013521

105-D

LEWES RIVER
MINES LTD.

REPORT ON EXPLORATION

WHITEHORSE COPPER BELT PROPERTY

LEWES RIVER MINES LTD. (N.P.L.)

RESULTS OF EXPLORATION
ON WHITEHORSE COPPER BELT PROPERTY
YUKON TERRITORY

April 15, 1969

CONTENTS PAGE

Introduction 1
Property, Accessibility 2
History 3
General Geology 7
Economic Geology
General 10
New Imperial Ore Reserves 14
Details of Lewes River Exploration
General 16
Aeromagnetic Survey 18
Ground Magnetometer and Induced Polarization Surveys 20
Statement of Expenditures 30
Conclusions and Recommendations 31

FIGURES AND ILLUSTRATIONS IN TEXT

Figure 1 - Yukon Location Map 4
Figure 2 - Property and Grid Location Map. 17
I.P. Profiles - Profiles on Lines 16 and 20N, Anomaly 1 23-24
I.P. Profile - Profile on Line 48N, Anomaly 2 25

APPENDIX

Figure 3 - Aeromagnetic Survey (pocket)
Figure 4 - Magnetic and I.P. data, Grid 1
Figure 5 - Magnetic and I.P. data, Grid 2
Figure 6 - Magnetic and I.P. data, Grid 3
Figure 7 - Magnetic and I.P. data, Grids 4 and 5

INTRODUCTION

This report is a synopsis of work done to date on the property of Lewes River Mines Ltd. in the Whitehorse area, Yukon Territory. It presents the interpretation by the management of Lewes River Mines Ltd. of the engineering data collected to date. This information is described in a report dated August 1, 1968, by Robert S. Adamson, P.Eng., the company's consulting engineer, and from reports on geophysical surveys by Seigel Associates Ltd. and Eagle Geophysics Ltd. Copies of the above mentioned reports are available on request.

Other important sources of information used are:

1909 - McConnell, R.G., Whitehorse Copper Belt, G.S.C. Publ. #1050.

1926 - Cockfield, W.E. & Bell, A.H., Whitehorse District, Yukon, G.S.C. Memoir 150.

1957 - Tozer, E.T., Stratigraphy of the Lewes River Group (Triassic), Central Laberge Area, Yukon Territory, G.S.C. Bulletin 43.

1961 - Wheeler, J.O., Whitehorse Map - Area, Yukon Territory, G.S.C. Memoir 312.

1964 - Kindle, E.D., Copper and Iron Resources, Whitehorse Copper Belt, Yukon Territory, G.S.C. Paper 63 - 41.

1967 - Dean, W., Open Pit Mining in the Yukon, New Imperial Mines Ltd., Paper presented at C.I.M. Convention, Prince George, B.C.

- Hilker, R.G., Copper Mining on the Whitehorse Copper Belt, Paper presented at Alaska Centennial Minerals Conference, Fairbanks, Alaska.

1968 - Kenway, R.W., Large Scale Mining of Small Open Pits, Paper presented at C.I.M. Convention, Vancouver, B.C.

- Hilker, R.G., Geology of Little Chief Ore Deposit, Paper presented at C.I.M. Convention, Vancouver, B.C.

The recommendations outline the general type of program that Lewes River management envisions as a minimum requirement for the next stage of development.

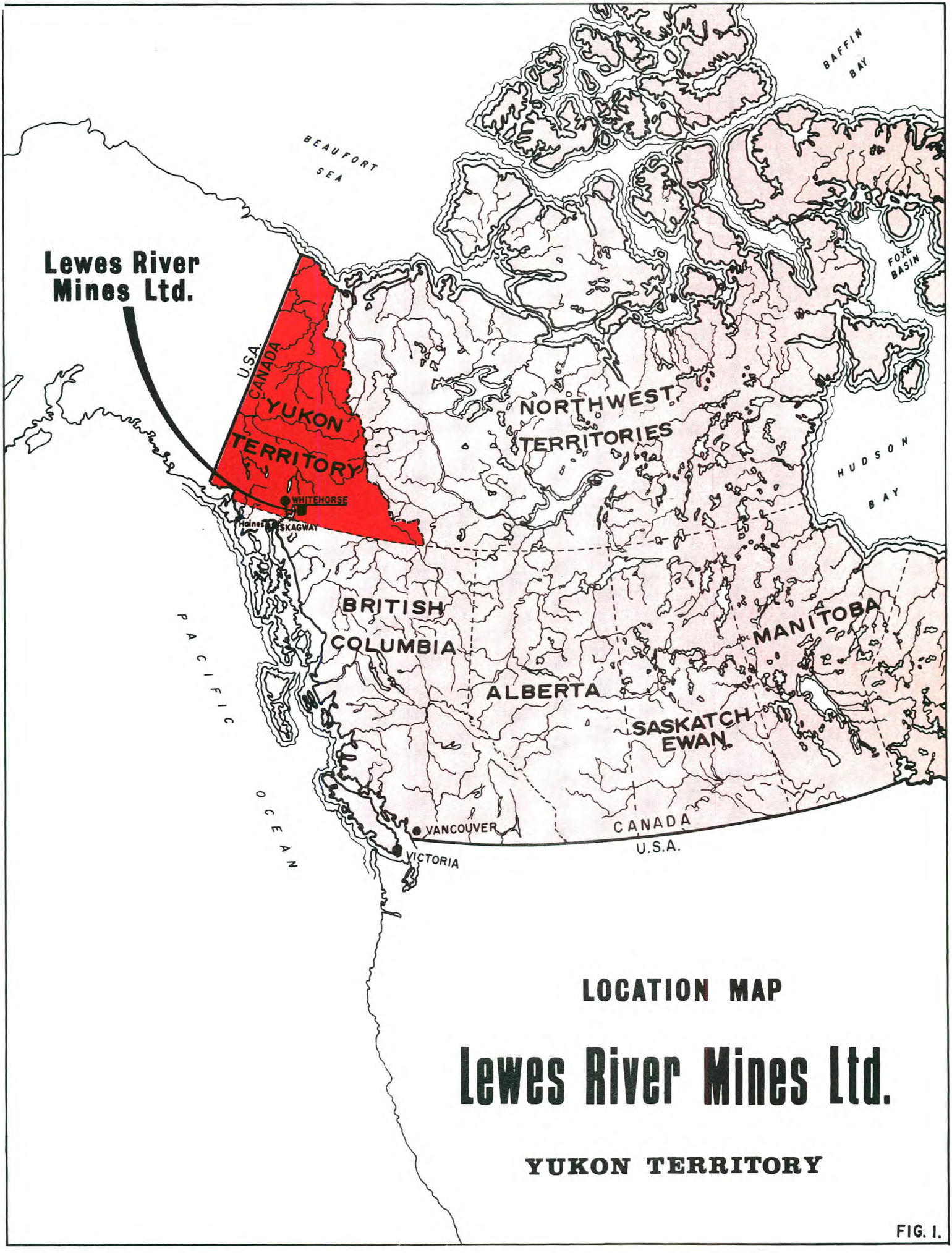
PROPERTY, ACCESSIBILITY

The property consists of a contiguous block of 478 claims following the eastern contact of the Whitehorse Copper Belt and a separate block of 44 contiguous claims some two miles further east. Assessment credit has been claimed for all work to date and all claims are in good standing until October 26, 1969 or later.

The main block of claims lies immediately east of the City of Whitehorse, a fully serviced community of approximately 8,000 people. Whitehorse is the capital city of Yukon Territory and, as the northern terminus for the White Pass & Yukon Railway, is also the main distribution centre. Most of the Lewes River property is accessible via bush road from Whitehorse and the southern portion is actually crossed by the Alaska Highway. Whitehorse is serviced twice daily by CP Air jet flights from Vancouver and Edmonton.

HISTORY

Discoveries of copper outcrops in the Whitehorse area were first reported by miners on their way to the Klondike in 1897. By 1899 important discoveries had been made at the Anaconda, Pueblo, Best Chance, Arctic Chief, Grafter, Valerie and War Eagle properties. These showings occur in a linear trend called the Whitehorse Copper Belt, that lies immediately west of Whitehorse. Small shipments of selected, hand picked ore were made from several properties up to 1909.



LOCATION MAP

Lewes River Mines Ltd.

YUKON TERRITORY

FIG. I.

Between 1915 and 1920 extensive development was done on the Copper King, Carlisle, Pueblo and War Eagle properties. In March of 1917 a disastrous mine cave at the Pueblo killed several miners and forced the closure of the largest producer on the Copper Belt. All mining ceased in 1920, primarily due to a drop in the price of copper. Between 1900 and 1920, some 162,000 tons of ore were shipped which averaged over 3.5% copper. The Pueblo Mine produced about 85% of the total.

The Richmond Yukon Company Ltd. drilled at the Pueblo Mine and other properties between 1926 and 1929 but a drop in the price of copper from 18¢ to 8¢ caused activity in the area to be abandoned.

Noranda Mines Ltd. and Quebec Gold Company acquired claims, conducted geophysical surveys, geological mapping and trenching, and diamond drilled about 6,000 feet between 1946 and 1948 in the Little Chief, Big Chief and Valerie areas. The area then remained idle until Aubrey Simmons formed Imperial Mines and Metals Ltd. in September of 1954 and acquired most of the old properties. Only a limited amount of exploration (mainly 2,200 feet of drilling on the Arctic Chief and Best Chance properties) was completed

before the company was re-organized in 1957 as New Imperial Mines Ltd.

No further work was done until 1963 when the aggressive program which led to production commenced under Arnold Pitt, President and Dr. A.C. Skerl, Consulting Geologist. By the end of 1964 the company had completed 169 diamond drill holes (aggregating about 43,000 feet) and had proven 2.1 million tons of open-pit ore grading 1.20% copper. In August of that year, Sumitomo Metal Mining Company of Japan purchased a small equity and was granted an exclusive option to purchase concentrate and supply senior financing. A feasibility study by Wright Engineers Ltd. in November 1965, was favourable for a 2,000 TPD mill based on open-pit reserves of 5.5 million tons. Milling commenced on May 1, 1967, at a rate of 2,500 TPD. During 1968 the mill treated 732,095 tons grading 1.03% copper, from the Arctic Chief and Little Chief deposits, for a net profit of $1,273,000.

Lewes River Mines Ltd. was incorporated on February 2, 1968, to explore property acquired from prospectors along the eastern side of the Copper Belt. An exploration program consisting mainly of geophysical surveys was conducted over portions of the property during the summer and fall of the same year.

GENERAL GEOLOGY

Sedimentary rocks of Upper Triassic age, the Lewes River Group, are the oldest rocks exposed along the Copper Belt. They consist of greywacke, arkose, limestone, quartzite, argillite, and slate. These rocks are all metamorphosed - the arkose has a granitic appearance, and massive beds of dark greywacke often have the outward appearance of fine-grained diorite. Discontinuous beds of grey, crystalline limestone occur at irregular intervals intercalated with the clastic sediments. Beds of grey to white crystalline limestone from 500 to 1500 feet in thickness cap the succession.

The intrusive stock associated with the Whitehorse Copper Belt, the Whitehorse stock, is an oval-shaped northwesterly trending body, about 16 miles long and up to 5 miles wide. It is an outlying mass of the Coast Range Intrusion from which it is separated by some 8 miles of intervening Jurassic and Triassic sedimentary and volcanic rocks. The stock is coarse-grained and hornblende-rich and ranges in composition through quartz monzonite to granodiorite and diorite. Numerous dykes of porphyritic diorite, felsite, and aplite cut the intrusion near its margins.

Most of the mineral showings follow the east side of a northwesterly trending belt of Lewes River limestone and associated strata that occur as an elongated roof pendant along the west side of the Whitehorse stock. Metamorphism of the limestone varies in the vicinity of the intrusive contact. At irregular intervals the limestone is recrystallized and heavily charged with various contact-metasomatic minerals as well as copper sulphides and magnetite. The intrusion was dated by Wheeler (1961) as between late Lower Cretaceous and early Upper Cretaceous.

