# GEOPHYSICAL & GEOLOGICAL EXPLORATION

of

# THE JIM, PAT, CHRIS & A.T.S. MINERAL CLAIMS

LOCATED ON CLAIM MAP #105K-3

at

62° 13' N. - 133° 15' W.

VANGORDA CREEK AREA, YUKON TERRITORY


by

R.A. Granger

Supervised by

Albert F. Reeve, P.Eng.,
Geological Engineer


PROFESSIONAL PROVINCE OF A. F. REEVE BRITISH COLUMBIA ENGINEER

A F Reeve

February to November, 1966

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## INTRODUCTION

This report is based on a programme of geological and geophysical investigations carried out by Arlington Silver Mines Ltd. on a group of 70 claims and fractional claims in the Vangorda Creek area of the Yukon Territory in 1966. It has been compiled and written by R.A. Granger under the general supervision of Albert F. Reeve, P.Eng., geological engineer. It is submitted to the Mining Recorder of the Whitehorse Mining District to satisfy assessment work requirements on the claims described for a period of two years. A set of geological and geophysical maps are enclosed in the back cover and a certificate of the supervising engineer's qualifications is included in the appendix.

This work was carried out during the period of February to November, 1966 by the following persons:

- White, Hosford & Impey - line cutting contractors
  Whitehorse, Y.T.
- Granger, R.A. - Geophysical Contractor
  400, 837 W. Hastings St., Vancouver 1, B.C.
- Hay, R.G. - Geologist
  c/o R.A. Granger
- Winton, John - Geophysical Technician
  c/o R.A. Granger
- Coyne, Jim - Geophysical Technician
  c/o R.A. Granger

## WORK DONE

1. Line cutting and surveying

   a) 4.24 miles of base line was cut and surveyed.

   b) 60 miles of picket line was cut and chained.

   c) All claim posts were tied to points on the line grid.

2. Geology - All major outcrop areas on the property were examined and tied to the grid system.

3. Geophysics.

   a) Magnetic survey - 60 line miles of magnetic observations were taken at 100' intervals on lines 400' apart.

   b) Electromagnetic survey - 75 line miles of electromagnetic observations were taken at 100' intervals on lines 400' apart.

PROPERTY

| Name of Claim | Number | Record Date |
|---|---|---|
| Chris # 1 to #34 | 93838 to 93871 incl. | Nov. 10, 1965 |
| Jim #1 to #8 | 94438 to 94445 incl. | Nov. 22, 1965 |
| Jim 9 - 16 | 94574 - 94581 | Nov. 24, 1965. |
| Jim #17 to #22 | 94582 to 94587 incl. | Nov. 24, 1965 |
| ATS #1 to #4 | Y 4952 to Y 4955 incl. | April 25, 1966 |
| ATS #9 & #10 | Y 4956 and Y 4957 | April 25, 1966 |
| ATS #5 to #8 | Y 10849 to Y 10852 incl. | Oct. 26, 1966 |
| ATS #9 & #10 | Y 8970 and Y 8971 | July 13, 1966 |
| ATS #1 F | Y 10848 | Oct. 26, 1966 |
| ATS #11 | Y 10853 | Oct. 26, 1966 |
| Pat #1F to #8F | Y 3006 to Y 3013 incl. | March 16, 1966 |

Total number of full sized Claims - - - - - - 61

" " " fractional Claims - - - - - - 9

70

All of the above claims are held by:
Arlington Silver Mines Ltd.,
809, 525 Seymour Street,
Vancouver, B.C.

The claims have been grouped in blocks of not more than 16. Form E, Sect. 52, Yukon Quartz Mining Act, and applications have been made for certificates of work, Form C, Sect. 53.

## LOCATION

The claims are located 35 miles N.W. of the community of Ross River, approximately at 62 13' N. latitude and 133 15' W. longitude between 2400' ASL and 4000' ASL. The property extends from Blind Creek to Vangorda Creek along the SW flank of Sheep Mountain.

## ACCESS

Ross River is accessible from Whitehorse via the Alaska Highway and Canol Road. (about 200 miles).

From Ross River the claims are reached by travelling about 35 miles N.W. of Ross River, with 4-wheel drive transportation, to a point on the S.W. bank of the Pelly River, at a ferry crossing. A rough access road, constructed by Arlington Silver Mines, extends from a point near the crossing (Blind Creek Bridge) to a central point on the property. The exploration work was carried out from a base camp on the property. Helicopter access was occasionally required.

## TOPOGRAPHY

The northern part of the property is occupied by steep slopes on the side of Sheep Mountain and a rounded ridge which paralells the south bank of Vangorda Creek. Southward the claims extend onto a gently rolling bench about 300' above the Pelly River.

## REGIONAL GEOLOGY

The geology of the surrounding region is described on G.S.C. Map #13-1961 - "Tay River".

The structural and stratigraphic relationships of the various rock units are described as follows:

### Table of formations

Quaternary - unconsolidated glacial and alluvial deposits.
- unconformity -

Tertiary - felsic to intermediate volcanic flow rocks, flat lying.

Tertiary - intermediate plutonic rocks
- intrusive contact -

Paleocene - clastic sediments
- unconformity -

Cretaceous - intermediate plutonic rocks
- intrusive contact -

Mississippian ** - Meta sediments and minor volcanic rocks. Included in this assemblage are a group of meta sediments in which a number of important Pb Zn sulphide occurrences have been found.

