to Line 25E suggests the possible presence of an intrusive feature of lower susceptibility than the surrounding rock. As further information on the geology becomes available, these results can be used for magnetic response comparisons and extrapolations.

Electromagnetic anomalies recorded during the survey fall into the "C" anomaly classification. This category has been reserved for those anomalous responses which are questionable; i. e. possibly due to swamps, conductive sediments or topographical effects. The topographic relief in this region is extremely rugged. As with all electromagnetic systems, the KEM system responds to variations in sensor orientation and terrain clearance along the flight lines. It is important to maintain a nearly constant altitude above the ground. Although a high powered Jet Ranger II aircraft was utilized for this survey, variations in terrain clearance were large, resulting in many unwanted "topographic responses". Other responses appear to originate from conductive

stream or river sediments.

No significant EM conductors were outlined by this survey technique in the extremely rugged terrain.

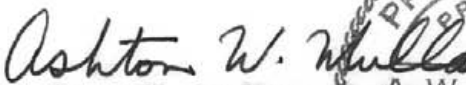
6. SUMMARY AND CONCLUSIONS

The low level airborne magnetic survey shows good detail and definition. Contoured magnetic results from the area covered by these "Gold" claims held by White River Mines display high relief. This type of response is usually characteristic of volcanic rocks. Several local magnetic anomalies have been outlined and the possibility that they may be associated with extensive gossans should be investigated. An elongated magnetic low within the group suggests the presence of an intrusive rock unit.

Electromagnetic results were adversely affected by the extremely rugged topography. It appears that anomalous EM responses recorded were mainly topographic effects.

McPHERSON GEOPHYSICS LIMITED


Peter W. Smith,
Geophysicist


Ashton W. Mullan,
Geologist.



Dated: June 8, 1973

ASSESSMENT DETAILS

PROPERTY: "Gold" Mineral Claims	MINING DIVISION: Omineca
SPONSOR: White River Mines Ltd. (N.P.L.)	PROVINCE: British Columbia
LOCATION: Toadoggone River Area	FLYING DATE STARTED: April 26, 1973
TYPE OF SURVEY: Combined Helicopter Borne Magnetic and VLF-EM	FLYING DATE FINISHED: April 28, 1973
MEAN FLIGHT LINE DIRECTION: E-W	MILES OF LINE FLOWN: 137
MEAN FLIGHT LINE SPACING: 660 Feet	MILES OF LINE INSIDE AREA: 26
MEAN TERRAIN CLEARANCE: 450 Feet	NUMBER OF MINING CLAIMS: 50
AIRCRAFT: Jet Ranger II 206B Helicopter CF-OAP Owned by Okanagan Helicopters Ltd.	

CONSULTANTS:

Peter K. Smith, 650 Parliament Street, Apt. 2212, Toronto, Ontario.
Ashton W. Mullan, 1440 Sandhurst Place, West Vancouver, B.C.

TECHNICIANS:

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DRAUGHTSMEN:

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D. Taylor, 13 Bowden Street, Toronto, Ontario.

McPHAR GEOPHYSICS LIMITED
A. W. Mullan
A. W. Mullan, F. Eng.
Geologist.



Dated: June 8, 1973

STATEMENT OF COST

White River Mines Ltd. (N.P.L.)
Airborne Magnetic and KEM Survey - Toodoggone River Area,
Omineca Mining Division, North Central B. C.

Period:- April 26 - April 28, 1973

Technician:- W. Magee

Consulting Geologist: A.W.Mullan, P. Eng.



