A Geophysical Report on the Silver and Spring Claim Groups

Mayo M.D. Sheet 106-D-3

Lat. 64° 3'N., Long. 135° 19'W.

September 15th. to October 16th. 1971

For Canadian Reserve Oil and Gas Limited

By E.J. Wilson, Supervised by R.W. Stemp, P.Eng.

Spartan Aero Limited, Ottawa

November 26, 1971

SPARTAN AERO LIMITED

SUMMARY

Previous work on the property consisted of geochemical sampling on a cut grid by P.H. Sevensma Consultants Limited followed by crawler tractor trenching and stripping.

Between September 15th. and October 16th. 1971, a reconnaissance magnetic and EM 16 survey was carried out over an area of approximately 20 claims near Hanson Lakes, Yukon Territory on behalf of Canadian Reserve Oil and Gas Limited by Spartan Aero Limited.

A number of encouraging conductors and magnetic anomalies were located (profile sheets) and it is recommended that geological mapping, geochemical sampling and horizontal or vertical loop EM be used to evaluate these areas further.

TABLE OF CONTENTS

I. INTRODUCTION

A geophysical survey was conducted on behalf of Canadian Reserve Oil and Gas Limited by Spartan Aero Limited on portions of the Silver and Spring Mineral Claim Groups in the period from the 15th. September to the 16th. October 1971. These claims appear on the McQuesten Lake Sheet, 106-D-3.

Geophysical methods employed were VLF electromagnetic (VLF-EM) and magnetic (Mag.).

The objective of the survey was to outline areas for further follow-up to locate base metal deposits; in particular lead-zinc-silver-cadmium bearing bodies and structures.

A total of nineteen line miles of reconnaissance magnetic and VLF-EM survey was performed on chain and compass traverse lines. This is divided among the various claim groups as follows:

Silver Claim nos. 9 to 16 inclusive,	
Spring Claim nos 5 to 12 inclusive,	10.7 miles
Silver Claim nos. 1 to 8 inclusive,	
and 17 to 24 inclusive	4.6 miles
Spring Claim nos 1 to 4 inclusive,	
13 and 14, and Spring Fractions 1 and 2	3.7 miles.

One hundred foot station spacing was generally employed on lines spaced 800 feet apart. In areas of high gradients readings were made every 50 feet; this work totalled 4.1 miles.

Personnel associated with the project were as follows:

J.M. Holmstrom	Keno, Y.T.	Line cutter
E.R. Rockel	Richmond, B.C.	Geophysicist
E.J. Wilson	Ottawa, Ontario	Geophysicist
R.W. Stemp, P.Eng.	Ottawa, Ontario	Chief Geophysicist.

II. GEOLOGY

Mapping by the Geological Survey of Canada shows the claim block to be underlain by graphite schists, thin-bedded quartzite, quartz-mica schist, phyllite, calcareous schist and minor thick-bedded quartzite of the Lower Schist Formation of the Yukon Group. Mapped throughout this formation are small intrusions of meta-gabbro, meta-diorite and meta-diabase (greenstone). These are common in the area of the survey, particularly in the northern sector.

Glacial deposits, mainly till, glacio-fluvial deposits and glacio-lacustrine gravel, sand and silt cover the McQuesten Valley floor and the lower slopes of Forbes Hill. They range in thickness from a few feet to 50 feet or more, and extend up slope to an elevation of 3,500 feet on the claim group.

III. GEOPHYSICAL INSTRUMENTATION AND METHODS

Two geophysical instruments were employed in the survey. The Ronka EM 16 unit (Serial no. 111) for VLF-EM measurements and the Sharpe MF 1 Vertical Fluxgate magnetometer (Serial no. 409109) for mapping the magnetic field.

Control for measurements was obtained by running chain and compass traverse lines simultaneously with the geophysical measurements between base lines spaced three to four thousand feet apart. Base line 1 (5,500 feet) and 3,000 feet of base line 2 were hand cleared and the remainder of Base line 2 and Tie line 1 were cleared with a crawler tractor. Base lines, roads and ties to claim posts etc. were surveyed with a Brunton compass and chain. Slope distance for 100 feet horizontal was derived in the field by using the direct reading Suunto level incorporated in the EM 16. Reconnaissance traverses spaced 800 feet apart were made using the same method of chaining and a Silva "Prospector" Compass. Closures of 5 feet in chainage and 100 feet in direction over a distance of 4,000 feet were common. One hundred foot stations were marked with orange flagging and labelled with felt pen and where required 50 foot stations were marked by blue flagging.

