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GEOCHEMICAL REPORT

Rover, fourteen miles north-northeast of Lac la Hache, 52° 121° S.E.

R. H. Janes, P.Eng.

Coranex Limited

7th June 1966 to 18th July 1966 (field work)

CONTENTS

Introduction	Page	4
Location and Accessibility	41	4
Claims and Ownership	<u>**</u>	4
Geology	11	5
Applied Geochemistry	12	6
Geochemical Results	¥4	9
Conclusions	++	12
Recommendations	**	13
Appendix I - Analytical Methods	14	14
Appendix II - Personnel	**	18
Appendix III - Costa	11	19

MAPS

		,
17	1	Figure 1
+1	2	Figure 2 L
**	3	Figure 3 3
*1	7	Figure 4 -
11	8	Figure 5 🗸
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INTRODUCTION

The object of the geochemical work was to outline a zone of newly discovered copper mineralization and to locate within the surrounding area such other zones of mineralization that were present.

Attention was first focused on the area in June 1966 during a regional geochemical reconnaissance programme. A silt sample taken from a creek bed at a point approximately 2000 feet west of the west end of Bluff Lake was anomalous in copper. Follow-up prospecting by N. Wychopen revealed very minor chalcopyrite and bornite disseminations in a coarsegrained symmite (Occurrence #2). The Rover Claim Group were staked to secure this ground. Soil sampling on a control grid was carried out on an overburden area north of the initial discovery area. Detailed drainage and soil sampling was extended westward from the discovery area. Previous exploration work covered the area to the northeast of Occurrence #2.

Field work was done under the supervision of R. H. Janes. J. R. Woodcock managed the overall programme.

LOCATION AND ACCESSIBILITY

The area of mineralization is located in the rolling uplands of the Cariboo east of the Fraser River. It lies approximately 36 miles eastsoutheast of Williams Lake, a major town on the Cariboo Highway. Geographical location is latitude 52° Ol' and longitude 121° 20'. Elevation is 3500 feet a.s.l.

Access is from Lac la Hache, a small settlement on the Cariboo Highway. From there a gravel road runs north to serve the area about Spout and Murphy Lakes. Just north of the Ten-ee-ah Camp turn-off, at a point approximately seventeen miles from Lac la Hache, a forest access road joins the gravel road. The access road runs due east and bounds the north shore of Spout Lake. The copper occurrences are situated between a half-mile and two miles west of the west end of Bluff Lake and between 1500 feet and a mile north of this access road.

The claim area has an open cover of jackpine, spruce and alder.

CLAIMS AND OWNERSHIP

The claims held are as follows:-

Name	Date	Date	(Agent for	Record		
	Located	<u>Recorded</u>	Coranex Limited)	No.		
Rover #1 to 4	4 June *66	17 June '66	N. Wychopen	36126 to -29		
" #5 to 12	8 June *66	17 June '66	N. Wychopen	36130 to -37		

Rover	13	to	26	10	June	'66	17	June	166	Ν.	Wychopen	36138	to	-51
Rover	27	to	46	15	June	166	27	June	166	в.	%alhovd	36485	to	-504
3 4	47	to	64	15	June	166	17	June	•66	N.	Wychopen	36152	to	-69
Ħ	65	to	72	17	June	•66	27	June	166	в.	Walhovd	36505	to	-12
11	73	to	79	18	July	•66	2	Aug.	166	в.	Walhovd	37331	to	-37

Figure 3 shows the layout of the group.

Work distribution on the claims was as follows:-

- a) initial soil sample traverses on claims 1,2,4,5,10 & 12
- b) detailed soil sampling on claims 1,5,8,9,10,13 & 15
- c) detailed drainage and soil sampling on lines spaced at half mile intervals on claims - 2,4,12,14,30,33,34,36,38,41,42, 45,46,48,50,53,54,55,57,58,61,67, 68,71,72, 75 Fr. and 76 Fr.

GEOLOGY

General

The area covered by the Rover Claim Group is underlain almost entirely by symmite. Eccene basalts form an extensive capping on the symmite northwards from the northern boundary of the group. Small outliers of these volcanics persist southwards within the group.

The sygnite forms part of the western border of a large complex acid batholith which is some forty miles wide in maximum dimension. Its composition is variable and phases present include sygnite, diorite, granodiorite and granite. Such compositional differences suggest a complex history with differing ages for the phases present. As a whole the batholith is assigned to the Mesozoic (R. B. Campbell, G. S. C. Map 3 - 1961). The batholith intrudes the Nicola Group (Upper Triassic) which at this locality is dominantly volcanic and is characterized by andesitic fragmentals.

