

# Shangrí-La Mínerals Límíteð

87-289-16077

GEOLOGICAL BRANCH ASSESSMENT REPORT





REFORT ON AIRBORNE GEOFHYSICAL SURVEY OF THE CAT 1 & 2 CLAIMS

FOR

Operator: TRI COUNTY HOLDINGS LTD. Owner: Norma Command

> NTS 82K/11W REVELSTOKE M.D. BRITISH COLUMBIA

NORTH LATITUDE 489 987 50° 35.4' WEST LONGITUDE 1210° 37" 117° 20'

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FILMED

F. DI SFIRITO, B.A.Sc., F.Eng.

SHANGRI-LA MINERALS LIMITED 6 MAY 1987

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#### SUMMARY

On March 21, 1987, Shangri-La Minerals Limited conducted an airborne magnetometer and VLF-EM survey over the Cat 1 & 2 claims with the object of defining geophysical targets which may be associated with precious metal deposits. The survey was performed on behalf of Tri County Holdings Ltd. This report presents the results of the survey, an evaluation of the Cat 1 & 2 claims, and recommendations for a \$150,000 exploration program.

The Cat 1 & 2 claims are approximately 90 km southeast of Revelstoke in the Revelstoke Mining Division. They lie on the crest and southwesterly facing flank of Silvercup Ridge, just northeast of Trout Lake. The claims are accessible by road.

The claims are within the Kootenay Arc, a geologically complex zone in the southern Rocky Mountains which hosts several hundred known precious metal occurrences.

The Cat 1 & 2 project area has been explored for minerals since the 1890's, and many prospects have been located on Silvercup Ridge. The most significant producer in the area was the Silver Cup Mine, which was approximately 4 km north of the Cat 1 & 2 claims. Froduction at the Silver Cup Mine is reported to have been more than 23,000 tons of ore averaging 0.22 oz/ton gold, 62 oz/ton silver. In 1986, a drill program 25 km northwest of the Cat 1 & 2 claims returned very good values, including 0.6 oz/ton gold over 25'.

Shipments of high grade ore have been made from the northern portion of the Cat 1 & 2 property, from the Foggy Day prospect. These include a 26 ton shipment made in 1917 from the Foggy Day which averaged 4.35 oz/ton gold, 13.9 oz/ton silver. The Cat 1 & 2 project area was the subject of a soil geochemical survey in 1980 which indicated strongly anomalous values for gold, silver, lead, and copper. The results of the airborne magnetic and VLF-EM survey do not reveal any anomalies which are thought to be of economic significance, indicating that the airborne method lacks sufficient spatial resolution and sensitivity to detect the deposits in this area.

A combined geological, geochemical, and ground geophysical exploration program is recommended. A primary object of the program is to determine, if possible, the geochemical and/or geophysical signature of the Foggy Day vein system. If a characteristic signature can be determined, a reconnaissance program can be designed to explore the rest of the Cat 1 & 2 property for similar targets. As well, trenching and detailed sampling are recommended in order to investigate the geometry and grade of the Foggy Day vein.

The program will consist of grid establishment, trenching and sampling, a soil geochemical survey, and the application of various ground geophysical methods. A sum of \$150,000 should be allocated to complete the proposed program.

Contingent upon favourable results from the proposed program, diamond drilling and additional trenching will be necessary in order to further evaluate the economic potential of the Cat 1 & 2 claims.

Respectfully submitted в.с., F. DISPIRITO B.A.SY May 1987

#### INTRODUCTION

On March 21, 1987, Shangri-La Minerals Limited conducted an airborne magnetometer and VLF-EM survey over the Cat 1 & 2 claims with the object of defining geophysical targets which may be associated with precious metal deposits. The survey was performed on behalf of Tri County Holdings Ltd. This report presents the results of the survey, an evaluation of the Cat 1 & 2 claims, and recommendations for a \$150,000 exploration program.

#### LOCATION, ACCESS, FHYSIOGRAFHY

The Cat 1 & 2 claims are approximately 90 km southeast of Revelstoke in the Revelstoke Mining Division (Fig. 1). They lie on the crest and southwest flank of the Silvercup Ridge, northeast of Trout Lake.