The magnetic survey has an arbitrary base level of 500 gammas at base no. 1 which is situated on a wooden block about 25 feet southeast of the grid origin. Magnetic closures were made at least every 3 hours and corrections applied to remove diurnal drift.

The EM 16 data is profiled in such a way that a "normal crossover" has its minimum on the left side and its maximum on the right side of the conductor axis.

IV. DISCUSSION OF RESULTS

In presenting the EM 16 data no attempt has been made to correct for topographic effects. The regional negative in-phase responses that vary down to - 60% on most traverse lines from 10+00W to 40+00E is a reflection of the west facing hillside which has an approximate average slope of 20°. The VLF primary field tends to follow the major features of the topographic surface.

Quadrature EM readings are considered of little significance in this area as phase shifts are associated with the effects of conductive ground on the primary and secondary signals. For example, the anomaly at 37+00E on line 48+00N has the in-phase and quadrature crossover in the same sense (graphically) indicating the conductor is in "conductive" ground while the response at 3+50E on line 64+00N shows a relatively "non conductive" host rock.

Areas showing little variation in EM response are probably deeply covered (greater than about 50 feet) with glacial till which is relatively electrically uniform and conductive. The area covered by lines 24+00S and 32+00S and the west end of line 16+00S and perhaps 12+00S fall into this category. Bedrock in these areas has not been adequately explored for conductors and further search should be carried out using conventional EM techniques.

It is considered that many of the weaker conductors detected in the area west of Base line 1 between lines 8+00N and 16+00S are due to variations in surface conductivity and perhaps to underlying graphite-schists. Trenching in the area has exposed till with varying amounts of ferruginous cement and graphitic schists. Graphitic schist was noted at 3+25W on line 8+00N where a conductor is indicated.

Magnetic profiles are flat on Sheet no. 1. Most of the activity on profiles of sheet no 2 is probably a reflection of the greenstone in this area. On Base line 1 at 22+50N a greenstone carrying magnetite with remanent magnetism was noted. This would explain the magnetic activity in this area and perhaps that at 7+00E on line 32+00N. The magnetic anomalies at 40+00N-10+00E, 40+00N-15+00E, 48+00N-25+00E, 56+00N-32+00E and 72+00N-37+00E probably have similar sources as greenstones are common in this area. With exception of the anomaly at 72+00N-37+00E these may be related to the same formation or structure. Correlation of features from line to line across 800 feet is hazardous in this area as structures appear small.

The most interesting anomaly detected is on line 58+00N at 7+50E. Here a VLF-EM anomaly is related to a magnetic feature (measured peak to trough is 3,200 gammas). It is not possible to completely explain this conductor but a body of sulphide, serpentinized greenstone or chloritic schist carrying magnetite or pyrrhotite is quite probable.

The EM crossovers in the northern section of the area (Sheet 1) are probably related to variations in the conductivity of the greenstone or to contacts. However, all the stronger responses together with the magnetic anomalies should be tested further with conventional EM equipment.

The crossovers on lines 0+00N, 8+00S and 16+00S extending from about 5+00 to 15+00E (Sheet 2) almost certainly arise from graphitic horizons as graphitic schist outcrops are common in the area. The immediate areas of these conductors should be examined by a geologist to verify this explanation in all cases. No explanation is apparent for the conductor at 23+00E on line 8+00S; it warrants further testing.

V. CONCLUSIONS AND RECOMMENDATIONS

The search for lead-zinc-silver-cadimium vein deposits in the Keno Hill area poses a number of problems. The major one is the usually small dimensions of the mineralized sections of the vein faults rendering them difficult to detect. Thus to efficiently search an area geophysical line spacing should be no greater than 400 feet.

Conventional EM techniques should be quite effective on those of sufficient size with high contents of lead mineralization. However, there are often significant amounts of sphalerite present which is a very poor conductor, thus limiting its usefulness.

VLF-EM surveys offer the advantages of being inexpensive and rapid but are subject to a number of limitations. Firstly conductive overburden or host rocks severely limit the depth of exploration. Secondly, anomalies tend to be generated by conductivity changes in the overburden, or at the overburden/bedrock interface. Thirdly since the frequency is high, the response factor of many geological conductors, including orebodies, is above the range where appreciable quadrature effects are generated. Phase shifts are more usually associated with effects of conductive ground. An additional problem in the Keno Hill area is that the strongest primary VLF signal, Jim Creek, Washington, couples very poorly with the northeast and north trending vein deposits. The signal from Hawaii which would couple excellently is, unfortunately, too weak to be used for reliable measurements.

