SILVER ARROW EXPLORATIONS LIMITED

LISA GROUP

Whitehorse M.D., Y. T.

Report on

GEOLOGICAL, GEOPHYSICAL AND GEOCHEMICAL WORK TO DECEMBER 1, 1966

By

P.H. Sevensma, Ph.D., P. Eng.

Vancouver, B. C.

D C Findlay
6,969.59
for R.G. Hedlan

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ILLUSTRATIONS

INTRODUCTION

During the summer of 1966, the 48 claim Lisa Group of Silver Arrow Explorations Limited has been examined by the writer and a preliminary exploration program was carried out between May and August 1966 with the writer acting as a consultant.

The schedule of work and a list of the personnel involved in this program are attached to this report as Appendix A, which also gives the major breakdown of the total expenditure of $6,419.50.

PROPERTY

The Lisa Group consists of the Lisa 1 - 48 mineral claims and the Eze 1 - 6 fractional claims which were staked when claim surveying showed a significant gap between the Kay Group on the Northeast and the Lisa Group.

The Lisa Group lies to the Northeast of the Pelly River at about 132°58' West and 62°9' North. (Fig. 1 and 2).

This location is about 7 miles ESE of the mouth of Blind Creek and 4 miles SSE of Kerr Addison's Swim Group sulphide body.

The property straddles the lower part of Moose Creek; geologically, it lies astride the contact between the volcanics of unit 8 on the SW and the sedimentary schists of unit 7 on the NE.

Anvil Mining Corporation's Kay and Mor Groups adjoin the Lisa on the North and East; the Ram and Wavy Groups adjoin it on the SW and SE.

A winter road to Swim Lakes crosses the property.

The topography of the claims is quite rugged with the volcanic ridge rising to an elevation of about 3500', which is some 1200' higher

than the elevation of the lowest claims close to the Pelly River.

During the summer of 1966, best access to the property was by 4-wheel drive vehicle before breakup and by helicopter before the Pelly River Ferry became operative in late July 1966. Road access is expected to be possible in the not too distant future.

The Lisa claims were staked shortly after the discovery of the Faro ore-body; the pertinent claim data are as follows:

Claims	Grant Numbers	Date Recorded
Lisa 1 - 7	93981 - 93987	November 17, 1965
Lisa 8 - 10	93965 - 93967	November 17, 1965
Lisa 11 - 14	93968 - 93971	November 17, 1965
Lisa 28 - 35	93973 - 93980	November 17, 1965
Lisa 47 & 48	93988 & 93972	November 17, 1965
Lisa 15 - 22	94005 - 94012	November 18, 1965
Lisa 23 - 27	94033 - 94037	November 18, 1965
Lisa 36 - 43	94041 - 94048	November 18, 1965
Lisa 44 - 46	94038 - 94040	November 18, 1965
Eze 1 - 6 (fractional)	Y9909 - Y9914	August 8, 1966

The Lisa 11 to 14 were found to cover ground subject to prior staking and will be allowed to lapse. The property now comprises a total of 50 (This) claims.

For assessment purposes, the claims have been grouped as follows:

Group I	Lisa 1 - 10 and 15 - 20	16 claims
Group II	Lisa 21 - 35 and 44	16 claims
Group III	Lisa 36 - 43 and 45 - 48	12 claims

AIRBORNE GEOPHYSICAL SURVEY

In view of the difficulties of access to the property anticipated in the summer of 1966, a combined magnetic and electromagnetic survey, using Lockwood Survey Corporation's helicopter-borne equipment, was chosen as the most economical preliminary exploration technique.

The Lockwood method uses a single frequency of 4000 cps to generate a primary electromagnetic field. The transmitter loop is carried in a fibreglass bird and is oriented with the loop axis parallel to the direction of flight. A receiving loop is located 30' away in the other end of the bird; the loops are coaxial.

The bird is suspended at the end of a 70' cable and is towed by a helicopter at an elevation of 100' above the ground.

A magnetometer of the Gulf Mark III type, also located in the bird, measures the total intensity of the magnetic field.

Recorders and a positioning camera are carried on the helicopter and are handled by an operator who indicates to the pilot the planned course plotted on 1" = 1320' airphotographs and who marks fiducial points on the recorder's strips.