These consist of banded skarn and quartz granulites, micaceous and chloritic phyllites, hornfels and minor andesite and crystaline limestone. (Unit 7 G.S.C.)

Table of Formations (cont'd.)

Devonian, Silurian, Ordovician and Cambrian

- sedimentary and meta sedimentary rocks.

Proterozoic - meta sediments and minor volcanic rocks.

## LOCAL GEOLOGY

Geology of the claim group is shown on a 1" = 1000' geological map (Fig. 2) in the back cover.

Table of formations:

1. Basic intrusives - diorite to serpentenized peridotite

   \- intrusive contact -

2. Interbedded chert and shale + (intermediate volcanic flow rocks?)

3. Quartz mica schist, quartz sericite schists and minor crystalline limestone.

## LITHOLOGY

1. The intrusive complex appears to grade in composition from diorite to gabbro to peridotite without sharp contacts. The distribution of magnetic accessory minerals in the more mafic parts is somewhat irregular. Alteration is geneally of moderate intensity. Fine calcite stringers and quartz veins up to 3' in width accompanied by fine irregular chalcopyrite disseminated in the wall rock, occur in the serpentenized areas. Else where these features are much weaker.

   The appearance of some dioritic phases in this unit vaguely suggest a possible volcanic origin.

2. Chert beds are generally massive and undeformed. Intercalations of shale are thinly bedded and brick red in colour.

3. Quartz mica schist is the most prominent representative of the meta sedimentary assemblage. The mica is commonly sericitic. There are several broad, poorly defined horizons in which the micaceous minerals are white non sericitic types accompanied by lesser amounts of biotite. Narrow bands of graphitic quartz mica schist were observed at two locations. The grade of metemorphism is in the "spotted slate" range.

Small quartz veins occur occasionally in this unit. A large vein of smokey grey quartz was found in a trench on line 20 N. south of the base line.

## Structure

The strongest structure on the claims is N.W. trending N.E. dipping feature along which the intrusive rocks have been emplaced. Where it passes through Unit 2 there are irregular breccia zones and in Unit 3 a weak skarn-like alteration. It is suggested that this may be an oblique branch of the Tintina fault zone which lies west of the property.

The foliated rocks have a general N.W. trend excepting areas of suspected drag folding in Unit 3.

# GEOPHYSICS

## Method

### A. Magnetic Survey

A Sharpe MF-1 flux gate magnetometer was used to observe the verticle component of the total magnetic field.

An arbitrary instrument datum of about 750 gammas was chosen by making a trial reconnaissance traverse over an area of low magnetic relief (i.e. quartz sericite schists). The latitude of the instrument was then mechanically adjusted to the datum. Magnetic observations were then taken at 100' intervals on grid lines 400' apart. In areas of high magnetic relief readings were taken at closer intervals (25' and 50').

All magnetic data was corrected for diurnal and daily variations with respect to time, by referring to a system of base stations. Corrections were made to the nearest 10 gammas in the most sensitive readout scale range of the instrument, and to the nearest 20 gammas in coarser ranges.

