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REPORT ON GEOCHEMICAL SURVEY

LINDSAY CLAIM GROUP

(Hidden Mineral,
Mineral Spring,
Gossan 1 - 2; 4 - 7
Mineral 1 - 16
Spring 1 - 16
M. S. 1 - 27; 31 - 38)

WHITEHORSE MINING DIVISION

YUKON TERRITORY

GEOLOGICAL SURVEY

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INTRODUCTION

This report presents the results of a geochemical soil survey and a geophysical magnetometer survey carried out on the Lindsay Claim group during August and September, 1966.

LOCATION

The Lindsay claim group is located approximately one mile south of Quiet Lake in the Yukon Territory. Quiet Lake is at an elevation of 2,630 feet immediately west of miles 49 and 50 on the Canol Road and approximately $1\frac{1}{2}$ miles west of the Nisutlin River. The Canol Road joins the Alaska Highway at mile 836, 81 miles southeast of Whitehorse. With reference to the National Topographic System the Lindsay claim group lies within subdivision 105 - C - 14.

DESCRIPTION OF FIELD AREA

The Lindsay claim group consists of 84 claims spanning a broad valley immediately south of Quiet Lake. To the east and west the claims overlap onto the gently sloping valley sides. The area is drained by a northward flowing stream and a well defined tributary. (Fig. 1)

Variations in relief in the claimed area are small and less than 500 feet. A large part of the area is underlain by flat-lying fluvio-glacial gravels which infill the valley extending southwards from Quiet Lake. These gravels extend from Quiet Creek westwards for approximately 7,000 feet. East of Quiet Creek, the ground surface rises to form a low hilly region separating the creek and Quiet Lake from the Nisutlin River valley. (Fig. 2)

Glacial overburden of variable thickness, predominantly gravels with some clays, covers the gentle hill slopes. The maximum thickness is unknown but may exceed 20 feet locally. In one trench east of Quiet Creek, bedrock is exposed at a depth of 3 feet. Outcrops are rare. The deepest overburden cover is in the area of fluvio-glacial gravels where thicknesses may exceed 100 feet.

GEOLOGY

Detailed geological relationships within the claim block are imperfectly known. On the regional scale, a large granodioritic body outcrops in the mountainous country to the west and has an irregular contact with undifferentiated sediments and volcanics which underlie the claim block. Limited outcrops in the eastern part of the claim block expose quartz schists and a serpentinized magnetite-bearing basic rock is exposed on the steep valley sides of the well incised Quiet Creek tributary. Elsewhere the bedrock geology is masked by glacial deposits.

ADDITIONAL FEATURES

Of geochemical interest is the occurrence of a mineral spring in swampy ground 3,500 feet east of Quiet Creek. The waters issuing from this spring contain very high contents of zinc and iron. The iron oxidizes when the waters emerge and a colloidal brown iron oxide scum covers the peat near the spring. Bulldozing in the vicinity of the spring has exposed a 3 - 6 foot thickness of glacial gravels cemented by iron oxides.

The waters of the spring give a strongly positive reaction with the cold extractable heavy metals kit and a sample of the iron oxide scum on analysis gave 1040 ppm Zn, 4 ppm Cu, 0 ppm Ag, and 0 ppm Pb.

In addition to the mineral spring occurrence, the Lindsay claim group also covers a northwesterly trending magnetic high zone outlined by government sponsored airborne surveys published as map 1345 G. This magnetic high zone is a prominent feature three miles in length having a maximum magnetic contrast of over 1100 gammas.

PROPOSED EXPLORATION PROGRAM

An exploration program was proposed to locate the position of any mineralized body contributing zinc to the groundwater flow. Since soil sampling had been used successfully in similar environments in the Dynasty area, geochemical

exploration was recommended to trace the dispersion of zinc. A ground magnetometer survey was also recommended to further explore the airborne anomaly and supplement the limited amount of geological information available.

Topographic relationships indicated that any mineralization source would likely occur within the catchment area of the spring. Consequently, the geochemical survey was restricted to an area lying east of Quiet Creek and enclosed by the higher ground surrounding the small tributary valley within which the spring is located. This outlined an area of low, rolling country where the overburden cover is minimal. Grid lines 400 feet apart were cut through this area and used for both the magnetometer and soil surveys. Traverses were extended along the base line and the claim staking lines to the extremities of the property.

The location of the mineral spring relative to the sampling grid is approximately 1 N, 150 E. A second spring is located at 8 N, 1300 W.

MAGNETOMETER SURVEY and INTERPRETATION

The results of the magnetometer survey are plotted on Fig. 3, and the magnetic features and interpretation by Wm. M. Dolan are presented on Fig. 4.

The survey was done using an Askania Torsion Balance magnetometer.

Inspection of the government airborne magnetic sheet 1345 G suggests a pattern outlined on the accompanying 1" = 1 mile sketch. (Fig. 5). The ground magnetic pattern trends to confirm this interpretation.

Two distinct rock types are recognized from the ground magnetics and their aerial distribution is shown on Fig. 4. These rock groups have been categorized on this map from the limited geological information available.

A set of faults and fractures are deduced in the general vicinity of the mineral spring. One fault is prominent and strikes northwesterly through coordinate 00 N, 20 W. Along the northeast side of this fault and essentially defining it, occur a series of narrow magnetic highs suggesting a very local concentration of several per cent magnetite.

The susceptibility of the rock unit indicated as quartz sericite schist averages about 1000×10^{-6} relative to the rocks lying to the north. This suggests a unit concentration of about $\frac{1}{2}\%$ magnetite.