Depending upon the problem, the flight lines are laid out at right angles to the strike of the formations and at distances varying from 600' to 1500' apart.

If a conductive body in the ground is crossed by the helicopter carrying this equipment, the primary electromagnetic field creates eddy currents in this conductor which cause the generation of a secondary electromagnetic field. This secondary field is generally of the same frequency as the primary field but out-of-phase with it; it is detected by the receiver loop in the bird.

As a variation in the distance between the transmitter and the receiver coils will create a strong in-phase response, both coils are in a fixed position in the relatively rigid bird. This will eliminate false responses. Increasing out-of-phase responses will be obtained

over bodies of low to medium conductivity; as the conductivity increases beyond the medium range, the out-of-phase response falls off again.

In-phase responses are increasingly stronger as the conductivity rises from poor to very high.

The strength of the response is measured in parts per million. For the above reasons, the ratio of the in-phase to the out-of-phase responses is less than one for bodies of poor to medium conductivity and increases rapidly as the conductivity varies from medium to high.

The response is also a function of the size of the conducting body and of the distance from the bird to it.

The maximum distance at which a highly conductive body of large size will give a response is still somewhat unknown, but appears to be about 300' between the bird and the top of the conducting body.

Various geological bodies are electrical conductors and geological conductors are manifold and of greatly varying size, shape and conductivity, the latter often being a function of the internal texture of the conductor.

Some examples of conducting bodies are:

Massive pyrrhotite
Massive pyrite
Disseminated pyrrhotite and/or pyrite
Graphitic schists
Talc shists, especially when wet
Chlorite-(serpentine) schists
Wet overburden in swamp
Lake-bottom deposits
Wet shears

Due to their schistose nature, graphitic schists may be excellent conductors if the individual graphite flakes form a conductive layer.

Massive sulphide bodies with 10 - 20% interstitial quartz may be excellent conductors if the main sulphide is pyrrhotite and if the individual grains of sulphide have large contact areas.

Their conductivity drops off rapidly if the main sulphide is pyrite and if the individual iron sulphide grains are isolated by interstitial non-conductors like silica or sphalerite.

For these reasons, a combined magnetic - electromagnetic airborne survey is essentially a geological mapping tool, especially so as the amount of magnetite in rock is even more of a geological variable than conductivity.

The reliability of the method is principally a function of the elevation above ground that can be maintained. Correlation of responses on adjacent lines flown at different elevations, due to weather or topographical conditions may not be satisfactory. This happens if the survey is flown with too light a helicopter.

Providing flying keeps the bird at a steady elevation above the ground, interpretation of airborne data is largely a function of the geological conditions.

Different geological environments will lead to different appraisals of quantitatively very similar airborne geophysical responses.

In general, experience has shown that long conductors (several thousand feet or miles) with relatively low ratios of 1 or less are likely to be of a formational nature, like graphitic schists. Smaller conductors of better than 1, or preferably 2, ratios may represent near-surface sulphide occurrences.

In certain areas, coincidence of magnetic and electromagnetic highs is critical becasue of an association of sulphides and magnetite. Most magnetic highs are however a reflection of increased magnetite content of the underlying rock formations.

Other geological factors complicating a qualitative interpretation are for example, the frequent association of graphite and sulphide bodies or the presence of sulphide deposits the mass of which is buried beyond the range of the electromagnetic field but that do have a small near-surface expression.

An airborne geophysical survey should therefore be considered as a mapping tool enabling the exploration effort to be directed towards limited portions of the area flown and further ground work in restricted areas should use methods like geological mapping, geochemical reconnaissance, ground EM and gravity to assess conductors or magnetic highs detected by airborne methods.

LISA GROUP SURVEY

The airborne survey carried out over the Lisa ground was preceded by a certain amount of linecutting and surveying to determine the approximate boundaries of the property. Flight lines were in general spaced at from 1000' to 1500', but rough terrain conditions occasionally forced wider spacing.

As is usual in such surveys, lines were flown beyond the property boundaries for two reasons:

(1) to position the helicopter on the correct line after the turnaround.

(2) to delineate magnetic and conductive zones sufficiently to determine whether significant folds in these formations occur near the property boundaries.

A total of 38 line miles were flown on May 7th, 1966.

