

ARCHER, CATHRO

& ASSOCIATES (1981) LIMITED

CONSULTING GEOLOGICAL ENGINEERS

1016-510 WEST HASTINGS STREET
VANCOUVER, B. C. V6B 1L8



(604) 688-2568

WERNECKE JOINT VENTURE
GEOLOGICAL AND GEOCHEMICAL REPORT
JOLLY 1-10 CLAIMS
(YA63101-YA63110)



FEBRUARY, 1983

CLAIM SHEET 106C/13
LATITUDE 64°48'N; LONGITUDE 133°54'W

W.D. EATON, B.A., B.Sc.

WORK DONE ON AUGUST 1, 1982 AND FEBRUARY 3 TO 4, 1983

091442

This report was prepared by
the Geological Evaluation Unit
under contract to the Yukon-Clairmont
Mining Division as
required by the Act of 1931
of \$1,000

R. Watson

for
Regional Geology, Engineering and
Geological Services for Commissioner
of Yukon Territory.

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INTRODUCTION

The Jolly property was staked by Wernecke Joint Venture (Chevron Canada Limited and Aquitaine Company of Canada Ltd.) in June, 1981 to protect a series of pyrite, galena and sphalerite-bearing veins discovered during follow-up of strong lead, zinc and silver and moderate copper and mercury stream sediment anomalies reported by the Geological Survey of Canada's Uranium Reconnaissance Program in Open File 518. Similar stream sediment anomalies occur downstream from a sedimentary exhalite lead-zinc occurrence on the Riocanex Cord property 10 km to the northeast.

The 1982 program consisted of geological mapping and hand trenching and an air photo interpretation. This work was directed toward comparing the geological setting at Jolly to that at Cord.

PROPERTY, LOCATION AND ACCESS

The Jolly property consists of 10 contiguous mineral claims recorded in the name of Archer, Cathro & Associates (1981) Limited in the Mayo Mining District as follows:

<u>Claim Name</u>	<u>Grant Numbers</u>	<u>Expiry Date</u>
Jolly 1-10	YA63101-YA63110	July 6, 1982

The claims are located at latitude 64°48'N and longitude 133°54'W within NTS claim sheet 106C/13, 165 km northeast of Mayo. The closest lake suitable for float-equipped, fixed-wing aircraft is Gillespie Lake, 9 km to the southwest, while the nearest bush airstrip is on the Bear River 18 km to the west. Access in 1982 was by helicopter from the WJV base camp at the Igor property.

GEOLOGY

General

Figure WJV83 J1 in the pocket illustrates geology for a 15 by 5 km area on and peripheral to the Jolly and Cord properties. The area is underlain by folded Helikian and older Wernecke Supergroup sedimentary rocks which are cut by scattered, small heteroclast breccia bodies, occasional mafic dykes up to 10 m wide, numerous large and small high angle faults and at least one major thrust fault.

Geomorphology

The area of interest escaped continental glaciation during the Pleistocene but was strongly affected by alpine glaciation. It is characterized by U-shaped valleys, headed by cirques and separated by steep ridges, and exhibits local elevations ranging from 1200 m on the floors of the larger valleys to 2000 m on the peaks. The valley floors are generally obscured by glacial debris, glaciofluvial outwash and, rarely, wasting glaciers, while the rapidly eroding hillsides are largely blanketed by talus. Outcrop is common on the upper slopes and in recent creek cuts. The area lies above treeline and vegetation is restricted to moss and lichens with scattered buckbrush (alder) on the valley floors.

Stratigraphy

Wernecke Supergroup strata are divided into three groups which are described below from oldest to youngest.

Fairchild Lake Group - These rocks occur north of the area of interest on the lower plate of a south-dipping thrust fault. They probably belong to the F3 formation and include pale green phyllites with minor brown weathering silty dolomites.

Quartet Group - These rocks consist of Q_2 formation rhythmically interbedded pale to medium grey weathering, thinly laminated siltstones and dark grey weathering, carbonaceous mudstones with occasional light grey weathering fine sandstones. The rocks are non-gossanous and pyrite is restricted to widely disseminated blebs and cubes in carbonaceous horizons.