Sample Calculation

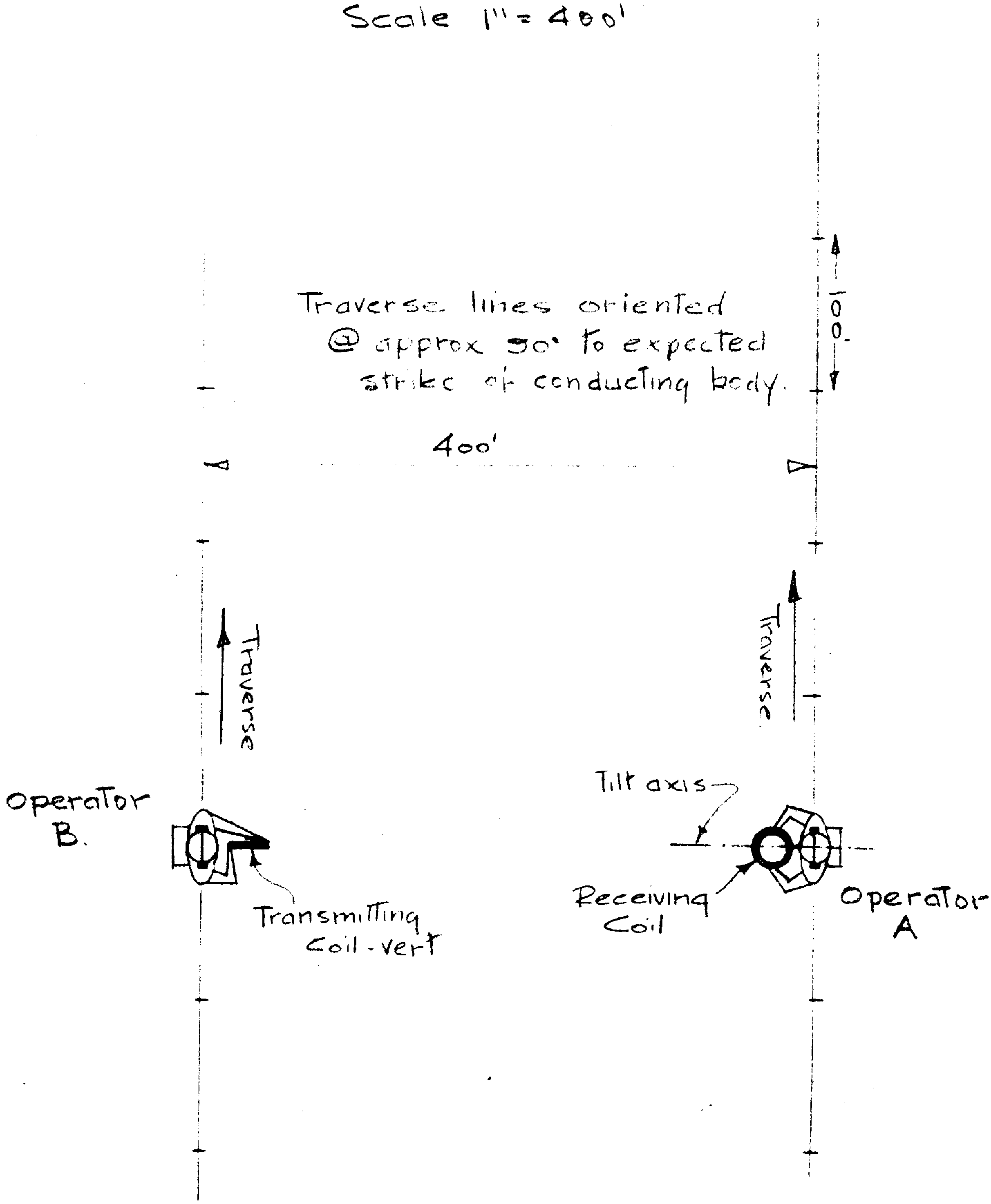
| Station | Reading | Diurnal Correction | Daily Correction | Result | Time |
|---|---|---|---|---|---|
| base | 780 | + 0 | -40 | 740 | 2:00 p.m |
| 1 | 800 | + 0 | -40 | 760 | |
| 2 | 850 | +10 | -40 | 820 | |
| 3 | 870 | +10 | -40 | 840 | |
| 4 | 910 | +20 | -40 | 890 | |
| 5 | 890 | +20 | -40 | 870 | |
| 6 | 840 | +30 | -40 | 830 | |
| base | 750 | +30 | -40 | 740 | 2:30 p.m |

The corrected magnetic results were plotted and contoured on a 1" = 400' plan (See Figs. 3 & 4).

Fig 1-A

# ORIENTATION DIAGRAM
for
SHARPE SE-300 E.M. EQUIPMENT
"BROADSIDE" RECON. METHOD

Scale 1" = 400'



B. <u>Electro Magnetic Survey</u>

Sharpe SE 300 electromagnetic survey equipment was used to make EM observations at 100' intervals on lines 400' apart.

This equipment consists of 2 identical units, each having a coil capable of transmitting and receiving oscillating magnetic field signals of 400 cps. and 1600 cps.

There are several ways (or configurations) in which the two units can be used to produce useful EM data.

In this case a <u>reconnaissance</u> method known as the "<u>broadside" configuration</u> was employed. This method is illustrated on Figure 1A. Operator B generates a cyclic magnetic field signal with the transmitting coil. Operator A receives this signal and "nulls" it by tilting the receiver coil. If there are no conductors, such as sulphide bodies, graphite zones, or confined ionic waters, in the near vicinity of the operators, the angle of tilt of the receiving coil will be near $0^{\circ}$. However, if such a conducting body is cut by the varying magnetic field of the transmitter, electrical currents will be produced which in turn will set up a secondary magnetic field of like frequency. When this occurs the resultant of the original and secondary fields will cause the receiver coil to null at anomalous $\pm$ tilt angles.

In the broad side method the operator s traverse in parallel directions, successively occupying directly opposite stations. At each station operator B transmits and A receives, then the procedure is reversed.

Tilt angles are recorded and plotted at the receiving station. In this way two lines of data are accumulated on a single traverse. Anomalous results indicating a conductor consist of a series of high positive tilt angles followed by a "cross-over" and a group of negative angles.

Tilt angles in this case were plotted directly and did not require mathematical reduction. The 1600 cps frequency was used for this work.

Sample of Field Data

| Trans. Station | Rec. Station | Tilt Angle 400 cps. | Tilt Angle 1600 cps. | Remarks |
|---|---|---|---|---|
| 45, 1E | 85, 1E | | $0^{o}$ | - |
| 85, 1E | 45, 1E | | $+ 1^{o}$ | - |
| 45, 2E | 85, 2E | | $- 2^{o}$ | flat |
| 85, 2E | 45, 2E | | $+ 1^{o}$ | rock |
| 45, 3E | 85, 3E | | $- 2^{o}$ | steep slope |
| 85, 3E | 45, 3E | | $+ 2^{o}$ | Claim post |

Tilt angle profiles are shown on Figures 4 & 5; 1" = 400' scale electromagnetic survey plans.

Anomalous areas indicated by the reconnaissance broad side method were checked by using more detailed procedures. Areas in which check work was done are indicated as A-1, 2, 3, etc. and B-1, 2, 3 etc. on the electromagnetic survey plans.