Subsequently, the observed magnetic and electromagnetic highs were investigated on the ground by reconnaissance mapping and some soil sampling, and a detailed claim survey was carried out in the area of a strong conducting zone located near the NW boundary of the property.

A. Magnetic Results

A large magnetic high, measuring 6200 gammas against a background of about 3200 gammas was located on the SW half of the property. Preliminary ground investigation indicated that this anomaly is related to a basic volcanic sequence.

These volcanics contain serpentine masses often carrying sufficient magnetite to produce anomalies of this type. More detailed mapping is required to determine whether this anomaly is due to serpentine, to volcanics with an unusual content of magnetite or to some other formation enclosed within the volcanics.

The anomaly suggests a body with a SW dip which, although not proven, is consistent with the dips observed in the underlying schists exposed to the NE.

The lines to the SW did not extend far enough to completely outline the anomaly.

B. Electromagnetic Results

Weak to medium strong conductors were found North and West of the magnetic anomaly; one of these anomalies proved to lie with its edge on the Lisa Group, where in-phase to out-of-phase ratios of 3.7/1.0, 3.8/1.3 and 4.9/3.9 were measured.

On the most Westerly claims, a restricted anomaly shows a ratio of 4.0/3.0.

The former conducting zone is about 1 mile long on the Kay Group whereas the latter is localized on one line only, near an embayment in a gently rising magnetic field.

The first conductor, on the Kay Group, is strongly suggestive of a graphitic schist zone; the isolated conductor is of a type that may or may not be associated with a sulphide zone; the next flight line to the NW did not extend far enough to be certain that this conductor is restricted to one line only.

Both conductors warrant geochemical investigation. A third conductor is near-coincident with the most Northwesterly magnetic high, and therefore warrants similar testing on the ground. The results of the airborne survey indicate clearly that the Westerly and Northerly one-third of the property warrants a soil sampling program on lines 800' apart in the areas of the conducting zones.

This represents approximately 7 miles of lines, to be sampled at 200' intervals, i.e. some 180 - 200 soil samples.

GEOLOGY

The general geological setting of the Lisa Group is shown on figure 1, a copy of part of the G.S.C. Tay River map sheet on which formational units relevant to this study have been indicated. G.S.C. formation 7 is the favorable schist formation containing the Swim Lake, Vangorda Creek and Faro sulphide bodies.

These bodies form a SE - NW belt with gentle NE dips. It is not yet certain that they all lie in the same stratigraphic sequence within formational unit 7; if so, a lateral facies change is indicated.

On the Lisa Group, dips to the SW were observed but whether these represent bedding or cleavage is not certain at this stage; the exposures were in general poor.

The volcanics are underlain by a limey quartzite, which in turn is underlain by a brown weathering ferrodolomite with calcite veins.

Sericite-biotite schists are exposed on the Eze claims 4 and 5, on the NE part of the property (figure 2); these schists are undoubtedly part of the favorable schist formation no. 7.

If further mapping confirms SW dips of the schists and NW dips on the Swim Lake hill, a NW trending anticline may extend to the SE from this latter hill into the Lisa ground. Therefore, the horizon containing the sulphide body on Swim Lake hill may be present on the Lisa Group, and further geological mapping should be carried out in an effort to test this hypothesis and if found correct, to make an estimate of the possible depth where this zone may occur on this ground.

The fact that the airborne survey has indicated conducting zones, which mapping has shown lie in a schistose sedimentary environment, is an added favorable factor.

The combined results of the airborne survey and of initial reconnaissance mapping thus suggest that as the Lisa Group may be underlain by a favorable host unit, known to carry ore elsewhere, further surface work is fully justified.

Structurally, the Lisa Group is cut by a number of strong NW lineaments and the airborne magnetics suggest that Moose Creek is not a locale of significant NE faulting. Further mapping would endeavour to check this interpretation and should have as a main objective the testing of the hypothesis that the Lisa Group covers ground which

contains the structurally and lithologically favorable features postulated in the foregoing description.

