

ARCHER, CATHRO & ASSOCIATES LTD.

CONSULTING GEOLOGICAL ENGINEERS

P.O. BOX 1051
WHITEHORSE, YUKON

REPORT ON
AIRBORNE GEOPHYSICAL SURVEY
GEOCHEMICAL SURVEY
AND
GEOLOGICAL SURVEY.

MACK, PAT AND JOE CLAIM GROUPS

TEDDY CREEK AREA
ANVIL- VANGORDA DISTRICT
CLAIM SHEET 105-K-10

FOR
YUKON COPPER LTD.
Whitehorse, Yukon.

R. J. Cathro, P. Eng.
June 1- July 31, 1966.

This report has been examined by
the Geological Evaluation Unit.
Approved as to technical worth by:

D. C. [Signature]
RESIDENT GEOLOGIST

Approved as to cost in the amount
of: \$ 5178.⁰⁰

A. S. [Signature]
RESIDENT MINING ENGINEER

Accepted as representation work
under Section 58(4) Yukon Quartz
Mining Act

[Signature]
COMMISSIONER OF YUKON

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INTRODUCTION

During the 1966 field season, an airborne geophysical survey and combined geochemical and geological survey was conducted on the Mack, Pat and Joe claim groups under the supervision of the writer. These three groups comprise one contiguous block of 64 claims centered on Teddy Creek just above its junction with Tay River, in claim sheet 105-K-10, and are collectively referred to in this report as the Teddy Creek claims. They are owned by Yukon Copper Ltd., and all work was performed by contractors working for Archer, Cathro and Associates Ltd., or employees of that firm.

The exploration techniques used in this program were patterned after the successful approach developed in this district by Dynasty Explorations Ltd., and were selected to locate any mineralized zones which are present on the property. A small lake on the Joe claims, named Keg Lake, will accommodate small aircraft.

AIRBORNE GEOPHYSICAL SURVEY

A combined magnetometer (Mag) and electromagnetometer (EM) survey was conducted under contract by Lockwood Survey Corp. Ltd. on July 5, 1966. The equipment was mounted in a Bell 204 B turbine helicopter on charter from Okanagan Helicopters Ltd. A total of 35 line-miles was surveyed.

A preliminary plot of the Mag and EM data was made in the field, on contract by Explorations Geophysics (Yukon) Ltd., and interpreted by Dr. D.W. Smellie, consulting geo-

physicist, of that firm. The preliminary plotting and interpretation, which was based on uncorrected data, was made to detect top priority anomalies which required immediate follow-up before the end of the summer. It was anticipated that final data reduction by Lockwood would take some time and it was not received until December. The results of this survey are shown in Figures 2 and 3. A copy of Dr. Smellie's final interpretation is included as Appendix IV.

GEOLOGICAL AND GEOCHEMICAL SURVEY

The area now staked by Anvil Mining Corp. Ltd. as the Ted claims was originally staked in 1956 by Prospectors Airways as the Jake property. A ground mag survey and total heavy ^{metal} geochem survey was followed by six shallow diamond drill holes. Some sphalerite and pyrrhotite was found but the results were disappointing.

The present survey showed that the west end of the Yukon Copper claims was underlain by small outcrops of granodioritic quartz--feldspar porphyry, possibly a dike. No outcrop was found on the remainder of the claims but outcrops of chert and slate are present on Anvil's Ted claims. The granodioritic porphyry contains a reddish variety and a greenish variety which owes its colour to

greenish feldspar phenocrysts. The neighboring sediments have been mapped incorrectly on G.S.C. Map 13-1961 and should be reclassified as unit 3- Ordovician-Silurian, or unit 5- Upper Devonian- lower Mississippian.

Reconnaissance geochemical sampling was conducted along the claim base lines, using a 400 foot sample interval. A total of 96 samples were collected and analyzed.

Control for the sampling was provided by aerial photographs, tape, and compass. Sample locations were marked with plastic flagging. Sampling was done with a mattock grub-hoe and wherever possible the B 1 horizon was sampled. In a few cases permafrost prevented the taking of an ideal sample, free from organic matter or volcanic ash. However, since geochemical targets in this district are large and the spacing of the samples was fairly close, it is felt that nothing significant has been missed.

The samples were collected in individual small kraft bags and sent to Atlas Testing Labs, Edmonton, for analysis. Analysis consisted of hot aqua regia extraction of heavy metal ions from the screened and dried sample, and metal content determination by atomic absorption. All samples were analyzed for copper, lead and zinc.

Figures 5, 6 and 7 show the plotted results for copper, lead and zinc, respectively. The geochemical background in this area is quite low for all metals and only one anomalous value was obtained, a lead value near the east end of Keg Lake. Since this sample is underlain by granodiorite and is in a low area beside Teddy Creek, it is thought to be caused by glacial till and to have little significance.