GEOCHEMICAL SURVEY

A poorly developed podzolic profile is present in the freely-drained soils within the soil survey area. In this soil environment, collection of samples from the B and C horizons below the leached A_2 horizon will indicate the presence of metal in bedrock at shallow depth, in glacial till derived from a mineralized zone and in overburden soaked by metal bearing groundwaters flowing close to surface. Where these conditions are not satisfied, metals may be brought to surface from depth via the biogeochemical cycle and deposited in the humic A_0 horizon.

The freely-drained soils in the grid area were sampled at two depths based on the reasoning outlined above:-

1. At a depth of 0 - 3" collecting material from the A_0 horizon only.
2. At a depth of 30" collecting material from the B or C horizons (A preliminary examination of profiles in the field area indicated that the A_2 horizon attained a maximum thickness of 24").

In the limited areas of poor drainage, the soil profile development consists of approximately 12" of peat overlying an impervious layer of grey gravelly clay. Previous experience in this type of environment has indicated

a selective concentration of metals in the upper clay layer underlying the peat. Sampling of this upper clay layer, in addition to the surface 0 - 3" of peat, was recommended in the poorly-drained soils, but this was often impracticable because of the presence of permafrost.

The samples collected were analysed for total Pb and Zn by Barringer Research Limited, of Toronto, using atomic absorption and colorimetric techniques following a perchloric acid digestion. The results of the survey are plotted on 4 maps as follows:-

Fig. 6	Total zinc	Sample Depth	0 - 3"
Fig. 7	Total zinc	Sample Depth	30"
Fig. 8	Total lead	Sample Depth	0 - 3"
Fig. 9	Total lead	Sample Depth	30"

GEOCHEMICAL RESULTS

a) Total Zinc, Sample Depth 30"

The range of zinc values in samples collected at a depth of 30" is 43 to 288 ppm. In general the geochemical relief is low and no broad contrasting patterns are present. However, the distribution of higher values (in excess of 110 ppm Zn) indicates the presence of linear zones coinciding to a large degree with the fault and fracture traces deduced from the magnetic interpretation. One of these zones extends from 20 S, 900 W to 8 N, 2700 W and is coincident with the most prominent interpreted fault and associated small magnetic anomalies. A parallel zone, passing through 0, 00 is roughly coincident with a second, less prominent magnetic zone. The highest values along this trend occur in the vicinity of the mineral spring.

On the linear extension of interpreted cross fractures in the vicinity of the mineral springs are additional high geochemical zones trending in a north-easterly direction.

The coincidence of geochemical and magnetic features strongly suggests that the data is reflecting bedrock conditions.

Although the presence of significant economic mineralization in the suboutcropping bedrock is not indicated, the association of higher zinc values with fracture zones in the bedrock suggests the presence of leakage anomalies which could be related to mineral occurrences at depth.

b) Total Zinc, Sample Depth 0 - 3"

The range of total zinc values in this horizon ranges from 15 - 550 ppm. The general geochemical relief is low with the highest values occurring near the mineral springs. Northwesterly trending zones paralleling those indicated by the deeper samples do occur, and are indicated by values in excess of 100 ppm Zn. The most prominent zone passes through the area of the mineral springs and is partly coincident with the higher zinc values at the 30" depth. A parallel zone is also indicated passing through 24 N + 00.

c) Total Lead, Sample Depth 30"

The lead content of these deeper samples ranges between 9 and 125 ppm. The higher values in excess of 30 ppm Pb show an erratic distribution and the two most prominent trends are in part, coincident with the two northwesterly trending magnetic zones. The higher lead values along these trends occur to the southeast of the zinc zones previously described. No features are present which are indicative of significant lead mineralization in the suboutcropping bedrock.

d) Total Lead, Sample Depth 0 - 3"

The range of lead values at this depth is 1 - 175 ppm. Values in excess of 30 ppm Pb are relatively rare and for the most part geochemical relief is negligible. The highest value of 175 ppm occurs close to the larger mineral spring. The concentration of higher values along lines 28 N and 30 N reflect a pattern more characteristic of a normal geological condition rather than a dispersion pattern developed over or near mineralization.

GEOCHEMICAL INTERPRETATION

In the foregoing sections it has been noted that none of the observed geochemical patterns are considered to be indicative of economic concentrations of lead or zinc in the suboutcropping bedrock. The coincidence of the higher geochemical values with fault and fracture zones interpreted from the magnetic data is strongly suggestive of the presence of leakage anomalies which may be related to mineralization at depth.

The high anomalous zinc content of the groundwaters issuing from the mineral spring could be derived from mineralization at depth occurring along or intersected by the fracture zones.

From the geochemical information collected it is not possible to suggest whether any mineralization occurring at depth is in the form of veins or more irregular replacement bodies. The high iron content of the spring waters does indicate that any zinc mineralization may be accompanied by oxidizing iron sulphides.

In the Dynasty area to the north where large tonnages of replacement lead-zinc-silver mineralization have been proved in areas of similar geology, individual orebodies have contrasting magnetic characteristics. Where the lead and zinc sulphides are associated with pyrite, the orebodies have no magnetic expression. When these sulphides are associated with pyrrhotite however, magnetic anomalies are prominent.

It follows, therefore, that the absence of magnetic bodies at depth in the vicinity of the Quiet Lake mineral spring does not rule out the possibility of zinc-bearing pyritic bodies occurring in the deeper bedrock.