The claims are traversed by a four-wheel-drive road which starts from a maintained gravel road (BC Highway 31) along the northeast side of Trout Lake. The four-wheel-drive road climbs the southwest flank of Silvercup Ridge just northwest of Rady Creek.

Elevations on the property range from 5600' to over 8800' ASL (1700-2680 m). Approximately two thirds of the property is above treeline, which is at about 7000'. Approximately one third of the property is quite gently sloping and above treeline. There are some steep cliffs in the north part of the property, and the west and southwest parts of the property are generally steep and heavily forested.



#### FROFERTY STATUS

The Cat 1 & 2 project area is shown in Figure 1. The property consists of two modified grid system mineral claims, and one 2-post claim (the Foggy Day) which is within the Cat 1 claim. The Cat 1 & 2 property surrounds two excepted Crown Grants - the IXL and the IXL Fr. Details of the property are as follows:

NAME	RECORD NO.	EXFIRY DATE	AREA
Cat l	1577	March 25, 1987 <sup>*</sup>	20 units <sup>**</sup>
Cat 2	1578	March 25, 1987 <sup>*</sup>	15 units <sup>**</sup>
Foggy Day	6888	May 9, 1989	20.9 ha

A Statement of Exploration and Development has been filed with respect to the airborne geophysical survey which is the subject of this report. Upon acceptance of this report, the expiry date of the Cat 1 and Cat 2 claims will be March 25, 1988.

\*\* Both the Cat 1 and Cat 2 claims overlie pre-existing mineral claims and Crown Grants, so that their total area is less than 35 units.

#### HISTORY

The Trout Lake area has been explored for minerals since the 1890's, and many prospects have been located on Silvercup Ridge (Fig. 2). Due to the remoteness and inaccessibility of the area in the early 1900's, only the highest grade ore was shipped.

The most significant producer in the area was the Silver Cup Mine, which was approximately 4 km north of the Cat 1 & 2 claims. The Silver Cup Mine operated intermittently from 1895 to 1974,



and official production was more than 23,000 tons of ore averaging 0.22 oz/ton gold, 62 oz/ton silver (Schroeter et al., 1986). The Triune (653 tons), and the Winslow (1,788 tons) were other important producing mines in the vicinity of the project area (Read, 1976a). Silver properties in this area are noted for their high gold values - ore values from the Triune (2 km north of the Cat 1 & 2 claims) were about 0.6 oz/ton gold, 325 oz/ton silver, 25% lead (MMAR 1900).

A 1986 drilling on Windflower Mining Ltd.'s Goldfinch property approximately 25 km northwest of the Cat 1 & 2 claims has returned very good values, including 0.6 oz/ton gold over 25' (News Release, Oct. 6, 1986). The property is under option to Granges Exploration Ltd.

Small shipments of high grade ore have been made from the northern portion of the Cat 1 & 2 property, from the Foggy Day prospect. In 1917, a 26 ton shipment from the Foggy Day averaged 4.35 oz/ton gold, 13.9 oz/ton silver (MMAR 1918). The very high gold content indicates that the ore was oxidized, which results in leaching of the pyrite with which the gold is associated. The Cat 1 & 2 claim area was the subject of a geochemical survey in 1980 which indicated strongly anomalous values in gold (1210 ppb), silver (9900 ppb), lead (2250 ppb), and copper (335 ppm) (Netolitzky, 1981).

## REGIONAL AND LOCAL GEOLOGY AND MINERALIZATION

The Cat 1 & 2 claims are within the Kootenay Arc, a geologically complex zone of the Furcell Anticlinorium in the southern Rocky Mountains. In the Trout Lake area, the Kootenay Arc is comprised of interbedded sedimentary and volcanic rocks of late Proterozoic to Mesozoic Age which have been subjected to multiple episodes of metamorphism, deformation, and intrusion (Read, 1976b) (Fig 3).