CONCLUSIONS AND RECOMMENDATIONS

The airborne geophysical survey shows a large aeromag anomaly centered on the Ted claims of Anvil Mining Corp. Ltd., and a few isolated mag highs to the north and west on the Mack claims of Yukon Copper Ltd. Small Em conductors also occur near Keg Lake but their ratios are very low and they are likely caused by graphitic shear zones within the porphyry dike, overburden conditions, or in one case, by the lake itself. The mag highs within the dike are probably due to disseminated magnetite. Although these have not been fully explained, the poor geochemical response and the granitic host rock discourage further investigation.

The large aeromag anomaly was adequately explained by the original Prospectors Airways work, which disclosed disseminated pyrrhotite in chert. There is also probably

some topographic effect here as well since the anomaly is centered on a low hill. The small mag anomalies to the north are of some slight interest. Although geochemical results here were poor, the fact that the mag anomalies occur in low ground near Teddy Creek, means that they would be difficult to detect with geochemistry anyway.

This is the only part of the property worth holding. A limited program of linecutting and gravity surveys would be the most effective method of further evaluating the mag anomalies. However, the poor EM response over these anomalies and the presence of pyrrhotite in the sediments on the Ted claims gives this property a very low priority.

Respectfully submitted,
ARCHER, CATHRO & ASSOC. LTD.

R. J. Cathro
R. J. Cathro



RJC:ps

Appendix I

AFFIDAVIT

I, Robert J. Cathro, Consulting Geological Engineer, of Whitehorse, agent for Yukon Copper Limited, have compiled the statement of costs presented in Appendix II of this report, and do hereby make oath and say:

That to the best of my knowledge and belief, the statement of costs as presented is a true and accurate representation of expenditures, to be applied as assessment work on the Mack, Pat and Joe claim groups.


R. J. Cathro, P. Eng.

Sworn and subscribed to at
Whitehorse this 13 day of
January 1967.



A Commissioner for taking Affidavits
in and for the Yukon Territory.



Appendix II

STATEMENT OF COSTS

A. Airborne Geophysical Survey- 35 line-miles (LM)

1. Helicopter rental- Okanagan Helicopters Ltd.
 -surveying lines- 2:45 hours.
 -mobilization, ferry fuel- :42 "
 Total . . . 3:27 hrs @ \$450.00- \$1552.50

2. Crew accomodation @ avg. cost/LM. 87.50

3. Prelim, plotting, interpretation @ \$3.00/LM plus
 -drafting supplies, blueprinting 135.00

4. Air photos, mosaic preparation, Maps 95.00

5. Management fees @ \$3.00/claim 192.00

6. " expenses @ avg. cost/LM 49.00

7. Equipment rental- estimate- \$10.00/LM. 350.00

8. Data reduction- estimate- \$20.00/LM 700.00

Sub-total \$3161.00

B. Geological and Geochemical Survey

1. Transportation- G.N.A.- June 15-30 \$302.00

2. Camp rental & supplies, mobilization 355.00

3. Wages- 25 man-days 650.00

4. Analysis- 96 samples @ \$1.95 plus freight 195.00

5. Supervision, reports 350.00

6. Office expenses- drafting, blueprinting 165.00

Sub-total \$2017.00

Grand Total \$5178.00

Appendix III

PERSONNEL ENGAGED IN 1966 FIELD WORK

A. GEOPHYSICAL SURVEY

T.R. Gurr	pilot	Okanagan Helicopters, Vancouver.
H. Sandau	operator	Lockwood Survey Corp., Toronto.
D. Gamble	technician	Expl. Geophysics (Yukon) Ltd.
D. Smellie	geophysicist	" " " "
R. Cathro	geol. engineer	Archer, Cathro & Assoc. Ltd.

B. GEOLOGICAL AND GEOCHEMICAL SURVEY

J. Litsenburger	student geologist	Archer, Cathro & Assoc. Ltd.
R. McGeachen	soil sampler	" " "
J. Dickson	soil sampler	" " "
M. Hommes	draftsman	" " "
R. Cathro	consulting engineer.	" " "

Appendix IV

DONALD W. SMELLIE, P. ENG.

CONSULTING GEOPHYSICIST

1665 WEST BROADWAY

VANCOUVER 9, B.C.

REGENT 1-6584

HELICOPTER MAGNETIC AND ELECTROMAGNETIC SURVEY

ANVIL-VANGORDA AREA, Y.T.

YUKON COPPER LTD.

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INTRODUCTION

A combined helicopter magnetic and electromagnetic survey has been carried out by Lockwood Survey Corporation Limited for Yukon Copper Ltd. The survey was flown during July 1966 in the Anvil-Vangorda area of the Yukon Territory. The claim groups surveyed were the Mack, Pat and Joe, the Tara, Dane, Hal and Mark, the Tel group.

