1829

MERCURY EXPLORATIONS LIMITED. (N.P.L.)

INDUCED POLARIZATION

GEOPHYSICAL SURVEY ON THE

SPA, SKU, ALTA, SCAT, JEFF, & LARK CLAIMS

SITUATED FIFTEEN MILES NORTHWEST

OF MERRITT IN THE KAMLOOPS M.D., 50°N. 120°W.

N.T.S. 921/7W

WORK WAS DONE ON THE SPA, SKU, ALTA, SCAT, JEFF, & LARK CLAIMS

IN THE PERIOD

JUNE 1st to JUNE 27th, 1969 - SOUTH AREA AUGUST 5th, to AUGUST 16th, 1969 - NORTH AREA MARCH 22nd to MARCH 23rd, 1969 INCLUSIVE

23 PHONE

REPORT BY:

ROBERT E. CHAPLIN, P.ENG.

MARCH, 1969

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ASSESSMENT REPORT	
NO. 1829 MAP	× . 31

TABLE OF CONTENTS

.

												-	Page No.	
INTRODUC	TION	•	•	•	•	•	•	•	•	•	•	•	1	
PROPERTY	AND	OWNE	ERSHI	Р		٠	•	•	•	•	•	•	2	
LOCATION	I AND	ACCI	ESS	•	•	•	•	•	•	•	•	•	3	
GEOLOGY	•	٠	•	٠	•	•	•	•	•	•	•	•	3	
INTRODUC Princ Varia Detai	CTION ciples able a ls o	TO 1 s Frequ F IP	INDUC Jency Surv	ED P Met ey	POLAR hod	IZAT	ION	(IP)	•	•	•	•	4	
RECONNA1 Gener I.P. I.P.	SSAN al Pi Survo Survo	CE II roced ey ey Re	NDUCE dure esult	D PC s)LARI	ZATI	ON S	URVE	Y	•	•	•	7	
RECOMMEN Appro	IDATI(oxima	ONS te Co	ost o	fRe	comm	ende	d Wo	ork	•	•	•	•	9	
STATEMEN	IT OF	EXPI	ENDIT	URES	5.	٠	•	•	•	٠	•	•	10	
PERSONNE	EL.	•	•	•	٠	٠	•	٠	•	•	•	•	10	
QUALIFIC	CATIO	NS OI	F THE	WRI	TER	•	•	•	•	•	•	•	11	
ACCOMPAN	YING	MAPS	s.	•		•	•	•	•	•	•		Pocket	
(a)	Map :	show [.]	ing c	laim	1 1oc	atio	ons a	ind s	urve	y li	nes.	Sc	ale 1" = []] /2	mile.
(b)	Prof Meta reman	iles 1 Cou rks 1	of I nduct for e	.P. ion ach	data Fact line	sho or a	wing Ind a	Per ppar	cent ent	Fre resi	quen stiv	cy ity	Effect, , and	
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MERCURY EXPLORATIONS LIMITED (N.P.L.) SPA, SKU, JEFF, ALTA, LARK, & SCAT CLAIMS 921-7W 50°N. 120°W. KAMLOOPS M.D., B.C.

INTRODUCTION

Mercury Exploration's property totals 73 full-size and 2 fractional claims and covers a porphyry copper environment situated in the Highland Valley mineral district fifteen air miles northwest of Merritt, B.C.

The claims lie in the southern sector of the Guichon batholith, in an area of generally low relief. Bedrock on the property is largely obscured by overburden from five to fifty feet deep along the flanks of the main stream valleys and up to 300 feet in the valley centers.

The property was staked in early 1968 prior to the Valley Copper discovery to cover a favorable geological setting. It is located within a north trending mineral belt that includes the Lornex, Valley Copper, and Bethlehem Copper to the north, the Craigmont copper mine to the south, and the Chataway copper prospect immediately to the east.

Noranda Mines Limited, worked on part of the claims in 1958, looking for a possible Craigmont-type ore body.