SOIL SAMPLING

Figure 2 shows the location of 12 soil samples taken by A.F. Koster van Groos and R. Peltola. The following analyses were obtained from T.S.L. laboratories on the samples submitted:-

Sample No.	P.P.M. Pb	P.P.M. Zn	P.P.M. Ag
1	21	64	.5
2	25	60	/ *
3	18	44	.5
4	14	39	.5
5	19	48	.5
6	18	104	1.0
7	9	50	.5
8	10	60	.5
9	27	75	/ *
10	19	52	.5
11	18	64	.5
12	14	55	.5

* / below limit of detection

Background values in this district are generally about 1 - 20 ppm Pb and 30 - 75 ppm Zn.

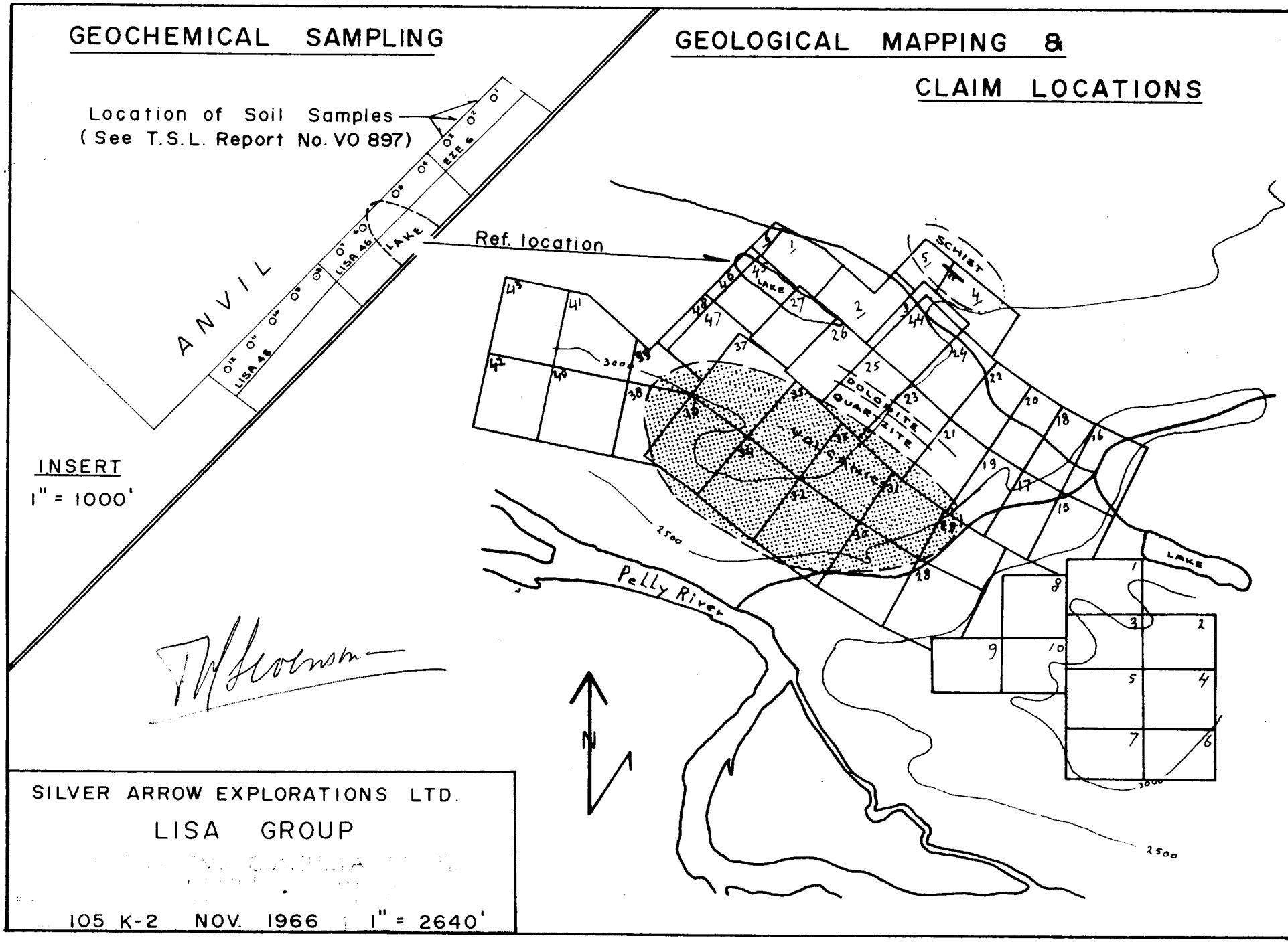
Samples 1, 2 and 9 show values for lead slightly above background; they are located in the vicinity of conducting zones.