Gillespie Lake Group - At least three formations of the Gillespie Lake Group are present in the Jolly-Cord area. Although the distribution of the various units is largely controlled by broad, east-west trending folds, the formations generally decrease in age from north to south across the area of interest with the oldest formation (G_{TR}) occurring north of the Cord and the youngest strata south of Jolly. Based on Delaney's (1981) descriptions, the sedimentary exhalite mineralization on the Cord property is probably hosted by the G_2 formation. The five oldest formations of the Gillespie Lake Group are described below.

G_{TR} is gradational into Q_2 , thus its lower contact is somewhat arbitrary. It includes 400 to 500 m of recessive, pale to dark grey weathering, fine clastics interbedded with orange to brown, thin-bedded, dolomitic siltstones and silty dolomites. The ratio of clastics to carbonates decreases up-section. This formation thins to 20 m (or has been eroded) across a northwest-trending fault 0.5 km northeast of the Cord occurrence. Here it consists mainly of fine- to coarse-grained, thin-bedded ferroan dolomite with thin, contorted and brecciated grey chert bands up to 5 cm thick. A single 10 cm thick bed of coarsely crystalline gypsum occurs within the chert-dolomite sequence and fine-grained quartz(?) pseudomorphs after gypsum and/or anhydrite are common in the surrounding dolomites.

The G_2 formation in the Jolly-Cord area has been subdivided into two units. The lower consists of 300 m of locally resistant weathering, thin to locally medium-bedded, tan, orange and grey-brown weathering dolomite and silty dolomite with small nodules, lenses and narrow contorted beds of recrystallized medium-grey chert and rare narrow interbeds of dark grey, non-dolomitic argillite. The upper unit which hosts the stratiform lead-zinc mineralization is recessive weathering and includes 150 m of thin- to medium-bedded, orange weathering dolomites and silty dolomites containing chert nodules and lenses interbedded with medium to dark grey, grey-brown and greenish-grey and locally maroon weathering, dolomitic and non-dolomitic argillites and siltstones, some of which are manganese stained.

G_3 consists of at least 200 m of medium- to thick-bedded, buff weathering dolomites and silty dolomites. For the purposes of mapping, this unit has not been subdivided from G_4 which includes about 450 m of brown, buff, grey weathering, locally dolomitic, siltstones interbedded with cherts and G_5 which is generally similar to G_4 but is distinguished by the abundance of stromatolites. This entire sequence is characteristically resistant weathering.

Breccia Bodies and Intrusions

Only three small breccia bodies occur within the Jolly-Cord area. The largest is 0.5 km in diameter and lies 2 km east of the Cord occurrence on the WJV Ape property, while the others lie 3 km north of the Jolly and 2.5 km west of Cord. All three are typical heteroclast breccias and clearly post-date the lead-zinc mineralization. Narrow, dark green to brown weathering diorite dykes and sills are scattered throughout the area. The largest is 10 m wide and approximately 500 m long but most are only 1 to 2 m wide and less than 100 m long.

Structure

The rocks in the area of interest are deformed into upright, open to tight, concentric folds that plunge gently to the east-southeast. Cleavage is rare in the Gillespie Lake Group carbonates but the underlying Quartet Group clastics are strongly cleaved and locally phyllitic.

The largest fault in the target area is a northwest-trending, steeply-dipping reverse fault (north side up) that lies immediately northeast of the Cord occurrence and juxtaposes Quartet and Gillespie Lake Group strata. Numerous small faults with various orientations are also common but aside from those on the Jolly property have not been mapped in detail.

The east-west trending thrust which forms the northern boundary of the area of interest and the major folds are probably related to the Cretaceous Laramide Orogeny.

MINERALIZATION

Both stratiform and fracture-filling mineralization are found in the Jolly-Cord area. Each type contains varying amounts of galena and sphalerite with abundant pyrite and traces of chalcopyrite.