Miles Canyon basalt flows are found immediately south of Whitehorse. Individual flows are thin and vescicular and their aggregate thickness is probably less than 200 feet. The flows overlie glacial till and are Pleistocene in age.

The Lewes River rocks are generally folded along northwesterly trending axes and along the Copper Belt the folds are invaded by granite and broken by faults. Most of the large faults strike northerly but a number of lesser faults have easterly strikes. Faulting is believed to have been a contributing factor in formation of skarn zones and mineral deposits. The axial plane of the largest anticline along the Copper Belt trends northwesterly through a point 1/2

mile west of the Grafter mine. The Spring Creek, Empress of India, Retribution, Best Chance, and Grafter showings occur on the easterly dipping limb of this anticline, at the contact of the limestone and granite. The limestone beds here dip easterly at angles ranging from 20° to 60°. In many instances bedding in the limestone near the granite contact and in the skarn zones has been obliterated by recrystallization and flowage. Recrystallization is most common limestone pendants which are completely surrounded by granite.

Fluvioglacial and lacustrine aluvium overlies most of the Lewes River property. The Gronk claims exhibit about 10% outcrop along the west side of Cantlie Lake, where limestone is in contact with a small granitic stock. Skarn has been developed along the contact and reconnaissance prospecting failed to locate any sulphide mineralization. No outcrop, other than a small area of Miles Canyon basalt near Schwatka Lake, has been found on the main body of the Lewes River claims. The overburden depth is difficult to predict and various estimates range from a few tens of feet to several hundred feet. The I.P. surveys indicate depths in the order of 50 feet but these were conducted some distance from the Yukon River.

Extrapolation from nearby outcrops and geophysical interpretation indicates that the majority of the Lewes River claims are underlain either by Lewes River Group limestone or the Whitehorse stock. Most of the claims lie within the Yukon River valley, which is lightly wooded with local relief under 500 feet. Although dotted with small lakes, the area is otherwise fairly dry. Elevations range from 2100 feet above sea level to about 2500 feet.

ECONOMIC GEOLOGY

General

Most of the copper occurrences in the Whitehorse Copper Belt are classed as contact-metasomatic skarn deposits. They are found both in limestone of the Lewes River Group and in the adjoining intrusion. Lime silicate skarn enriched in silica, iron, alumina and magnesium is the common host rock for the copper sulphides. Most of the skarn zones are characterized by an abundance of brown to red garnet, epidote, clinopyroxene, tremolite, wollastonite, magnetite, and specularite.

In some instances, mineralization is found as far as 500 feet away from the contact, mainly along fractured and faulted zones where mineral-bearing solutions from the

granite had easy access to the host rock. Abrupt directional changes and irregularities (or embayments) along the limestone-granite contact appear to be a major control for mineralization.

Bornite and chalcopyrite are the principal economic copper minerals. Some chalcocite is found at the Best Chance and Spring Creek properties. The copper carbonates, malachite and azurite, occur in the oxidized parts of most of the deposits. The copper silicate, chrysocolla, is found at the Keewanaw property. Minor native copper was encountered during early mining at the Pueblo mine.

There are two distinct classes of skarn deposits and both are present at many of the mines:-

1) Bornite and chalcopyrite associated with magnetite and/or specular hematite. Large lenses of cupriferous magnetite occur at the Arctic Chief, Best Chance, Little Chief, and Big Chief mines. Cupriferous specular hematite is common at the Pueblo mine.

2) Bornite and chalcopyrite associated with silicate gangue minerals. These contact-metamorphic minerals include andradite (brown to red garnet), wollastonite, tremolite, actinolite, clinopyroxene, clinochlore, epidote, chlorite, serpentine, asbestos, calcite, and

quartz. Small amounts of magnetite and in some cases specular hematite are also present in these skarns which sometimes grade into the magnetite-rich class. A small amount of pyrite occasionally occurs with the copper sulphides, and pyrrhotite is found with pyrite at the Valerie mine. In general, pyrite is not common within the intrusive or skarns.

The copper deposits contain small amounts of gold, silver, and platinum, and preliminary tests show the presence of from 0.01 to 0.06 per cent gallium in the magnetite and hematite-rich parts of the orebodies. Chalcopyrite and bornite are commonly disseminated throughout both silicate and iron-rich skarns. They are partly contemporaneous with the enclosing skarn but also occur as solid sulphide veins, veinlets, plums, lenses and rich pockets that replace the skarn. Molybdenite is present in some parts of the silicate-rich copper lodes and skarn samples containing more than 1 per cent molybdenite are present on the waste heap at the Copper King, Grafter, and Cowley Creek mines. Scheelite occurs sparingly in a few places at these same mines and is generally associated with vein quartz.

In the Copper Belt, only the Keewanaw and Reservoir Lake occurrences can possibly be classified as 'porphyry' type. In both places bornite and chalcopyrite occur in grey hornblende granite along poorly defined sheared zones or as disseminations in shattered or fractured zones of irregular outline.

The Little Chief deposit acquires, at depth, many of the characteristics of a structurally controlled replacement deposit - definite linear trend, uniform dip, better continuity of mineralization and larger size. The presence of serpentine and linear structure could indicate that the mineralization and/or the favourable intrusive contact follows an altered basic or ultrabasic dyke, or fault zone. Hilker (1968) regards the high magnesium content of the skarn zone as an indication that the mineralized belt may follow a major tectonic structure which once contained small alpine-type ultrabasic intrusions. Much of the magnetite in the skarn zones may also have been derived from the same source. The paragenesis - magnetite, followed by bornite, followed by chalcopyrite and precious metals - tends to support this theory as well.

The deposits along the Copper Belt exhibit a crude mineralogical zoning. They have their highest magnetite content at the centre with decreasing amounts to the

north and south. Molybdenum, however, is most abundant toward the north and south ends of the Copper Belt and least abundant in the centre. The relative abundance of magnetite might be directly related to the amount of injected basic material. The two possible 'porphyry' type deposits occur at the north and south ends of the Copper Belt.

No copper occurrences are known on property held by Lewes River Mines. However, the overburden cover has prevented conventional prospecting and no modern exploration techniques have previously been applied to the area.

New Imperial Ore Reserves

On May 31, 1968, New Imperial reported reserves of 9.44 million tons averaging 1.66% copper in six separate deposits as follows:

Deposit	Length	Width	Depth	Strip Ratio	Tonnage	%Cu	Gold Silver/ton
Open Pit							
Little Chief	930	630	340	2.7	0.93m	1.90	$1.04
Arctic Chief	350	300	125	1.4	0.42m	1.27	1.67
War Eagle	1,300	400	250	2.7	1.14m	1.20	0.73
Cowley Park	800	500	225	1.5	1.27m	0.86	1.20
Keewanaw	450	400	200	1.5	0.49m	1.05	0.96
Best Chance	600	250	100	2.5 2.2	0.19m 4.44m	0.98 1.22	0.26 1.04
Underground							
Little Chief	700+	100	700+		5.0m	2.00	1.04
Total Reserves					9.44m	1.66	1.04

All production to date has come from the Little Chief and Arctic Chief pits. Production to the end of 1968 has been 1,258,930 tons grading 1.11% copper.

Except for the Keewanaw deposit, all deposits are open at the ends and at depth. Only the Little Chief has been tested to depth and it has responded extremely well. It has been drilled to 1,300 feet below surface and shows excellent continuity and improvement in grade with depth. The zone is open in all directions and could extend several thousand feet north to the Middle Chief deposit. New Imperial's estimate of tonnage and grade of this deposit appears to be extremely conservative and a more optimistic potential is 20 to 30 million tons grading about 3% copper.

The New Imperial claims contain over twenty more old properties, some of which were high graded in former years, which have yet to be explored in detail. A continuing exploration program is well underway using a combination of magnetic, E.M. 16 and I.P. surveys followed by drilling. The E.M. 16 surveys are used primarily to detect structure. The ratio of success in drilling I.P. anomalies has not been published but is thought to be better than 50%.

DETAILS OF LEWES RIVER EXPLORATION

General

The occurrence of numerous small low tonange but high grade copper deposits along the contact of the Whitehorse stock and Lewes River sediments has been well established by New Imperial. Discovery of the Little Chief extension to depth has indicated that the contact also has potential for very large, good grade deposits.

There is every reason to expect that a continuing pattern of mineral occurrences will be found on the overburden covered contact of the Whitehorse stock on ground held by Lewes River Mines. The exploration approach used by Lewes River has been, by necessity, almost entirely geophysical. The claims were first explored by a low-level helicopter borne magnetic survey to locate the intrusive-sediment contact and to define irregularities or embayments along the contact for first priority ground exploration. Five areas (grids 1 to 5 - see figure 2 on following page) were chosen and explored by a ground magnetometer survey on lines cut at 400 foot intervals. Specific portions of grids 1, 2 and 4 were then explored by induced polarization

(I.P.) surveys to locate drill targets. A test soil sampling survey was done on grid 1. The aeromag survey, I.P. surveys and ground magnetometer survey on grids 3, 4 and 5 were done under contract to Seigel Associates Ltd. The ground magnetometer survey on grids 1 and 2 was done under contract to Eagle Geophysics Ltd. The soil sampling was done by Lewes River Mines. A discussion of the results of these surveys follows.

Aeromagnetic Survey

This survey was conducted over most the property in April 1968. Portions of the property near the Whitehorse townsite were not flown in order to avoid public disturbance. Flight lines were flown at 500 foot intervals in a magnetic north-south direction using a Scintrex NPM-1 total intensity nuclear precession magnetometer. The data was plotted on five maps to a scale of 1" = 1000 feet. These maps were later reduced to a single map at a scale of 1" = 1/2 mile. A geological interpretation was done by Seigel on the 1/2 mile scale (see figure 3 in the appendix) in a report dated July 24, 1968. A summary of this interpretation is as follows:

(1) the contact of the Whitehorse stock and Lewes River sediments is defined by the 1500 gamma contour. Outlying igneous bodies may be represented at localities F through J.

(2) a series of northeast and eastwest striking faults numbered A through F have been interpreted.

(3) possible roof pendants of sediments are indicated by magnetic lows at localities D and E.

(4) favourable embayment areas along the intrusive contact are indicated at points A and B.

(5) the northwest trending high at point C could represent an upwarp of the igneous basement.

(6) the high intensity magnetic field distortions at K may indicate underlying Miles Canyon basalt.

Since this interpretation was made, additional geological and geophysical information has indicated that:

(1) the Miles Canyon basalt appears to be reversely polarized in places and therefore may occasionally produce magnetic lows.

(2) the northernmost magnetic high (point G) is due to a skarn zone in limestone rather than an outlying intrusive body.

Ground Magnetometer and Induced Polarization Surveys

The results of these surveys is discussed for the individual grids in a southeast to northwest order (grid 1, 4, 5, 2 and 3, respectively). The orientation of lines on each grid is approximately at right angles to the interpreted contact. Data for each survey is illustrated by transparent overlays in the appendix.

Magnetic readings were taken at 100 foot intervals using a Sharpe MF 1 Fluxgate Magnetometer. The induced polarization survey was done with Seigel Mk VI time domain (pulse-type) equipment. A three electrode array with electrode separation of 300 feet was used for the first stage of exploration on grids 1 and 2 while grid 4 was initially surveyed with a 400 foot separation. Station intervals were 200 feet apart.

Grid 1 - The embayment into the Whitehorse stock as indicated by the aeromag survey has been well defined by the ground magnetometer survey. The regularity of the western side of the embayment suggests a fault contact and this possibility is further confirmed by Seigel's interpretation of the aeromagnetic survey. The magnetic gradient from sediments to intrusives is

about 500 gammas (from 1700 to 2200) and the 2000 gamma contour has been assumed to define the contact. A 4-claim area in the northeast corner of the grid is between 200 and 500 gammas above background for the sediments, a slightly lower response than the interpreted intrusive. This could represent an outlying intrusive plug of weaker magnetic character or a similar but more deeply buried intrusive. The low magnetics along the northern contact of this high (near the Yukon River) suggests that it could also be a sheet of overburden-covered Miles Canyon basalt that has been cut through on the north by the river. Induced polarization surveys of this grid were restricted to the embayment within the Whitehorse stock and the contact. Five reconnaissance lines at 800 foot intervals were also surveyed over the possible outlying intrusive plug indicated in the northeast corner of the grid. Two significantly anomalous areas were located.