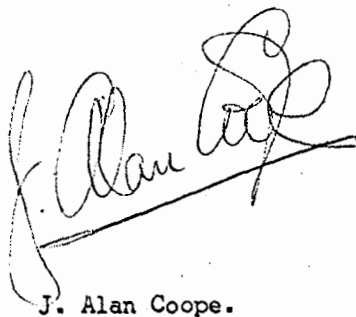
CONCLUSIONS and RECOMMENDATIONS

The combined information obtained from a study of the Lindsay Option claim group indicates the possibility of zinc-bearing mineralization occurring at depth. There is

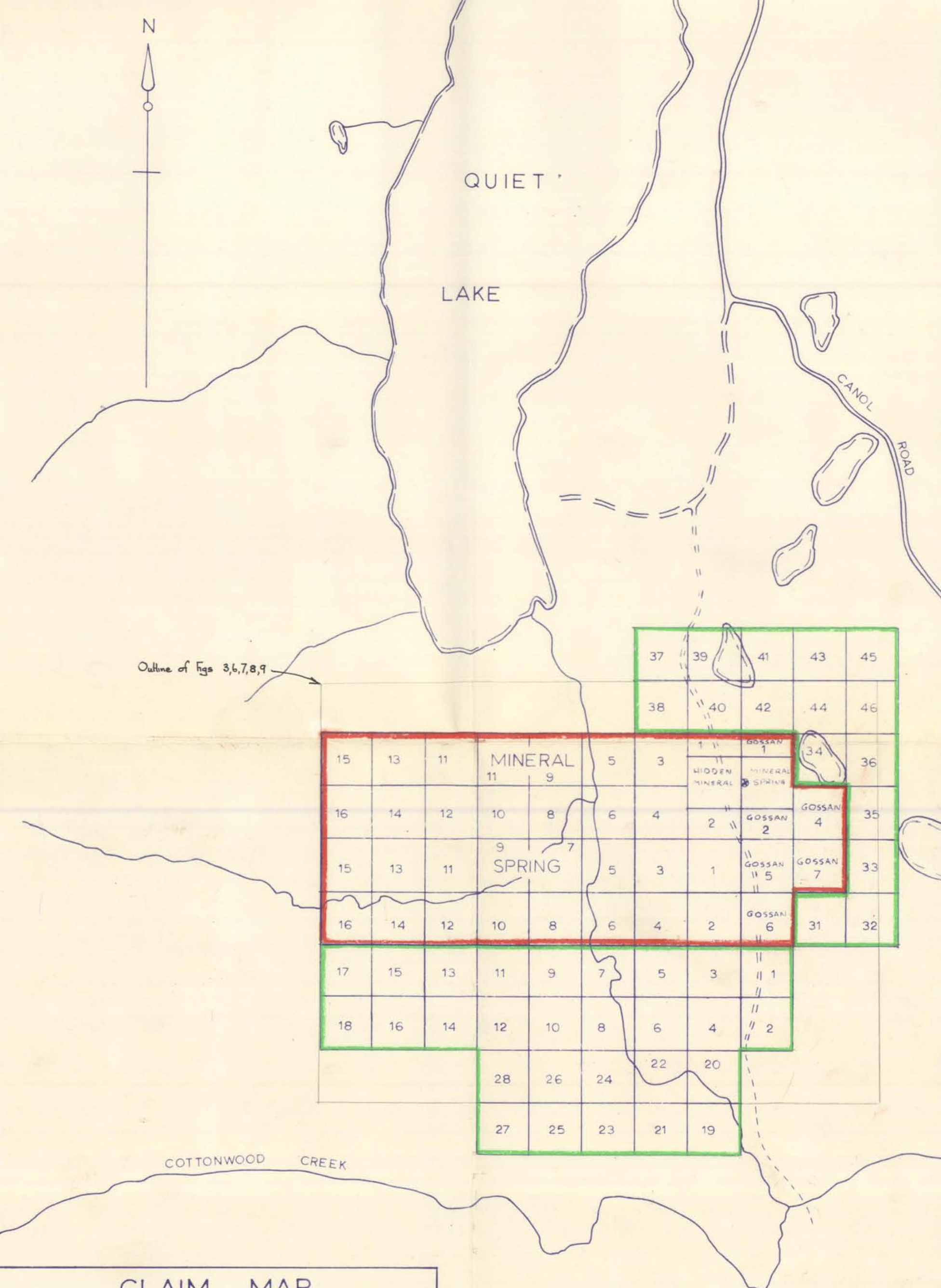
no direct indication of the size or nature of this possible mineralization. The structural and general geological environment is similar in many respects to that occurring in Dynasty area.

Further exploration in the Quiet Lake area is recommended to explore the near-surface layers of bedrock for large sized conducting bodies. The most satisfactory method for such an examination is considered at this time, by Dolan, to be a carefully planned Turam E - M survey. Such a survey should be capable of detecting a five million ton, globular shaped conductor to a maximum depth of between 300 and 400 feet. It is doubtful if a mineralized body of this size having a grade similar to those proved in the Anvil district will prove to be an economic proposition if present at a greater depth than 400 feet.

The Turam survey could be carried out along the survey lines already present on the Lindsay Option property, although an additional 12,000 feet of cross lines will be required.