Importantly, the prospect lends itself to reconnaissance geophysical prospecting by the Induced Polarization method since bedrock material is largely masked by surficial deposits. For these reasons the claim was selected by Messrs. Chaplin, Graham, Gifford, and Riley under their Prospecting Agreement with the Northwest Syndicate for the application of I.P. techniques based both on their previous prospecting experience and I.P. case history field work in the Highland Valley district. The syndicate performed I.P. work between April 6th and May 31st, 1968, the results of which require further testing. The syndicate vended its property to Mercury Explorations Limited which, in turn, completed an additional 17 miles of reconnaissance induced polarization survey work, as described in this report. No follow-up work on existing anomalies has yet been carried out. This report details results of geophysical work in the property with reconnaissance I.P. in the period June 1st-June 27th, 1968, and August 5th-August 11th, 1968, and March 22nd-March 23rd, 1969. Six men were employed in the program.

PROPERTY AND OWNERSHIP

	<u>Claim</u>	<u>Tag No</u> .	<u>Record No</u> .	Recording Date	Recorded Owner
7	ALTA 26-32	-	51005-51011	August 4, 1966	Mercury Ex.
14	JEFF 1-14	878460-73	68703-68716	April 3, 1968	Mercury Ex.
3	LARK 1-8	878486-93	68846-68 853	May 6,1968	Mercury Ex.
ب	SCAT 1-16	878494-509	69097-69112	May 17, 1968	Mercury Ex.
Ç.	SKU 1-10	878458-59 878476-83	68693-68702	April 3, 1968	Mercury Ex.
18	SPA 1-18	878440-56	68673-68690	April 3, 1968	Mercury Ex.
	AL Fraction	ı –	74690	Nov. 18, 1968	Mercury Ex.
2	SK Fraction	ı –	74689	Nov. 18, 1968	Mercury Ex.
75	Expiry	/ dates are as	follows:		
		<u>Claims</u>		<u>Expiry Date</u>	
		AL Fraction		November 18, 1970	
		SK Fraction		November 18, 1970	
		ALTA 26-32		August 4, 1973	
		JEFF 1-14		April 3, 1974	
		SPA 1-4		April 3, 1974	
		SPA 5-6		April 3, 1974	
		SPA 7-8		April 3, 1973	
		SPA 9-18		April 3, 1971	
		LARK 1-4		May 6, 1971	
		LARK 5-8		May 6, 1971	
		SCAT 1-16		May 17, 1971	
		SKU 1-10		April 3, 1971	

LOCATION AND ACCESS

The property lies mostly north of Farr Lake and northwest of Tyner Lake, 15 air miles northwest of Merritt, B.C., in the Kamloops and Nicola Mining Divisions. It is situated at elevation 4,200 feet, latitude 50° 19' N., 120° 58' W., on claim map 92I-7W. The upper reaches of Skuhun Creek traverse the north sector of the property.

Access is gained via nine miles of secondary road, following Skuhun Creek from the Merritt-Spences Bridge highway. Additional roads and trails provide access to other points within the property boundaries.

GEOLOGY

The company's claim groups lie in the Highland Valley copper district in the southern sector of the Guichon batholith.

The batholith is concentrically zoned with the youngest intrusive phase in the centre and oldest on the periphery. Porphyritic dykes and cataclastic breccia zones are associated with some of the younger intrusive phases. The batholith intrudes Upper Triassic volcanic rocks and is unconformably overlain by Jurassic marine sediments.

The property is located within the batholith near the southern contact zone between younger phase and older phase rocks. It lies on the southern extension of a mineralized belt containing the economically important Bethlehem, Lornex and Valley Copper deposits.

Outcrops on the margin of the claim area contain minor amounts of copper as bornite, associated with a porphyry dyke and east northeast striking zones. No known economic mineral deposits are currently known within the claim area. Geophysical work (induced polarization) indicates possible favourable disseminated sulphide response in the northeast portion of the claim group, where airborne magnetic data indicates a definite change in the intrusive geologic **trend** from north-south to east-west, caused possibly by the south-east termination of the quartz-rich interior younger intrusive complex.

Page 3'

INTRODUCTION TO INDUCED POLARIZATION (IP)

Principles

When an electric current in passed through unmineralized ground the current is carried by ions in the pore solutions, the rock-forming silicates being near-insulators. If metallic minerals, mainly sulphide and oxides. are also present, then these minerals conduct current by electron flow. In mineralized ground then, electric currents are carried both by ions in the pore fluids and by electrons in the metallic minerals. Where a metallic mineral replaces a pore passage (eq. fracture filling) the mode of current conduction changes from ionic to electronic at the interface of the pore fluid and the metallic mineral. A reversible chemical reaction must occur to permit this change. Since not all the ions of the pore fluid participate in the reaction surplus, nonreactive ions accumulate at the interfaces and oppose further current flow. The metallic mineral therefore acts as a block to all but a small part of the ion population in the pore field. Because of this blocking action, charges of opposite sign develop on either side of the metallic mineral grain. Because this polarization is induced by the passage of the current it is called the IP effect. If the inducing current is now cut off the electro-chemical dipoles set up at each metallic mineral grain decay by means of currents flowing in the reverse direction to the inducing current.

