LOBELL MINES LTD.
GEOCHEMICAL, GEOLOGICAL, GEOPHYSICAL REPORT

Joe l-128 člaim group, 30 miles South of Smithers, BC 52° 22' North Latitude, 127° 12' West Longitude

AUTHORS: G. L. Anselmo G. E. White

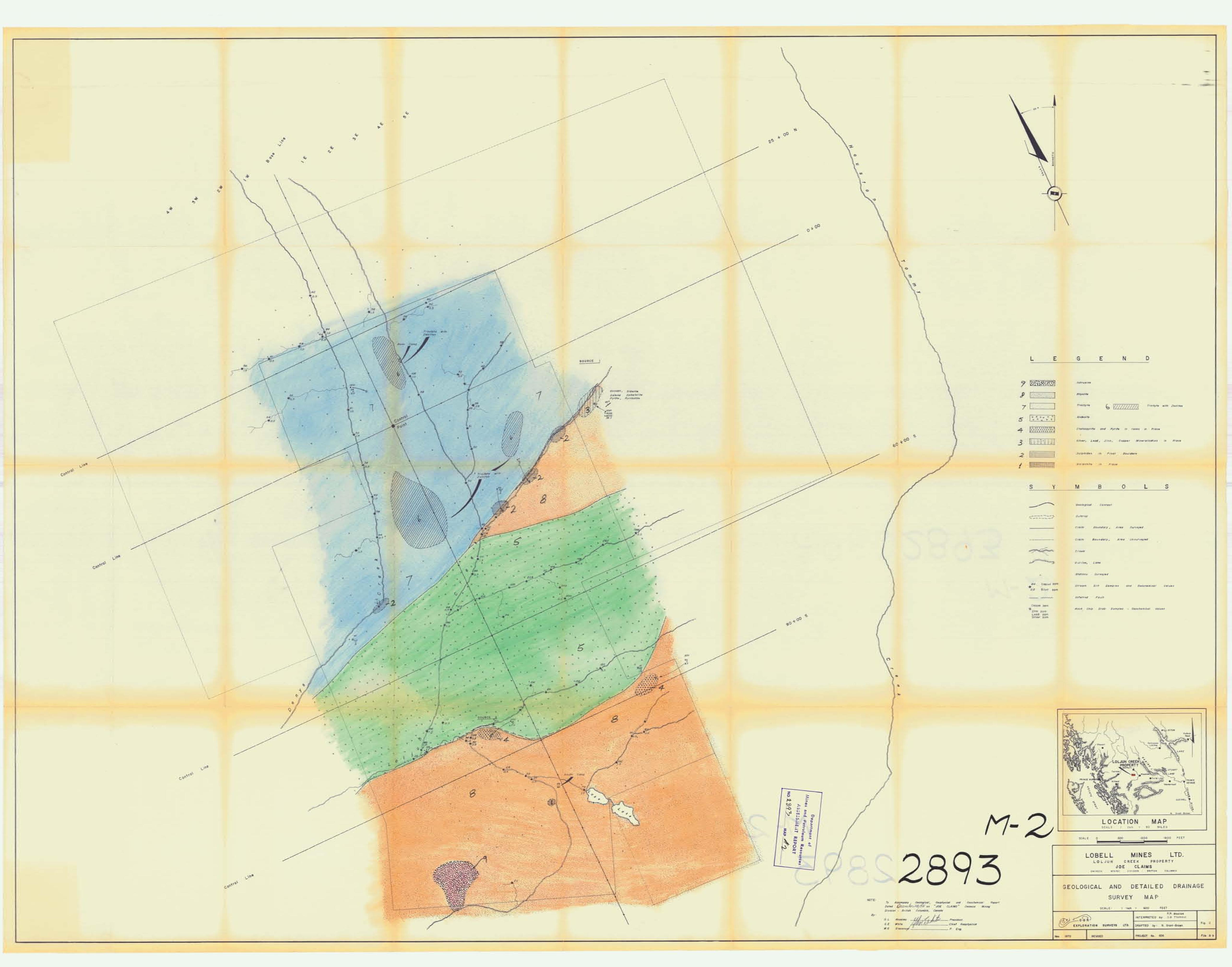
P. ENGINEER: W. G. Stevenson

DATE OF WORK: June 20 to July 7, 1970.