INSTRUMENTATION

The combined helicopter magnetic and electromagnetic installation consists of the Gulf Model III airborne magnetometer and the E.M. system developed by Hunting Survey Corporation (now Lockwood).

The E.M. system consists of coaxial transmitter and receiver coils mounted 30 feet apart in a "bird" that is suspended 100 feet below the helicopter when in operation. The instrument records the in-phase and quadrature components of the secondary field relative to the primary field at the receiver coil. The operating frequency is 4000 cycles per second.

FIELD PROCEDURE

The survey was flown at an average line spacing of 1000 feet and at 200 feet mean terrain clearance.

The flight path was recovered by plotting positions on the ground determined by a positioning camera that takes a sequence of exposures while the survey is in progress. The magnetic data were corrected for diurnal variation and plotted in the form of contours of equal magnetic intensity. The E.M. data were plotted as contours of in-phase amplitude in parts per million with respect to the primary. Anomalies are shown by circled figures representing the amplitudes of the in-phase and quadrature components.

RESULTS

Mack, Pat and Joe Group - None of the magnetic and electromagnetic features in this area were considered particularly noteworthy, and no ground geophysical follow-up is recommended.

Fara, Dane, Hal and Mark Groups - A belt of good-quality E.M. anomalies occurs in Devonian chert, shale and quartzite. Zones A, B and C in particular are contiguous

to an inferred NE fault shown on the geological map of Archer and Cathro. The presence of an intrusive to the west is also considered favourable.

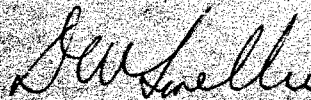
Electromagnetic Zones A to I inclusive mark good-quality conductors and are all recommended for ground magnetic, electromagnetic and geochemical surveys. They are shown on the accompanying interpretational overlay.

Approximate boundaries of some magnetic bodies are also marked.

TEL Group -- This area is mapped geologically by Archer and Cathro as biotite schist.

A broad and low-amplitude electromagnetic anomaly occurs at 12 (4285) and 13 (4158), the latter denoting fiducial 4158 on line 13. This is not a strong feature and should be followed up with ground geophysics only if there is other evidence such as geochemical to support this.