Two main methods of measuring IP effects have been developed. In each the voltage effects of passing a current between two power electrodes are measured between two receiving electrodes. A number of arrangements and spacings of the four electrodes are in use. We use the Variable frequency method.

VARIABLE FREQUENCY METHOD

The build-up of ions at surface of metallic minerals (IP effect) due to current flow takes a few seconds to develop fully, and if the applied current is reversed the polarization is also reversed. Thus, if a high frequency AC current is applied, polarization scarcely develops at all, whereas with a low frequency AC current nearly complete polarization may occur. Since the build-up of ions impedes the current flow of the inducing AC current, then the resistivity of suitably mineralized ground between two given points varies according to the extent of ion accumulation and, therefore, upon the frequency of the inducing current. The resistivity difference for two frequencies is then a measure of the IP effect and, therefore, of the amount of electron conducting minerals between the receiving electrodes.

In practice, the resistivity of the ground between two points is measured at two different frequencies and the magnitude of the IP effect is quantitatively expressed by the "metal conduction factor" (MCF), which is defined as:

MCF =
$$\frac{(P \text{ High} - P \text{ Low}) 100\%}{P \text{ High}} \times 2 17 (10)^5$$

where Aigh = apparent resistivity at relatively high frequency. Low = apparent resistivity at relatively low frequency.

Another value used in interpretation is the percent frequency effect (PFE), which is defined as:

PFE = (High - P Low) x 100%

The resistivity, percent frequency effect, and metal conduction factor are all used in interpretation, but it has been shown, theoretically and practically, that the MCF is the most reliable indicator of the presence of metallic minerals when the MCF is accompanied by anomalous PFE.

Page 6

DETAILS OF IP SURVEY



Measurements were made using the dual frequency method and an assymmetrical array with on energizing electrode at infinity (pole-dipole array).

P1, P2 are power electrodes
R1, R2 are receiving electrodes
P1-R2 = R1-R2>> P1-P2
P1-P2 > 5L

In practice a linear array was used ($0 = 180^{\circ}0$

 \checkmark = 4pi L $\frac{VR1-VR2}{I}$

Frequencies used Low = 0.1 cps.

$$High = 10.0 cps.$$

Current range - 0.1 amp. - 1.0 amp.

Electrode spread

(a) 200' = 400' - 600' - 800' as required by restivity range

RECONNAISSANCE INDUCED POLARIZATION SURVEY

General Procedure

Geoscience Incorporated Frequency-Domain Induced Polarization Equipment model numbers 5170 (tx) 5260 (rx), was used in pole-dipole array as previously described.

An expanding array from small (50' - 100') to large (400' - 800') separations indicated (by means of resistivity break <u>vs</u> electrode separation) that bedrock resistivity in the Highland Valley ranges between 1500 and 5000 ohm-feet. (500-1800 ohm-meters). An optimum electrode separation was judged to be that which maintained the measured resistivity between 500-1000 ohm-feet (150-300 ohm-meters), to insure that sufficient volumes of bedrock were effectively prospected. The smallest electrode separation was 200 feet. Percent Frequency Effects (PFE) were measured over the frequency range of 10.0-0.1 cps. A 3.0-0.1 cps. range was used to periodically check for inductive coupling effects, but none were detected.

Small PFE's could be significant in this area, and accordingly all transmitter percent deviations and daily receiver calibration deviations were noted and used in the calculations to obtain the PFE from the apparent frequency effect measured directly by the receiver console. Transmitter deviations greater than one were not accepted, the station was re-read.

Electrode contact resistances varied between 200 and 4000 ohms. No polarization of the stainless steel electrodes was detected.