Anomaly 1 is centered on L20N at 62E as shown on figure 4 in the appendix. Detailed profiles across this anomaly, on lines 16N and 20N, are shown on pages 23 and 24. The area of chargeability readings exceeding

7.0 milliseconds (about twice background) is roughly 500 feet by 1200 feet. Interpretation from the magnetic surveys indicates this area lies within the intrusive immediately west of a fault contact with Lewes River sediments. Resistivity of anomaly 1 is in the order of 300 ohm-meters, about the same as background readings elsewhere on grid 1.

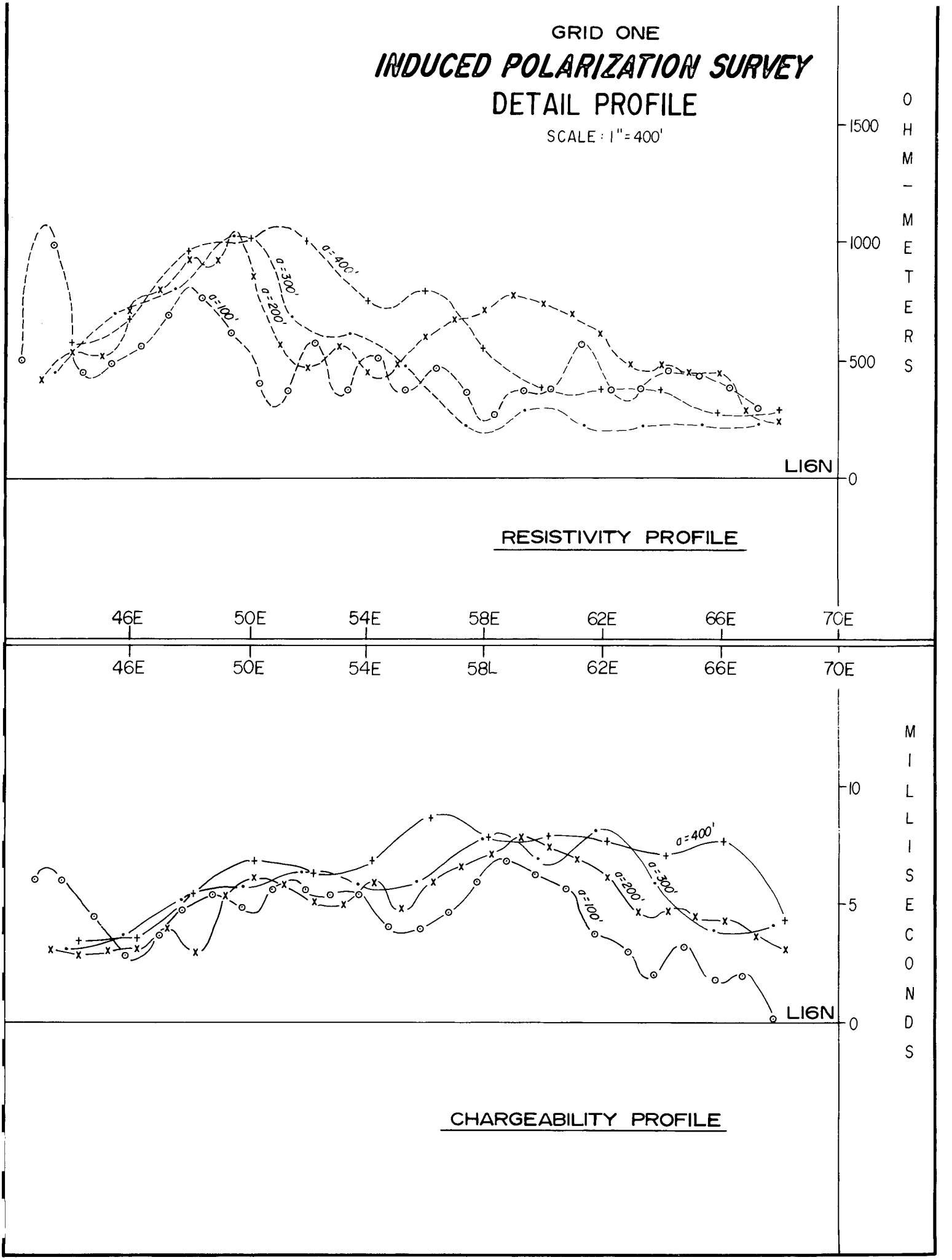
Anomaly 2 is centered on L52N at 46E. A circular area about 800 feet in diameter has chargeability readings in excess of 8.0 milliseconds and a very much larger area has readings in excess of 7.0 milliseconds. Background in this part of the grid varies from 4 to 6 milliseconds. A detailed profile through anomaly 2 is shown on page 25. Peak responses in the order of 12 to 18 milliseconds were obtained. The magnetic surveys indicate this anomaly lies within the intrusive near its contact with Lewes River sediments. Resistivity values along the western part of the grid and at anomaly 2 are in the order of 800 to 2000 ohm-meters. This area of higher resistivity may indicate an underlying intrusion although its dimensions do not conform exactly to the intrusive area as indicated by the magnetic survey.

GRID ONE

INDUCED POLARIZATION SURVEY

DETAIL PROFILE

SCALE: 1"=400'

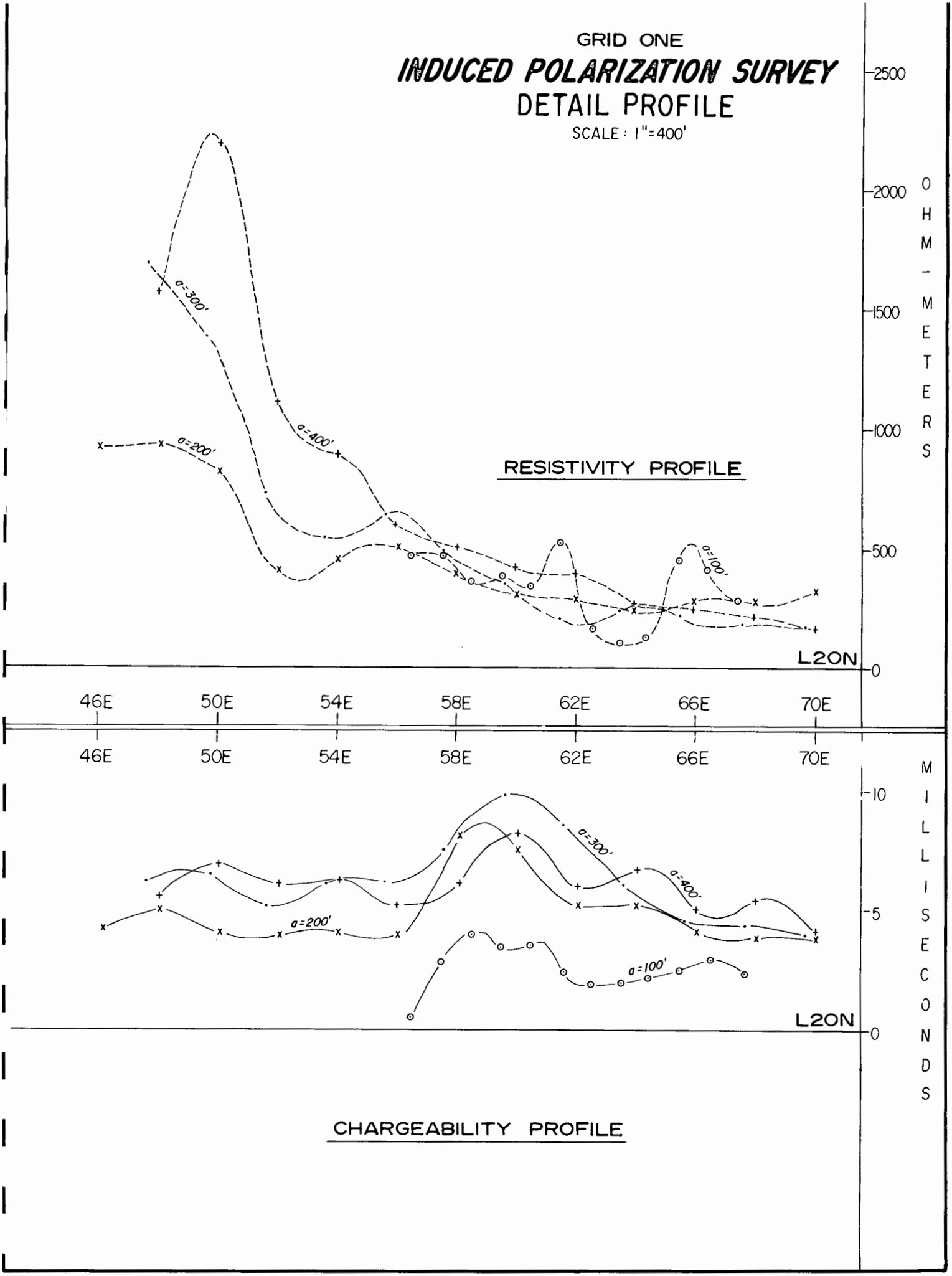


GRID ONE

INDUCED POLARIZATION SURVEY

DETAIL PROFILE

SCALE : 1"=400'

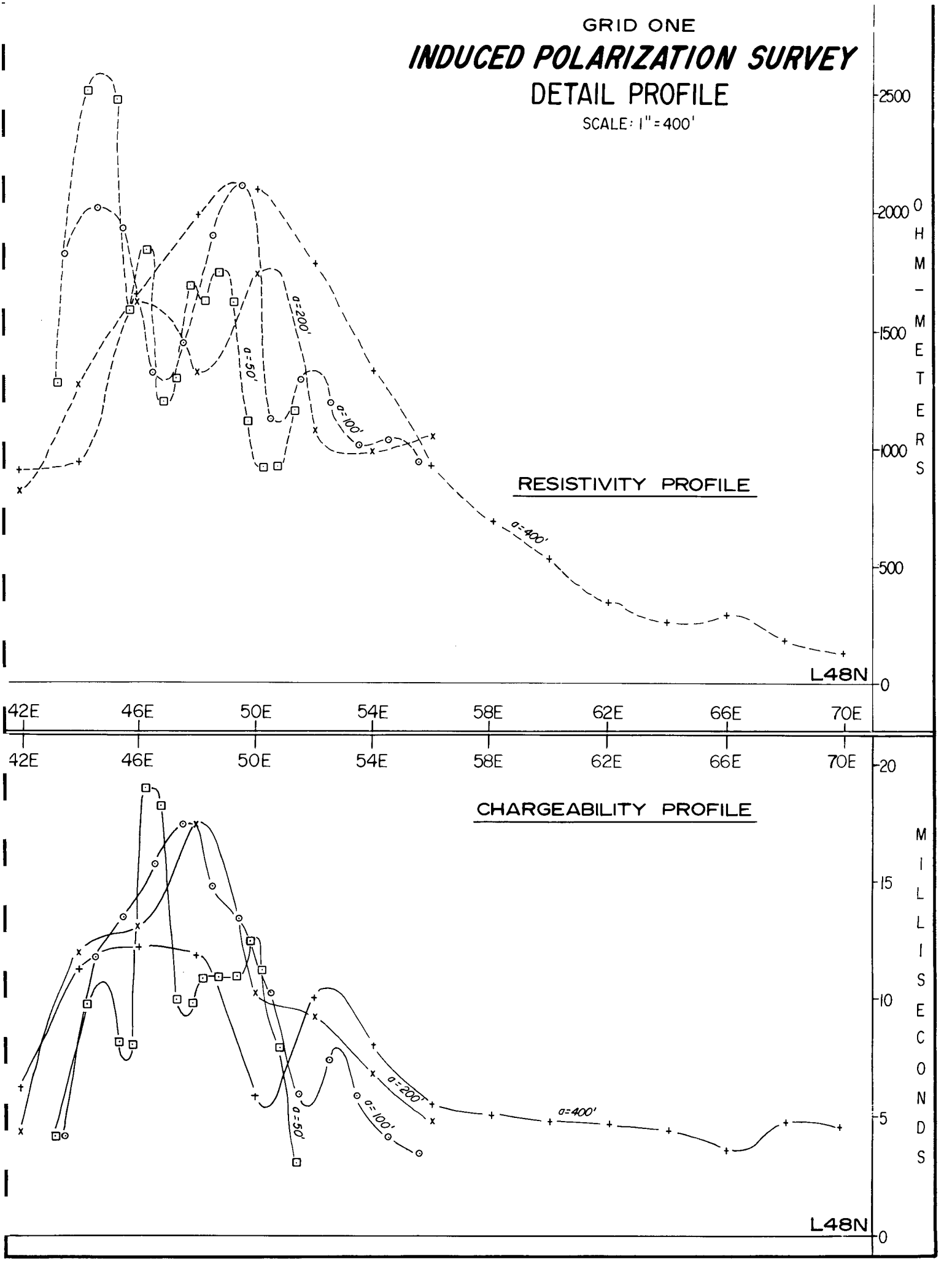


GRID ONE

INDUCED POLARIZATION SURVEY

DETAIL PROFILE

SCALE: 1" = 400'