Flying 137 Line Miles	@ \$28.95 per mile	=	\$3,966.15
Data compilation - 137 Line Miles	@ \$5.00 per mile	=	685.00
Reporting - 3 days	@ \$150.00 per day	=	450.00
			<u>\$5,101.15</u>

McPHAR GEOPHYSICAL LIMITED

A.W. Mullan,
Geologist



Dated: June 8, 1973

I, *A.W. Mullan*, do hereby certify that the above is a true and correct copy of the original as shown to me by *A.W. Mullan*, a duly qualified Professional Engineer in the Province of British Columbia, this *8th* day of *June*, 1973.
 Declared before me at the *City of Vancouver* of *British Columbia* this *8th* day of *June*, 1973.
[Signature]
 Notary Public

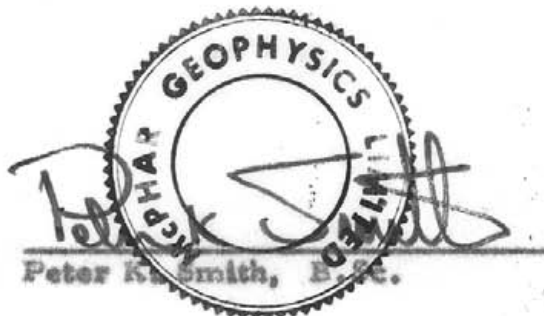
CERTIFICATE

I, Peter K. Smith, of the City of Toronto, in the Province of Ontario, hereby certify:

1. That I am a geologist/geophysicist with a business address at 139 Bond Avenue, Don Mills, Ontario.
2. I am a graduate of the University of British Columbia with a B.Sc. Degree in Honours Geology and Geophysics (1970).
3. I am a member of the Society of Exploration Geophysicists.
4. I have been practising my profession for 3 years.
5. I have no direct or indirect interest, nor do I expect to receive any interest directly or indirectly, in the property or securities of White River Mines Ltd. (N.P.L.) or any affiliate.
6. The statements made in this report are based on a study of published geological literature and unpublished private reports.
7. Permission is granted to use in whole or in part for assessment and qualification requirements but not for advertising purposes.

Dated at Toronto

This 8th day of June 1973.


Peter K. Smith, B.Sc.

CERTIFICATE

I, Ashton W. Mullan, of the City of Vancouver, in the Province of British Columbia, hereby certify:

1. That I am a geologist and a fellow of the Geological Association of Canada with a business address at Suite 811, 837 West Hastings Street, Vancouver, B.C.
2. That I am registered as a member of the Association of Professional Engineers of the Provinces of Ontario and British Columbia.
3. That I hold a B.Sc. degree from McGill University.
4. That I have been practising my profession as a geologist for about twenty years.
5. I have no direct or indirect interest, nor do I expect to receive any interest directly or indirectly, in the property or securities of White River Mines Ltd. (N. P. L.) or any affiliate.
6. The statements made in this report are based on a study of published geological literature and unpublished private reports.
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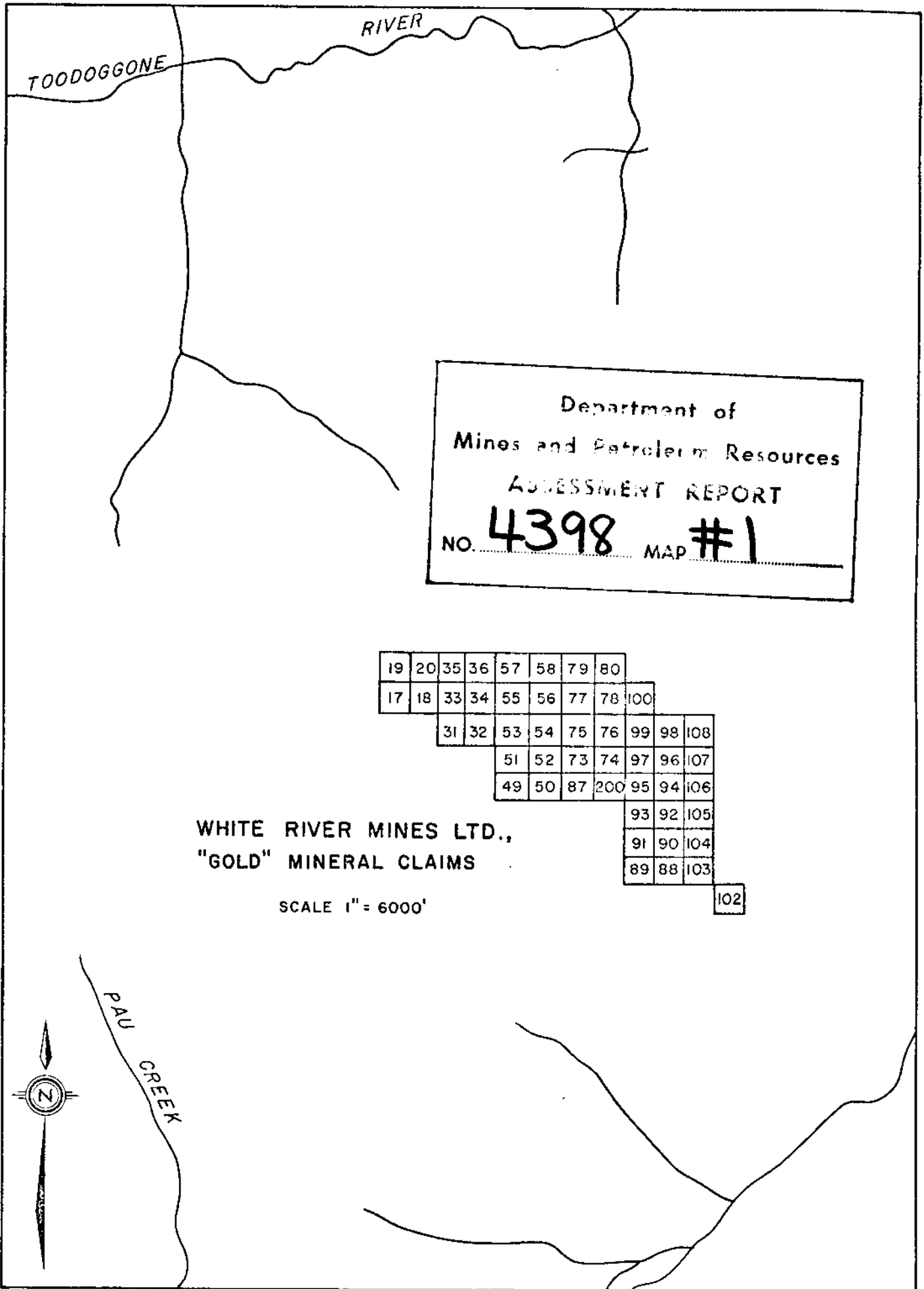
Dated at Toronto

This 8th day of June 1973.