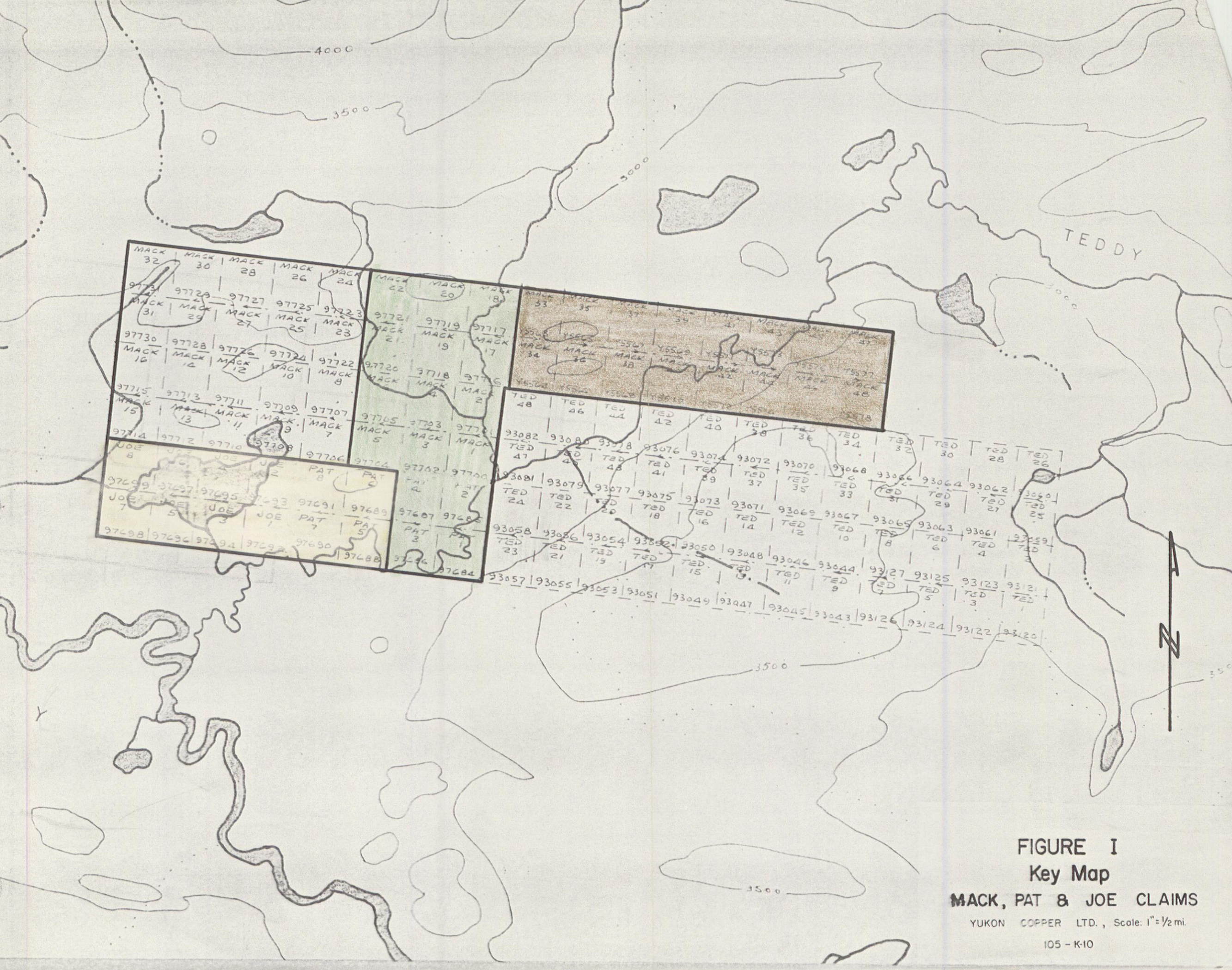
Respectfully submitted,



D.W. SMELLIE, P.Eng.
for Exploration Geophysics (Yukon) Ltd.