Sample 6 shows a zinc value slightly above background, but the sample comes from a low-lying area near the lake, and is therefore not significant.

Further soil sampling should be done for Cu, Pb and Zn, as Ag is not significant in this area. Streamsilt samples should be taken along the creeks crossing the property. Reconnaissance soil sampling

GEOCHEMICAL SAMPLING

GEOLOGICAL MAPPING & CLAIM LOCATIONS



SILVER ARROW EXPLORATIONS LTD.

LISA GROUP

105 K-2 NOV. 1966 1" = 2640'

on lines 800' apart with stations at 200' intervals is recommended for the area lying to the NW of the NW boundary of Lisa 21 and 22.

In view of the general geological setting of this property, the absence of a geochemical anomaly would not preclude the presence of a mineralized zone at greater depth and in assessing this property, emphasis on geological mapping should be greater than on soil sampling.

SUMMARY

The Lisa Group straddles the contact between the upper part of the favorable schist unit no. 7 and the overlying volcanics.

Weak to medium conducting zones occur on part of the property. Some of these are part of a mile long zone extending on the Kay Group to the Northwest, and some are more localized conductors.

Twelve reconnaissance soil samples have so far indicated weakly anomalous conditions near some conductors.

Structurally, a zone known to contain sulphide bodies elsewhere may underlie part of the property.

RECOMMENDATIONS

The property is well located and warrants detailed mapping as well as soil sampling on about 7 line miles, on lines 800' apart with stations every 200', and streamsilt sampling on stations 400' apart in the creeks. This will require a total of about 200 samples.

Mapping is best done along about 15 miles of line before breakup, as swampy NW-SE draws follow the full length of the property.

COST OF PROPOSED PROGRAM

1. Linecutting 15 line miles @ $120 per line mile	$1,800
2. Geological mapping 2 men, 2 weeks - 1 man month	1,500
3. Camp construction	750
4. Transportation	1,500
5. Soil sampling	800
6. Assaying	600
7. Engineering and supervision	1,000
	$7,950
Contingencies, 20%	1,550
	$9,500

Respectfully submitted,

P.H. SEVENSMA CONSULTANTS LTD.

P.H. Sevensma

P.H. Sevensma, Ph.D., P. Eng.

PHS/lz

December 2, 1966

CERTIFICATE

I, PETER H. SEVENSMA, of Vancouver, B.C. do hereby certify

that:

1. I am a graduate of the University of Geneva, Switzerland (Physics and Chemistry, 1937; Geology and Mineralogy, 1937) where I obtained my Ph.D. in Geological and Mineralogical Sciences in 1941.

2. I am a Consulting Geological Engineer and a registered member in good standing of the Association of Professional Engineers of British Columbia and of the Association of Professional Engineers of Yukon Territory.

3. From February 1948 until December 1965 I have been engaged continuously in mining and exploration geology in the employ of Cominco Limited. As a Senior Exploration Geologist, I have worked extensively both in Eastern and Western Canada.

4. I have personally examined on several occasions the claims which are the subject of this report and have acted as a Consulting Geologist since early 1966 on the exploration program conducted by Silver Arrow Explorations Ltd. on these claims.

5. I have not received, nor do I expect to receive or acquire, directly or indirectly, any interest in any of the properties or securities of Silver Arrow Explorations Ltd.

Respectfully submitted,

P.H. Sevensma, Ph.D., P. Eng.

December 2, 1966

APPENDIX A

LIST OF FIRMS AND INDIVIDUALS ENGAGED IN WORK PROGRAMS ON LISA GROUP FOR SILVER ARROW EXPLORATIONS LTD.

Surveying, Tape & Compass: May 1 - 7, 1966	P.H. Sevensma Consultants Ltd. M. Cloutier, Field Operator Joe Dick, Assistant
Airborne EM & AM Survey: May 7, 1966	Lockwood Survey Corporation, Vancouver, B.C. H. Sandan, Operator
Geophysical Helicopter:	CF-NJW G. Kerr, Pilot
Legal Surveying: July 13-15, 1966	White, Hosford & Impey, Whitehorse, Y.T.
Geological Survey: August 2 - 8, 1966	P.H. Sevensma Consultants Ltd. Dr. A.F. Koster van Groos, Geologist
Geochemical Reconnaissance: August 2 - 8, 1966	Silver Arrow Explorations Ltd. R. Peltola, Field Operator
Geochemical Analysis: August 19, 1966	T.S.L. Laboratories Ltd., Vancouver, B.C.