None of the common minerals found in the vein fault systems of the area are magnetic, thus magnetic measurements are of little use in directly detecting deposits. However, they should be very useful when used in conjunction with geological mapping in helping to determine the relations and distributions of greenstone bodies which exert important control over the location of mineralized zones.

It is recommended that all the stronger conductors located on Sheet no. 1 and the conductor on line 8+00S at 23+00E (Sheet 2) be investigated further. Detailing should be carried out with vertical loop EM followed by geological investigation if warranted. Geochemical methods may be useful in eliminating graphite conductors. Additional follow-up should be done on the conductive zones detected on lines 8+00N, 0+00N, 8+00S and 16+00S between 5+00 and 20+00E to either confirm or refute the graphitic origin suggested. No additional work is recommended for the southwest corner bounded by Base line 1 and line 8+00N (Sheet no. 2) in view of the work already completed by P.H. Sevensma Consultants Limited.

Respectfully submitted,

E.J. Wilson, B.Sc.,
Geophysicist.

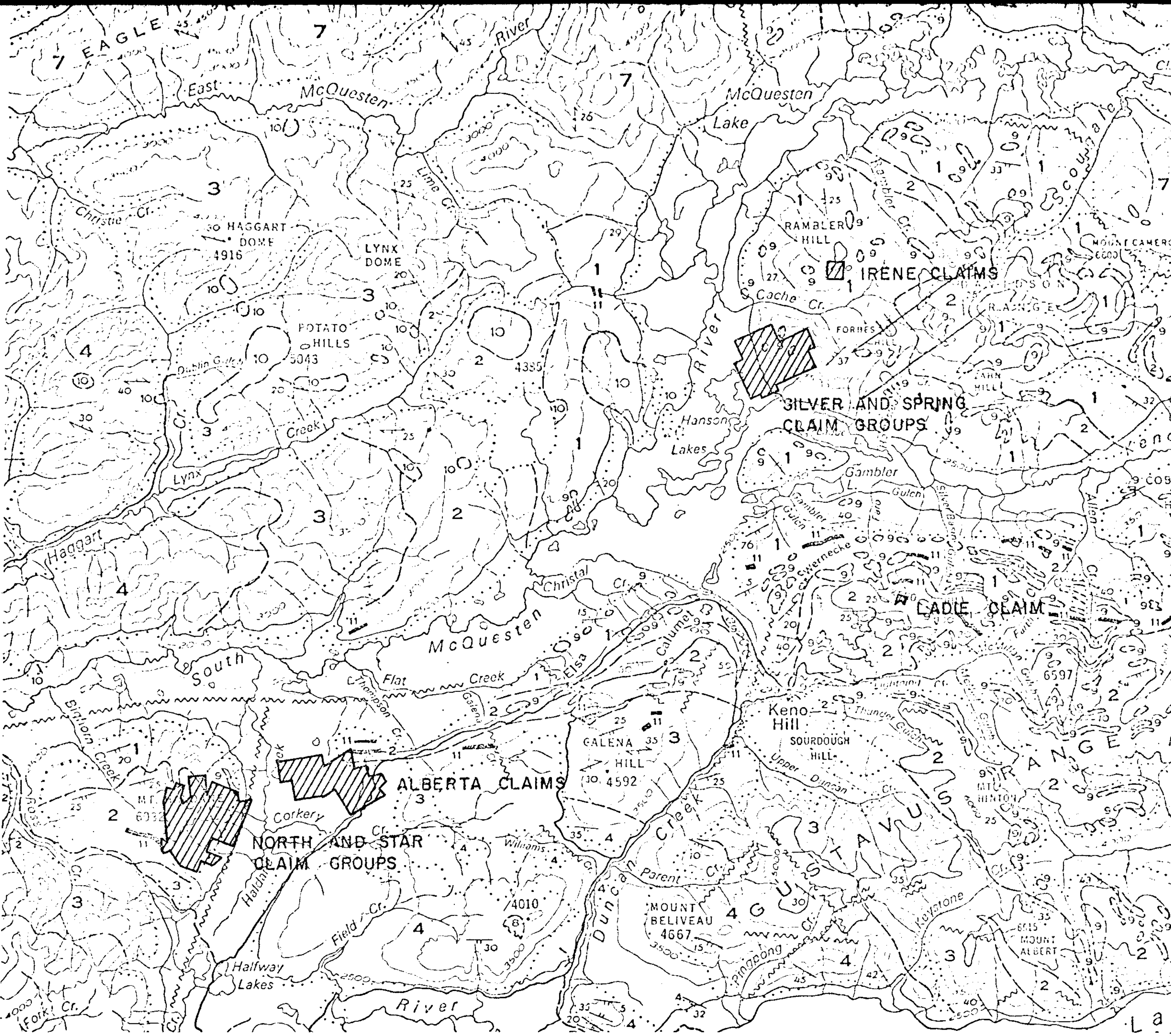
Robert W. Stemp, P.Eng.,
Chief Geophysicist.