Stratiform mineralization occurs at the Cord property where a relatively argillaceous section of G₂ hosts pyrite with lesser sphalerite and galena and traces of chalcopyrite in thin (up to 4 cm thick) beds that are commonly delicately laminated and exhibit soft sediment deformation textures. Up to 2 cm thick beds of siderite are associated with the sulphides locally. The mineralized horizons are normally recessive weathering but a few outcrops in creek beds exhibit 30 to 50 percent sulphides over true thicknesses of 1 to 2 m.

Fracture-filling mineralization occurs on both large and small scales within the Jolly-Cord area and appears to be related to remobilization of sulphides from the stratiform horizons. The clearest examples of remobilization are seen where coarse-grained galena and sphalerite fill hairline fractures cutting the sulphide-bearing horizons at Cord. Larger scale remobilization has occurred at Jolly where 1 to 2 m wide shear zones contain coarse-grained pyrite, galena and sphalerite in a calcite, dolomite and quartz gangue. A lead isotope analyses of fracture mineralization from the Jolly property (recently performed for WJV by Dr. C. Godwin at U.B.C.) returned isotopic ratios which are nearly identical to those from stratiform occurrences at Cord, Hart River and Sullivan, as shown on the following page. The analyses are easily distinguished from the other Pb-Zn veins in Gillespie Lake Group rocks, such as those on Prism Resource's Vera property.

GEOCHEMISTRY

Figure WJV83 J1 in the pocket is a compilation of WJV and GSC (Open File 518) lead stream sediment and soil geochemical data for the Jolly-Cord area. Soil and stream sediments are immature and surface and groundwater pH is generally greater than 7.0. Thus, mechanical dispersion is believed to be the dominant means of metal transport.

The anomalous values are all apparently derived from the G_2 formation with the exception of a few values which are due to veins in the overlying strata. The highest stream sediment values, 870 and 720 ppm Pb, 2600 and 1368 ppm Zn, and 225 and 80 ppm Cu, occur directly below Jolly and Cord, respectively. However, regionally anomalous values have been obtained from nearly every stream in the area and most of these anomalies have not been explored by WJV.

Soil geochemistry is limited but, where available, supports the stream sediment anomalies. Once again the most anomalous values, up to 2350 and 1950 ppm Pb, >4000 and >4000 ppm Zn and 360 and 104 ppm Cu, were from samples taken directly below Jolly and Cord.

DISCUSSION

Although no economically significant lead-zinc mineralization has as yet been discovered in the Jolly-Cord area, the general geological setting is strikingly similar to that of major mid-Proterozoic lead-zinc deposits in British Columbia and Australia. Sedimentation in each area took place along continental margins in extension (rifting) tectonic environments related to ancient high angle faults with long and complex histories. Wernecke Supergroup strata have been correlated with lower Belt-Purcell Supergroup rocks which host the Sullivan deposit (Young, et al, 1979), and the stratigraphy of the Purcell Supergroup is so similar to mid-Proterozoic strata in northern Australia which hosts the McArthur River and Mt. Isa deposits, that Jefferson (1978) has speculated they may have rifted away from one another. Lead isotope data from Sullivan, McArthur River, Mt. Isa, Hart River, Cord and Jolly are nearly identical.

Given the general similarities in stratigraphy, structural setting, and age of mineralization, there appears to be good potential for a major sedimentary exhalite lead-zinc deposit within the Wernecke Mountains.

Respectfully submitted,

ARCHER, CATHRO & ASSOCIATES (1981) LIMITED

A handwritten signature in black ink, appearing to read 'W. Douglas Eaton', written in a cursive style.