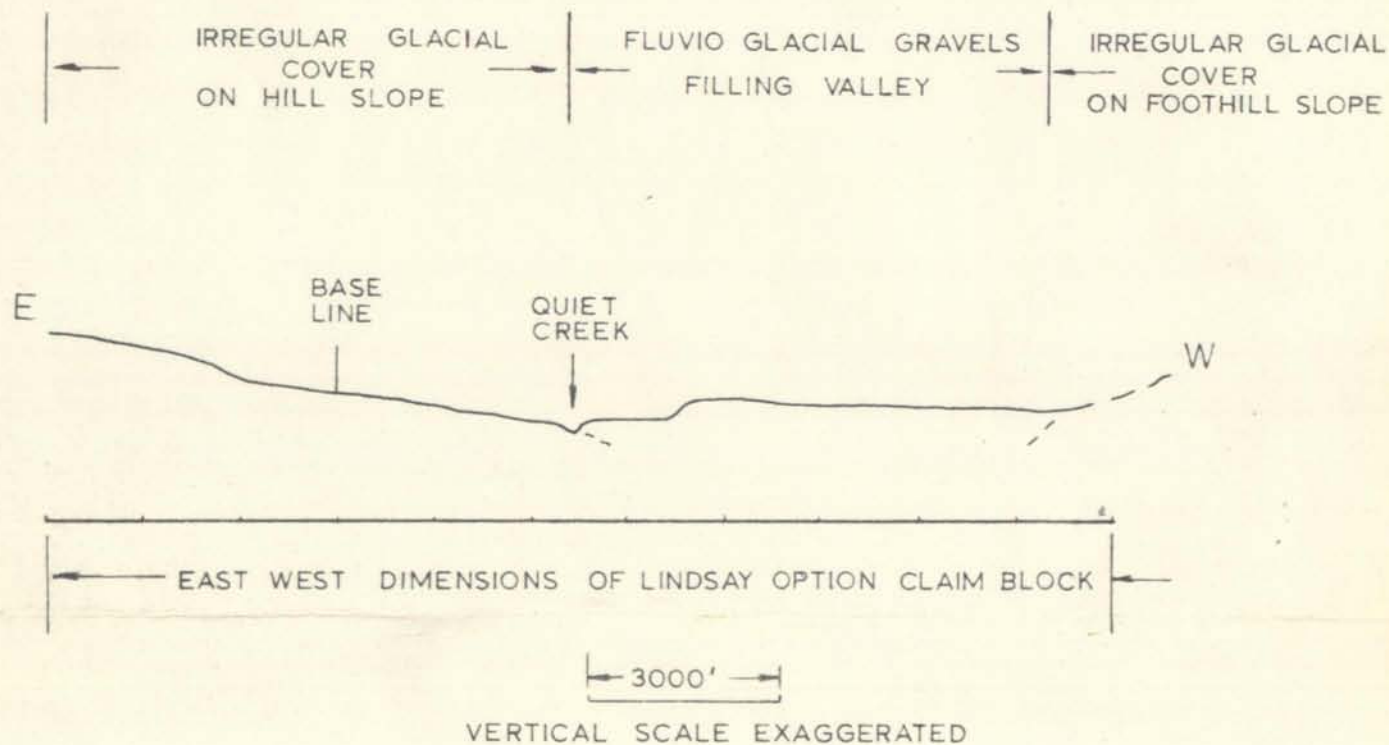
J. Alan Coope.



CLAIM MAP LINDSAY OPTION, YUKON NTS (105-C-14)

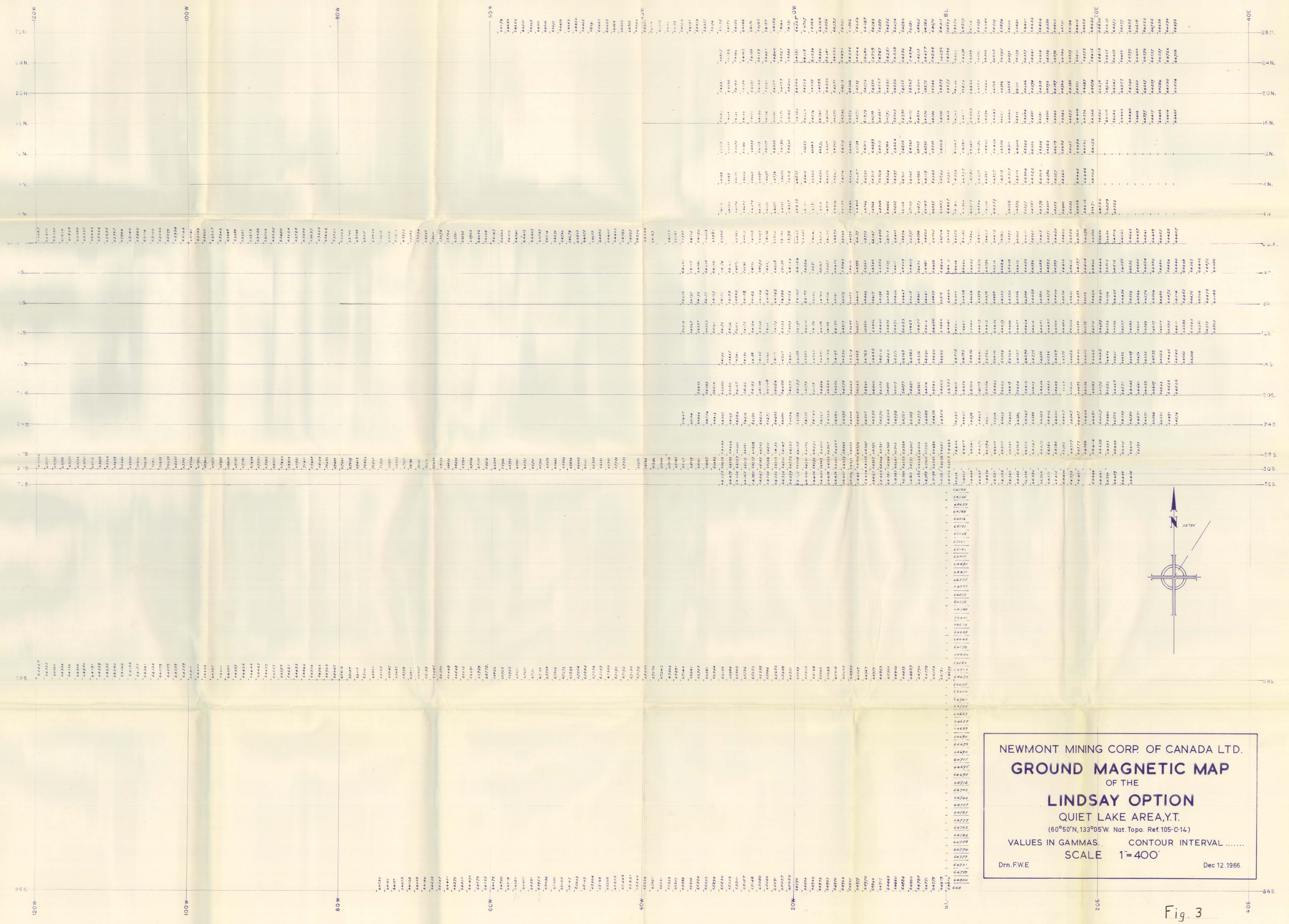
- LINDSAY CLAIMS
- NEWMONT M.S. CLAIMS
- * LOCATION OF MINERAL SPRING
- SCALE 1" = 1/2 MILE