OTTAWA, ONTARIO,
November 26, 1971.

REFERENCES

Boyle, R.W.,
1965: Geology, Geochemistry, and origin of the lead-zinc-silver deposits of the Keno Hill - Galena Hill Area, Yukon Territory; Geol. Surv. Can. Bull. 111.

Sevensma, P.H.,
1968: Summary Report, Geological, Geophysical and Geochemical, Silver and Spring Claim Group, Silver Spring Mines Ltd. (unpub.).



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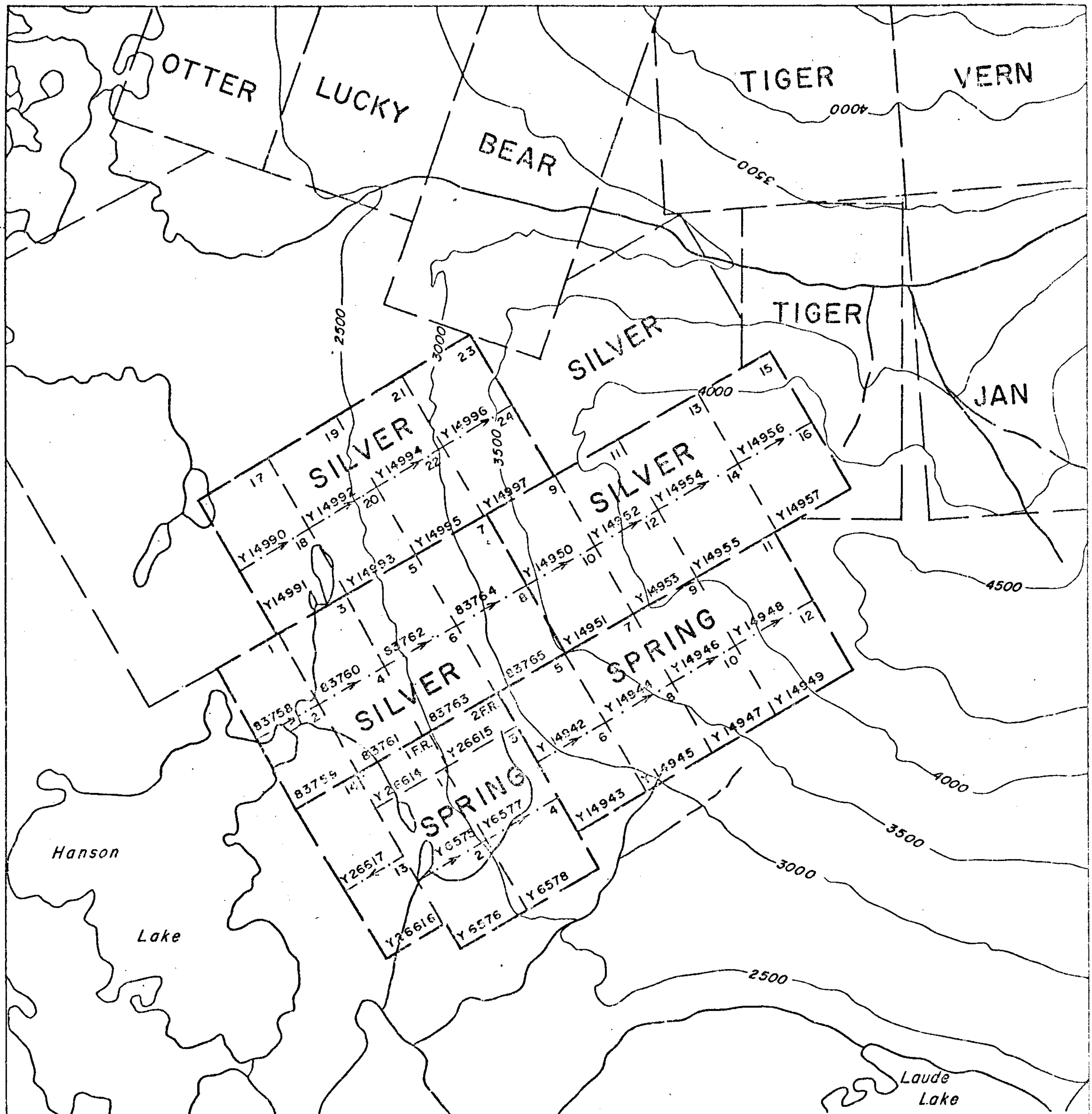
CANADIAN RESERVE OIL AND GAS LIMITED