Greas structures are probably mirrored by the prominent topographical features. The symmite---Nisola Volcanics contact lies to the immediate south of the claims and is overlain by recent sediments and by Spout and Peach Lakes.

The only economic mineralization found within the batholith to date is the Boss Mountain molybdenum deposit which is located in diorite approximately eighteen miles to east-northeast.

Detailed

The copper occurrences are shown on Figures 4 and 5. As seen in outcrop these are all of one type and consist of very sparse disseminations (<0.1% Cu.) of chalcopyrite and bornite within small sections

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(<25 square feet in area) of the syenite. Such disseminations are infrequently scattered throughout parts of the syenite. For convenience of description the term "occurrences" has been loosely applied to such specific points of mineralization. Only occurrences #2 and #4 and #9 combined merit this term.

Within the claim group the sympite is well exposed except for an area north of Occurrence #2. It is coarse-grained, pinkish in colour and has the following composition:-

Felspar (K-spar dominant)	50 - 30%
Hornblende	10 - 40%
Biotite	5- 15%
Quarts, generally not visibl	le
Magnetite	< 2%

The felspars are slightly iron stained due to a dusting of fine iron oxides. Hornblende shows chloritic alteration at the crystal cores where mineralization is present.

A structural control of the mineralization is evident as the disseminations generally occur in the walls of gullies and depressions. The favoured trend for these linears is north-south i.e. Occurrences 2, 4 and 9. At Occurrence #3, the control appears to be east-west fracturing. No mineralized fractures have been observed on the claim group. However, such mineralization is reported to occur in the sympite to the southeast between Bluff and Peach Lakes.

An examination of air photos (scale: 1 inch = 1/2 mile) shows that a well defined pattern of structural linears is present. These linears trend north-northeast, east-northeast and northwest. The linears of interest, those that trend north---south, are not recognizable.

Overburden is largely glacial drift and within the claim area it is confined to the linears and to the area north of Occurrence #2. In the latter case the glacial drift is extensive but of unknown depth.

APPLIED GEOCHEMISTRY

Introduction

The claim area slopes gently southwards and shows little relief except to the immediate north of Spout Lake. Steep-sided but shallow gullies, which reflect marked structural linears, trend in a variety of directions (Figures 4 & 5). Low relief, apparent absence of pyrite and very minor amounts of copper sulphides produce a condition which is characterized by low order drainage anomalies. Sample material from the drainages was classed as either silt or gully material according to following definitions:-

> Silts: Fine material in active or dry creeks which is watertransported and sorted and is generally accompanied

by rounded pebbles. In some drainages deposits of stream gravel and silt are covered with black soil and plant debris.

Gullies: This material is located in minor drainage channels and is a soil through which water has seeped or is seeping. The material is not water-transported. The "A" horizon is often relatively thick.

The soil is poorly developed and what there is originated from the blanket of glacial drift. It is a podzol type but does not often show the characteristic profile as the A₃ horizon is rarely seen except in well drained depressions. The glacial drift includes locally derived material and is generally shallow, consequently its composition is considered to reflect that of the underlying area. However in areas where the drift cover is thick (> 50 feet ?) clay horizons may be present.

The "B" horizon was sampled. Sampling depths varied from two inches to twenty-four inches and generally were about six to eight inches.

Coverage

After the initial discovery of copper mineralization soil samples were taken along three short traverse lines south of Occurrence #2 and a traverse ringing the area was run to mample the drainages.

Detailed soil sampling was conducted northwards from Occurrence #2 to check the overburden area and covered claims Nover #5 and 13 (Figure 6). Sample lines were 400 feet apart with sample stations at intervals of 100 feet.

Eight north-south traverse lines were run west of Occurrence #2 at intervals of half a mile (Figures 4 and 5). On these all drainages and gullies were sampled and soils were taken where drainages were absent. The traverse lines extended from Spout and Bluff Lakes northwards to the Eccene Volcanics.

Analytical Work

Sample analysis was carried out by J. Samson, under the supervision of C. Chun, in a field laboratory located near Horsefly. All samples were dried, sieved to -80 mesh and analyzed for total copper and molybdenum. Some silts were also analyzed for soluble copper. Though no molybdenum mineralization was observed samples were run for the element on account of the proximity of the Boss Mountain Deposit.

Details of the analytical methods employed are given in Appendix III.