Grid 4 - Correlation between the airborne magnetics and the almost adjoining ground magnetic survey on grid 1 indicates that the granitic-sediment contact on grid 4 may be represented by the 500 gamma contour. The very strong magnetic response found in an easterly trending direction in the south central part of the grid is likely due to either (a) a strongly magnetic phase of the Whitehorse stock or (b) Miles Canyon basalt of normal polarity. The magnetic gradient between sediments and intrusive is not as sharp in this areas as it was on the south part of grid 1. Therefore, it is possible that the contact actually lies north of the grid (ie - it might be represented by the 1300 gamma contour on the aeromag survey, figure 3).

Chargeability values from the I.P. survey on this grid vary from 1 to 6.0 milliseconds, much the same as grid 1. Several isolated values between 6.0 and 8.0 milliseconds are found but their random occurrence provides no useful information. Resistivities range from 17 to 1085 ohm-meters with no obvious pattern. It is possible, as already mentioned, that the intrusive-

sediment contact lies to the northeast of grid 4 and has been missed by the I.P. survey. The grid will have to be extended to the northeast to examine this possibility.

Grid 5 - Grid 5 is separated from grid 4 by the Yukon River. The magnetic gradient is from 500 to 1500 gammas and the 1000 gamma contour has been chosen as indicating the sediment-intrusive contact. No I.P. surveys have been done on this grid.

Grid 2 - The magnetic gradient from sediments to intrusive is about 200 gammas (from 1700 to 2400) and the 2100 gamma contour has been assumed to define the contact. The contact, as defined by the ground magnetics, appears to be remarkably smooth as compared to a major embayment indicated by the airborne magnetics. This significant difference between the airborne and ground magnetic pattern has not been satisfactorily explained. Mr. J. Baird of Seigel Associates Ltd. believes (verbal communication) that both may be correct with the airborne magnetics indicating a deep seated characteristic that is masked on the ground by surface effect.

The irregular 'birds-eye' pattern of extreme low

magnetic values along the southwest side of the grid has been interpreted by Peter Walcott, P. Eng., of Eagle Geophysics Ltd. as being caused by a thin layer of reversely polarized Miles Canyon basalt overlying the Whitehorse stock. This theory is partially confirmed by the fact that Miles Canyon basalt has been found outcropping in this area. It should be noted that the major portion of the grid exhibiting the 'birds-eye' pattern lies on unstaked ground and because of the above interpretation protection claims were considered unwarranted.

The I.P. survey shows background chargeability values range from 3 to 6 milliseconds. Several areas of chargeability between 6 and 7.5 were found and covered in detail. Profiles were made at L58 from 0 to 16E, at L66 from 0 to 17E, at L74 from 18E to 36E, at L82 from 0 to 24E, and at L94 from 28E to 44E but changes in electrode spacing did not result in increased chargeability reading in any of the profiles. These weakly anomalous areas lie within the stock as interpreted from the magnetic surveys. A fairly extensive area of readings exceeding 6.0 milliseconds with peaks

to 10.0 milliseconds is found along L98 from 4E to 16W. Freezing weather at the time of the survey prevented a profile being obtained. The anomalous area is bounded on the north by very low chargeability values (1.0 or less) that have an easterly orientation and could represent a fault contact. Resistivity values at the centre of the anomaly are 100 to 200 ohm-meters and rapidly increase to over 1000 ohm-meters to the north near the interpreted fault.

Grid 3 - Geological projection from outcrop areas lying to the west, on New Imperial property, indicates this grid is underlain by Lewes River limestone. The projected contact with the Whitehorse stock lies about 2000 feet further south and the grid will have to be extended in this direction. The magnetometer survey appears to verify the presence of underlying sediments and does not indicate any significant magnetic mineralization within them. No induced polarization surveys have been done on this grid.

Geochemical Survey

Because of the nature and depth of overburden cover, geochemical surveys were not expected to provide useful

information. However, a test survey was conducted over grid 1 with sampling at 400 foot intervals on lines 400 feet apart. Sample pits were dug to the "B" horizon using a mattock grub-hoe and samples were sent to Chemex Labs Ltd., North Vancouver, for copper analyses using a hot acid extraction technique. Background values ranged from 3 to 10 parts per million copper. A number of randomly oriented areas with values between 10 and 20 parts per million were found. These weak anomalies have no correlation with geophysical anomalies or the projected underlying formations and are probably caused by drainage differences within the grid area.

STATEMENT OF EXPENDITURES

A summary of all expenditures made by Lewes River Mines Ltd. to the December 31, 1968, audit is given. Field supervision, consulting fees and sundry costs pertaining to exploration and development are included with each category on a pro-rated basis.

Exploration and Development

Staking, recording and assessment fees	$40,318	
Aeromagnetic survey (600 miles)	12,098	
Line cutting, grid 1 and 2 (95.7 miles)	11,070	
Ground magnetometer survey (134.6 miles)	5,865	
I.P. surveys (58.3 miles)	31,112	
Soil sampling (585 samples)	781	
		$101,244

General and Administrative

Administrative and management fees	14,075	
Office rent, supplies and expenses	3,856	
Legal, audit, bank	1,433	
Travel and promotional	494	
		$ 19,858
Total		$121,102

CONCLUSIONS AND RECOMMENDATIONS

The potential of the Whitehorse Copper Belt has always been considered good for small, marginal copper deposits. Recent work by New Imperial Mines Ltd.

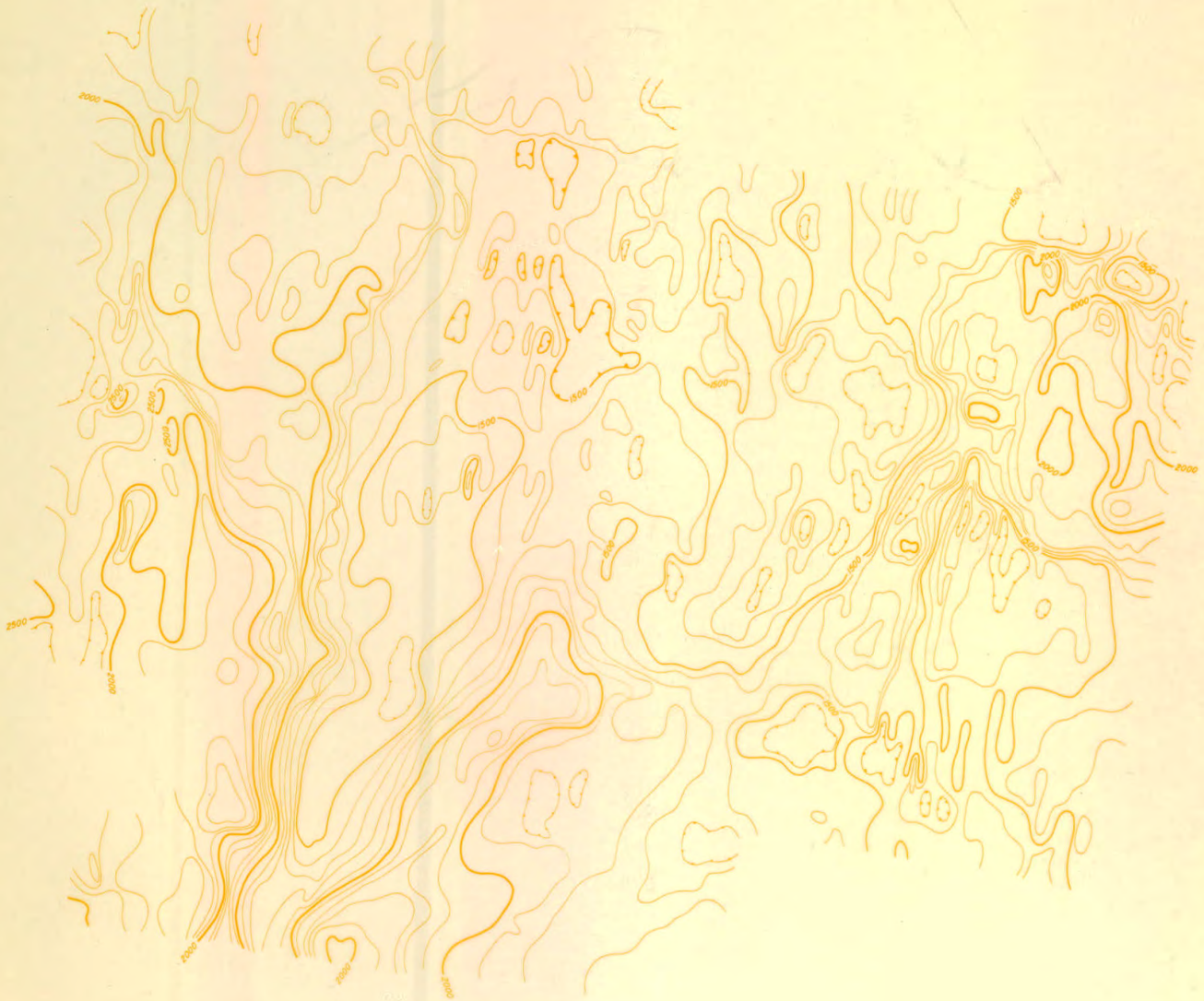
at the Little Chief has indicated that an excellent potential also exists for large tonnage deposits exceeding 2% copper in grade. The known area of mineralization extends for 16 miles along the outcropping western contact of the Whitehorse stock on ground held by New Imperial. The property of Lewes River Mines Ltd. is along the eastern, overburden-covered, contact of the Whitehorse stock where there is every expectation of a continuing pattern of mineral occurrences.

The exploration program conducted by Lewes River Mines has utilized a combination of ground magnetometer and induced polarization surveys, a technique already proven successful by New Imperial. Only a small portion of the Lewes River Mines property has been so explored and this work has been restricted to the postulated contact area between the Whitehorse stock and Lewes River sediments. Additional magnetometer and induced polarization surveys should be completed over (a) the remainder of the postulated contact area including the uncertain portion of grids 1 and 4, (b) the aeromagnetic low areas within the intrusive that could be due to roof pendants of Lewes River sediments, (c) the area north of grid 3 where the Lewes River sediments may form a shallow capping over the Whitehorse stock and

(d) the aeromagnetic anomalies within the Gronk claim block.