DWS:sd

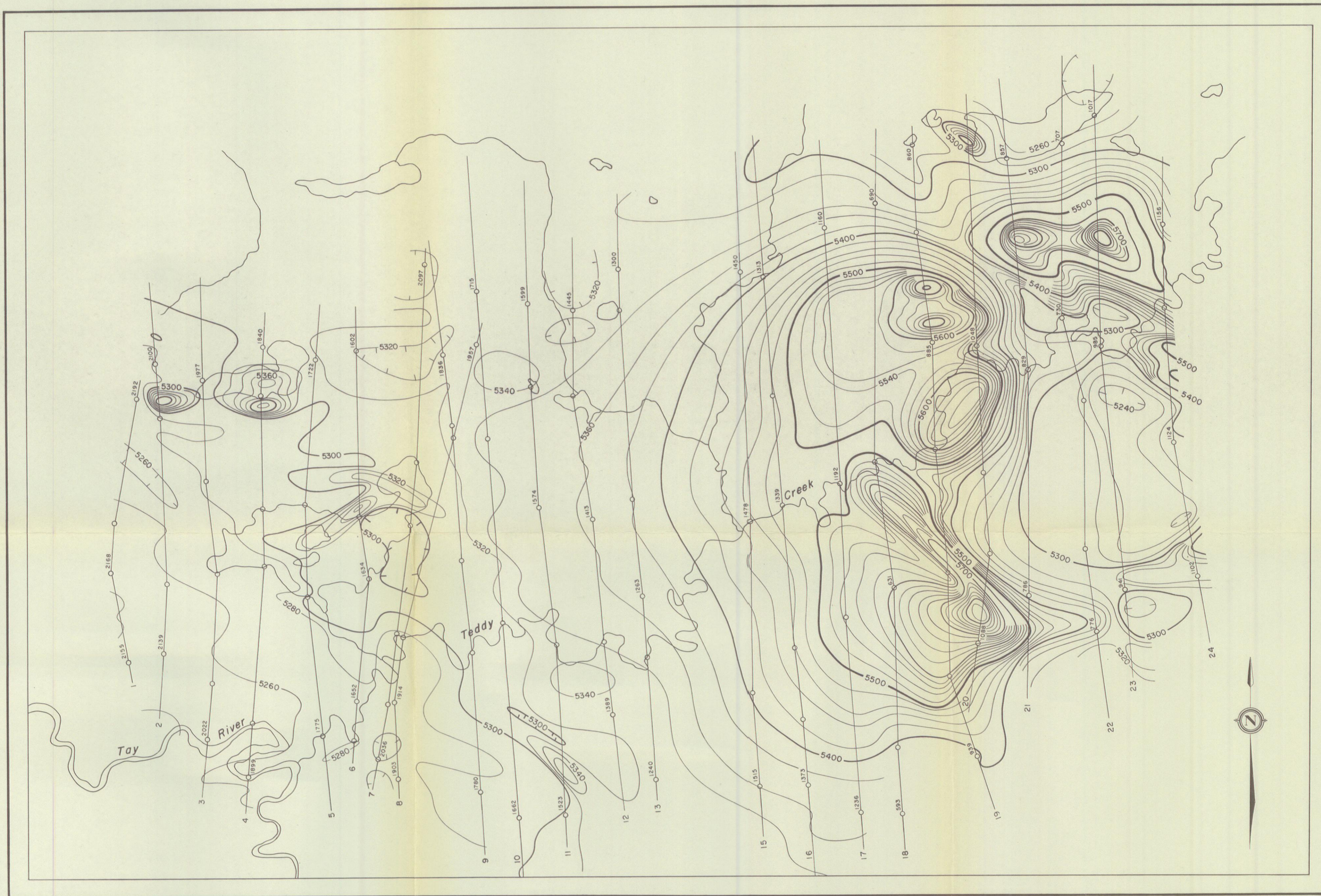
December 20, 1966



MACK 32	MACK 30	MACK 28	MACK 26	MACK 24	MACK 22	MACK 20	MACK 18	MACK 16	MACK 14	MACK 12	MACK 10	MACK 8	MACK 6	MACK 4	MACK 2	MACK 1	MACK 33	MACK 35	MACK 37	MACK 34	MACK 41	MACK 43	MACK 45	MACK 47	MACK 48																																	
97729	97728	97727	97725	97723	97721	97719	97717	97715	97713	97711	97709	97707	97705	97703	97701	97700	93082	93080	93078	93076	93074	93072	93070	93068	93066	93064	93062	93060	93058	93056	93054	93052	93050	93048	93046	93044	93042	93040	93038	93036	93034	93032	93030	93028	93026	93024	93022	93020										
MACK 31	MACK 29	MACK 27	MACK 25	MACK 23	MACK 21	MACK 19	MACK 17	MACK 15	MACK 13	MACK 11	MACK 9	MACK 7	MACK 5	MACK 3	MACK 1	MACK 34	MACK 36	MACK 38	MACK 40	MACK 42	MACK 44	MACK 46	MACK 48	MACK 50	MACK 52	MACK 54	MACK 56	MACK 58	MACK 60	MACK 62	MACK 64	MACK 66	MACK 68	MACK 70	MACK 72	MACK 74	MACK 76	MACK 78	MACK 80	MACK 82	MACK 84	MACK 86	MACK 88	MACK 90	MACK 92	MACK 94	MACK 96	MACK 98	MACK 100									
97730	97728	97726	97724	97722	97720	97718	97716	97714	97712	97710	97708	97706	97704	97702	97700	93081	93079	93077	93075	93073	93071	93069	93067	93065	93063	93061	93059	93057	93055	93053	93051	93049	93047	93045	93043	93041	93039	93037	93035	93033	93031	93029	93027	93025	93023	93021	93019	93017	93015	93013	93011	93009	93007	93005	93003	93001		
97715	97713	97711	97709	97707	97705	97703	97701	97700	97699	97697	97695	97693	97691	97689	97687	97685	93082	93080	93078	93076	93074	93072	93070	93068	93066	93064	93062	93060	93058	93056	93054	93052	93050	93048	93046	93044	93042	93040	93038	93036	93034	93032	93030	93028	93026	93024	93022	93020	93018	93016	93014	93012	93010	93008	93006	93004	93002	93000
97714	97712	97710	97708	97706	97704	97702	97700	97699	97697	97695	97693	97691	97689	97687	97685	93081	93079	93077	93075	93073	93071	93069	93067	93065	93063	93061	93059	93057	93055	93053	93051	93049	93047	93045	93043	93041	93039	93037	93035	93033	93031	93029	93027	93025	93023	93021	93019	93017	93015	93013	93011	93009	93007	93005	93003	93001		
97699	97697	97695	97693	97691	97689	97687	97685	97684	97683	97682	97681	97680	97679	97678	97677	93081	93079	93077	93075	93073	93071	93069	93067	93065	93063	93061	93059	93057	93055	93053	93051	93049	93047	93045	93043	93041	93039	93037	93035	93033	93031	93029	93027	93025	93023	93021	93019	93017	93015	93013	93011	93009	93007	93005	93003	93001		
97698	97696	97694	97692	97690	97688	97686	97684	97683	97682	97681	97680	97679	97678	97677	97676	93081	93079	93077	93075	93073	93071	93069	93067	93065	93063	93061	93059	93057	93055	93053	93051	93049	93047	93045	93043	93041	93039	93037	93035	93033	93031	93029	93027	93025	93023	93021	93019	93017	93015	93013	93011	93009	93007	93005	93003	93001		
97698	97696	97694	97692	97690	97688	97686	97684	97683	97682	97681	97680	97679	97678	97677	97676	93081	93079	93077	93075	93073	93071	93069	93067	93065	93063	93061	93059	93057	93055	93053	93051	93049	93047	93045	93043	93041	93039	93037	93035	93033	93031	93029	93027	93025	93023	93021	93019	93017	93015	93013	93011	93009	93007	93005	93003	93001		

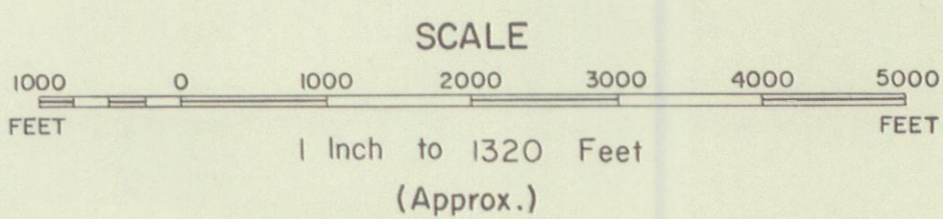
FIGURE I
Key Map
MACK, PAT & JOE CLAIMS
 YUKON COPPER LTD., Scale: 1" = 1/2 mi.
 105 - K-10