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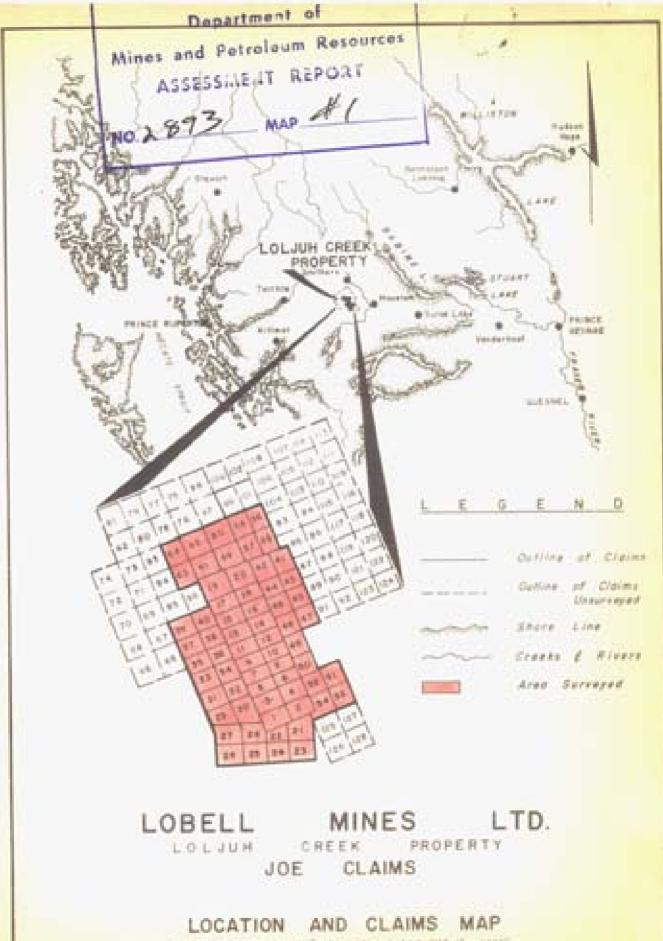




Department of .Aines and Petroleum Resources ASSESSMENT REPORT

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INTRODUCTION

From June 20 to July 7 1970, Tri-Con Exploration Surveys Ltd. on behalf of Lobell Mines Ltd. conducted a program of geological mapping, detailed reconnaissance soil sampling, and electromagnetometer and magnetometer surveying on the Joe claim group, Omineca Mining Division, Province of British Columbia.

The purpose of this 1970 exploration program was to conduct detailed-reconnaissance geochemical and geophysical surveys over areas determined anomalous by a reconnaissance geological-geochemical program carried out in 1969 by Pacific Geochemical Services, such that if the previously located anomalies were substantiated and further defined, detailed geochemical ical and geophysical programs could then be undertaken.

The purpose of the electromagnetometer survey was to try and locate any conductors indicative of massive mineralization or fault structures. The magnetometer survey was conducted to try and detect any magnetic patterns indicative of structure or lithology which upon correlation with the geochemical data would aid in determining the significance of any geochemical or electromagnetic anomalies located.

LOCATION AND ACCESS

The Joe 1-128 mineral claims are situated some 30 miles south of Smithers at latitude 54° 22' North, longitude 127° 12' West, Omineca Mining Division, Province of British Columbia.

Access to the property is by helicopter from a helicopter base at Smithers, as there are no roads to the property or lakes large enough on which to land a float equipped aircraft. Facile camp movement is by helicopter from the termination of logging roads which extend to within approximately 8 miles of the Joe claim group from Telkwa, B.C.

PROPERTY

The Joe Claim Group property of Lobell Mines Ltd., registered office at 14th Floor, 1030 W. Georgia Street, Vancouver, B.C. consists of some 128 contiguous mining claims listed as follows:

Joe 1 - 128 inclusive

HISTORY

The Joe 1-64 claims were originally staked in 1969 by Summit Oils Limited to cover two intersecting magnetic linears, discovered by pre-liminary magnetic interpretation of aeromagnetic Map 5309-G N.T.S. 93L/6. These magnetic linears were thought to be possibly indicative of fault zones. Subsequently Pacific Geochemical Services Ltd. were retained to carry out a program of reconnaissance geochemical-geological and geophysical surveying in an attempt to outline any areas of anomalous geochemical values on the claim group.