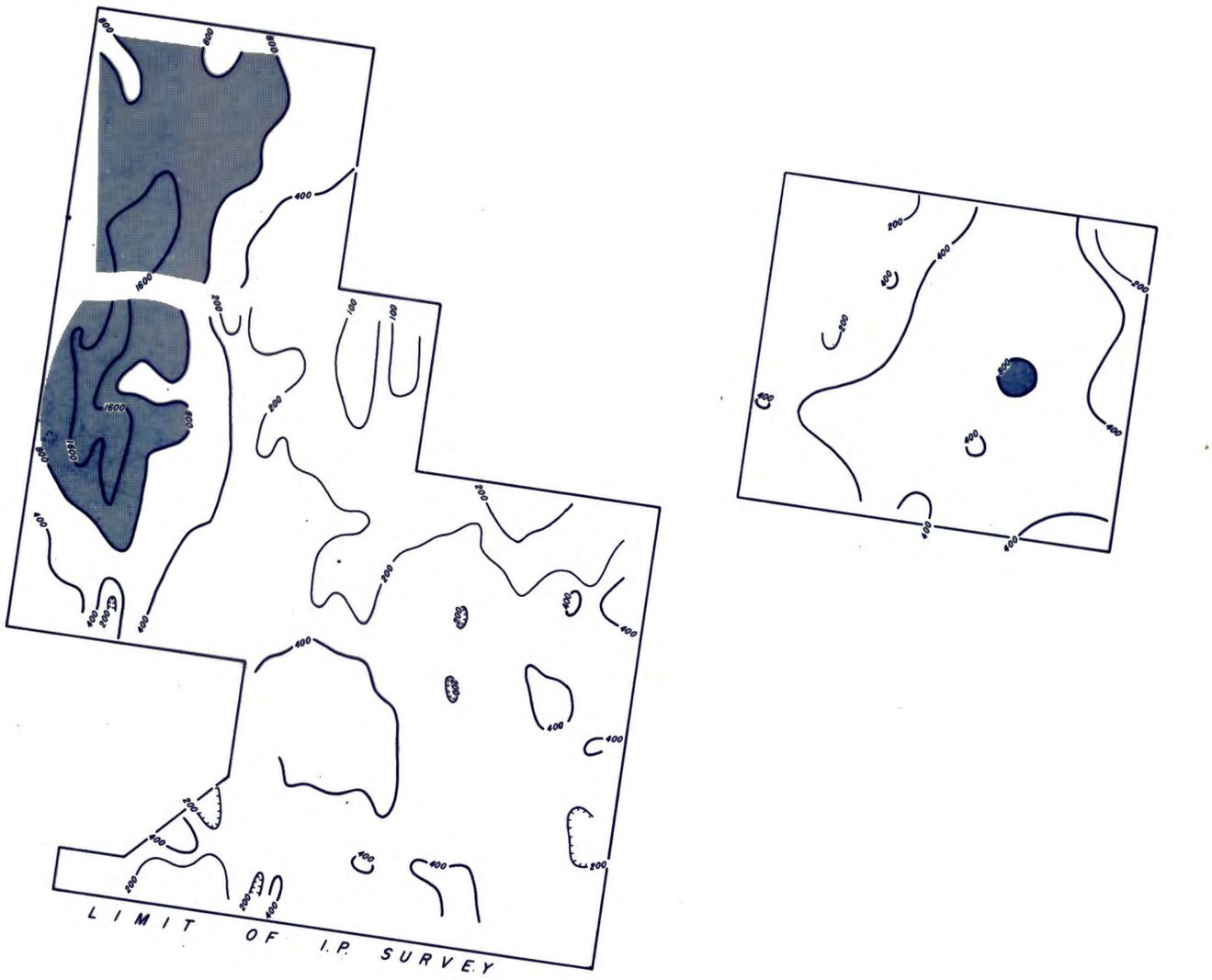
In conjunction with the above program the two I.P. anomalies on grid 1 should be drilled to determine their mineral content and to provide badly needed geological information for more precise interpretation of ground geophysical data. The additional geophysical work is almost certain to locate more drill targets so a fairly continuous drill program should be possible.

The minimum cost of this next stage of work is estimated at $75,000 for the geophysics and $75,000 minimum for the drilling.


2000
2500
2000
2000
2000

CHARGEABILITY

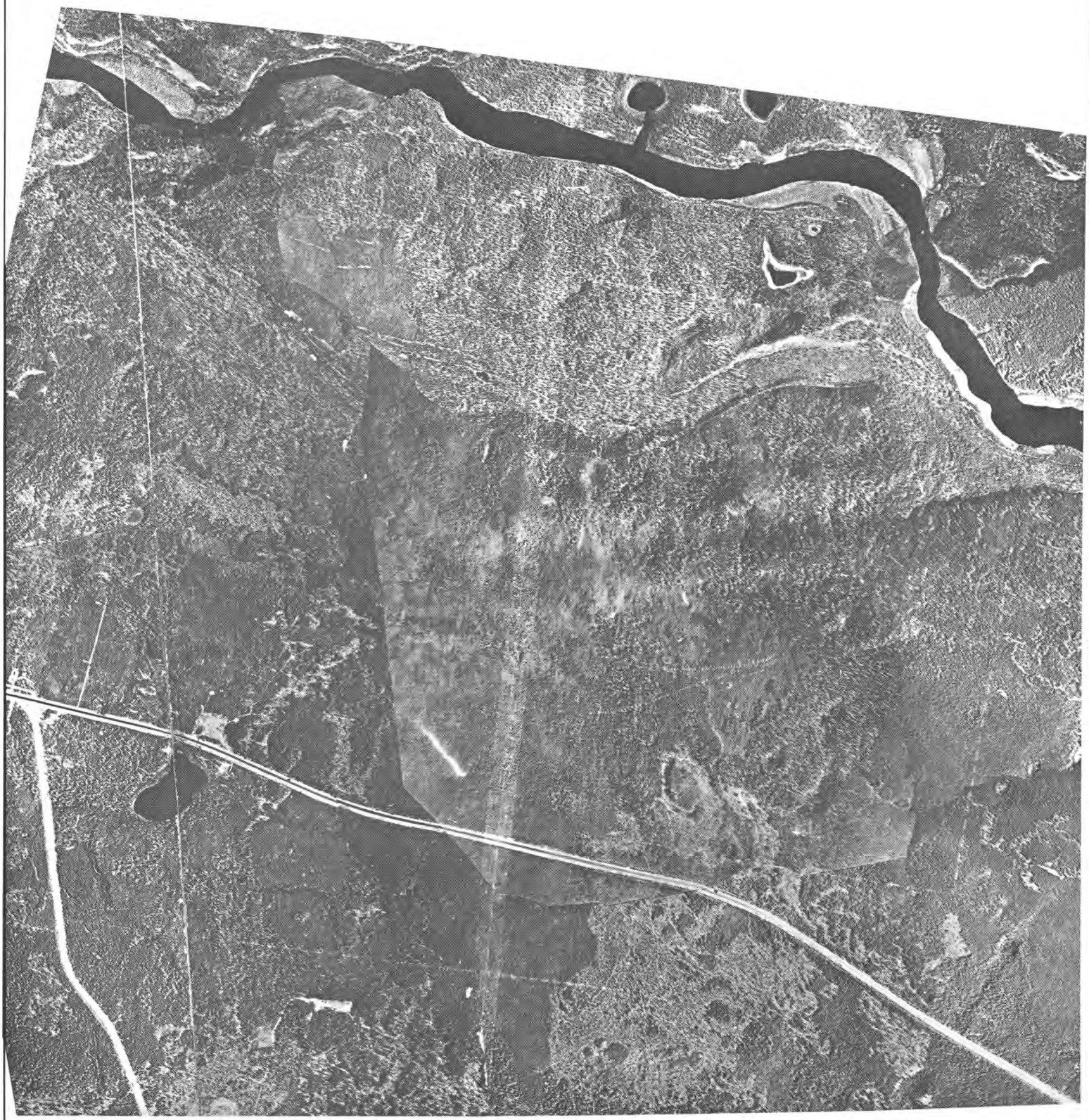
——— CHARGEABILITY CONTOUR (2 millisecond interval)



RESISTIVITY

——— *RESISTIVITY CONTOUR (100, 200, 400, 800 ohm/meters)*

YUKON RIVER
BASELINE 'A'
BASELINE 'B'
BASELINE 'C'
ALASKA HIGHWAY
CARCROSS HIGHWAY
PROPERTY BOUNDARY



LEGEND

GROUND MAGNETIC SURVEY

INDUCED POLARIZATION SURVEY

LEWES RIVER MINES LTD.

WHITEHORSE AREA, YUKON

GRID I.

INDUCED POLARIZATION & GROUND MAGNETIC SURVEY COMPOSITE

FEET 400 200 0 400 800 1200 2000 2400 2800 3200 FEET

FIG. 4.

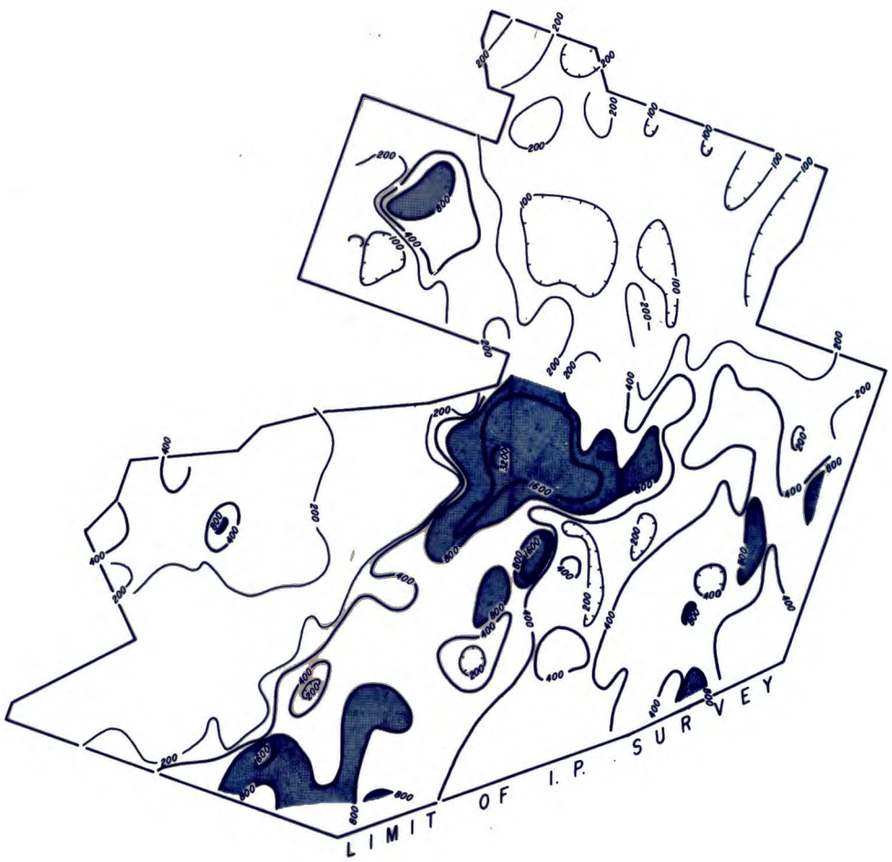
MAGNETIC CONTOUR (500 gamma interval)