Fig. 1



DIAGRAMMATIC SECTION ACROSS LINDSAY OPTION CLAIM
BLOCK ALONG STAKING LINE OF SPRING CLAIMS

Fig.2



NEWMONT MINING CORP. OF CANADA LTD.
GROUND MAGNETIC MAP
OF THE
LINDSAY OPTION
QUIET LAKE AREA, Y.T.
(60°50'N, 133°05'W. Nat. Topo. Ref. 105-C-14)
VALUES IN GAMMAS. CONTOUR INTERVAL
SCALE 1"=400'
Drn.FWE Dec 12.1966.

Fig. 3

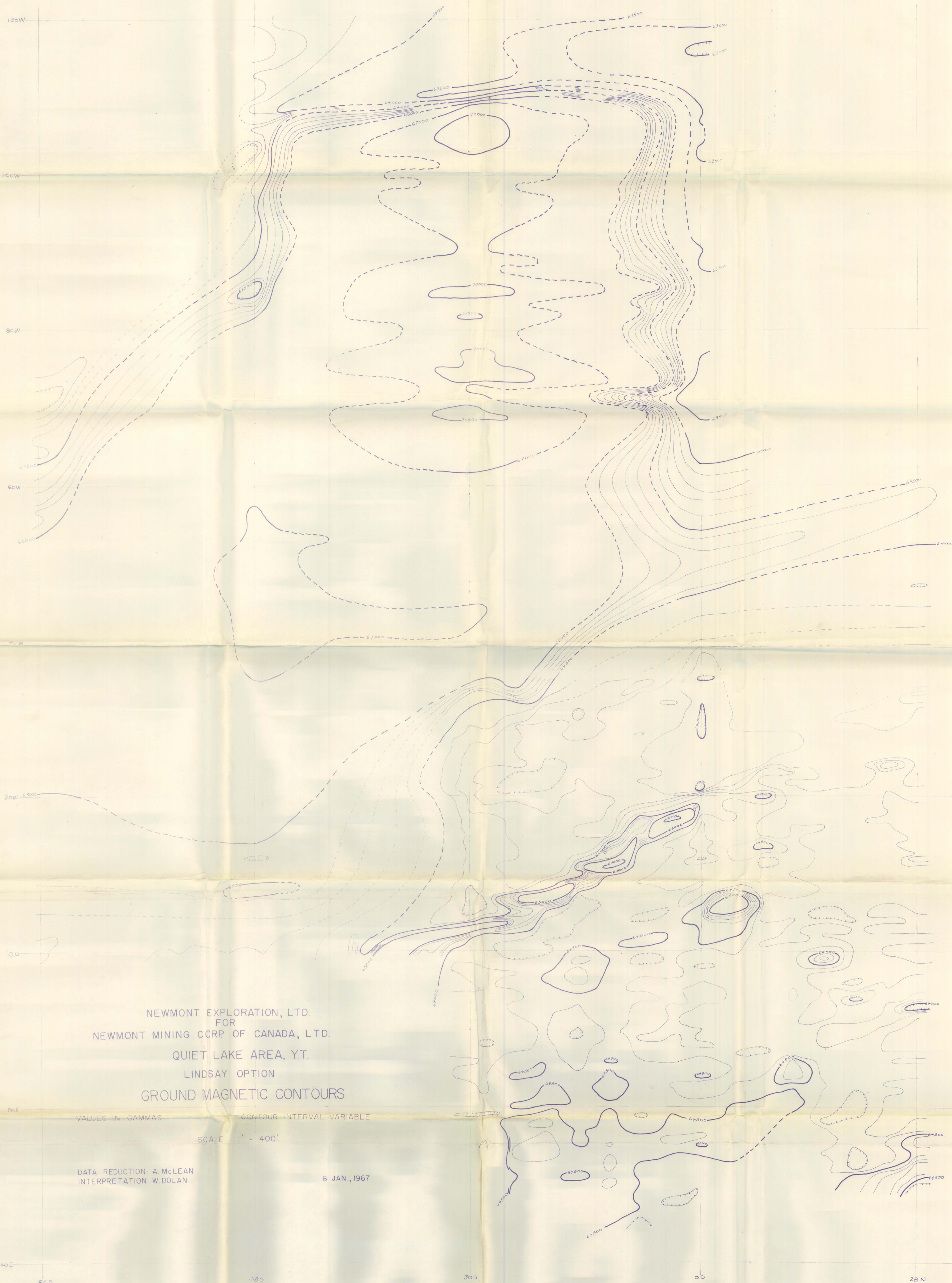
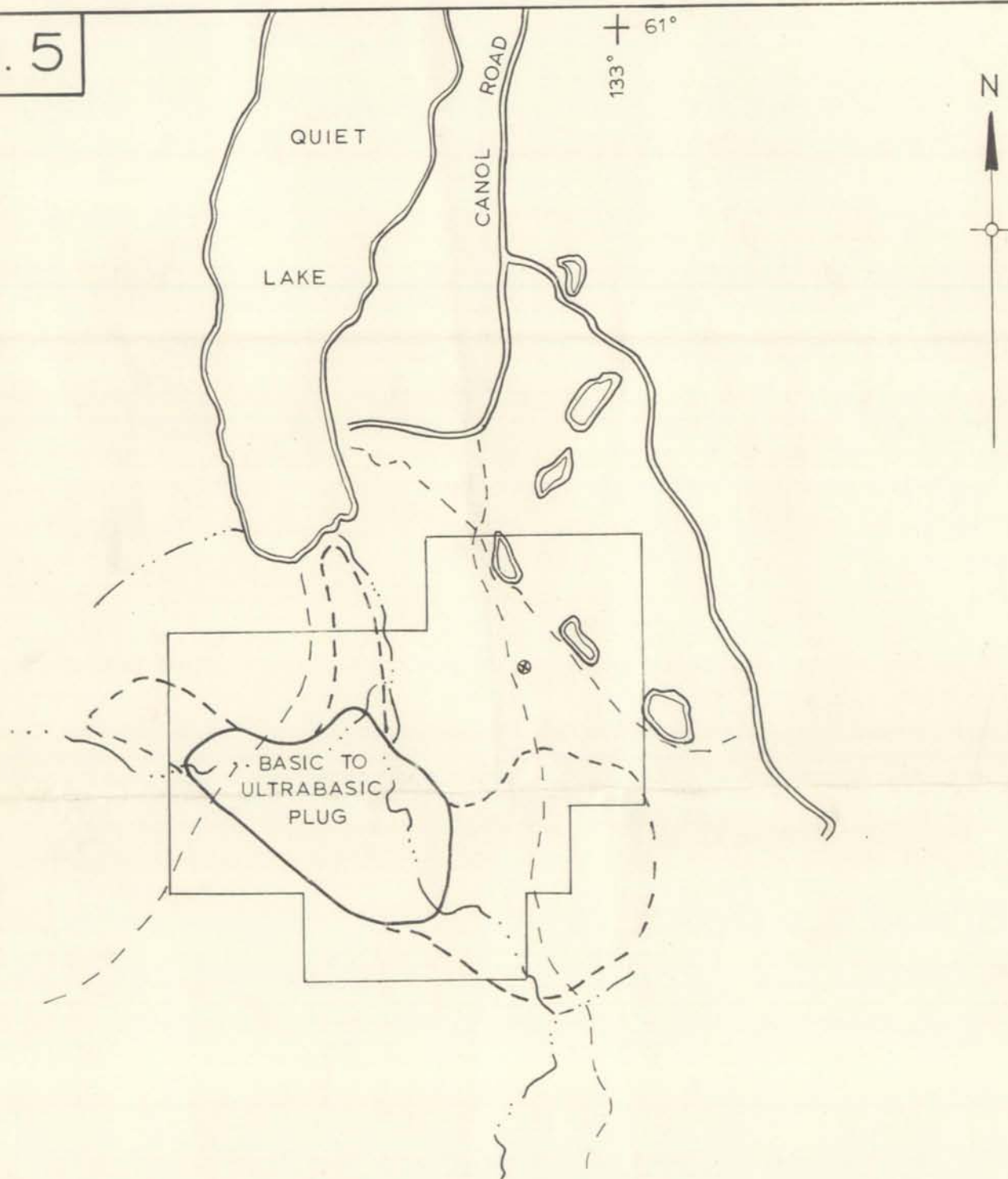