The property was then vended to Lobell Mines Ltd. who staked an additional 64 claims, Joe 65-128 to protect the areas of interest. Thereafter during the 1970 exploration season Tri-Con Exploration Surveys Ltd. were contracted to conduct a program of detailed-reconnaissance geological, geochemical, and geophysical surveys to further explore the Joe 1-64 claim group.

GENERAL GEOLOGY

The general geology of the area is shown on the B.C. Department of Mines and Petroleum Resources Map 69-1 at a scale of 1"=4 miles. This map indicates that the property is underlain by interbedded sedimentary and volcanic flows and tuffs of the Hazelton formation of Jurassic age. Mineralization is reportedly associated with a number of small igneous stocks which have intruded the Hazelton formation.

SURVEY SPECIFICATIONS

Survey Grid

A central blazed and flagged north-south directed baseline some 16,300 feet in length was established for the full north-south length of the claim block. Ten survey lines consisting of a total of 128,000 linear feet were cut parallel to the baseline at 700 foot intervals, five to the east, and five to the west. Four additional lines some 3,500 feet in length were cut in an east-west direction for grid control.

Geochemical soil samples were taken at 500 foot intervals along the grid lines. The ground magnetometer readings were taken at 100 foot intervals and the electromagnetometer readings at 50 foot intervals. Some

27 line miles of magnetometer and electromagnetometer surveying were conducted respectively.

Geology

Systematic geological mapping on a reconnaissance basis using the baseline and grid lines for control was conducted over the claim group. Areas of apparent particular interest were then examined in closer detail. Rock chip samples were taken for use in mapping and for later rock geochemical analysis.

The Geochemical Survey

Preliminary Discussion

From sample profiling and pH data gathered on the property in the summer of 1969, as presented in a report by Pacific Geochemical Services Ltd., dated January 20, 1970, the following conclusions were drawn.

- (a) A sampling depth of 8" to 10" ("B" horizon) was found to be the most likely sampling medium to give reliable geochemical readings.
- (b) Acidic soils indicated by pH testing show that copper & silver ions will travel with relative ease in the surface soils of the property.
- (c) In areas of high relief surface anomalies may be extended some distance down slope from their source. On the valley bottom, surface anomalies overlay the source due to the low relief.
- (d) Round rock in the soils of the valley bottoms suggest glacial deposition of materials whereas angular rock on the slopes suggests proximity of bedrock.
- (e) Silt samples taken from drainages of the property confirm the presence of mineralization on the property.

Based on these and other findings significant to the 1969 reconnaissance program, a detailed-reconnaissance geochemical program was carried out over the entire Joe 1-64 claim block in 1970.

During the 1970 exploration season there were 231 soil samples taken from the "B" horizon (8"-10") on the grid previously outline in

this report under <u>Survey Specifications</u> - <u>Survey Grid</u>. The samples were taken at 500 foot intervals and their locations were flagged and coded.

79 silt samples were taken while following up the drainages of the property and their locations are positioned in Figure 2.

The soil sampling medium ("B" horizon) was encountered in general from 8-18 inches in depth and is described as follows:

A light to medium brown fine to medium clay to sand (occasionally oxidized) containing in the majority of cases angular rock. The area is composed of various valley systems including ridges and mountain tops. The region is medium to heavily forested and non-timbered on the upper slopes.

The sample holes were dug with a mattock. The samples were taken by hand and placed in a water resistant bag where they remained until analysis. They were delivered to Chemex Laboratories Ltd., of North Vancouver, B.C. where drying, -80 mesh sieving, digestion by perchloric acid, and analysis by atomic absorption was carried out under the supervision of professional chemists. All samples were analysed for copper and silver. Intensities ranged from 4 ppm. to 1000 ppm. copper and from less than 0.5 to 3.5 ppm. silver.

The Magnetometer Survey

The magnetometer survey was conducted using a Geotronics G-110

Fluxgate magnetometer. This instrument measures the vertical component of the earth's magnetic field to an accuracy of 20 gammas.

Corrections for diurnal variation were made by tying into previously established base stations at intervals not exceeding one and one-half hours. Readings were taken at 100 foot intervals along the traverse lines.