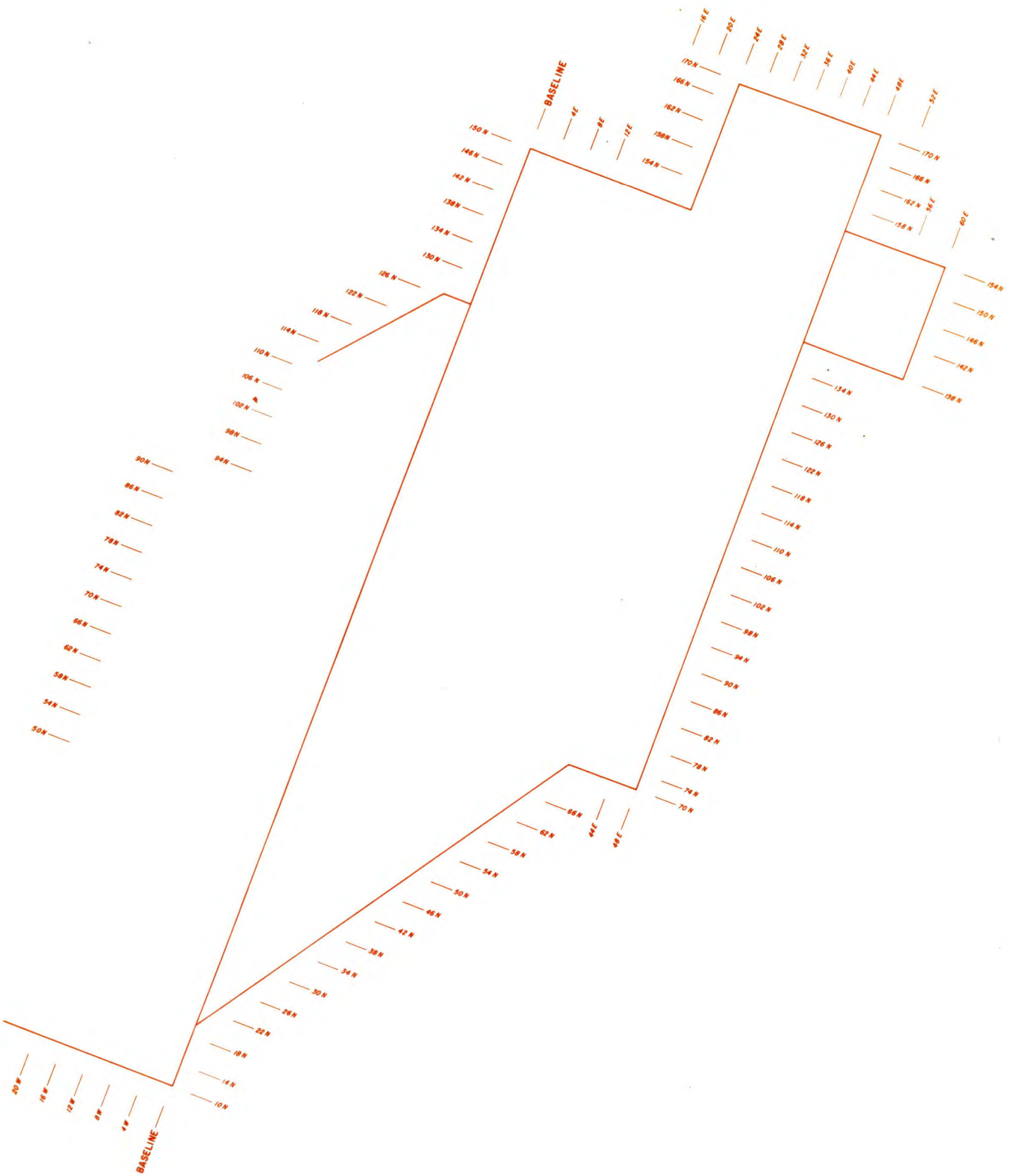
CHARGEABILITY

——— CHARGEABILITY CONTOUR (2 millisecond interval)

RESISTIVITY

——— *RESISTIVITY CONTOUR (100, 200, 400, 800 ohm/meters)*

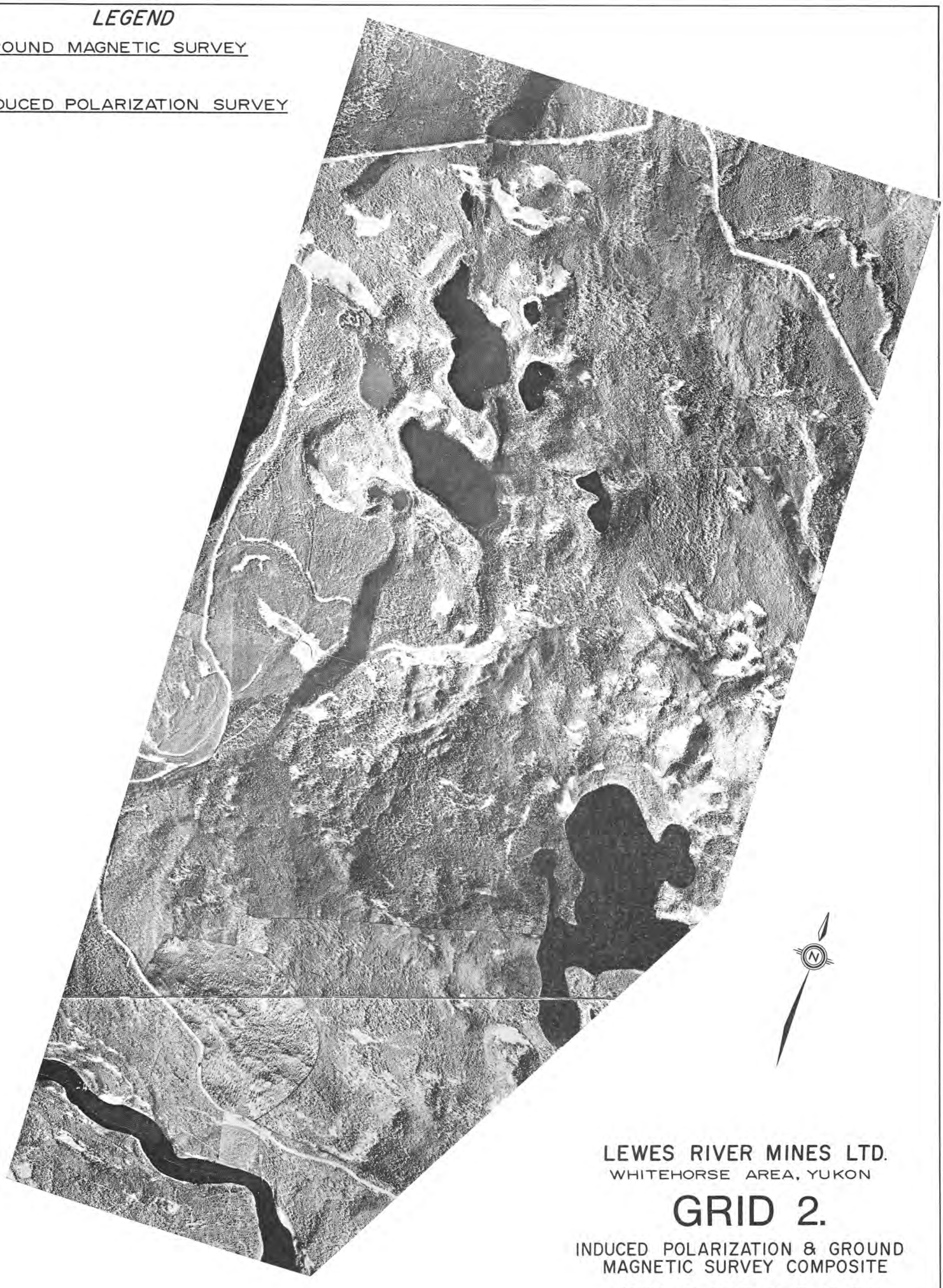



BASELINE
BASELINE
0E
4E
8E
12E
16E
20E
24E
28E
32E
36E
40E
44E
48E
52E
56E
60E
64E
68E
72E
76E
80E
84E
88E
92E
96E
100E
104E
108E
112E
116E
120E
124E
128E
132E
136E
140E
144E
148E
152E
156E

LEGEND

GROUND MAGNETIC SURVEY

INDUCED POLARIZATION SURVEY



LEWES RIVER MINES LTD.

WHITEHORSE AREA, YUKON

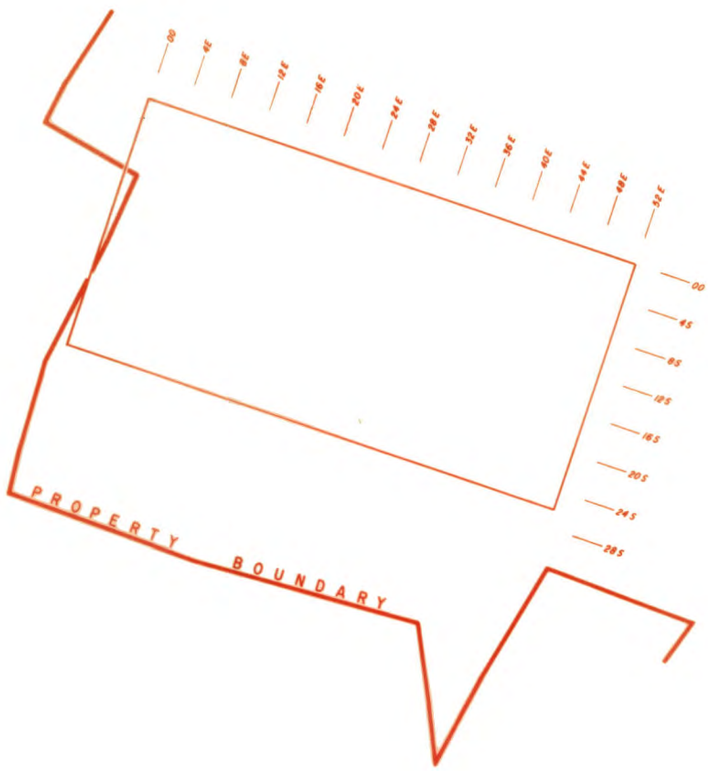
GRID 2.

INDUCED POLARIZATION & GROUND MAGNETIC SURVEY COMPOSITE

FEET 400 200 0 400 800 1600 2000 2400 2800 3200 FEET

FIG. 5.

——— MAGNETIC CONTOUR (500 gamma interval)


0E
4E
8E
12E
16E
20E
24E
28E
32E
36E
40E
44E
48E
52E
00
4S
8S
12S
16S
20S
24S
28S
PROPERTY BOUNDARY

LEGEND

GROUND MAGNETIC SURVEY

LEWES RIVER MINES LTD.

WHITEHORSE AREA, YUKON

GRID 3.

GROUND MAGNETIC SURVEY

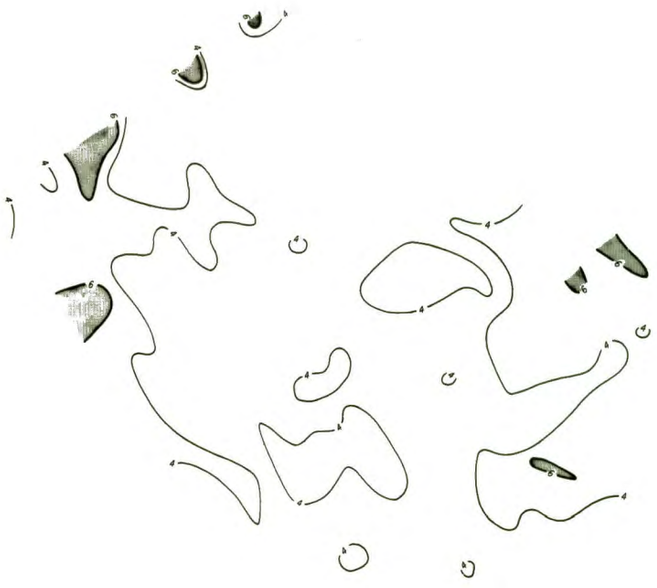
FEET 400 200 0 400 800 1600 2000 2400 2800 3200 FEET

FIG. 6.