W. Douglas Eaton, B.A., B.Sc.

/mc

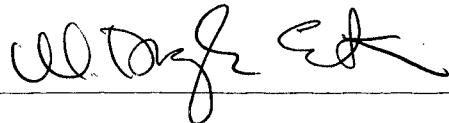
APPENDICES

APPENDIX I - STATEMENT OF QUALIFICATIONS

STATEMENT OF QUALIFICATIONS

I, W. Douglas Eaton, geologist, with business addresses in Whitehorse, Yukon Territory and Vancouver, British Columbia, and residential address in Burnaby, British Columbia, do hereby declare:

1. I graduated from the University of British Columbia in 1980 with a B.Sc. and am currently enrolled in a M.Sc. majoring in Geological Sciences.
2. From 1971 to the present, I have been actively engaged in mineral exploration in British Columbia and Yukon Territory and on June 1, 1981, became a partner in Archer, Cathro & Associates (1981) Limited.
3. I have personally participated in or supervised the field work reported herein and have interpreted all data resulting from this work.

A handwritten signature in dark ink, appearing to read 'W. Douglas Eaton', is written over a horizontal line.

W. Douglas Eaton, B.A., B.Sc.

APPENDIX II - PERSONNEL

NAMEADDRESSPOSITION

W.D. Eaton

6108 Burns
Burnaby

Geologist

B. Sinclair

314-10229 149th Street,
Surrey, B.C.

Student Assistant

APPENDIX III - REFERENCES

BIBLIOGRAPHY

- Delaney, G.D.
1981: The mid-Proterozoic Wernecke Supergroup, Wernecke Mountains,
Yukon Territory; in Proterozoic Basins of Canada, F.H.A. Campbell,
ed.; Geological Survey of Canada Paper 81-10, p.1-23

ARCHER, CATHRO

& ASSOCIATES LIMITED

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1016 - 510 WEST HASTINGS STREET
VANCOUVER, B.C. V6B 1L8



AFFIDAVIT

I, Joan Mariacher, of Vancouver, B.C. make oath and say:

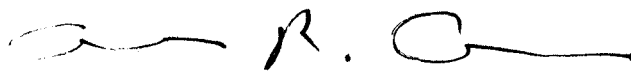
That to the best of my knowledge the attached Statement of
Expenditures for exploration work on the Jolly 1-10
mineral claims on Claim Sheet 106C/13 is accurate.


Joan Mariacher

Sworn before me at Vancouver, B.C.

this 28th day of

February, 198 3



Notary, Yukon Territory

091442

Statement of Expenditures
Jolly 1-10 Claims
January 23, 1983

Labour

D. Eaton - August 1 plus 1 day office - 2 days at \$260/day	\$520.00	
B. Sinclair - August - 1 day at \$107/day	<u>107.00</u>	\$ 627.00

Expenses

Helicopter -0.8 hours Bell 206B contracted from Century Helicopters at \$400/hr	320.00	
Helicopter fuel - 0.8 hrs at 25 gal/hr at \$5/gal delivered to site	100.00	
Room and board - 2 mandays at \$45/day	<u>90.00</u>	<u>510.00</u>
		<u>\$1,137.00</u>

Project -

Date --

WARRICK. DOWNT VENTURE

Aug 31, 1982

MANAGEMENT

Aug

Total

LABOUR

Supervisory

M. P. Phillips - 1 hr. review C of W & claim expiries

Field

4- D. EATON - 13 DAYS @ \$3400/mo

12- D. HERBERLEIN - AUG 1-31 @ 2600/mo

2- S. SHALANSKI - AUG 1-31 @ 1400/mo

- B. SINCLAIR - AUG 1-16, 1700 @ 1/mo

- D. STANFORTH - AUG 1-16, 1700 @ 1/mo

2- J. DENNETT - AUG 1-25 @ 2100

6- J. MORTENSEN - AUG 1-31 @ 3000

(unit NAT) H. OIYE - 7/30 OF ONE MONTH @ 2400/mo

plus 50 %

Casual ? - K. HACHMANN - 3 DAYS @ 140

EXPENSES

Accounting

Expediting

Room & Board in Whse

29 MANDRY. AT \$45/day

total days at \$ /day

Field equipment from AC stock

Xerox copies, 119 copies at 25¢/copy

Radio rental 5B x 10 Aug 1-21 @ 400/mo plus

1 5B x 10 @ \$150/mo.