CLAIM GROUP LOCATION MAP

MAYO M.D. — YUKON TERRITORIES

SCALE: 1 INCH = 4 MILES

FROM G.S.C. MAP 1147A



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CANADIAN RESERVE OIL AND GAS LIMITED

CLAIM MAP

MAYO M.D. — SHEET 106-M-13

YUKON TERRITORIES

SCALE: 1 INCH = 1/2 MILE

BASE LINE 1
BASE LINE 2
L72+00N
L64+00N
L56+00N
L48+00N
L40+00N
L32+00N
L32A+00N
L24+00N
12W
10W
6W
8W
16W
2W
00
10E
20E
30E
40E
32E
TIE LINE 1
Silver no.17 Y14990
Silver no.18 Y14991
Silver no.19 Y14992
Silver no.20 Y14993
Silver no.11 Y14852
Silver no.12 Y14853
Silver no.3 83760
LEGEND
CHAINED AND PICKETED LINE
CHAINED, COMPASS AND FLAGGED TRAVERSE LINE
CLAIM LOCATION LINE AND POSTS WITH DIRECTION FROM No.1 Post to No.2
CLAIM BOUNDARY
ROAD
LAKE
38°
Magnetic North
(APPROX.)
SHEET INDEX
1
2
GEOPHYSICAL TRAVERSE PLAN
SILVER AND SPRING CLAIM GROUPS
MAYO M.D. — YUKON TERRITORIES
FOR
CANADIAN RESERVE OIL AND GAS LIMITED
BY
SPARTAN AERO LIMITED
SCALE: 1 IN. = 200 FEET
PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
S.A.L. 71205