MAGNETIC CONTOUR (500 gamma interval)
1000
1500
1500
1000
1000
1500
1000
1000
1500
1000

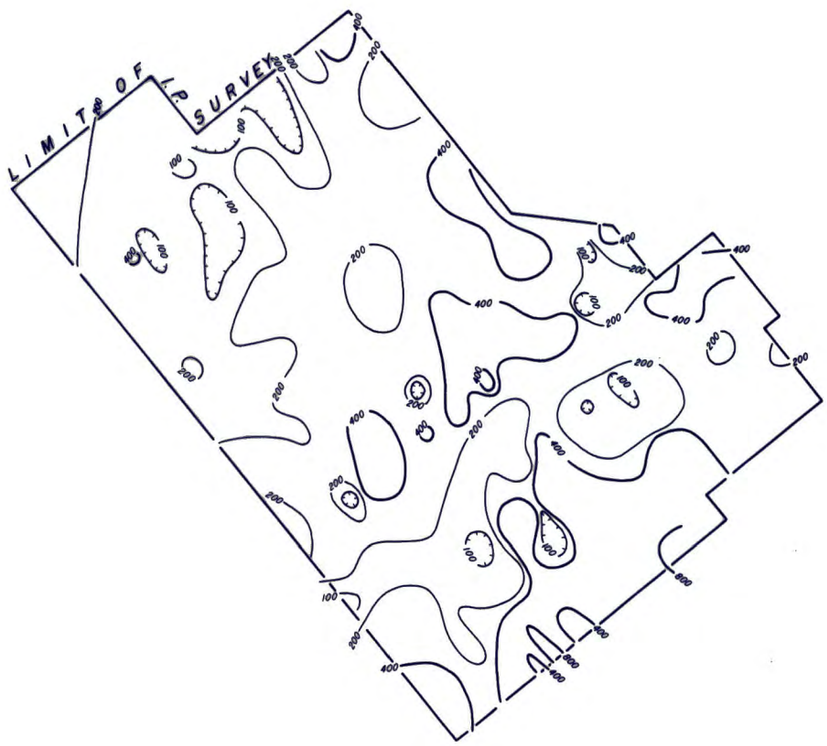
CHARGEABILITY

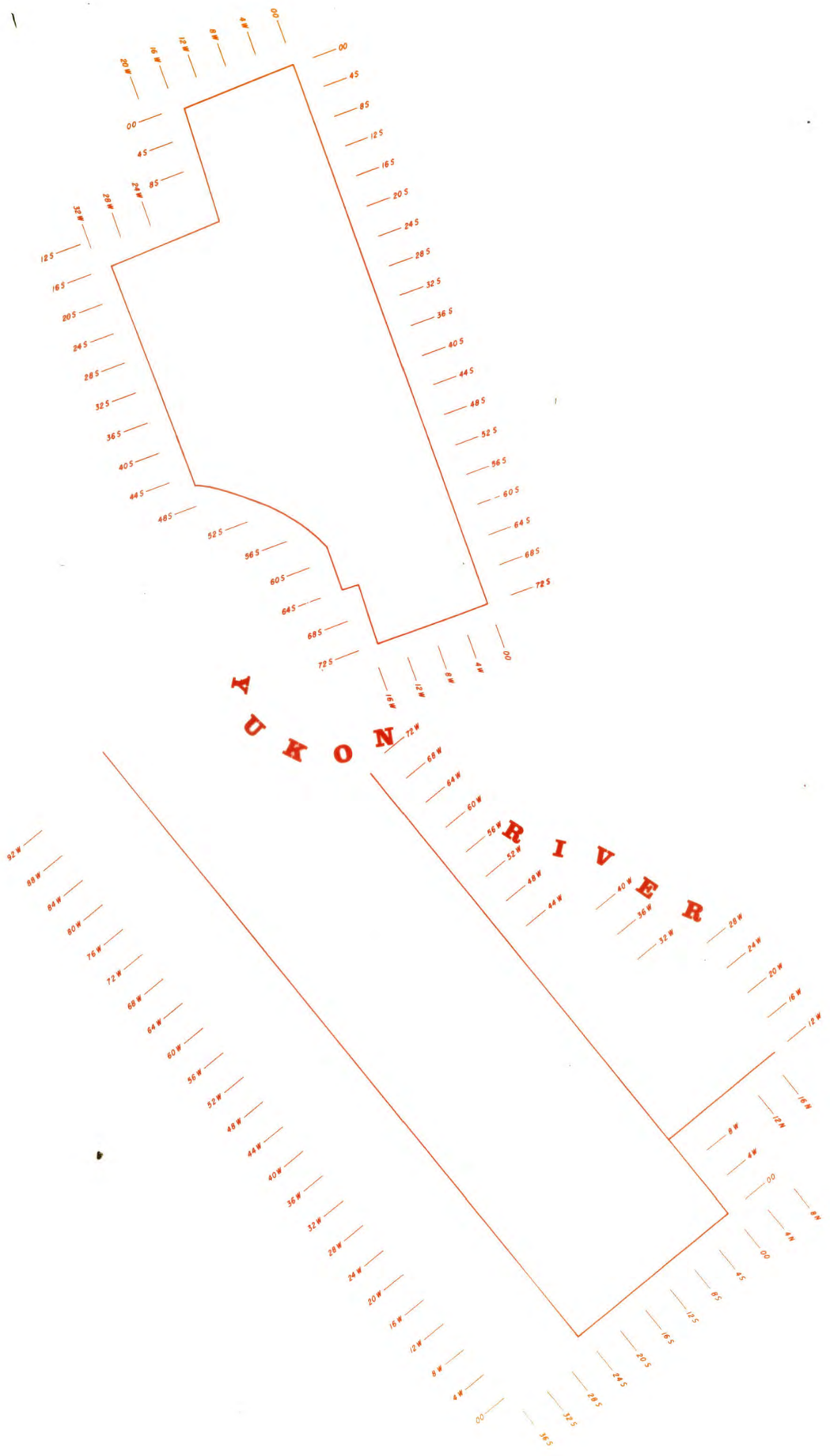
——— CHARGEABILITY CONTOUR (2 millisecond interval)



RESISTIVITY

——— *RESISTIVITY CONTOUR (100, 200, 400, 800 ohm/meters)*




YUKON RIVER

LEGEND

GROUND MAGNETIC SURVEY

INDUCED POLARIZATION SURVEY

N

LEWES RIVER MINES LTD.

WHITEHORSE AREA, YUKON

GRIDS 4 & 5

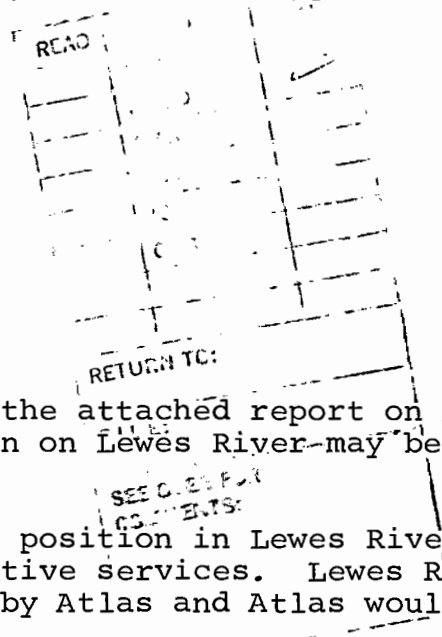
INDUCED POLARIZATION & GROUND MAGNETIC SURVEY COMPOSITE

FEET 400 200 0 400 800 1600 2000 2400 2800 3200 FEET

FIG. 7.

Atlas Explorations Limited,
Ross River, Yukon

August 9, 1969



Mr. R.E. Gordon Davis,
Executive Vice-President,
Atlas Explorations Limited,
330 355 Burrard Street,
Vancouver 1, B.C.

Dear Gordon:

Would you please review the attached report on Lewes River Mines Ltd. Recent information on Lewes River may be found in George Cross, July 23, 1969.

Atlas has been offered a position in Lewes River in return for management and administrative services. Lewes River would be billed for these services by Atlas and Atlas would also earn a share position.

It is my understanding from Messrs. White, Archer and Cathro, that Atlas would earn the escrow position of Styba and Krueger who are presently providing the management for Lewes River.

Naturally no details concerning this proposal have been finalized but I think we should give it serious consideration because:

1) Lewes River is about to enter into a joint venture with either Placer or Cyprus, which will initiate a large exploration program on the ground (Confidential)
2) Atlas would gain participation in an issue of public interest
3) The exploration possibilities of this area are good.

Would you please consider this initial proposal with the Board so that you and I may pursue it further with the principals on your next visit to Whitehorse.

All the best,

John S. Brock,
Vice-President, Exploration

LEWES RIVER MINES LTD.

MORE DRILL TARGETS SOUGHT IN CONTINUED YUKON PROGRAM - Additional funds to accrue from a new public share offering will carry forward the program under way on the Yukon properties of Lewes River Mines Ltd., acquired in part from Pacific Giant Steel Ores Ltd. which was paid in full in cash the consideration of $11,200.

Corporate Structure

Inc.: B.C., 2Feb68; public 14July69.
Extra-Territorial Registration in Yukon 13May68.
H.O.: 410-355 Burrard St., Vancouver.
Reg. Off.: 1650-770 Hornby St., Vancouver.
Auditor: Bock W. Yip.
T.A. & Reg.: Canada Permanent Trust Co.
Auth. Cap.: 5,000,000 shs., $1.00 par.
Shares Issued:

For $131,301 cash	881,502
For mineral claims	560,000
Outstanding 30Apr69	1,441,502
Outstanding 27June69	*1,631,502

* Incl. 750,000 shs. escrowed.

Financial Position: Of the $131,301 received from sale of shares, $169,000 was spent as at 30Apr69, leaving working capital deficit of $38,384.

Public Share Offering: by prospectus 14July69 the company offers 260,000 shs. priced at 65¢ p/s subj. to 15¢ p/s commission to net $130,000. Of the shares issued, and to be issued 14.2% are being offered to the public and, of the remaining 85.8%, 46.7% have been issued to directors, officers and controlling persons for cash and property. Prior to the offering, directors or senior officers held 54% of the outstanding common shares.

Directors: E.B.Krueger, West Vancouver, pres. B.V.Styba, N.Vancouver, sec-tres.; D.Freeze, Calgary; P.White, Whitehorse.

Promoters: Messrs Styba, Krueger, Freeze.

The properties are across the Yukon River from the mineral deposits of New Imperial Mines Ltd. They are described as "two separate irregular claim blocks on the eastern side of the Yukon River at Whitehorse." The main block, 478 contiguous claims, extends 3 miles north of Whitehorse and 9 miles south of the city where it crosses the river to extend for another 3½ miles south. The separate "Gronk Group" consists of 44 contiguous claims 2½ miles further east. The "A" group was acquired from Boris Styba and Egon Krueger for 560,000 shares. The company paid $10,000 cash as full consideration for the "B" group, the vendors being Alan Archer and Robert Cathro. The "C" group was acquired from Pacific Giant Steel Ores Limited for $11,200. The "D" group was acquired from Messrs Styba and Krueger for 190,000 shs. and the "E" group was acquired for the cost of staking. The vendor shares have been redistributed among the following, classed as "insiders", Styba and Krueger, 202,778 shs. each; David Freeze, 172,222 shs.; and Cathro and Archer, 86,111 shs. each.

To date, work has been limited to surface development in the form of a helicopter-borne low level aeromagnetic survey in April and May, 1968. The company says this work gave 13 target areas for further more detailed examination, 9 of which are recommended for immediate consideration. I.P. and ground magnetic and geochem. surveys have been done over 2 of these 9 target areas resulting in the definition of one I.P. anomaly of potentially economic significance.

The program to be continued follows recommendations by R.S. Adamson, P.Eng., dated 1Aug68, in which he estimated a budget of $135,000 of which $58,000 has been completed leaving a balance of $77,000. The company will also apply from its new funds $42,000 to pay accounts payable incurred as a result of completing the work done to date. The balance of $35,000 will be used for general and administrative purposes as well as for a property payment of $15,000, 1Dec69, on the D group.

The $75,000 to be disbursed in Stage I includes $55,000 for I.P. surveys, including cost of ground control, $5,000 for ground magnetic surveys, $10,000 for overhead and $5,000 for contingencies.