Rental AC truck

at \$ /mo.

plus (to) kms at /km

Petty cash 27.55 C2; 141.35 D2; 3.90 D2; 23.25 D2

Telephone

Blueprinting, — sq. ft. Ozalid at — c/ft plus — sq. ft. Dilar at \$ — /ft.

Drafting, 45 1/2 hrs. at \$ 22 /hr.

rental large AC internal generator Aug 1-21 @ \$5/day

Ford Fair

Nortack

Chenue Lab

Kelly Douglas

Coffee, Tea & Snacks

Yellow Wood Road

Credit

sub-let helicopter to NAT on Aug 4, 49425

Whitcomb Trained

Total

25,129.0

Project -
Date --

WERNERKE JOINS VENTURE

OCT. 31, 1983

MANAGEMENT

OCT.

LABOUR

Supervisory

Field

D. RATION - 1/2 month @ \$3400

1700.00

D. HERBERLIN - Oct 1-31 @ \$2600/mo

2600.00

H. OLYE - 5/20 of Oct 1-30 @ 2400/mo

400.00

4700.00

Casual

plus 50 %

M. COOKE - 9 1/2 hrs TYPING DRILL LOGS @ \$22/hr

209.00

209.00

EXPENSES

Accounting

500.00

ch

Drafting, 19 1/2 hrs at 22 /hr.

429.00

cl

Xerox copies, 150 copies at 25¢ /copy

37.50

cl

Petty cash 3.18C2,

3.18

cy

Telephone 17.93 + 20.20

38.13

cv

Car. Carbon

16.47

cy

1024.25

11,283.15

CREDIT

AC SEPT. BILLING

(2783.45)

Neville Crosby, refund

(47.70)

bl

AC advance Nov 2

(6000.00)

(8831.15)

Total

2452.15

Keystone Helicopters Ltd.

P.O. Box 178, Atlin B.C. V0W 1A0 Phone (604) 651-7569

No 4462

CHARTERER

ARCHER / CHARTER (W-TU)

ADDRESS

DATE 4-21-82

A/C 111

TYPE Bell 206B

BASE

CHEQUE

CASH

CHARG

P.O.

REMARKS

PASS

CARGO

TIME

JOLLY

0.8

REGIONAL

2.1

2.9

TERMS: NET 10 DAYS

TOTALS

FUEL COST \$

TOTAL

\$ 1160.00

FLYING 2.9 HRS. AT \$400.00 = \$1160.00

AUTHORIZED BY
PRINT

D. Eaton

SIGNATURE

W. D. S. 22

CONTRACT HRS.

FUEL SUPPLIED BY:

CUST. ☒

KH ☐

DAY

KEYSTONE FUEL

MONTH

GALS. FROM AT PER GAL.

YEAR

GALS. FROM AT PER GAL.

GALS. FROM AT PER GAL.

GALS. FROM AT PER GAL.