**RESULTS** Results of the integrated geological and geophysical investigations are described below as A - Geological, and B - Economic.

A. The results of outcrop mapping and magnetic survey work are shown on Fig.(2). This suggests a N.W. trending N.E. dipping structural fabric which is obliquely cut by a fault zone along which basic intrusive rocks have been emplaced. The intrusive rocks are marked by relatively strong (to + 5000$\gamma$) magnetic highs. While the magnetic properties of the intrusive rocks are somewhat inconsistent they are sufficient to indicate a well defined pattern which is generally confirmed by rock exposures. Additionally the shape of EM profiles confirm altitude of the rock seen in outcrop.

B. A number of EM and magnetic anomalies suggest possible economic exploration targets. These occur principally on the southwest portion of the property which is underlain by Unit 3 (see Fig. 2).

Reconnaissance EM work indicates a number of conductive anomalous areas rather than well defined individual conductors. Some of these areas have been checked by detailed dual frequency methods and appear to consist of complex systems linear of conductors.

A number of these conductors are known graphitic schist horizons. This was confirmed on Line 20N near the base line where a 4' graphite zone was uncovered by trenching on an EM conductor. No anomalous magnetic relief was associated with this particular conductor.

Moderate magnetic relief of 100 to several hundred gammas is associated with some EM anomalies particularly on the SE end of the property. The most prominent of these are numbered (see Fig. 6) A-1, A-3, A-2 and A-5. A-1 is a very strong EM feature as indicated by reconnaissance results. Detailed work in this area, using shorter coil separations, gave weaker results. This suggests that the source must be buried by at least 50' of overburden.

CONCLUSIONS

1. The suggested fault zone and associated intrusive masses indicated by the magnetic survey may constitute a possible channel by means of which economic mineralization has been introduced into the area.

2. It is significant that a number of EM conductors occur in rock unit #3. This formation consists principally of phyllitic meta sediments composed of quartz and sericitic mica similar to the host rocks of important Pb Zn deposits located in other parts of the region.

3. EM conductors associated with weak to moderate magnetic features such as A-1, A-2, A-3 and A-5 should be considered as 1st order exploration targets. It is suspected that the magnetic relief may be due to oxidizing sulphide bodies or magnetic minerals associated with a sulphide mineralization

4. EM conductors unrelated to magnetic features are of less importance since they are probably caused by graphitic horizons in the schistose rocks.

5. Vein matter and traces of copper sulphide mineralization found do not appear to be of direct economic importance but they do suggest that hydrothermal activity which may be related to economic mineralization has occurred in the area.

## RECOMMENDATIONS

It is recommended that all electromagnetic features on the property associated with moderate magnetic relief be selectively investigated in the following manner:

1. Carry out careful local prospecting for mineralized float. Take detailed soil sections and analyze the samples quantitatively for copper, zinc and manganese.

2. Make accurate detailed EM surveys of all coincident Mag - EM anomalous areas.

3. Run at least one gravimetric section over each significant anomaly

4. The above procedure would be followed by drilling or mechanical stripping if warranted.

Respectfully submitted,

R.A. Granger

Albert F. Reeve, P.Eng.
Geological Engineer

PROFESSIONAL
PROVINCE OF
A. F. REEVE
BRITISH COLUMBIA
ENGINEER

# A P P E N D I X

# A.

## ~~ESTIMATED~~ COST OF

## GEOLOGICAL AND GEOPHYSICAL INVESTIGATIONS

## CHRIS, JIM, PAT & ATS CLAIMS

## 1966

| | | |
|---|---|---|
| 1. | Line cutting (contracted) | |
| | 4.24 miles surveyed base line - | 746.00 |
| | 60 miles of chained picket line @ $75.00 - | 4,500.00 |
| 2. | Magnetic survey (contracted) | |
| | 60 line miles @ $50.00 - | 3,000.00 |
| 3. | Electromagnetic survey (contracted) | |
| | 60 line miles of reconnaissance @ $50.00 - | 3,000.00 |
| | Detail and check work 15 miles @ $50.00 - | 750.00 |
| 4. | Geological Mapping 20 days @ $35.00 - | 700.0 |
| 5. | Camp maintenance (incl. meals & supplies) | |
| | 300 man-days @ $5.00 - | 1,500.0 |
| 6. | <u>Transportation</u> | |
| | Jeep 5200 miles @ .18¢ - | 936.0 |
| | Helicopter 3:00 hrs. @ $104.50 = | 313.0 |
| | 4:15 hrs. @ 111.50 = | 474.0 |
| | 1:10 hrs. @ 122.50 = | 143.0 |
| | 1:25 hrs. @ 136.50 = | 193.0 |
| 7. | Supervision 3 days @ $60.00 - | 180.0 |
| 8. | Office and miscellaneous costs | 280.0 |
| | Total Cost: | $ 16,715. |

Total Requirement for 1 year (size of claims shown on plans.)

| | | | |
|---|---|---|---|
| 62 claims greater than 25 acres @ $100.00 | = | $ 6,200.00 |
| 8 claims less than 25 acres @ $50.00 | = | 400.00 |
| | | $ 6,600.00 |

Apply (2 x 6600.00) = $13,200.00 of the total estimated cost to cover two years' assessment work.