The Electromagnetometer Survey

This survey was conducted using a Geotronics V.L.F. Electromagnetometer. This instrument acts as a receiver only. It utilizes the primary electromagnetic fields generated by V.L.F. marine communication stations. These stations operate at a frequency between 15-25 KHZ,

and have a vertical antenna-current resulting in a primary horizontal field. Thus, this V.L.F. - E.M. measures the dip-angle of the secondary field induced in a conductor.

For maximum coupling, a transmitter station located in the same direction as the geological strike should be selected, since the direction of the horizontal electromagnetic field is perpendicular to the direction of the transmitting station.

Readings were taken at 50 foot intervals and the data filtered in the field by the operator as described by D.C. Fraser, Geophysics Vol. 34, No. 6 (December 1969). The advantage of this method is that it removes the dc and attenuates long spatical wave lengths to increase resolution of local anomalies, and phase shifts the dip-angle data by 90 degrees so that crossovers and inflections will be transformed into peaks to yield contourable quantities.

DATA PRESENTATION

The survey data for the Joe claim group have been plotted at a horizontal scale of 1"=600 feet and accompany this report as follows:

Figure 2	2	Geological Map
Figure 3	3	Geochemical - copper contoured at 40,
		50, 60 ppm. levels.
Figure 4	4	Geochemical - silver contoured at .8,
		1.6, 2.4 ppm. levels.
Figure 5	5	Vertical Magnetic Intensity contoured
		at 500 gammas.
Figure 6	5	Electromagnetic dip-angle contoured at 5,
		10, and 13 degrees.

DISCUSSION OF RESULTS

Geology

The reconnaissance geological mapping has indicated that some 3-5% of the claim group consisted of outcrop which was scattered throughout the survey area. Virtually all the outcrop mapped was of volcanic origin. The exception was the small syenite intrusive located in the extreme southwest section of the claim group. The volcanic rocks consisted mainly of

medium grained red to gray andesites, trachytes and rhyolites part of the Hazelton formation. A description of the common rock types identified on the property, is as follows:

- (1) Trachyte Fine grained to porphyritic light gray to purple volcanic containing stains of limonite and manganese on fractures. The rock has approximately 0.5% disseminated magnetite and minor amounts of arsenopyrite.
- (2) Syenite Fine grained, light to medium gray porphyry with plagioclase phenocrysts, chloritized/biotized hornblende and 1-1.5% disseminated magnetite.
- (3) Andesite Fine-coarse grained red to green with prominent feldspar and mica inclusions with 1-2% disseminated magnetite.
- (4) Rhyolite Fine grained white to coloured with flow lines; in places contained a small amount of chalcopyrite mineralization.
- (5) <u>Diabase</u> Basaltic fine grained ophitic texture within the rock and contains approximately 65% mafic minerals and 35% fresh unaltered plagioclase.
- (6) <u>Basalt</u> Dark grey porphyritic texture contains abundant light coloured plagioclase, phenocrysts in a dark grey ground mass with clots of rounded epidote; possibly an intrusive basalt.

Mineralization within the reconnaissance survey area occurred in both disseminated and vein-like fracture filling form. Typical mineralogical associations observed were (1) Siderite, galena, sphalerite

(2) Pyrite, chalcopyrite, pyrrhotite

Zeolites and epidote were commonly found in the volcanic rocks, the first as cavity fillings and the second as alteration zones which give the volcanics a light green sugary texture. The mineralization located on the property appears to be associated with faulting as the outcrops located show sheared and slickensided surfaces.

The claim group is divided into several areas of varying elevations which may possibly be the result of block and transform faulting.

Mineral deposition may possibly be contemporaneous with the faulting.

The area is also probably underlain by Upper Cretaceous or early Tertiary intrusive rocks consisting of quartz-monzonite, granodiorite, quartz diorite and porphyritic and fine grained equivalents. Faulting and mineralization may be associated with these subsurface intrusions. Thus the syenite intrusion in the southwestern section of the survey area may be part of a larger body of intrusive rock.

From the reconnaissance geological examination, two main areas of mineralogic interest were discovered. These areas are referred to as Source I and Source 2 and are illustrated in Figure 2.