A. W. Mullan,



LOCATION MAP



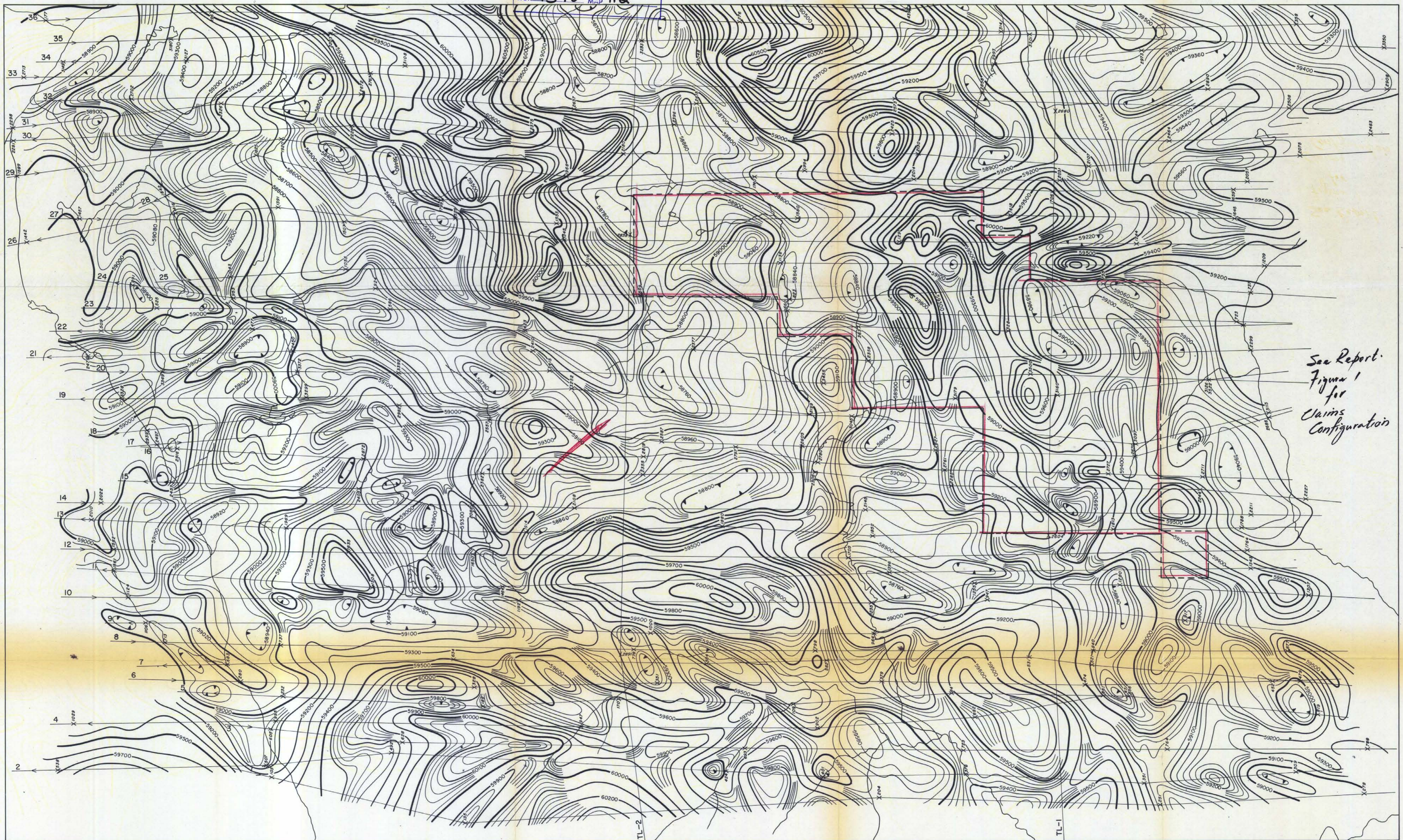
Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. **4398** MAP **#1**

WHITE RIVER MINES LTD.,
"GOLD" MINERAL CLAIMS

SCALE 1" = 6000'