L16+00N
L8+00N
L6+00N
L4+00N
L2+00N
L0+00N
L4+00S
L8+00S
L12+00S
L16+00S
L24+00S
L32+00S
Silver no 3
83760
Silver no 4
83761
Silver no 5
83762
Silver no 6
83763
Spring Fraction no 2
Y 26615
Spring Fraction no 1
Y 26614
Spring no 1
Y 6575
Spring no 2
Y 6576
Spring no 3
Y 6577
Spring no 4
Y 6578
Spring no 5
Y 14942
Spring no 6
Y 14943
Spring no 7
Y 14944
Spring no 8
Y 14945
Spring no 13
Y 26616
Spring no 14
Y 26617
BASE LINE 1
BASE LINE 2
To Elsa and Keno
To Foley Silver
Magnetic North
38°
(APPROX.)
SHEET INDEX
LEGEND
CHAINED AND PICKETED LINE
CHAINED, COMPASS AND FLAGGED
TRAVERSE LINE
CLAIM LOCATION LINE AND POSTS WITH
DIRECTION FROM No.1 Post to No.2
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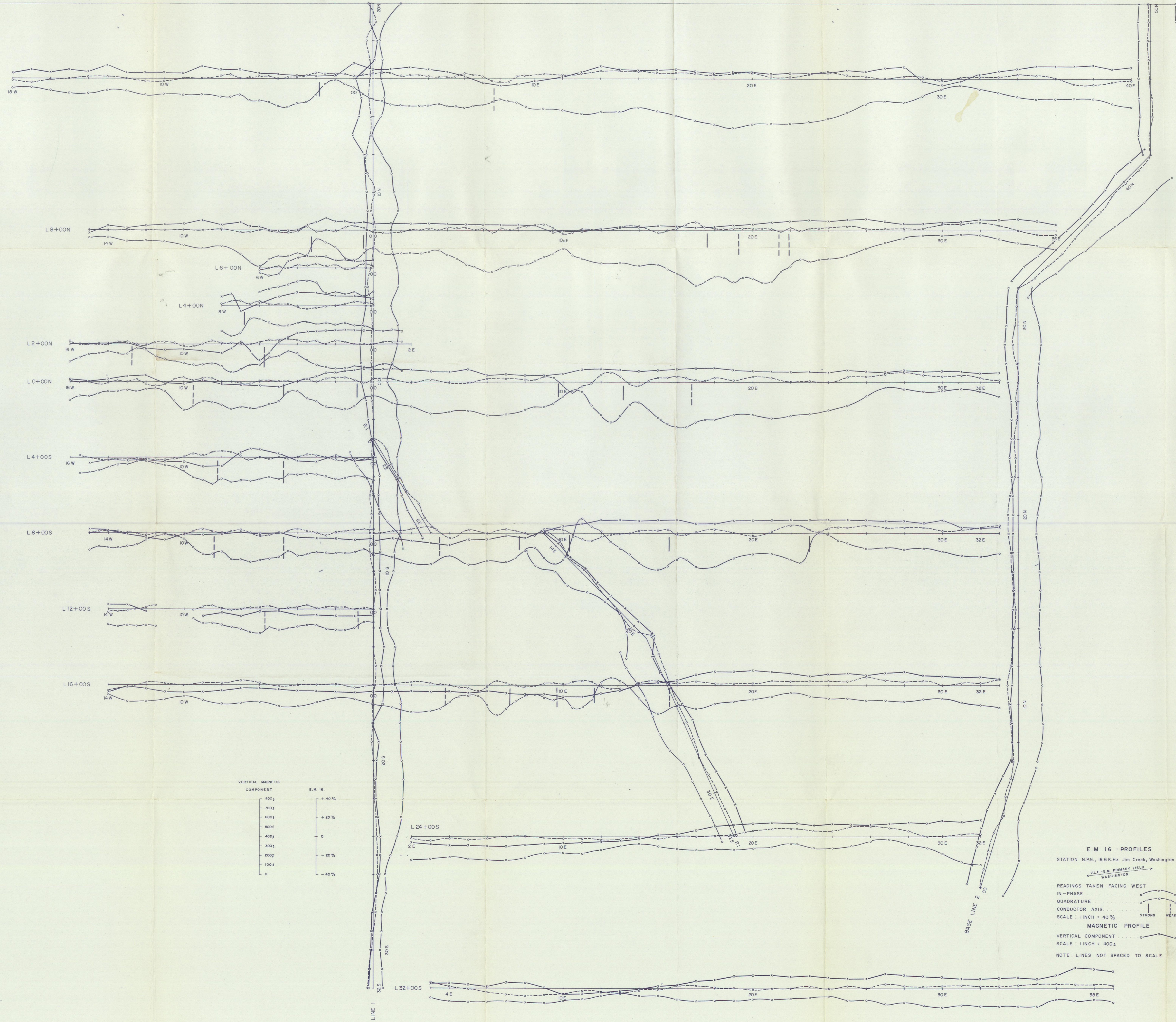
MAYO M.D. – YUKON TERRITORIES
FOR
CANADIAN RESERVE OIL AND GAS LIMITED
BY
SPARTAN AERO LIMITED
SCALE: 1 IN. = 200 FEET
PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
R. W. STEMP

S.A.L. 7205



E.M. 16 · PROFILES

STATION N.P.G., 18.6 K.Hz. Jim Creek, Washington

V.L.F.-E.M. PRIMARY FIELD
WASHINGTON

READINGS TAKEN FACING WEST
IN-PHASE
QUADRATURE
CONDUCTOR AXIS — STRONG / WEAK
SCALE: 1 INCH = 40%

MAGNETIC PROFILE

VERTICAL COMPONENT
SCALE: 1 INCH = 400γ

NOTE: LINES NOT SPACED TO SCALE

SHEET INDEX

(APPROX.)

VERTICAL MAGNETIC AND E.M. 16 SURVEY

PROFILE PRESENTATION

SILVER AND SPRING CLAIM GROUPS
MAYO M.D. — YUKON TERRITORIES
FOR
CANADIAN RESERVE OIL AND GAS LIMITED
BY
SPARTAN AERO LIMITED
SCALE: 1 IN. = 200 FEET