YUKON COPPER LIMITED
AIRBORNE GEOPHYSICAL SURVEY



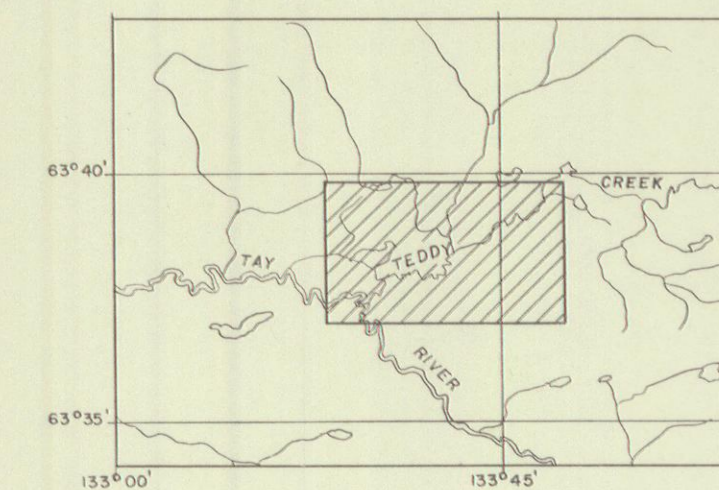
MACK, PAT AND JOE GROUP
YUKON TERRITORY

Flown and Compiled by
LOCKWOOD SURVEY CORPORATION LIMITED
TORONTO, CANADA
1966



AEROMAGNETIC MAP

FIG. 2.



- CONTOUR INTERVAL ----- 20 GAMMA
- MEAN FLIGHT LINE SPACING ----- 1000 FEET
- MEAN TERRAIN CLEARANCE ----- 200 FEET
- 500 GAMMA CONTOUR -----
- 100 GAMMA CONTOUR -----
- 20 GAMMA CONTOUR -----
- MAGNETIC LOW -----
- FIDUCIAL POINTS -----
- FLIGHT LINES -----

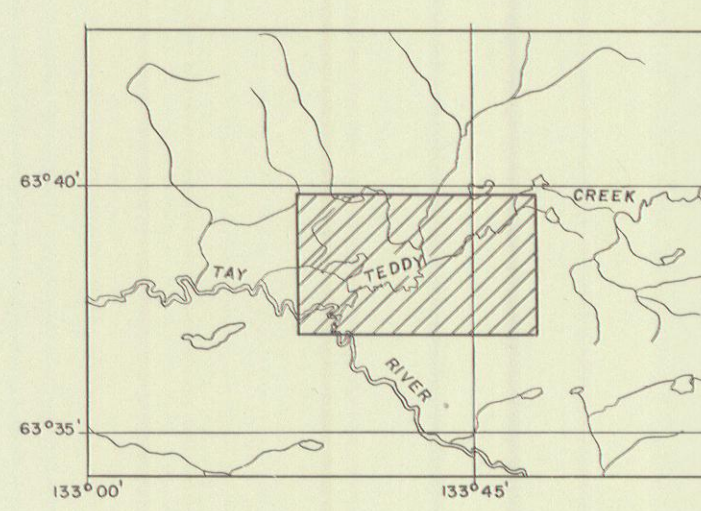
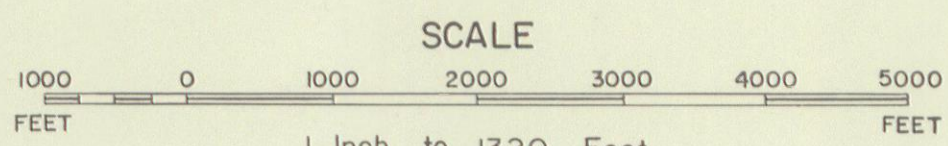
YUKON COPPER LIMITED AIRBORNE GEOPHYSICAL SURVEY



MEAN FLIGHT LINE SPACING ----- 1000 FEET
 MEAN TERRAIN CLEARANCE ----- 200 FEET
 ELECTROMAGNETIC CONTOURS 5, 10, 15 etc. -----
 1, 2, 3, 4 etc. -----
 NEGATIVE CONTOURS -----5, -10 etc. -----
 -1, -2, -3, -4 etc. -----
 FIDUCIAL POINTS ----- O 3690 -----
 FLIGHT LINES -----