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The Kootenay Arc is a metallogenic province hosting several hundred known precious metal occurrences. In the Trout Lake area, mineral occurrences lie along three fairly well-defined beds the Lime Dyke Belt, the Central Belt, and the Southwestern Belt (Fig. 2). The Cat 1 & 2 claims are within the Central Belt.

The mineralization is dominantly galena, sphalerite, pyrite, and occasional chalcopyrite in a quartz and carbonate gangue. The precious metal content varies depending on the vein types, with high silver values in galena-rich veins, and high gold values in pyrite with relatively less galena. If the ore is oxidized, gold values are often in the 4-5 oz/ton range. More representative gold values for unoxidized ore are on the order of 0.2-0.6 oz/ton.

#### AIRBORNE VLF-EM AND MAGNETOMETER SURVEY SPECIFICATIONS

The airborne magnetometer survey provides an effective method of reconnaissance mapping of lithology for rock types with differing magnetic mineral concentrations. Under favourable circumstances, small-scale features such as dykes and magnetic mineral deposits can be detected.

Airborne VLF-EM data are mainly used for the interpretation of large-scale geological features such as faults and conductive rock units, although under favourable circumstances smaller conductors (such as massive sulphide deposits) may be revealed. VLF-EM surveys are recognized as a cost-effective complement to airborne magnetic data.

The survey system equipment simultaneously monitors and records the output signals from a proton precession magnetometer

and two VLF-EM receivers installed in a bird which is towed over the survey area at an altitude of approximately 75 m by helicopter. The average flying speed while surveying is about 110 km/hr. Landmarks along the flight lines are plotted on aerial photographs as the lines are flown. This allows subsequent production of a flight line map on which to plot the survey results.

The two VLF-EM receivers respond to signals from two different transmitters - one near Seattle, Washington and one near Annapolis, Maryland. Conductors respond most strongly to the transmitter in the direction of their strike.

The three channels of geophysical data and one navigational marker channel are each digitized at a sample rate of approximately once every 1.6 seconds (resulting in a station spacing of approximately 50 m) using an 8 channel analog-to-digital converter. The data is then recorded digitally on one channel of a stereo cassette tape recorder, while the other channel records the operators' voice descriptions of landmarks, line identification, and other details. As well, the data is displayed on the screen of a TRS-80 Model 100 lap computer as it is recorded. Instrument specifications are detailed in Appendix C.

The flight lines run northwest-southeast. The line spacing is roughly 150 m.

DISCUSSION OF AIRBORNE GEOFHYSICAL RESULTS

#### Airborne Magnetometer Survey

The results of the airborne magnetometer survey are presented in Figure 4. Total magnetic field strength variation on the Cat 1 & 2 project area is on the order of 100 gammas, which is very low. This implies that there is very little variation in the magnetic mineral content of the rock types in this area. The magnetic field strength in the northern part of the property is generally higher than that in the south, indicating a very slightly more magnetic rock type to be present there.

#### Airborne VLF-EM Survey

The results of the airborne VLF-EM survey using the Seattle transmitter are presented in Fig. 5a, and those using the Annapolis transmitter are shown in Fig. 5b.

There is a zone of generally higher conductivity for both the Seattle and Annapolis results which trends east-west across the central area of the property. This zone corresponds to a topographic high, and it is not thought to be of economic significance. Given the nature of the exploration targets in this area, it is unlikely that the airborne VLF-EM results could detect them.

#### CONCLUSIONS

There are numerous precious metal occurrences in the vicinity of the Cat 1 & 2 claims, and small tonnages of very high grade gold ore have been shipped from the property. The area has never been extensively prospected using modern methods.

The results of the airborne magnetic and VLF-EM survey do not reveal any anomalies which are thought to be of economic significance, indicating that the airborne method lacks sufficient spatial resolution and sensitivity to detect the deposits in this area.

#### RECOMMENDATIONS

A combined geological, geochemical, and ground geophysical exploration program is recommended. A primary object of the program is to determine, if possible, the geochemical and/or geophysical signature of the Foggy Day vein system. If a characteristic signature can be determined, a reconnaissance program can be designed to explore the rest of the Cat 1 & 2 property for similar targets. As well, trenching and detailed sampling are recommended in order to investigate the geometry and grade of the Foggy Day vein system.