Source I

This zone was located through stream follow-up along Loljuh Creek. This area is fairly extensively mineralized approximately 200' wide and 300' long, along a geological contact at the base of a mountain on the south side of Loljuh Creek. Two types of sulphide mineralization were noted. Green andesites containing disseminated pyrite and pyrrhotite were found below the contact and above the contact the andesites contained veins of calcite and siderite. Associated with these carbonate rocks are veinlets of galena and sphalerite comprising approximately 2-5% sulphide mineralization.

This mineralized outcrop appears to be the source to the iron stained siderite bearing mineralized rock float found along Loljuh Creek.

Source 2

This mineralized outcrop is located in the southern part of the claim group. Chalcopyrite and pyrite mineralization occur as fracture fillings in an altered green andesite. This mineralized zone is still undefined in an east-west direction along Loljuh Creek. Epidote is the most common alteration mineral present. Pyrite, pyrrhotite and chalcopyrite with malachite staining occur as blebs and fracture fillings within the rock.

Sulphide mineralization forms from 2 to 5% of the rock.

A rock chip sample taken from a hillside some 2200 feet further to the east showed .5 to 1% chalcopyrite, sphalerite and galena mineralization in a white rhyolite.

Mineralized float samples were also observed in Denys Creek. One sample was an angular piece of quartz with borders of epidote alteration. In this piece of float malachite stain and dark grey mineral, possibly a sulphide of copper were observed.

Geochemistry

The 1969 geochemical program based on sampling traverses over the large area of the property showed various interesting but non-specifically defined areas. The 1970 detailed-reconnaissance program outlined two major areas of interest. The areas outlined as anomalous in copper have coincident high silver values. The two areas are exceptionally large and are, due to the wide sample spacing, as yet only generally defined. However, their size is not expected to diminish with detailed sampling, as stream sediments with high copper-silver values as well as areas of visual copper-silver sulfides in place within these anomalies confirms the size and suspected importance of these anomalies.

The southernmost copper anomaly runs E-W and is coincident with changing lithology and a definite E-W trending magnetic high flank. This area also is somewhat coincident with a large E.M. conductor.

The northernmost copper anomaly runs N-S to NW-SE and is strongly coincident with the silver anomaly. Mineralization has been located on the East and West flanks of this anomalous area which is overburdened.

These two main anomalies are therefore excellent targets for intensified exploration. Related sulphides in the form of chalcopyrite, tetrahedrite, galena, sphalerite, and iron pyrite, have already been located within these areas. The possibility of encountering this mineralization in greater amounts on the surface is highly probable and its significance in relation to the overall anomalies will be determined upon a program of more intensified studies of these areas.

The Magnetometer Survey

The magnetic intensity showed considerable variation from a minimum of 4480 gammas to a maximum of 8720 gammas, a change of 4200 gammas. This strong magnetic change is located in the southern section of the survey area which is a region of high magnetic gradients. Whereas the magnetic intensity in the northern two-thirds of the claim group is relatively plateau like with variations around 500 gammas. In general on the southern one-third of the property the zones of high magnetic intensity trend east-west and may reflect the lithology of the Hazelton volcanic flows. The large magnetic depression located along the eastern extension of Loljuh Creek in the southern section of the property, in general forms the boundary of the area of high magnetic changes with the northern area of low magnetic relief and may have some structure or lithologic association with the mineralization located along this section of Loljuh Creek. In general the magnetic contours in the southern section of the property are biased in an east-west direction while in the northern two-thirds of the claim group they appear to be biased in a more NW-SE direction.

The Electromagnetometer_Survey

The electromagnetometer survey delineated several zones of moderate NW-SE and approximately E-W directed conductivity trends. The principle electromagnetic conductor is located in the southern section of the property, in an area of fault intersections and generally along the boundary of the magnetic plateau and the area of high magnetic intensities.

The northern two-thirds of the survey area contains mostly NW-SE trending electromagnetic conductors which may indicate NW-SE directed structure fault features. In this area on the western end of control line 0+00 there is an excellent correlation between a high electromagnetometer dip-angle and coincident high copper-silver values. The electromagnetic data at this point has been shown as trending NE. However, the trend should possibly be SE. This electromagnetic anomaly would then intersect another weak electromagnetic conductor to the SE and would parallel, just upslope, a definite copper geochemical trend.

CONCLUSIONS

Correlation of the reconnaissance geological, geochemical and geophysical information to date located two areas of high copper and silver
geochemical responses which show good correlation with trends delineated
by the magnetometer and electromagnetometer surveys. The first area is in
the southern section of the property along the eastern extension of Loljuh
Creek, and the second is in the northern section of the survey area around
the main control point for the survey grid.