GENCHEMICAL RESULTS

Introduction

For convenience the geochemical results are discussed under three

separate sections. The first deals with the initial discovery area and the soil grid, the second with the reconnaissance traverses made to the west of Occurrence #2, and the third with an area between one and two miles northeast of Bluff Lake.

Occurrence #2 and the Soil Grid (Figure 6)

The initial anomalous silt gave a value of 140 ppm copper on a background of less than 10 ppm. Occurrence #2 lies 2200 feet upstream. Initial soil sample traverses either side of the anomalous draimage gave only two anomalous copper values, one at Occurrence #2 and the other at a point 600 feet northeast of the initial silt location. A check soil sample from directly above (overburden six inches thick) mineralized syenite gave a background value (4 ppm Cu.). Such a result indicates that group values rather than unit values should be used in assessing areas.

Detailed soil sampling northwards from Occurrence #2 showed a small area anomalous in copper about Occurrence #2 and a single isolated "high copper" (800 ppm) 2200 feet east of Occurrence #2. Examination of the isolated "high" sample site disclosed very minor copper mineralization in symple float. The total molybdenum values were all background (< 3 ppm).

Area west of Occurrence #2 (Figures 4 and 5)

This includes Occurrences 3, 4, 5, 6, 7, 9 and 10. These were found while staking and on the drainage traverses. Occurrence #10 consists of transported (?) mineralized symplet fragments in a creek bed.

Drainages and soils were anomalous in copper about Occurrences 3, 4, 9 and 10. Drainages to the north of and above Occurrences #9 and #10 were also anomalous.

Again the total molybdenum results were all background (< 3 ppm).

Area Northeast of Bluff Lake

This is added in explanation as the results of this work are shown on Figures 4 and 5 though the work was done before the location of the Rover Group.

Detailed soil sampling showed only two samples anomalous in total copper. Both are underlain by sympite (?) and suggest the type of copper mineralization found on the Rover Group.

CONCLUSIONS

1. The reconnaissance drainage sampling successfully located areas of very minor copper mineralization. Such sampling is particularly

effective for this area as the mineralization tends to occur in the walls of gullies and depressions and weathering tends to further concentrate the copper in the drainage systems.

- Nineralization is not so well reflected by the soils as by the drainages due to the nature of the mineralization and the absence of copper concentration which occurs in the drainages.
- The geochemical work indicates that copper mineralization about Occurrence #2 is sporadic, sparse and of no economic interest at present.
- 4. The absence of an anomaly on the soil sample grid north of Occurrence #2 could be due to "blanketing" by the glacial drift. Reference to the Cariboo-Bell Deposit, situated approximately forty miles to the north--northwest, is useful in this case. There, soils are anomalous which developed from slightly layered glacial drift which in places is at least twenty-five feet thick. As regards the effect of clays, significant copper anomalies due to copper migration and trapping by clay horisons are reported from Folley Mountain just north of the Cariboo-Bell Deposit. At present no evidence exists to suggest that copper mineralization, of economic significance, underlies the overburden area.
- Sampling to the west of Occurrence #2 disclosed an area anomalous in copper which includes Occurrences 3, 4, 9 and 10. These Occurrences, excepting #10, probably impart anomalous amounts of copper to the drainages.

RECOMMENDATIONS

- The claims covering the known occurrences and adjacent areas of interest be retained. These are:-
 - Rover #1,5,8,9,10,12,13,14, 48,50,53 to 58,60,61, 67 to 73, 75 Fr., 76 Fr. and 77 Fr. (a total of 28 claims).
- Further prospecting and geochemical sampling be carried out in the symite north of Occurrence #10.
- 3. Further prospecting and geochemical sampling be carried out in the symplet area outside the claim area with a view to locating zones of intense fracturing and alteration.

R. H. Janes, Pring.

April 5th, 1967

APPENDIX I

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ANALYTICAL METHODS

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ANALYTICAL METHODS USED IN GEOCHEMICAL ANALYSIS FOR ACID SOLUBLE COPPER

MINTHOD

- (1) DIGESTION
 - (a) 0.25 gram of -80 mesh sample
 - (b) Perchloric acid digestion in sand bath

(2) Copper Analysis

(a) Buffer solution at pH 6.5

Reagents: Sodium acetate Sodium tartrate Hydroxylamine hydrochloride

- (b) 2, 2' biquinoline in iso-amyl alcohol
- (c) A Fisher Electrophotometer II for reading copper concentration.

REFERENCES

- (1) SANDELL: Colourimetric Metal Analyses 3rd. ed.
- (2) FEIGL: Spot tests in inorganic analysis.