Initially, the program will consist of grid establishment, prospecting and geological mapping, a soil geochemical survey, trenching and sampling, and the application of various ground geophysical methods in the area of the Foggy Day vein.

The baseline of the grid should be on strike with the Foggy Day vein, and extend for approximately 1 km. Crosslines should be established at 100 m intervals and extend 500 m on either side of the baseline. Crosslines should be established at 50 m intervals near the surface exposure of the Foggy Day vein. All lines should be slope-corrected for topographic variation. This grid will give control for prospecting, geological mapping, the geochemical survey, and the geophysical surveys.

Soil samples should be collected along the crosslines and baseline at 25 m intervals, with more detailed sampling (10 m) for 50 m on either side of the baseline. Samples should be analyzed for an ICP multi-element suite, and AA for gold. The geochemical results should be analyzed statistically to allow for better resolution of anomalies.

A variety of geophysical surveys should be tested on the crosslines, including electromagnetic (VLF-EM, Crone shootback, horizontal/vertical loop), magnetic, induced polarization, and self potential. The more expensive methods, such as induced polarization, would be used on just some of the lines.

The induced polarization method is particularly suitable for detecting the pyrite mineralization with which the gold is associated, but interference from graphite is expected. The electromagnetic methods are expected to indicate areas of conductivity associated with the vein.

When the Foggy Day vein has been extensively surveyed, it should be trenched and sampled in detail. Using the results of the survey on the Foggy Day vein, a program to explore the rest of the Cat 1 & 2 property should be designed and implemented.

# ESTIMATED COST OF PROPOSED EXFLORATION PROGRAM

Survey of Foggy Day Area

Grid establishment	\$6,000
Soil Geochemical survey (including analyses)	14,000
Geological support	3,000
Trenching	8,000
Assays	2,000
Ground magnetometer survey	4,000
Electromagnetic surveys	12,000
Induced polarization survey	10,000
Engineering and report	4,000
Contingencies @ 15%	9,450

Total cost for survey of Foggy Day area \$72,450 Estimated cost for surveying remainder of property <u>\$80,000</u> Total Cost of Proposed Program, say \$150,000

Contingent upon favourable results from the proposed program, diamond drilling and additional trenching will be necessary in order to further evaluate the economic potential of the Cat 1 & 2 claims.

Respectfully submitted at Vancouver, B.C.,

F. DISPIRITO Di в to. 6 May 1987

#### REFERENCES

Geochemical and geophysical evaluation Allan, J.R. of a portion of the Winslow Group claims, 1983 B.C. Minister of Mines Annual Reports for 1900, 1914, 1918 Geological evaluation and exploration Netolitzky, R.K. program, Trout Lake Project, 1981 Read, P.B. Mineral Deposits, Lardeau West Half, GSC OF 464, 1976a Read, F.B. Geology, Lardeau West Half, GSC OF 432, 1976b Schroeter, T.G., Gold in British Columbia, MEMPR Frelim. Fanteleyev, A. Map No. 64, 1986.

Windflower Mining Ltd. News Release, October 6, 1986

AFFENDIX A

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COST BREAKDOWN OF AIRBORNE SURVEY

# COST BREAKDOWN OF AIRBORNE SURVEY

52 line-km of airborne surveying including report preparation and research \$7,000.00

Total Cost For Survey \$7,000.00

CERTIFICATES

# AFFENDIX B

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#### CERTIFICATE

I, Frank Di Spirito, of Vancouver, British Columbia, do hereby certify:

- I) I am a Consulting Engineer with the firm of Shangri-La Minerals Limited, based at 706-675 West Hastings Street, Vancouver, B.C., V6B 1N2.
- II) I am a graduate of the University of British Columbia (1974) and hold a Bachelor of Applied Science in Geological Engineering.
- III) I am a registered member, in good standing, of the Association of Professional Engineers of British Columbia.
- IV) Since graduation, I have been involved in numerous mineral exploration programs throughout Canada and the United States of America.
- V) This report is based on an evaluation of data obtained by a Shangri-La Minerals Limited crew on March 21, 1987, and an evaluation of publicly and privately held data pertaining to the claim area.