*These figures are greatly amended due to provisions of the Quartz Mining Act. See Forms C.*

*RH*

| | | |
|---|---|---|
| Data Reduction | — | $4400.00 |
| Draughting | — | 750.00 |
| Printing & office | — | 280.00 |
| Report | — | 250.00 ~~180~~ |
| Supervision | — | 180.00 |
| Total | | $5860.00 |

*Apply 1 yr. to each of Chris 1 to 34 and Jim 1 to 22.*
*i.e. $5600.00*

*RH*

A P P E N D I X

C

ALBERT F. REEVE, P.ENG.
GEOLOGICAL ENGINEER
400 — 837 West Hastings Street, Vancouver 1, B.C.

ASSOCIATE
RONALD A. GRANGER

Phone 685-0167

# CERTIFICATE

I, Albert F. Reeve, of Vancouver, B. C. hereby certify that:

1. That I am a geological engineer residing at 2557 West 3rd Ave., with an office at 400, 837 West Hastings Street.

2. I am a graduate of the Provincial Institute of Mining, Haileybury, Ontario, 1958; and received a Bachelor of Science degree from Michigan College of Mining and Technology, Houghton, Michigan, U.S.A. in 1961.

3. I am a certified member of the Association of Professional Engineers in the provinces of British Columbia and Ontario.

4. I visited the author of this report in the Yukon in August, 1966, to inspect the progress of his work and assisted in the compilation of the enclosed material. I have examined the results of the various surveys and find that they have been properly executed and described.

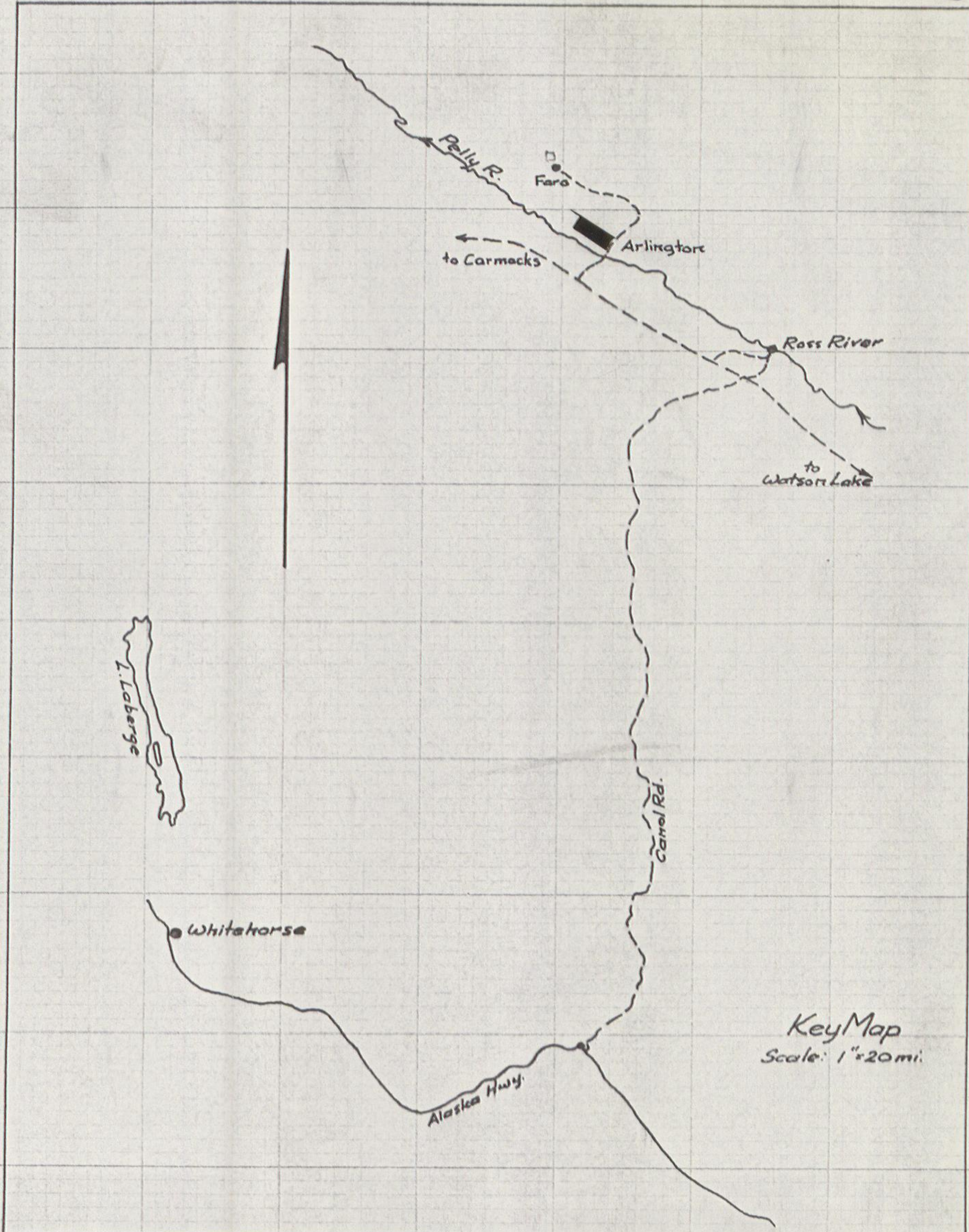
PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
A. F. REEVE