Page

15

(3) WARD ET AL: Analytical methods used in geochemical exploration by the U. S. Geological Survey. Bulletin 1152. ANALYTICAL METHOD USED IN GEOCHEMICAL ANALYSIS FOR COLD ACID-EXTRACTABLE COPPER

METHOD :

- (1) 0.50 grams -80 mesh dried sample
- (2) · Buffer solution at pH 5.0

Reagents:

Ammonium citrate Hydroxylamine Hydro chloride

- (3) Dithizone-benzene solution at 0.001% W/V concentration
- (4) The concentration of the copper is estimated by using the following formula:

	1		x	mi.	of	dithizone	to	reach	the	end	point	=	parts
Wt.	of	Sample		01		ml.	of	buffer					per
												mi	Ilion

Hydrochloric acid

REFERENCES:

- (1) Holman: Trans. Inst. Min. & Met. V66, Part I, pp 7-16.
- Methods of geochemical determinations from Applied Geochemical Laboratory, University of California, U. S. A.

ANALYTICAL METHOD USED IN GEOCHEMICAL ANALYSIS FOR ACID SOLUBLE MOLYEDENUM

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(1) DIGESTION

- (a) 0.25 gram of -80 mesh sample
- (b) Perchloric acid digestion in sand bath

(2) Molybdenum Analysis:

- (a) Ammonium thiocyanate solution to complex ions.
- (b) Stannous chloride solution for reducing.
- (c) Iso-propyl ether for extraction.
- (d) A Bausch & Lonb spectronic 20 colourimeter for reading molybdenum concentration.

HE ERENCES

- (1) SANDELL: Colourimetric Metal Analyses 3rd. ed.
- (2) FEIGL: Spot tests in inorganic analysis.
- (3) WARD ET AL: Analytical methods used in geochemical exploration by U. S. Geological Survey Bulletin 1152.
- (4) Methods of geochemical determination from Applied Geochemical Laboratory, Imperial College of Science & Technology, London, S. W. 7, England.

APPENDIX II

PERSONNEL

- J. R. Woodcock, P.Hng., Manager of Coranex Limited
- R. H. Janes, P. Mng., Geologist
- C. Chun, Chief Chemist
- J. Samson, Field Chemist
- N. Wychopen, Prospector

R.	Surgis	5	
R.	NoFee	5	
G.	Singer	}	Samplers
з.	Walhovd	s	

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1. Vages: The following table shows the work distribution of and the number of samples collected by those field personnel angaged on the project:-

Geologist (Supervision)	Geologist (Supervision)	R. Burgis Sampler	G. Singer Sampler	B. Walhowd Sampler	R. McFee Sampler	N.Wychopen Prospector	Date	
					Staked Rover	1 to 4	June	4
	Examined #2 Occurrence & Sampling					Prospecting & Sampling JN 1292 to 1305	June	7
					Staked Rover	5 to 12	June	8
					Road Work	Prospecting & Sampling	June	9
			Sampling JG 1050 to 1076	Staking	Sampling	Staked Rover 13 to 26	June	10
Supervision & Sampling JM 1001 to 1017			Road	¥огк	Sampling	Prospecting & Sampling	June	11
			Soil Sam- pling grid JG 1077 to 1160	Sampling JR 1107 to 1114	Soil Sam- pling grid	Prospecting & Sampling	June	12
			Soil Sam- pling JG 1161 to 1243	Sampling JR 1115 to 1126	Soil Sampling	Prospecting & Sampling	June	13
			Sampling	Sampling JR 1127 to 1131			June	14
			Rover 27 Staking & JG 1284 t	to 46 Sampling to 1285	Rover 47 Stal	to 64 cing	June	15
	Examination & Sampling JJ 104 to 104	5				Prospecting & Sampling	June	16

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J.R. Woodcock Geologist (Supervision	R. H. Janes Geologist (Supervision)	R. Burgis Sampler	G. Singer Sampler	B. Walhowd Sampler	R. McFee Sampler	N. Wychopen Prospector	Date 1966	
			Staki Rover 65	ng to 72			June 17	
			Soil Sam- pling Grid JG 1243 to 1254	Grid Layout	Soil Sampling		June 18	
			Soil Sem- pling JG 1255 to 1280	Grid Layout	Soil Sampling		June 19	-
		Sampling JB 1490 to 1496	Sampling	Making traverse lines	Sampling		June 20	AP
		Sampling JB 1497 to 1517	Sampling	Making traverse lines	Sampling		June 21	PERCENT IN
		Sampling JB 1518 to 1529	Sampling	Sampling JR 1132 to 1145	Sampling		June 22	I cont'd
		Sampling JB 1530 to 1538	Sampling JG 1281 to 1289	Sampling	Sampling		June 23	
	Supervision (1/2 day)			Draughting			June 24	
			Sampling JG 1290 to 1302	Draughting	Sampling		June 25	
				Draughting	********		June 26	