Respectfully ouver, B.C. OF PIRITO Sn Enq. Di 4av 1987

#### CERTIFICATE

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I, J. Campbell Graham of the City of Vancouver in the Frovince of British Columbia, do hereby certify:

- I) I am a Consulting Geophysical Engineer with the firm of Shangri-La Minerals Limited, 706-675 West Hastings Street, Vancouver, B.C., V6B 1N2.
- II) I graduated with a Master of Engineering degree (1985) in Geophysical Engineering and a Bachelor of Science degree (1982) in Geophysical Engineering from the Colorado School of Mines, Golden, Colorado.
- III) I have been involved in numerous mineral exploration programs since 1975.
- IV) This report is based upon field work carried out by a Shangri-La Minerals Limited crew on March 21, 1987.

Respectfully submitted at Vancouver, B.C. Graham, M.Eng. J.C. 6 ма/у 1987

# AFFENDIX C

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# AIRBORNE EQUIPMENT SPECIFICATIONS

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# SPECIFICATIONS: SABRE AIRBORNE VLF-EM SYSTEM

Antenna System: 2 separate omnidirectional arrays, housed in same bird as proton magnetometer detector.

- Parameters Measured: Horizontal field strength on 2 stations simultaneously (Seattle and Annapolis). Designed for use in steep terrain where dip angle information is confusing and often useless.
- Type of Readout: 2 analog meters, one for each station, and 2 analog outputs at rear of console. These analog outputs, along with those of the proton magnetometer and a marker channel, were digitized by a CCC-Maron Remote Monitoring and logging system (an 8 channel, 8 bit analog to digital converter custom manufactured by Maron Engineering Ltd., Burnaby, B.C.) and stored in multiplex format on one channel of a conventional stereo cassette tape deck.

Receiver Console: 2 separate receiver channels, both housed in 30 x 10 x 25 cm case.

# Operating Temperature Range:

Instrument console:	-10 C	to	+50 0	2
Antenna System:	-10 c	to	+50 0	)

### **Power Source:**

Receiver Console:	8 alkaline penlite cells with life of 100 hours.
Instrument console:	2 9V transistor batteries

Manufacturer: Sabre Electronic Instruments Ltd., Burnaby, B.C.

# SPECIFICATIONS: SABRE AIRBORNE MAGNETOMETER

Type: Proton Precession

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**Range:** 20,000 to 75,000 gammas

**Repetition Rate:** Approximately 1.6 seconds

- Output: Analog meter on instrument console, 0-100 mV analog output on rear of console. Full scale deflection can be either 1000, 2500, or 5000 gammas, this being measured from a zero value selected by instrument operator depending on background field in survey area. Zero value for this survey was 57,000 gammas, with 1000 gammas full scale deflection. The analog output on the rear of the console was digitized with the CCC-Maron Remote Monitoring and Logging System and stored on one channel of a conventional stereo cassette tape deck along with the VLF-EM data and the navigational marker channel.
- **Resolution:** Resolution of instrument itself is better than 1 gamma, but recorded resolution is limited to about 4 gammas (1000 gamma full scale deflection is resolved to one part in 255 with the 8 bit CCC-Maron analog to digital converter).
- **Detector:** Kerosene-filled coil, 9 cm long x 8 cm diameter. Inductance 60 millihenries, resistance 7.5 ohms, weight 2.2 kilograms.

# Operating Temperature:

Instrument: -10 C to + 60 CDetector: -40 C to + 60 C

# Dimensions:

Instrument console:	30 x 10 x 25 cm, weight 3.5 kg.
Towed bird:	1.7 m x 21 cm diameter, weight 30 kg.
(VLF-EM antenna system	is housed in bird along with mag detector).

# Power Source:

2 12V 20 AH lead-acid batteries.

### Manufacturer:

Sabre Electronics Ltd., Burnaby, B.C.

AFFENDIX D

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# REDUCED MAPS

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