Fig. 4

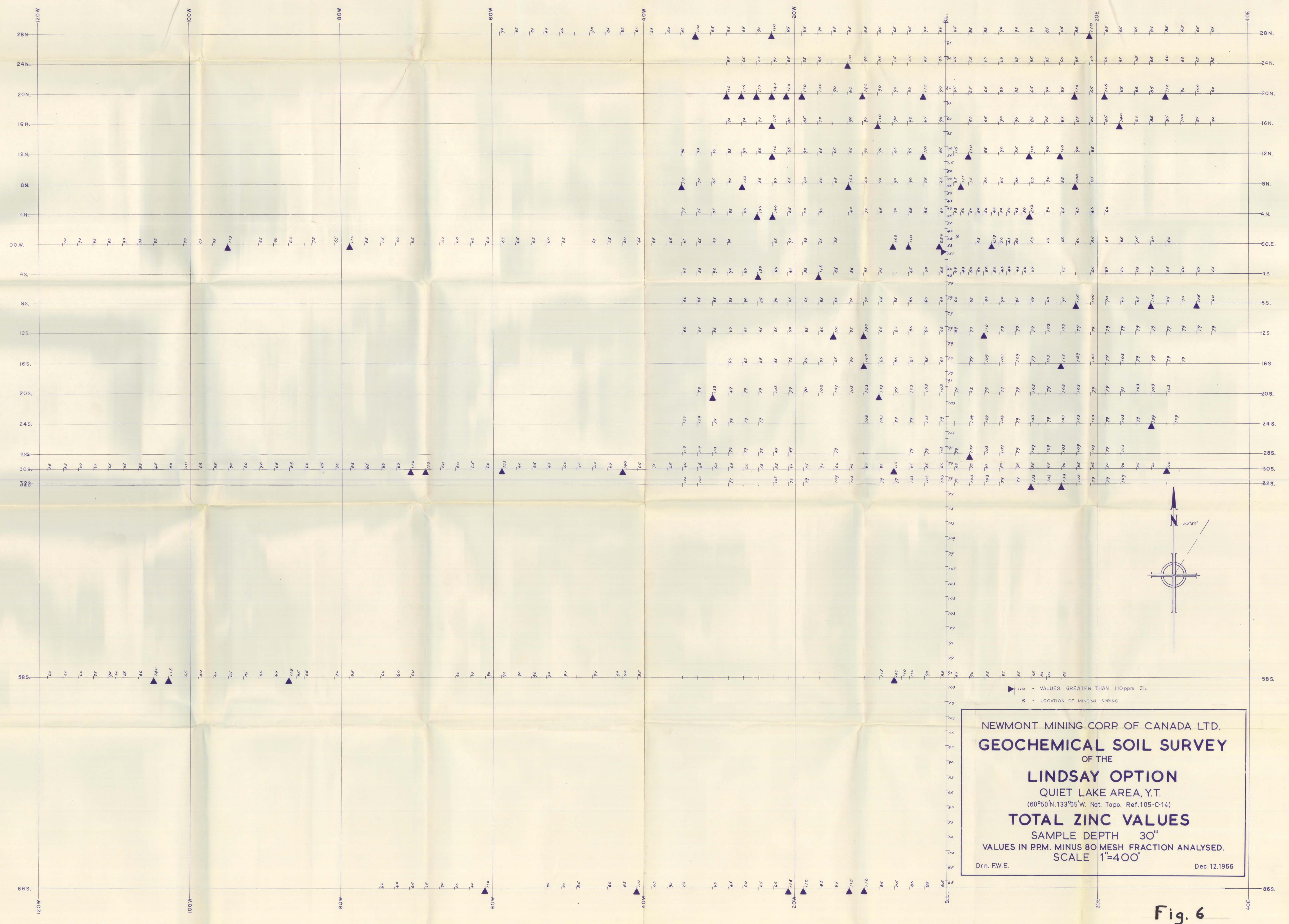
Fig. 5



GENERAL INTERPRETATION OF AIRBORNE MAGNETICS
LINDSAY OPTION CLAIM GROUP

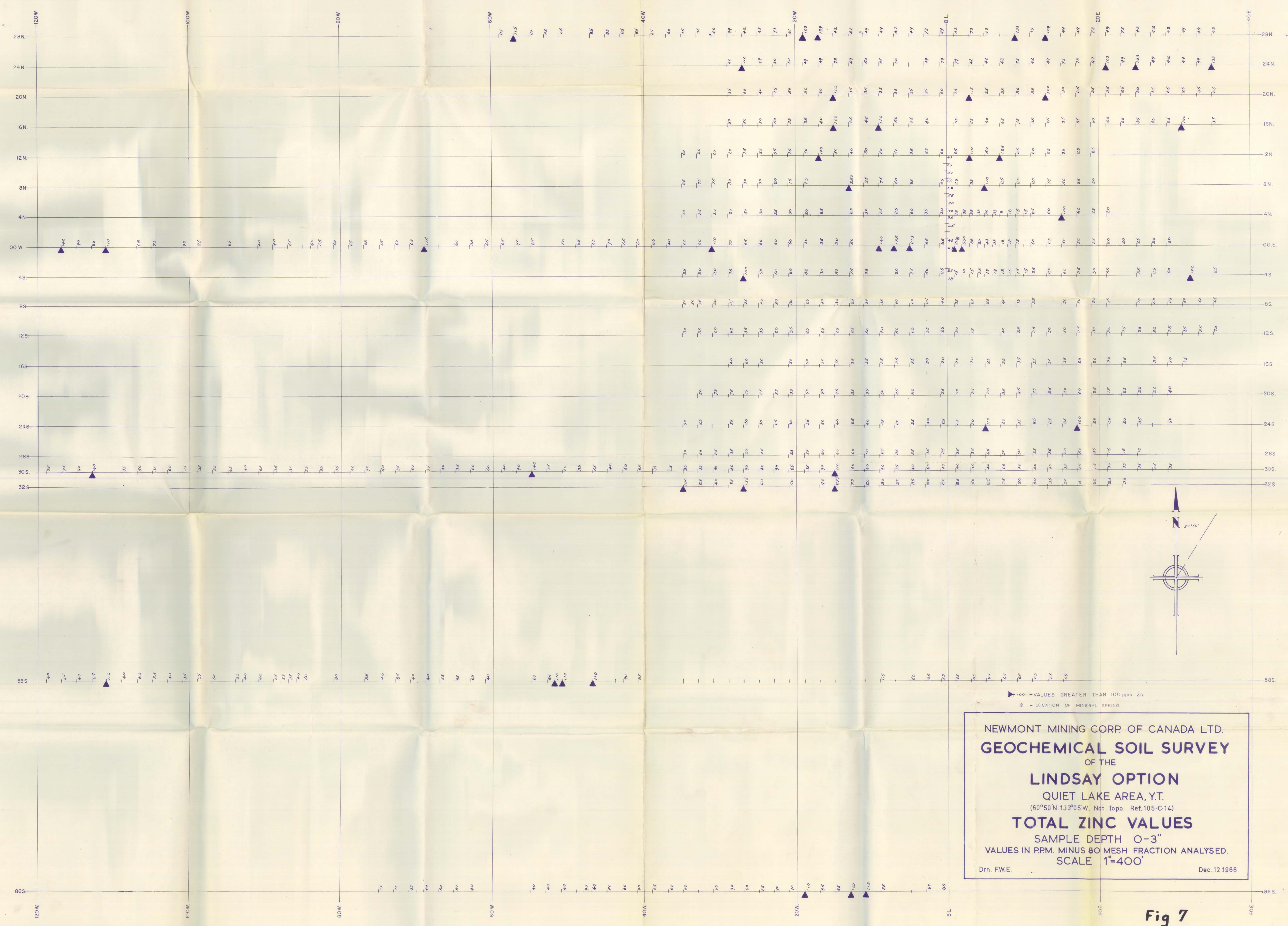
-  OUTLINE OF CLAIM GROUPS
-  LOCATION OF MINERAL SPRING
-  OUTLINE OF AREAS OF POSSIBLE SIGNIFIGANCE ASSOCIATED WITH BASIC PLUG