PAU
CREEK



*See Report
Figure 1
for
Claims
Configuration*

4398 M2

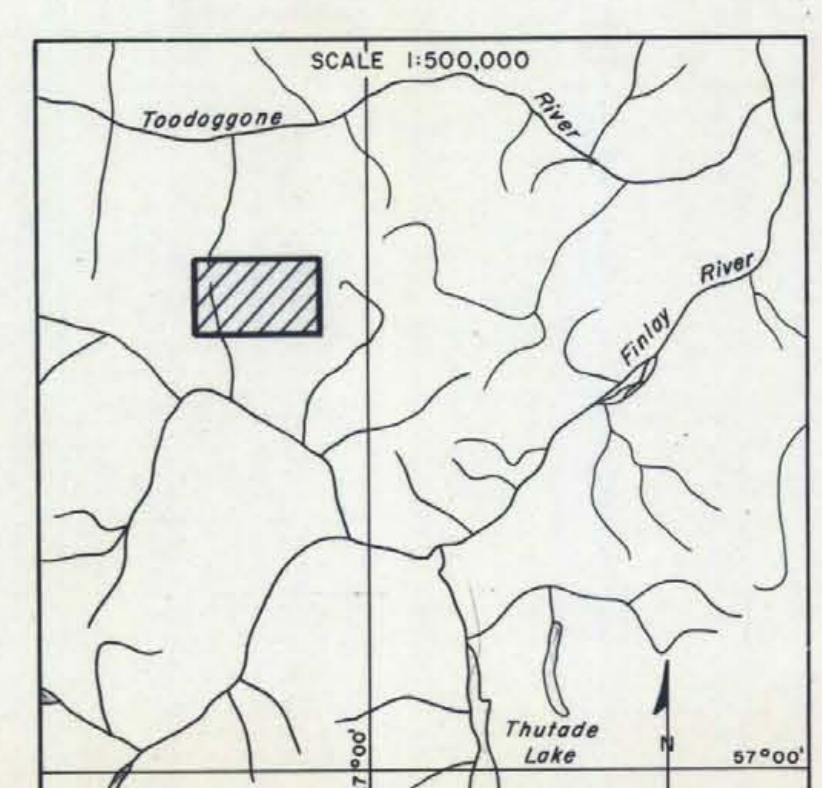
**WHITE RIVER MINES (N.P.L.)
GOLD CLAIMS GROUP**
OMINECA MINING DIVISION, BRITISH COLUMBIA

NOTE: TO ACCOMPANY GEOPHYSICAL REPORT FOR
WHITE RIVER MINES (N.P.L.) GOLD CLAIMS
GROUP, OMINCA MINING DIVISION, B.C.
BY A.W. MULLAN (PENG) AND P.K. SMITH,
GEOPHYSICIST.