I.P. Survey

The following personnel worked on the survey: R. E. Chaplin, P.Eng.,

A. O. Birkland, E. Birkland, J. Coldham, W. Campbell and K. Kaser.

Mercury Explorations completed approximately 17 line miles of reconnaissance survey between the dates of June 1st and June 27th, 1968, and August 5th to August 16th, 1968.

The work required 175 man days, and the cost per line mile was approximately \$700.00.

The following lines were surveyed:

North End	(August)	South End (June)
160 N.	3,000 feet	Road Line "C"
150 N.	3,000 "	18 S. 3,600 feet
140 N.	3,000 "	26 S. 10,000 "
130 N.	3,000 "	34 S. 8,000 "
120 N.	3,000 "	42 S. 10,000 "
120 N.	1,800 " (return)	50 S. 12,200 "
110 N.	3,000 "	-
100 N.	3,000 "	-
90 N.	3,000 "	-
80 N.	3,000 "	-
70 N.	3,000. "	-

Total North End 31,800 feet

Total South End 56,400 feet

Grand Total Footage = 88,200 feet - or 17 miles.

Page 9

I.P. Survey Results

Percent Frequency Effect background values range between 0.5% and 2.5%. Case history studies in the Highland Valley area over known ore zones showed that commercial low grade "porphyry" type copper deposits may contain approximately two percent total sulphides, including chalcopyrite, bornite and very minor pyrite. The sulphides commonly occur as small discrete grains and veinlets in an altered and fractured intrusive rock matrix. PFE's measured on known Highland Valley-type orebodies, with no overburden, produce anomalies between 4 and 6 times background, i.e. PFE's range between 6 and 15 percent. If a similar body were buried, its PFE measured through surface overburden would be progressively diluted by volumes of overlying surficial material. Only large buried bodies of disseminated sulphides could be detected at depth with Percent Frequency Effects as low as twice background.

Threshold anomalies between 3.0 and 5.0 PFE (i.e., $1^{1}/2$ times to 2 times background) could be significant in areas of relatively deep overburden.

Overburden may produce Percent Frequency Effects that appear similar to the above described threshold anomalies, and commonly caused by clay rock interfaces at the edge of existing surface swamps or conductive clay horizons. Detailed dipole-dipole IP studies may sort out the various causitive bodies obtained from the pole-dipole reconnaissance survey.

No anomalies were located by the present reconnaissance IP prospecting survey.

RECOMMENDATIONS

Follow-up induced polarization work is recommended on lines run by the Northwest Syndicate between April 6th and May 31st, 1968 (see Assessment Geophysical Report on SPA, SKU, ALTA, SCAT, JEFF and LARK Groups by R.E. Chaplin, P.Eng., in June, 1968).

Page 10

It is suggested that the follow-up be done on North-South cut lines on the JEFF, SPA and ALTA claims.

Approximate Cost of Recommended Work

(a)	Pole-dipole re-run		\$1,500.00
(b)	Dipole-dipole follow-up	3,000.00	
(c)	Pole-dipole in North directio	3,000.00	
		TOTAL	\$7,500.00
STATEMENT	OF EXPENDITURES		
	Salaries and Fees		\$ 5,482.00
	Field Transport		705.00
	Camp Support		1,640.00
	Field Supplies (salt, disposa reels, stainless steel elect	ble wire rodes, et	c.) 1,911.00
	Geophysical Equipment Rental		
	and Service Charge		2,200.00
		TOTAL	\$11,938.00

PERSONNEL

R.E. Chaplin, P.Eng.	June 1st-9th, 1968) June 22nd-26th, 1968)	
	Aug. 10th-16th, 1968)North Area	\$
	March 22-23, 1969)Report)21 days @ \$100.00/day Fee
A. Birkeland	June 1st-27th, 1968 Aug. 5th-16th,1968))38 days @ \$25.00/day Wages
E. Birkeland	June 1st-27th, 1968 Aug. 5th-16th, 1968))38 days @ \$16.00/day "
J. Coldham	June 1st-27th, 1968 Aug. 5th-16th, 1968))38 days @ \$16.00/day "
W. Campbell	June 1st-27th, 1968 Aug. 5th-16th, 1968))38 days @ \$16.00/day "
K. Kaser	June 1st-27th, 1968 Aug. 5th-16th, 1968))38 days @ \$ 16.00/day "

Respectfully submitted,

haple Obert

Robert E. Chaplin, P.Eng.

March 31st, 1969.