Stage II, estimated at $60,000, calls for diamond drilling to explore the most favorable zones disclosed under Stage I. The consultant proposes 3000 ft. of drilling at $15 per foot with $10,000 for overhead and $5,000 for contingencies. He points out that the geophysical work over zone A firmly established the presence of a valid drill target which could possibly, he says, represent a disseminated copper deposit near the eastern contact of the Whitehorse stock. He adds that equally attractive geological settings are present on the contact which have yet to be assessed geophysically.

FOR THE RECORD

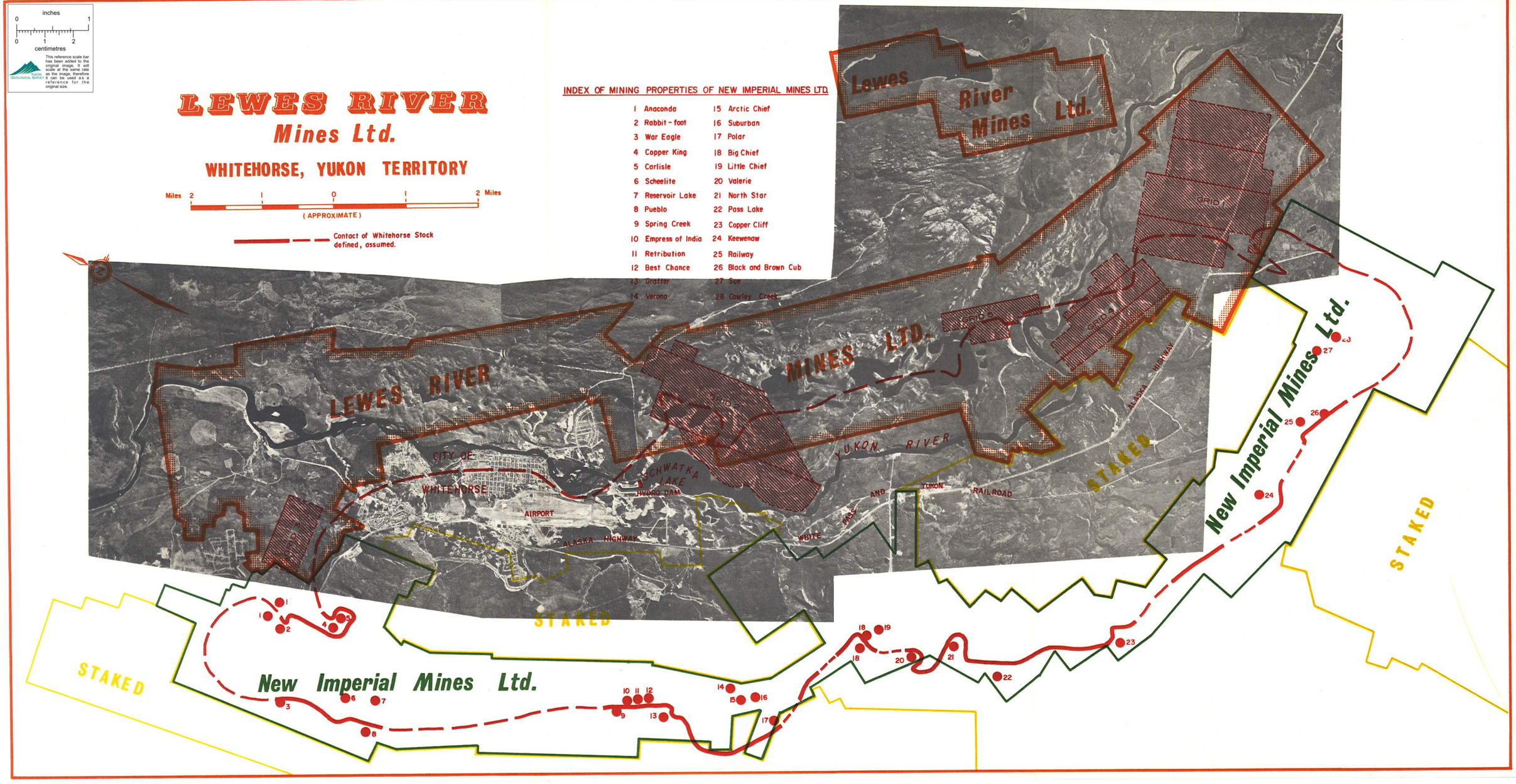
Inland Chemicals Canada Ltd. on June 6, 1969, changed its name to Inland Chemicals Limited. The shares of the company started trading under its new name as of July 18, 1969, and the ticker symbol ICH.

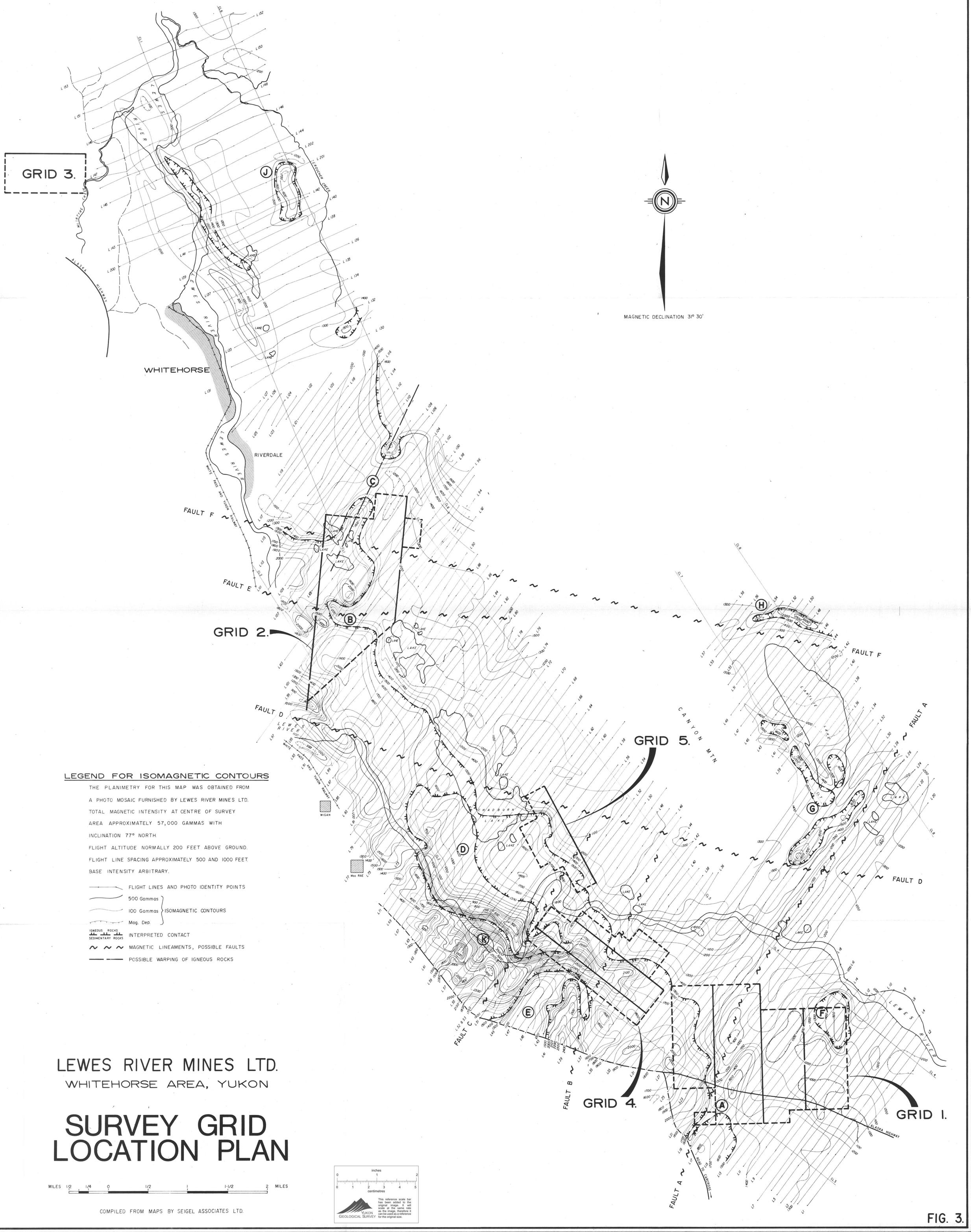
Ocean Cement Ltd. has purchased a 50% interest in Forden Concrete Ltd., an Edmonton, Alberta ready mix concrete firm, for an undisclosed price. Forden Concrete has been in operation in Edmonton since 1961 and is operating 20 trucks from two mix plants. The other 50% interest in Forden is held by Steel Brothers Canadian Holdings Ltd.

Enex Mines Ltd. annual meeting was told that 32,000 feet of drilling on the Uranium City, Sask. property, called the Scope group, has outlined 5 uranium zones which require underground work as the next phase of exploration.

Further exploration is planned for the Nicholson Bay claims, the meeting was told.

Enex has staked 475 claims in the Padlie area of the N.W.T. some 250 miles northwest of Churchill, Man. These claims cover a strike length of 16 miles along a conglomerate formation similar to the uranium conglomerates of the Elliot Lake area in Ontario. Elliot Lake claims will also be explored.


inches
0 1
0 1 2
centimetres
This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.
LEWES RIVER
Mines Ltd.
WHITEHORSE, YUKON TERRITORY
Miles 2 1 0 1 2 Miles
(APPROXIMATE)
Contact of Whitehorse Stock defined, assumed.
INDEX OF MINING PROPERTIES OF NEW IMPERIAL MINES LTD
1 Anaconda
2 Rabbit-foot
3 War Eagle
4 Copper King
5 Carlisle
6 Scheelite
7 Reservoir Lake
8 Pueblo
9 Spring Creek
10 Empress of India
11 Retribution
12 Best Chance
13 Grafter
14 Verona
15 Arctic Chief
16 Suburban
17 Polar
18 Big Chief
19 Little Chief
20 Valerie
21 North Star
22 Pass Lake
23 Copper Cliff
24 Keewenaw
25 Railway
26 Black and Brown Cub
27 Sue
28 Cowley Creek
Lewes River Mines Ltd.
GRID 1
GRID 2
GRID 3
GRID 4
GRID 5
LEWES RIVER
MINES LTD.
CITY OF WHITEHORSE
AIRPORT
ALASKA HIGHWAY
SCHWATKA LAKE
HYDRO DAM
YUKON RIVER
WHITE PASS AND YUKON RAILROAD
STAKED
New Imperial Mines Ltd.
STAKED
New Imperial Mines Ltd.
STAKED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27



LEGEND FOR ISOMAGNETIC CONTOURS

THE PLANIMETRY FOR THIS MAP WAS OBTAINED FROM A PHOTO MOSAIC FURNISHED BY LEWES RIVER MINES LTD.

TOTAL MAGNETIC INTENSITY AT CENTRE OF SURVEY AREA APPROXIMATELY 57,000 GAMMAS WITH INCLINATION 77° NORTH.

FLIGHT ALTITUDE NORMALLY 200 FEET ABOVE GROUND.

FLIGHT LINE SPACING APPROXIMATELY 500 AND 1000 FEET.

BASE INTENSITY ARBITRARY.

- FLIGHT LINES AND PHOTO IDENTITY POINTS
- 500 Gammas
- 100 Gammas } ISOMAGNETIC CONTOURS
- Mag. Dep.
- IGNEOUS ROCKS / SEDIMENTARY ROCKS — INTERPRETED CONTACT
- MAGNETIC LINEAMENTS, POSSIBLE FAULTS
- POSSIBLE WARPING OF IGNEOUS ROCKS

LEWES RIVER MINES LTD.

WHITEHORSE AREA, YUKON

SURVEY GRID LOCATION PLAN

MILES 1/2 1/4 0 1/2 1 1-1/2 2 MILES

COMPILED FROM MAPS BY SEIGEL ASSOCIATES LTD.

inches 0 1 2 — centimetres 0 1 2 3 4 5

YUKON GEOLOGICAL SURVEY

This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.

FIG. 3.