PILOTS NAME

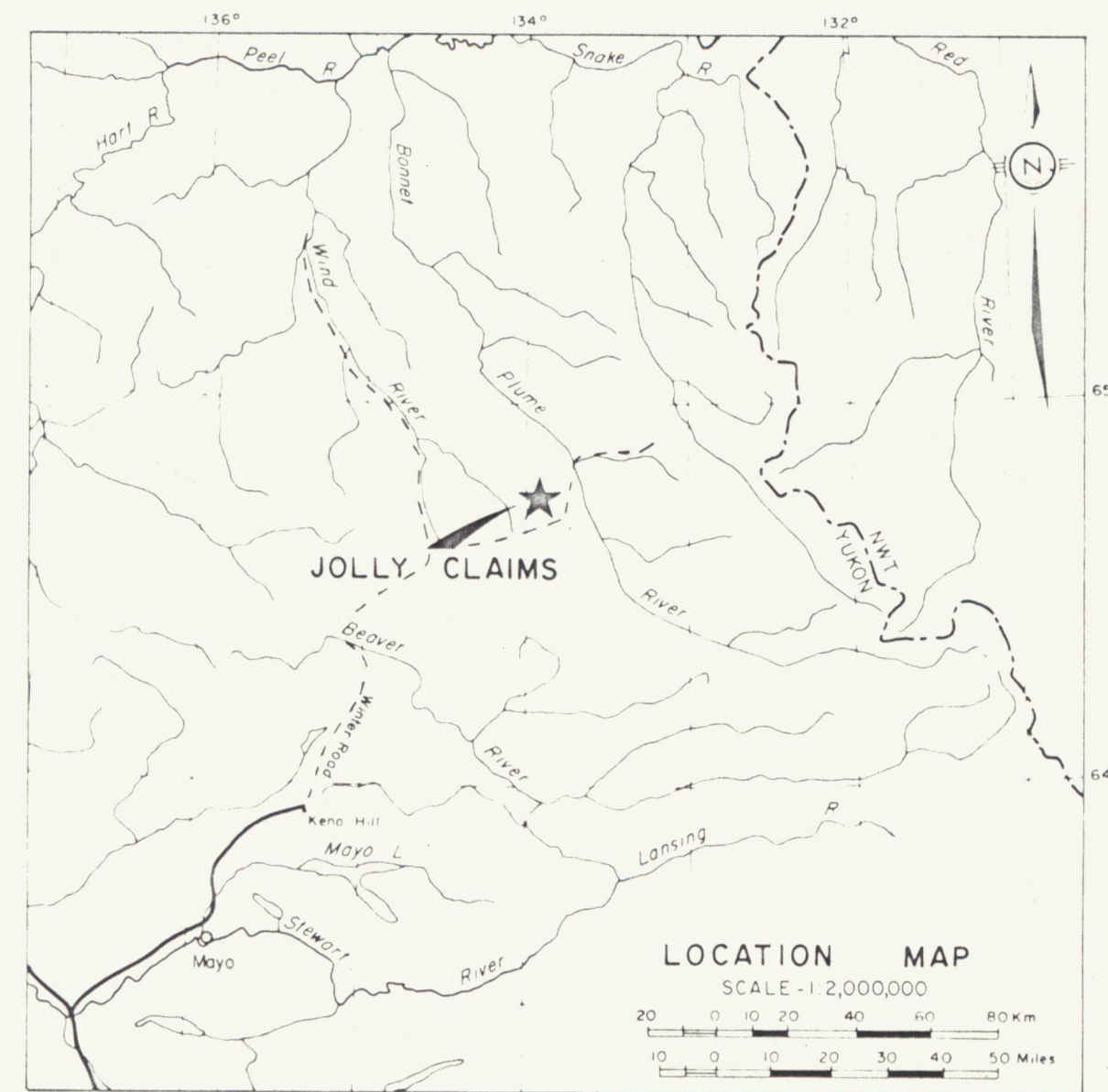
Tom Taylor

SIGNATURE

W. D. S.

Arctic Star Printing Inc.

FLIGHT TICKET NO.



LEGEND

- Heteroclast breccia
- Resistant weathering, massive dolomites
- Pyritic dolomites, silty dolomites and minor siltstones
 - Recessive weathering, thin bedded silty dolomites and siltstones
 - Resistant weathering, thick bedded dolomites
- Siltstones with minor dolomitic horizons
- Siltstones with minor fine sandstones
- Phyllites
- Thrust fault
- High angle fault
- Anticline
- Bedding attitude
- >1000 ppm Pb from soil or stream
- 500 to 1000 Pb sediment samples
- 100 to 499 Pb

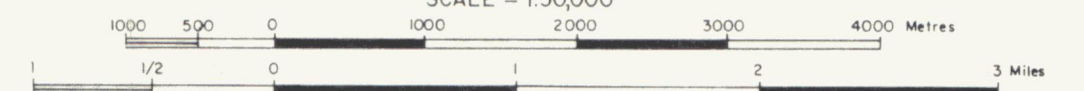
FIGURE WJV83 J1

ARCHER, CATHRO & ASSOCIATES (1981) LIMITED

GEOLOGY, GEOCHEMISTRY

JOLLY AREA
WERNECKE JOINT VENTURE

SCALE - 1:50,000



To accompany report dated Feb/83