DATED: JUNE 8, 1973

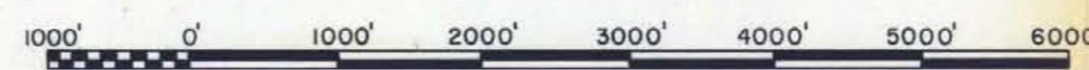


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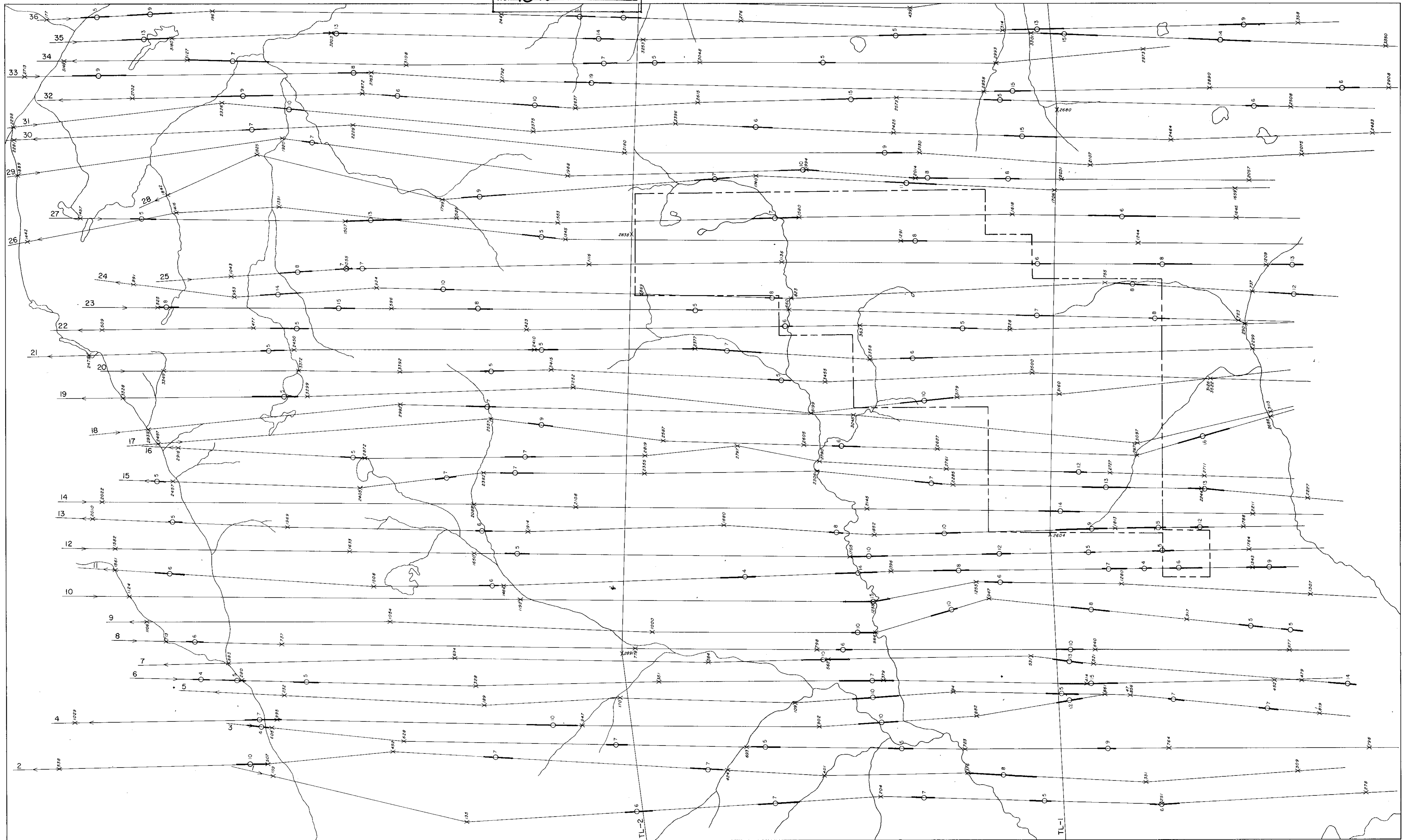


LEGEND

- CONTOUR INTERVAL ----- 20 gammas
- 20 GAMMA CONTOUR ----- (line with 20 gamma label)
- 100 GAMMA CONTOUR ----- (line with 100 gamma label)
- 500 & 1000 GAMMA CONTOUR ----- (line with 500 & 1000 gamma label)
- MAGNETIC LOW ----- (line with 'M' label)
- MEAN FLIGHT LINE SPACING ----- 660 FEET
- MEAN TERRAIN CLEARANCE ----- 450 FEET
- FLOWN AND COMPILED: APRIL TO JUNE 1973



SCALE 1:15,840 (Approx.)
NOTE: SCALE IS APPROXIMATE AS
PLANIMETRY HAS BEEN DRAWN
FROM AN UNCONTROLLED
AEROPHOTO MOSAIC.



4398 M3

**WHITE RIVER MINES (N.P.L.)
 GOLD CLAIMS GROUP
 Omineca Mining Division, British Columbia**

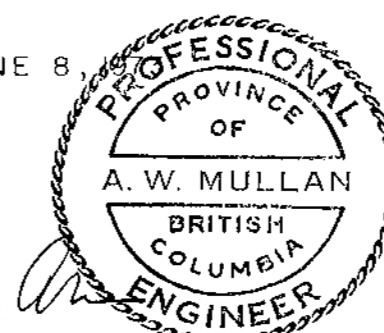


SCALE 1:15,840 (Approx.)
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 GROUP, Omineca Mining Division, B.C.
 BY A.W. MULLAN (P.ENG) AND P.K. SMITH,
 GEOPHYSICIST.

DATED JUNE 8

APPROVED



LEGEND

- A ——— DEFINITE
- B ——— PROBABLE
- C ——— POSSIBLE
- — PEAK TO PEAK AMPLITUDE
 IN DEGREES
- ANOMALY WIDTH PEAK
 TO PEAK
- FLIGHT LINE
- X — FIDUCIAL