Respectfully submitted

Albert F. Reeve, P.Eng.,
Geological Engineer

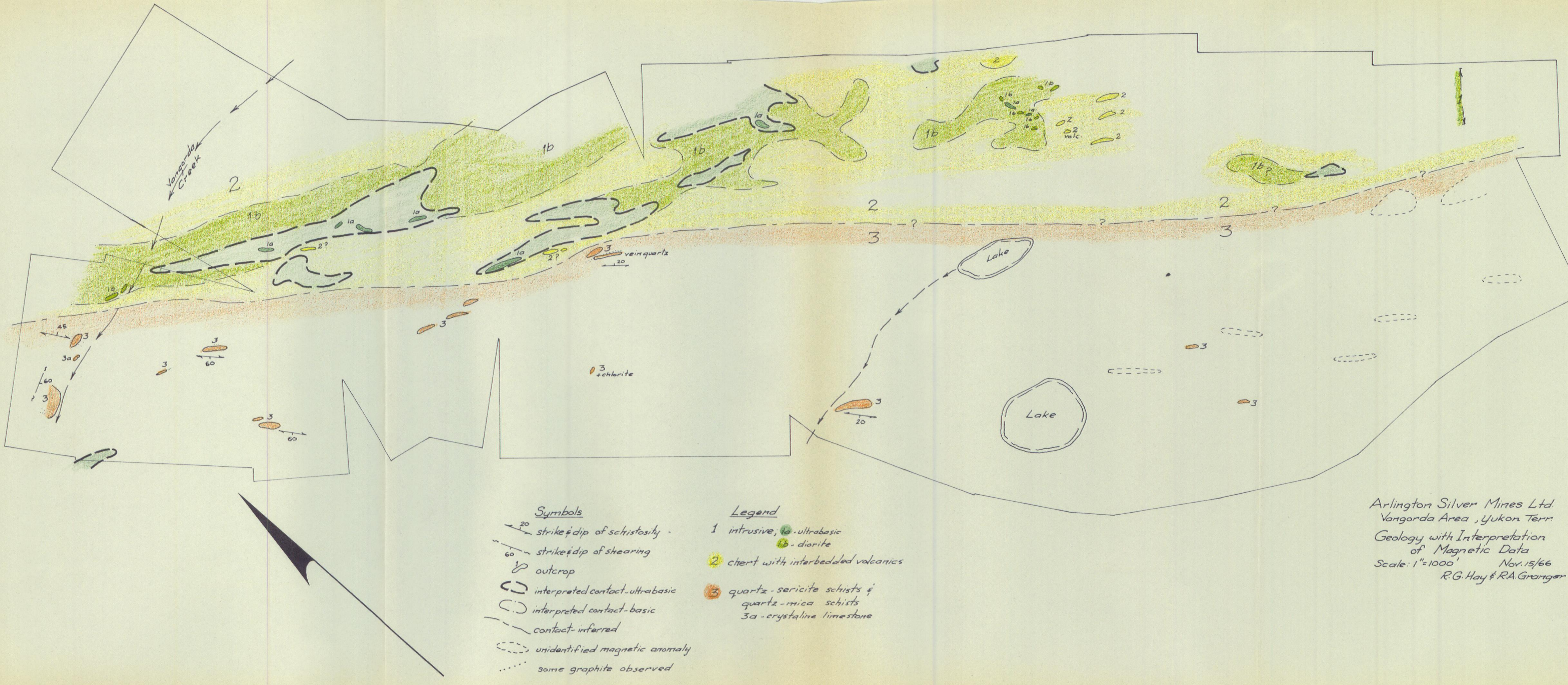
November 28, 1966.

Fig. 1



Pelly R.
Faro
Arlington
to Carmacks
Ross River
to
Watson Lake
L. Laberge
Canol Rd.
Whitehorse
Alaska Hwy.
Key Map
Scale: 1" = 20 mi.

Fig.2



Vangorda Creek
2
1b
1a
2?
3
vein quartz
20
45
3a
60
3 +chlorite
Lake
?
volc.
1b?
Symbols
strike & dip of schistosity
strike & dip of shearing
outcrop
interpreted contact-ultrabasic
interpreted contact-basic
contact-inferred
unidentified magnetic anomaly
some graphite observed
Legend
1 intrusive; 1a - ultrabasic
1b - diorite
2 chert with interbedded volcanics
3 quartz-sericite schists & quartz-mica schists
3a - crystaline limestone
Arlington Silver Mines Ltd.
Vangorda Area, Yukon Terr.
Geology with Interpretation of Magnetic Data
Scale: 1"=1000'
Nov. 15/66
R.G. Hay & R.A. Granger