CERTIFIED CORRECT:

APPENDIX B

SILVER ARROW EXPLORATIONS LTD.

COST BREAKDOWN FOR 1966 WORK ON LISA GROUP

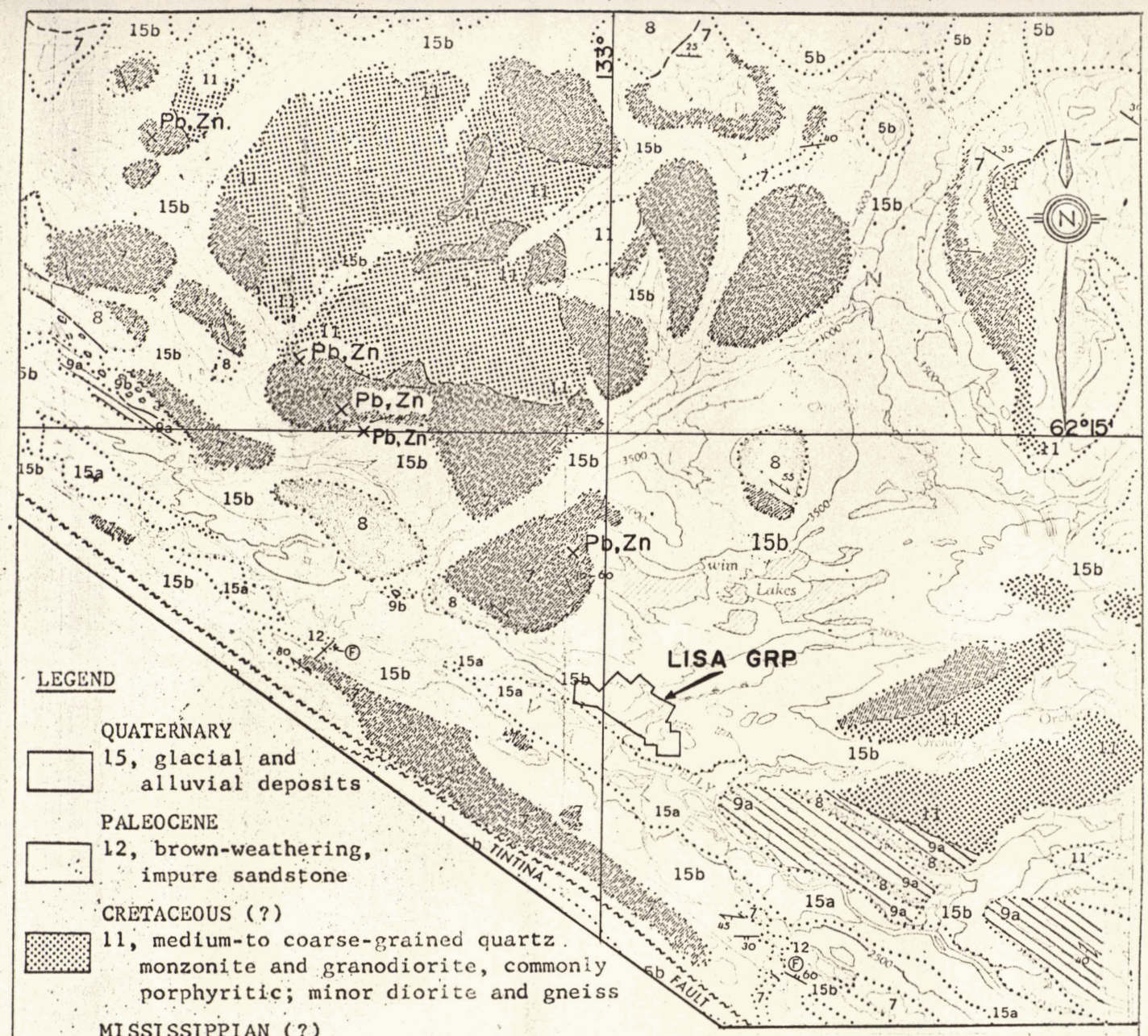
Type of Work	Cheque #	Paid to	Amount	
1. Linecutting and surveying				
Meals and lodging	13	Ross River Enterpr.	$ 63,65	
Wages	14	Joe Dick	20.00	
Preparatory for EM	16	P.H. Sevensma Cons.	537.50	
Preparatory to airborne	18(part)	Klondike Helicopters	437.00	
Consulting fees and expenses	19	P.H. Sevensma Cons.	552.00	
Expenses (M. Cloutier)	19	P.H. Sevensma Cons.	203.28	
Survey	28	White, Hosford & Impey	1271.83	$3,085.26
2. Airborne Survey				
Lockwood CF-NJW	18(part)	Klondike Helicopters	$ 378.00	
Wire	20	C.N.T.	1.50	
Consulting fees and expenses	27(part)	P.H. Sevensma	314.00	
Lockwood instrument rental	*	Lockwood Survey Corp.	653.70	
Lockwood data reduction	*	Lockwood Survey Corp.	1152.54	$2,499.74
3. Geological Survey & Soil Sampling				
Consulting fees and expenses	27(part)	P.H. Sevensma Cons.	$ 314.00	
Expenses	35	Koster van Groos	17.00	
Transportation	36	Klondike Helicopters	171.00	
Wages, Koster van Groos	37(part)	Selwyn Syndicate	180.00	
Bank charges	DM	Bank of Montreal	2.50	
Expenses	29 & 30	R. Peltola	150.00	$ 834.50
				$6,419.50