MACK, PAT AND JOE GROUP YUKON TERRITORY

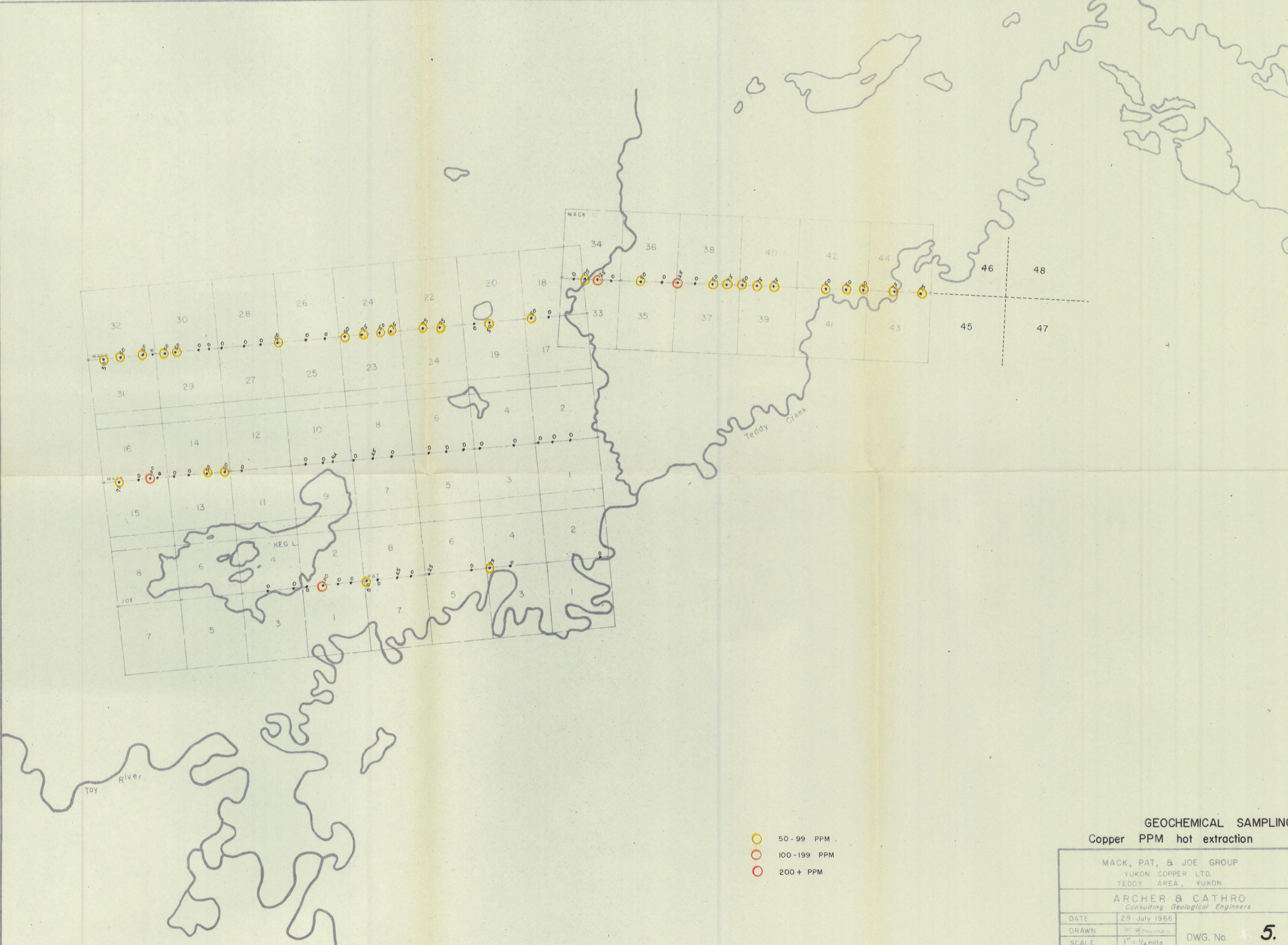
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 LOCKWOOD SURVEY CORPORATION LIMITED
 TORONTO, CANADA
 1966



ELECTROMAGNETIC MAP

FIG. 3.

The contours represent amplitude of in phase response of the resultant field expressed in parts per million of the primary. The figures $\frac{2.3}{0.2}$ represent amplitude $\frac{\text{in phase component}}{\text{quadrature component}}$. The frequency of the primary current is 4000 cycles per second.



- 50-99 PPM
- 100-199 PPM
- 200+ PPM

GEOCHEMICAL SAMPLING
Copper PPM hot extraction

MACK, PAT, & JOE GROUP YUKON COPPER LTD. TEDDY AREA, YUKON	
ARCHER & CATHRO Consulting Geological Engineers	
DATE	29 July 1966
DRAWN	M. [Signature]
SCALE	1" = 1/4 mile
DWG. No.	5.