ARLINGTON SILVER MINES LTD.
Vangorda Creek – north half
Yukon
Magnetometer Survey
inst.: MF-1
operator: J. Coyne
contour interval
50 & 100γ
scale:
1" = 400'
corrections:
10γ
date: Nov. 28/66
Ron Granger
Jim 15
Jim 16
Jim 9
Jim 10
Jim 8
Jim 6
Jim 4
Jim 2
Jim 3
Jim 5
Jim 7
Jim 1
Chris 1
Cris 2
Chris 3
Chris 4
Chris 18
Jim 12
Jim 11
Jim 17
Jim 19
Jim 21
Jim 22
Jim 20
Jim 18
Jim 14
Jim 13
ATS 10
ATS 9
ATS 6
ATS 5
ATS 8
ATS 7
ATS 11


ARLINGTON SILVER MINES LTD.
Vangorda Creek Property
Yukon
Shaft

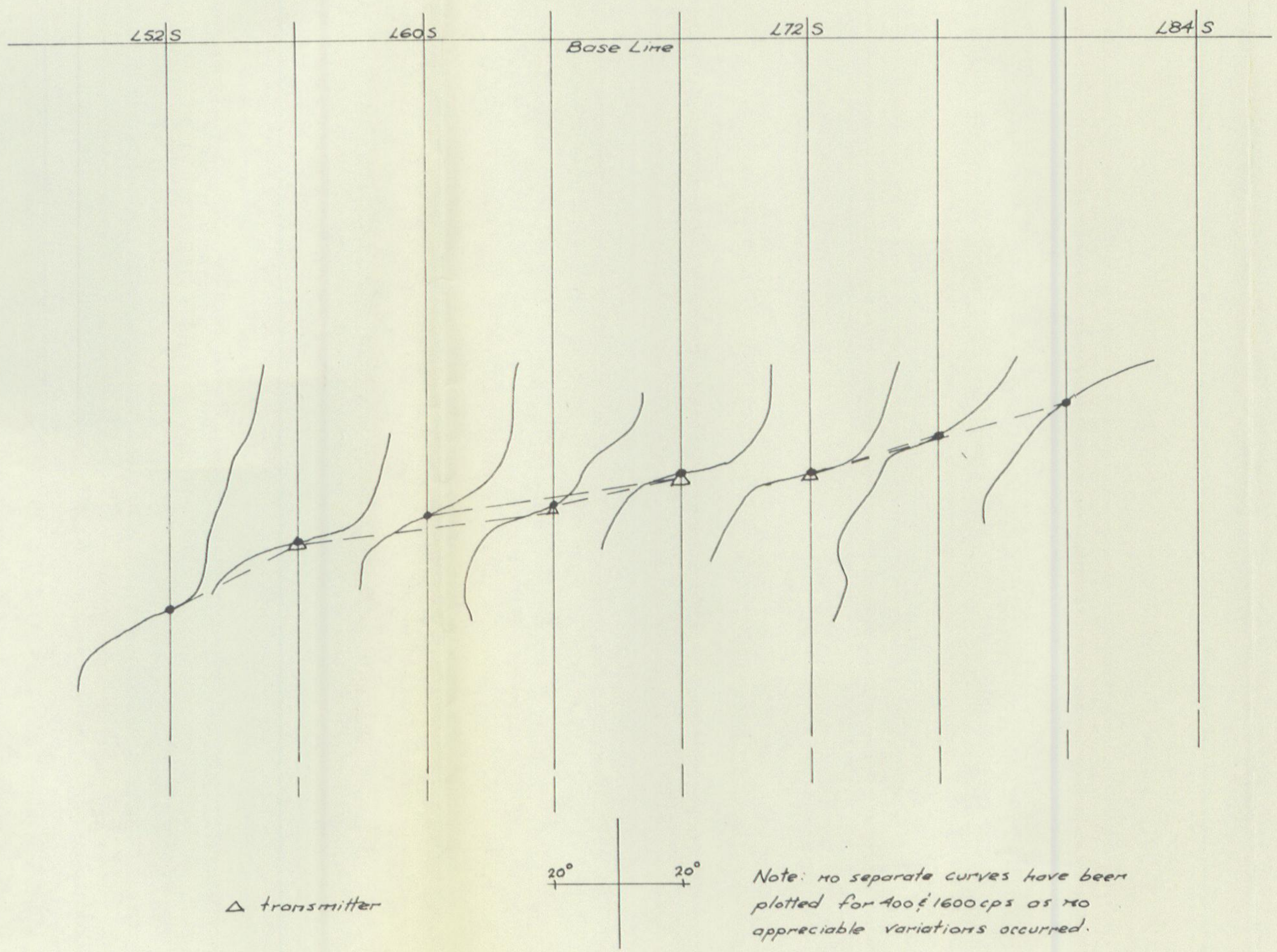
Magnetometer Survey
inst: MF-1
operator: RAG

| | |
|---|---|
| contour interval 50 & 100γ | scale: 1" = 400' |
| corrections: 5γ | date: Nov. 28/66 Ron Granger. |