* Paid directly by Silver Arrow Explorations Ltd.

Part of R. Peltola fee charged to Lisa Geology and Soil Sampling * $ 550.00

Total Expenditure $6,969.50

CERTIFIED CORRECT:



LEGEND

QUATERNARY

15, glacial and alluvial deposits

PALEOCENE

12, brown-weathering, impure sandstone

CRETACEOUS (?)

11, medium-to coarse-grained quartz monzonite and granodiorite, commonly porphyritic; minor diorite and gneiss

MISSISSIPPIAN (?)

9, 9a greenish grey quartzite, commonly thin-bedded; micaceous and silvery graphitic schists; and silty limestone

9b conglomerate

8, altered, dark green andesite and basalt flows and tuffs, minor sediments

7, banded quartzose granulite, green and purplish banded skarn, quartz-sericite schist, hornfels and phyllite; clorite schist and thin altered andesite.

DEVONIAN/MISSISSIPPIAN

5, 5a chert-pebble conglomerate

5b chert, shale, quartzite; minor conglomerate and limestone

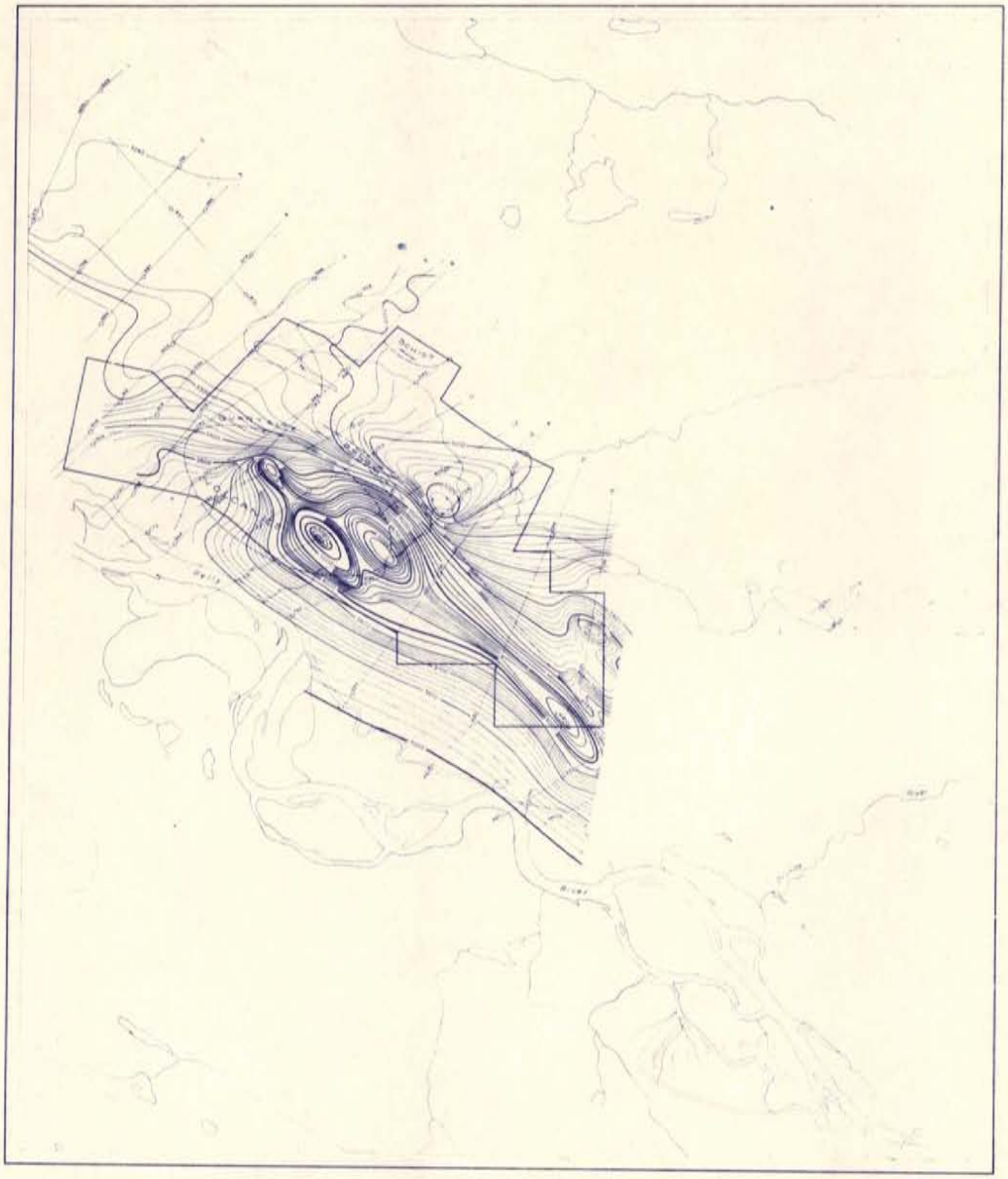
5c slate, shales, sandstone, greywacke, phyllite; minor conglomerate