Page 21

APPENDIX III

COSTS

J.R.Woodcock Geologist (Supervision)	R. H. Janes Geologist (Supervision)	Burgis, R. Sampler	G. Singer Sampler	H. Walhovd Sampler	R. McFee Sampler	N.Wychopen Prospector	Date
		Sampling	(Sampling JE 1160 to 1179	Consta tion of the second sec		June 29
	Examined Oc- currences 3,4, 9 & 10. Sam- pling JJ 1072 to 1091		Sampling		Sempling		July 15
			Soil sam- pling JG1406 to 1427		Soil Sampling	d* 81	July 16
			Staking	Staking Rover 73 to 79	Staking	and and any one of the set of the	July 18
NOTE: Soil sam	pling refers to wo	rit on the grid	l north of Occurr	ence #2.			
1	3-1/2	5	13	13	13	6 Geodha worked	mistry-days (excluding staking)
			1	1	1	- days	al work (road) worked
50.00	34.00	15.00	14.00	15.00	24,00	20.00 - Wags day	(\$)
50.00	119.00	75.00	182.00	195.00	182.00	120.00 - Geor	hemistry-wage per man
alan alah alah-alah		(3)1111	14,00	15.00	14.00	Phys	ical work-wag per man

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2.	Incidental expenses for crew a	ervicing		\$	520.00
3.	Vehicle hire for 20 work days 2/3 of rate of \$260.00, rental Rentals,	(staking excluded), from Redhawk			<u>173.00</u>
4.	Cost of sample analyses:-				
	Drying & sifting to -80 mesh Digestion in perchloric acid Total copper determination Soluble copper determination (no acid digestion) Total molybdenum determinati	0.25¢ each 0.50¢ each 0.50¢ each 0.25¢ each 0.25¢ each 0.75¢ each			
	Sampler No. of s	oil & drainage			
	N. Wychopen	14			
	R. McFee	15			
	B. Walhovd	39			
	G. Singer	260			
	R. Burgis	39			
	R. Janes Total	19			
	Each sample run for total co denum, - cost for each sampl	pper and molyb- a \$2.00			
	Janes' samples (19) run for copper	soluble each 0.25¢			
	Total costs for sample analy	80 5		\$	774.75
5.	Report preparation by R. Janes and April 3rd to 7th; 10 days	January 9th to 13th at \$34.00 per day,	3 340.00		
	Total wages; field and offic	8	1,263.00		
	Vacation pay du	e (4%)	50.00		
	Total wages inc	luding vacation pay		\$ <u>1</u> ,	313.00
6.	Total cost of geochemical work	and report		\$2	780.75
7.	Total cost of physical work i.	e. road work			\$43.00



Outline of Claim Group. 0 troverse 0. Eocene volcs. Syenite Location Map, Waced from air photo. 853-49. Scale: 1'~ 2200' 1090 Outline of Claim Grp Spout Lake 52°00' LEGEND O Silt sample site. Escene volcanies A Gully . Syenife . Q 5011 . 9 Copper occurrence n Soluble copper Analyses by J.S., Field lab Total copper Tot. Cu. Ex. Cu. opm. ppm Background. 0 - 10 0 - 2 Quest. bkgrd. 11-20 ----21-40 3-4 Quest anom. 5-8 Slightly anom. 41-80 9 - 16 81 - 160 Anomalous. Highly anon. 161 - 320 17 - 32 CORANEX LTD. GRP., Clinton M.D., B.C. ROVER Copper Occurrences #9 8 10 Geochemistry - COPPER Rec. Scale : 1" = 400' Jan. 1967 Janes Figure 7





Department of Mines and Petroleum Resources ASSESSMENT REPORT NO. 949 MAP 3 Forest Access Rd. Note. Topographic detail from air 52.00' photos - BC \$53.49, \$59.53 \$ \$59.55. CORANEX LTD. ROVER GROUP. ML Gariboo M.D., B.C. "Mulayout Map Scale : 1" = 2200' Mar.'67 Janes Figure 3











Soil	sample si	te:	
Cone	entration	-	\$Pn