Fig. 4

Chris 7
Chris 9
Chris 11
Chris 13
Chris 15
ATS 3
ATS 4
ATS 9
ATS 10
Chris 8
Chris 10
Chris 12
Chris 14
Chris 16
ATS 1
ATS 2
Chris 33
Chris 31
pond
pond
L20S
L28S
L40S
L60S
L80S
L100S
L120S
Lake
Pat 6F
Chris 34
Chris 19
Chris 29
Chris 32
A-5
Chris 21
Pat 2F
Pat 7F
A-2
A-1
Chris 23
Chris 27
A-3
A-4
Chris 25
Lake
Chris 30
Pat 1F
Pat 4F
direction of transmition
location of zone of anomalous conduction
Chris 22
Chris 28
Chris 26
Chris 24
Pat 3F
ARLINGTON SILVER MINES LTD.
Vangorda Creek - Yukon Terr.
south half
Electro magnetic Recon Survey
inst.: SE-300 method: vert. loop freq. 1600 c.p.s.
curves: 1"=40°
scale: 1"=400'
operators: R.G.Hay
J. Winton
date: Nov. 28/66

A-1 detail

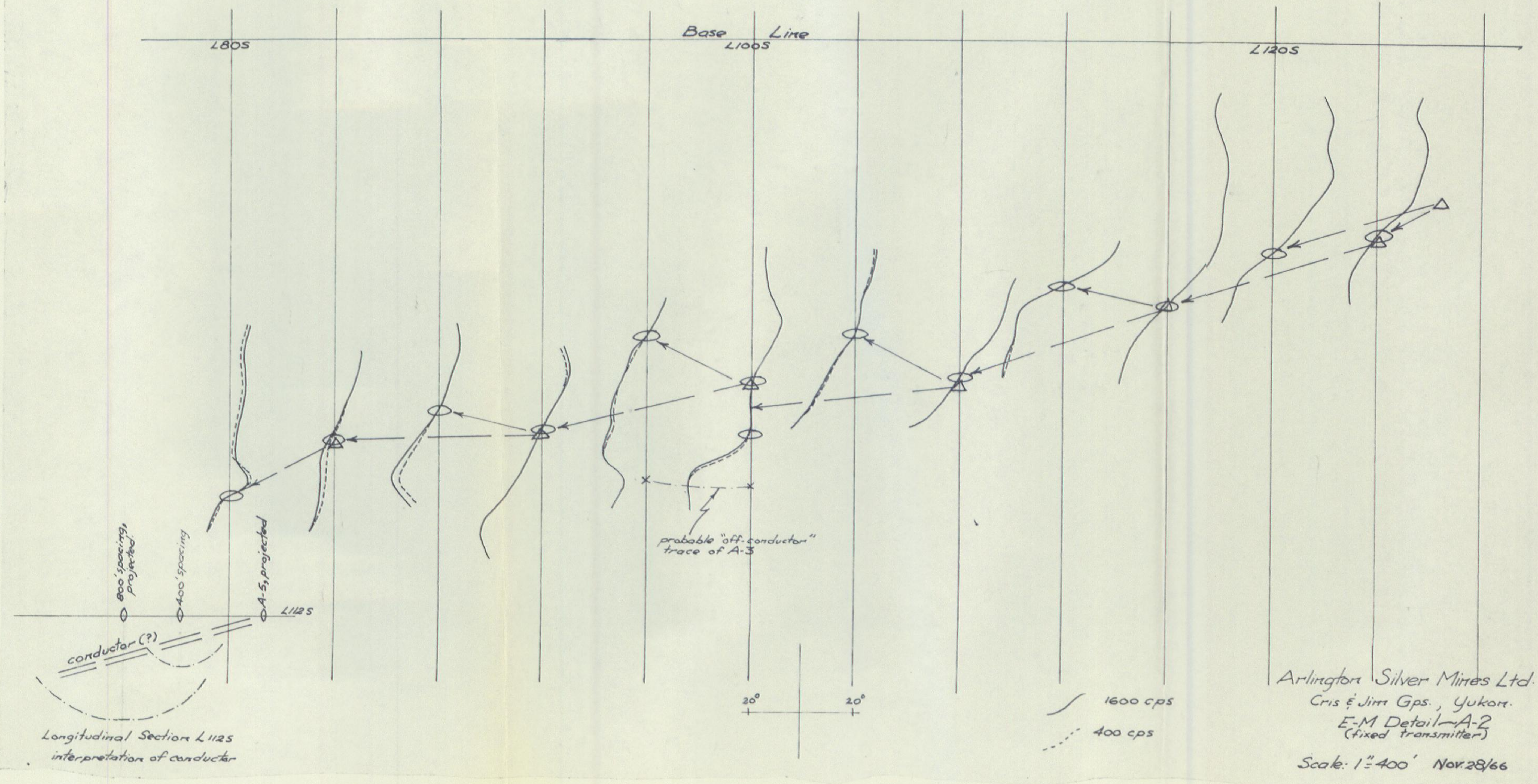



Note: no separate curves have been plotted for 400 & 1600 cps as no appreciable variations occurred.

Arlington Silver Mines Ltd.
Vangorda Area, Y.T.
E-M Detail ~ A-1
(fixed transmitter)

Scale: 1" = 400' Nov. 28/66

A-2 detail



Base Line
L80S
L100S
L120S
probable "off-conductor" trace of A-3
800' spacing, projected
400' spacing
A-5, projected
L112S
conductor (?)
Longitudinal Section L112S interpretation of conductor
20°
20°
1600 cps
400 cps
Arlington Silver Mines Ltd.
Cris & Jim Gps., Yukon.
E-M Detail ~ A-2
(fixed transmitter)
Scale: 1" = 400'  Nov. 28/66