Mineralization of commercial interest in the form of chalcopyrite, tetrahedrite, galena and sphalerite has already been located within these areas. Thus because of the large amount of area covered by overburden the possibility of detecting additional mineralization is quite good.

RECOMMENDATIONS

Α

- (1) Layout grids using the existing base line for control to cover the two main areas of interest.
- (2) Conduct detailed geochemical sampling on these grids in conjunction with a limited amount of hammer seismic work to evaluate overburden conditions.
- (3) Conduct a program of induced polarization surveying on these grids.
- (4) Conduct a program of detailed geological mapping over the grids.
- B Conduct a program of general prospecting and geochemical sampling traverses consisting of cold extractable field kit and sediment follow up surveys, on the major streams on the surrounding Joe 65-128 claims.

Particular interest should be concentrated on the areas in the Joe 65-128 claims that are designated by open-ended anomalies on the Joe 1-64 claims.

Respectfully submitted,

TRI-CON EXPLORATION SURVEYS LTD.

G. L. Anselmo, President

Glen Ell White, Chief Geophysicist

- I, Garry L. Anselmo, DO HEREBY CERTIFY:
- That I am President of Tri-Con Exploration Surveys Ltd. with offices at Suite 200 1405 Hunter Street, North Vancouver, British Columbia, and a Consultant in Geochemical Exploration.
- That I studied Geology and Geochemistry at the University of British Columbia for three years and am a graduate of Simon Fraser University with the degree of Bachelor of Arts.
- That I have been engaged in Mining Exploration for six years.
- That I have no direct, indirect or contingent interest in the Joe claim group or in the securities of Lobell Mines Ltd. nor do I intend to receive any such interest.
- That this report dated December 24, 1970 is based on information derived from detail-reconnaissance, geological, soil sampling programs, and ground magnetometer and electromagnetometer surveys carried out by Tri-Con Exploration Surveys Ltd.

DATED at Vancouver, British Columbia, this 24th Day of December, 1970.

TRI-CON EXPLORATION SURVEYS LTD.

G. L. Anselmo, B.A.

President

TO WHOM IT MAY CONCERN:

I, GLEN ELMO WHITE, of the City of Richmond in the Province of British Columbia, hereby certify:

- 1. That I am a Geophysicist and reside at 117-641 Gilbert Road, Richmond, B.C.
- 2. That I studied Geophysics and Geology and graduated from the University of British Columbia with the degree of Bachelor of Science.
- 3. That I have been engaged in Mining Exploration for eight years.
- 4. That I do not have, nor do I expect to receive, either directly or indirectly, any interest in the property, or in the securities of Lobell Mines Ltd.
- 5. That this report is based on information derived from a detailreconnaissance, geological, geochemical soil sampling programs and ground
 magnetometer and electromagnetometer surveys carried out by Tri-Con
 Exploration Surveys Ltd. during the 1970 exploration season.

Dated this 24th day of December, 1970.

TRI-CON EXPLORATION SURVEYS LTD.

G. E7 White, B.Sc., Chief Geophysicist

- I, Perry Ross Mascoe, do hereby certify:
 - 1. That I attended the University of British Columbia for four years and have graduated with a Bachelor of Science Degree in Geology.
 - 2. That I worked part of one summer for U.S. Borax at Alan, Saskatchewan in mine construction.
 - 3. That I worked one summer with Atlas Explorations Ltd. as a Lab Assistant in charge of a geochemical lab and part of the summer as a field assistant.
 - 4. That I worked for Endako Mines Ltd. as an Assistant Geologist doing detailed geological pit mapping and detailed geochemical and magnetometer surveys.
 - That this report is based on studies of maps and personal field observations by myself and colleagues.
 - 6. That I am permanently employed by Tri-Con Exploration Surveys Ltd. in my professional capacity as geologist.

Dated at North Vancouver, British Columbia, this 24th day of December, 1970.