P.H. Sevensma

SILVER ARROW EXPLORATIONS LTD.		
LISA GROUP		
P. H. SEVENSMA CONSULTANTS LTD. 715 - 850 WEST HASTINGS VANCOUVER, B.C.		
REF.: N.T.S. 105 K-2	DATE: DEC. 2, 1966	SCALE: 1" = 4 Mi

FIG. 1

SILVER ARROW EXPLORATIONS LTD
AIRBORNE GEOPHYSICAL SURVEY



CLAIMSHEET 105-K-2
LISA GROUP
YUKON TERRITORY
WHITEHORSE MINING DISTRICT
SCALE

MAGNETOMETRIC MAP

T. H. Stevenson

Figure 3.

SILVER ARROW EXPLORATIONS LTD
AIRBORNE GEOPHYSICAL SURVEY

CLAIMSHEET 105-K-2
LISA GROUP
YUKON TERRITORY
WHITEHORSE MINING DISTRICT

SCALE

ELECTROMAGNETIC MAP

T. M. Stevenson

Figure 4.

PLAN SHOWING

LOCATION OF LISA

KAY & PEA CLAIMS

MAP SHEET 105-K-3 & -2

SCALE 1"=400'

• ½" I.BAR PLACED

WHITE HOSFORD & IMPEY LIMITED

TRUE NORTH

KAY 13

KAY 14

KAY 44

KAY 5

KAY 6

PEA 30

PEA 29

KAY 11

KAY 12

ANVIL FRACTION

KAY 4

LISA 48

LISA 46

KAY 3

PEA 32

PEA 31

LISA 47

LISA 45

I.R.K.

LISA

OPEN GROUND

KAY 1.

PEA 34

PEA 33.

LISA 42

LISA 43

LISA 27

LISA 26

PEA 36

PEA 35

LISA 25

LISA 44

OPEN GROUND

July 18th 1966