QUALIFICATIONS OF THE WRITER

I, Robert E. Chaplin, am a **Regi**stered Professional Geological Engineer in the Province of British Columbia.

The writer has owned and operated induced polarization equipment since June, 1966, on both a contract basis and for personal prospecting, largely under guidance of a qualified consulting geophysicist.

The writer is a beneficial owner of shares of Mercury Explorations Limited (N.P.L.)

The writer has worked as a geologist, prospector and I.P. operator in the Province of British Columbia and Yukon for 13 seasons.

But Chaplon

Robert E. Chaplin, P.Eng., March 31st, 1969.





MERCURY EXPLORATIONS LIMITED - JEFF CLAIMS KAMLOOPS M.D. &C LINE 140 N JULY. 1968, R Charles P. Cong L= 300' Pole - Dipole I.P. Data 1 = 300' Department of Mines and Petroleum Resources ASSESSMENT REPORT NO. 1829 MAP #2 3 NZ 115 121 124 127 180 133E



MERCURY EXPLORATIONS LIMITED - JEFF CLAIMS NAMLOOPS A.D. B.C. JULY 1968, R. Cheplin A. Sing. Pole-Dipole I.P. Data 1" = 300' Department of Mines and Petroleum Resources ASSESSMENT REPORT NO. 1829 MAP #3

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			*		
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130 5

4 1

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127

NZ4

#8

14



JULY, 1968, R. Chardin. P. Sug. Pole-Dipole I.P. Data



-VI VV

121

110

115

124

127

(*)

109





/30 E

ろ



STATIONS EAST

548



145 1.50



MERCURY EXPLORATIONS LIMITED -



JEFF CLAIMS KAMLOOPS M.D. BC JULY 1968, R Chalm, P.Cong. Department of Mines and Petroleum Resources ASSESSMENT REPORT NO. 1829 MAP #6 3) THOE STATIONS EAST



MERCURY EXPLORATIONS LIMITED - JEFF CLAIMS KAMLOOPS M.D. B.C. JULY, 1968, R.C. Applin. Plag. L=600' Pole - Dipole I.P. Data 1" = 300' 26.3.69 Department of Mines and Petroleum Resources ASSESSMENT REPORT NO. 1829 MAP # 7 7 . T 6 1000 J- A ••, • -{Y 139 118 127 /30 /33 136 142 151E



MERCURY EXPLORATIONS LIMITED - JEFF CLAIMS KAMLOOPS M.D. B.C. JULY 1968, R Charlen P.Eug. Pole - Dipole I.P. Date Department of Mines and Petroleum Resources ASSESSMENT REPORT NO. 1829 MAP #8 1829 7 EAST













1185 //4 yb 86 78 62 66 70 82 58 74 30E LINE 34 S MERCURY EXPLORATIONS LIMITED SCAT, LARK, + SPA CLAIMS L=200' POLE-DIPOLE I.P. DATA 30 KAMLOOPS M.D |"=**4**00' JULY. 1968, R. Chaplen. P. Eng. Departn and ni 69 Mines and Petroleum Resource 20-M.C.F. ASSESSMENT NO. 1829 MAP # 15 \mathbf{L} Q. 1040 S. $\langle \mathcal{V} \rangle$ RE RE REMARKS NORT H MAKR FALLNKE MARSH 102 114 106 110 1184 98 97 78 90 82 86



78 99 102 106. 82 //0 L= 200' POLE - DIPOLE I.P. DATA Department of Mines and Petroleum Resources ASSESSMENT REPORT NO. 1829 MAP #/6 LAKE FARL 122 118 20 78





MERCURY EXPLORATIONS LIMITED, SCATE SPA CLAINS LINE SOS JULY, 1968 L= 200' POLE- DIPOLE I.P. DATA ROMAN P.Emp. l"= 400' Department of Mines and Petroleum Resources ASSESSMENT REPORT NO. 1829 MAP 417 90 90 102 206





MERCURY EXPLORATIONS LIPHTED, SCATT SPA CLAIMS TD- TD- KAMLOORS M.D - JULY, 1968. R. Harlon P.G. ROAD LINE C note: coordinates anythis line are not constant wirt Bind systemidule to wind ing road traverse L=200' POLE-DIPOLE I.P. DATA 1"=400' Department of Mines and Petroleum Resources ASSESSMENT REPORT NO. 1829 MAP #18