SCALE: 1" = 1 mile



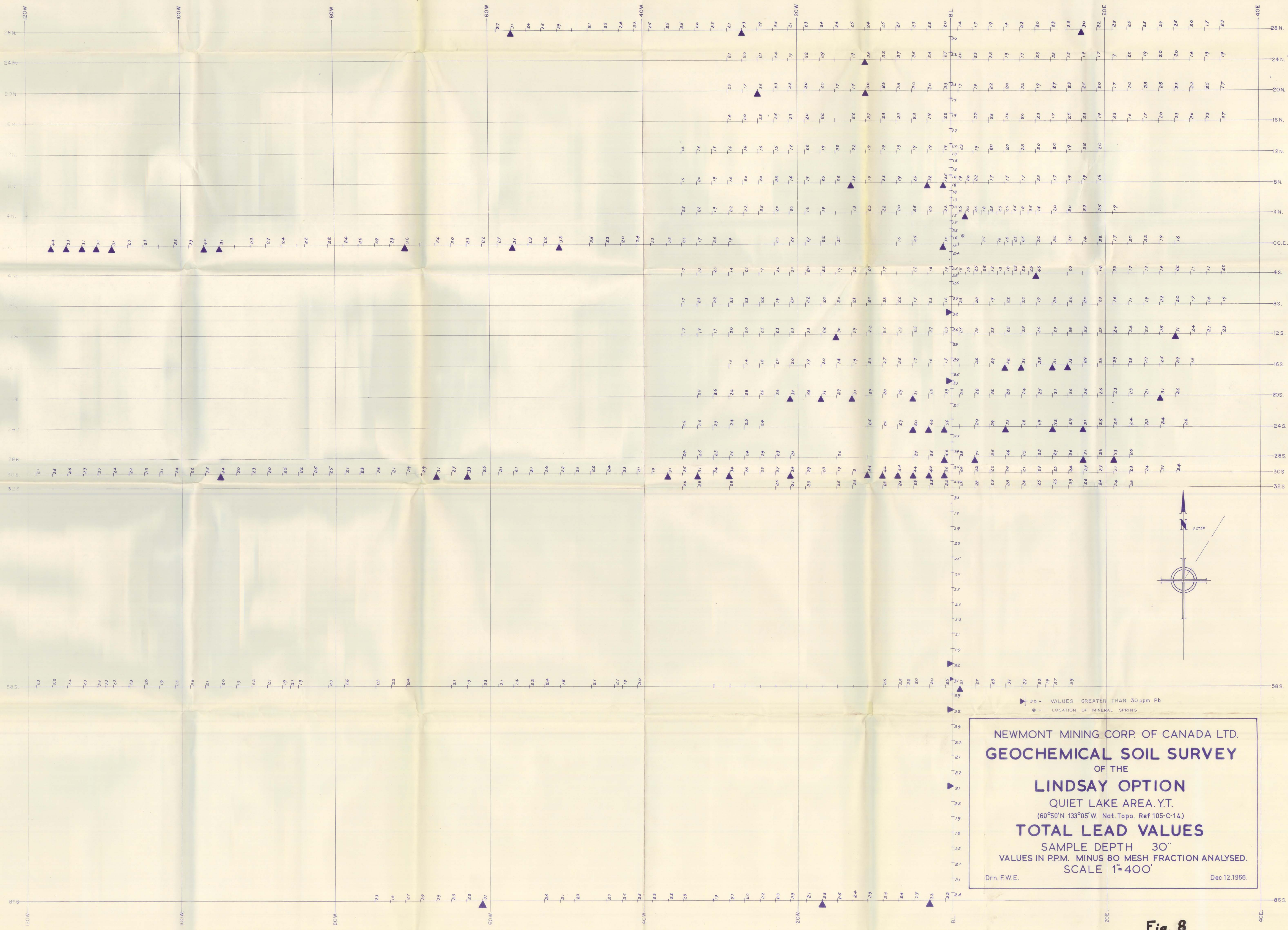
NEWMONT MINING CORP. OF CANADA LTD.
GEOCHEMICAL SOIL SURVEY
OF THE
LINDSAY OPTION
QUIET LAKE AREA, Y.T.
(60°50'N.133°05'W. Nat. Topo. Ref.105-C-14)
TOTAL ZINC VALUES
SAMPLE DEPTH 30"
VALUES IN PPM. MINUS 80 MESH FRACTION ANALYSED.
SCALE 1"=400'
Drn. F.W.E. Dec.12.1966

Fig. 6



NEWMONT MINING CORP. OF CANADA LTD.
GEOCHEMICAL SOIL SURVEY
OF THE
LINDSAY OPTION
QUIET LAKE AREA, Y.T.
(60°50'N. 133°05'W. Nat. Topo. Ref. 105-C-14)
TOTAL ZINC VALUES
SAMPLE DEPTH 0-3"
VALUES IN PPM. MINUS 80 MESH FRACTION ANALYSED.
SCALE 1"=400'
Drn. F.W.E.
Dec. 12. 1966.

Fig 7



NEWMONT MINING CORP. OF CANADA LTD.
GEOCHEMICAL SOIL SURVEY
OF THE
LINDSAY OPTION
QUIET LAKE AREA, Y.T.
(60°50'N, 133°05'W, Nat. Topo. Ref. 105-C-14)
TOTAL LEAD VALUES
SAMPLE DEPTH 30"
VALUES IN P.P.M. MINUS 80 MESH FRACTION ANALYSED.
SCALE 1"=400'
Drn. F.W.E.
Dec 12, 1966.

Fig. 8