- 50 - 99 PPM WEAKLY ANOMALOUS
- 100 - 149 PPM MODERATELY ANOMALOUS
- 150 - PPM + ANOMALOUS

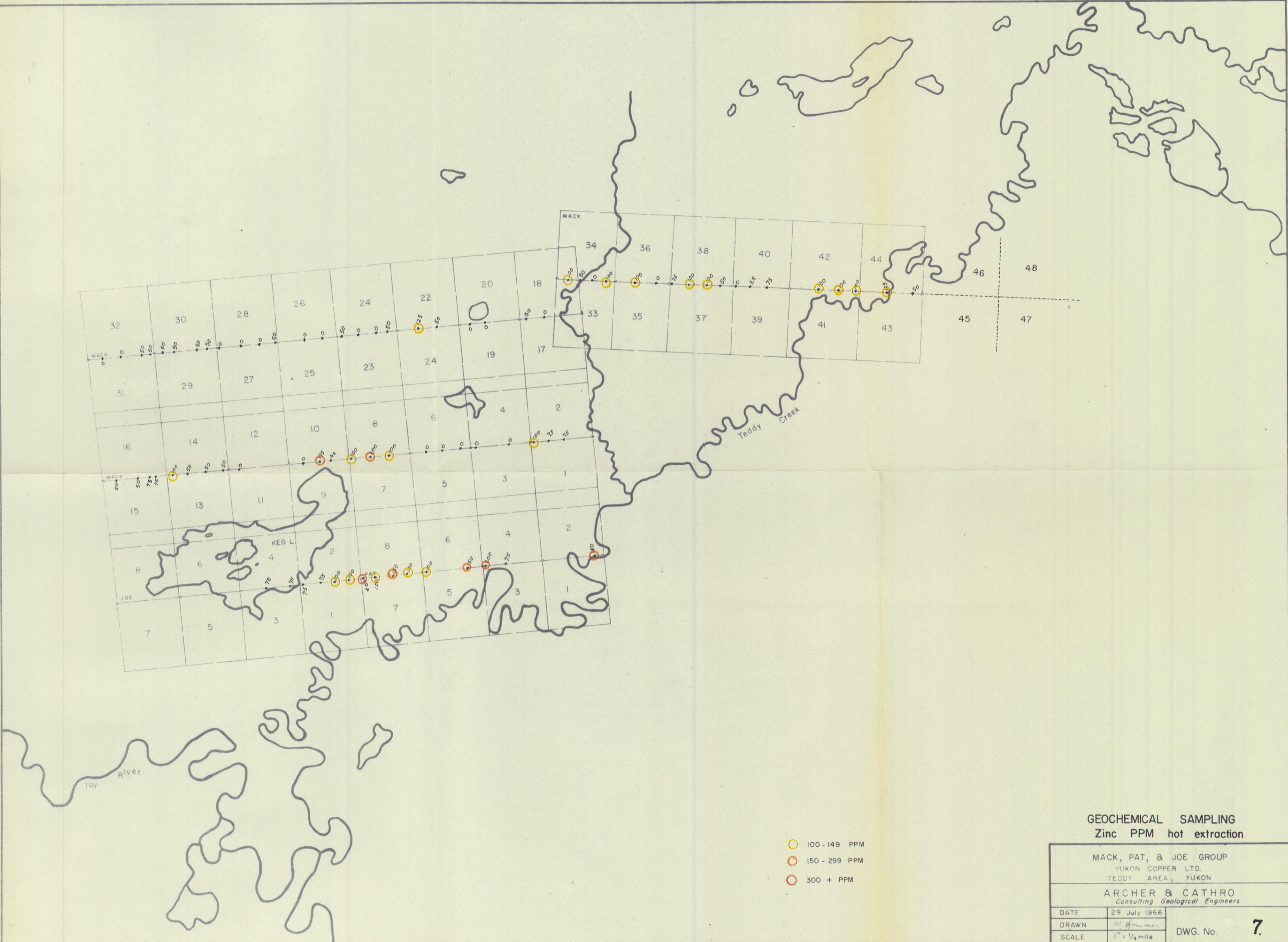
GEOCHEMICAL SAMPLING
Lead PPM hot extraction

MACK, PAT, & JOE GROUP
YUKON COPPER LTD.
TEDDY AREA, YUKON

ARCHER & CATHRO
Consulting Geological Engineers

DATE	29 July 1966
DRAWN	M. Holmes
SCALE	1" = 1/4 mile

DWG. No. 6.



- 100 - 149 PPM
- 150 - 299 PPM
- 300 + PPM

GEOCHEMICAL SAMPLING
Zinc PPM hot extraction

MACK, PAT, & JOE GROUP YUKON COPPER LTD. TEDDY AREA, YUKON		
ARCHER & CATHRO <i>Consulting Geological Engineers</i>		
DATE	29 July 1966	DWG. No. 7
DRAWN	<i>M. Ammer</i>	
SCALE	1" = 1/4 mile	