TRI-CON EXPLORATION SURVEYS LTD. Geologist

P. R. Mascoe, BSc.

APPENDIX

Instrument Specifications

MAGNETOMETER

A. Instrument

- (a) Type neutralized Fluxgate
- (b) Make Geotronics
- (c) Model G-110

B. Specifications

- (a) Measurement Vertical Magnetic Field
- (b) Range 100,000 gammas
- (c) Temperature coefficient less than 2 gammas per degree Centigrade
- (d) Sensitivity 20 gammas per dial division
- (e) Levelling systems oil damped gimbol
- (f) Size magnetometer 6" x $3\frac{1}{2}$ " x 8" weight $2\frac{1}{2}$ lbs. battery case $4\frac{1}{2}$ " x $4\frac{1}{2}$ " x $1\frac{1}{2}$ " weight $1\frac{1}{2}$ lbs.

C. Survey Procedures

- (a) Method one and one half hours
- (b) Corrections- (i) Base

(ii) Diurnal

(c) Station relationship - each station read for intensity of vertical magnetic field

D. Presentation

(i) Contour maps of values in gammas

APPENDIX

Instrument Specifications

ELECTROMAGNETOMETER

A. Instrument

(a) Type - Geotronics V.L.F. - E.M.

B. Specifications

- Measurement (1) Utilizing the VLF primary magnetic fields generated by marine communication stations. Measures the dip-angle at the resultant magnetic field.
 - (2) Frequency range 12 24 KC's
 - (3) Sensitivity ± degree
 - (4) Method of reading-null detection visual means of an averaging field strength meter and dip-angle meter.

C. Survey Procedures

- (1) Select VLF transmitting station in direction of geologic strike.
- (2) Station plot- plot values read at station surveyed.

I, William G. Stevenson, DO HEREBY CERTIFY:

- That I am a Consulting Geological Engineer with offices at Suite 209 Stock Exchange Building, 475 Howe Street, Vancouver 1, B.C.
- That I am a graduate of the University of Utah, 1946, with a B.Sc. Degree.
- That I am a registered Professional Engineer in the Association in British Columbia.
- That I have practised my profession for 22 years.
- That I have no direct, indirect or contingent interest in the Joe Mineral Claims or in the securities of Lobell Mines Ltd., nor do I intend to receive any such interest.
- That I have reviewed a report dated December 24, 1970 based on work conducted by Tri-Con Exploration Surveys Ltd. under the supervision of G. L. Anselmo, President; and Glen E. White, Chief Geophysicist.

DATED at Vancouver, British Columbia, this 31st day of January, 1971.

W. G. STEVENSON & ASSOCIATES LIMITED Consulting Geologists

DOMINION OF CANADA:

PROVINCE OF BRITISH COLUMBIA.

In the Matter of

To Wit:

GEOLOGICAL, GEOCHEMICAL & GEOPHYSICAL SURVEYS:

ł. Garry L. Anselmo, president of Tri-Con Exploration Surveys Ltd.

of #200-1405 Hunter Street, North Vancouver

the following is a true statement of cost in the Province of British Columbia, do solemnly declare that of combined surveys for report enclosed:

PERSONNEL	PERIO	<u>)</u>		MAN DAYS	WAGES/DAY	TOTAL	
R. Mascoe	June 20)-July 7	, 1970	18	\$75	\$ 1350.00	
J. Sheppe	u	11		18	\$65	\$ 1170.00	
G. Thomson	11	11	"	18	\$60	\$ 1080.00	
L. Vaness	· 11	11	17	18	\$60	\$ 1080.00	
T. Swann	11	**	**	18	\$60	\$ 1080.00	
G. McArthur	11	Ħ	"	18	\$40	\$ 720.00	
G. Gray	11	. 11	***	18	\$40	\$ 720.00	
S. York	11	11	11	18	\$60	\$ 1080.00	
C. Lahmer	11	**	11	18	\$40	\$ 720.00	
Food & Materials						. \$ 1000.00	
Camp & Equipment						. \$ 815.00	
Magnetometer Renta							
Electromagnetometer Rental @ \$25/day							
Sample Analysis							
Helicopter							
Maps & Reports							
Secretarial							
	. ,				TOTAL	\$16433.00	

And I make this solemn declaration conscientiously believing it to be true, and knowing that it is of the same force and effect as if made under oath and by virtue of the "Canada Evidence Act."

Province of British Columbia, this /

A Commissioner for taking Affidavits within British Columbia or A Notary Public in and for the Province of British Columbia.

SUE MINING RECORDER

