REPORT ON GEOLOGY AND DETAILED RADIOMETRIC SURVEY WERNECKE 1-82

MAYO MINING DISTRICT
Claim Sheet 106E/1

30 September, 1976

Lat. 65°07'N Long. 134°23'W

Colin J. Riley Geologist

090 3?

Office Of The Supervising Mining Recorder
NOV - 1 1976
WHITEHORSE
Yukon Territory

This report has been examined by the Geological Evaluation Unit and is recommended to the Commissioner to be considered as representation work in the amount of $ 9671.00

W.D. Sinclair
Resident Geologist or
~~Resident Mining Engineer~~

Considered as representation work under Section 53 (4) Yukon Quartz Mining Act.

B.R. BAXTER
Supervising Mining Recorder
for Commissioner of Yukon Territory

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INTRODUCTION

The Wernecke claims cover a uranium occurrence found by Wernecke Joint Venture (Standard Oil Company of B.C. Ltd., Aquitaine Company of Canada, Ltd., and Messrs. L. and H. Clay) in July, 1975 and explored by preliminary geological mapping and radiometric surveys. In 1976, this property was optioned to Eldorado Nuclear Limited and more detailed geological surveys of the central claims and detailed radiometric surveys of the uranium showing were carried out. Personnel involved with this program were geologist Uwe Schmidt on June 8, geologist James Griffin, June 8 to 24 inclusive, field man Jack Dennet, June 8 to 11, 13 to 15, 17 and 19, under the direct supervision of the senior geologist, Colin Riley who was on the property June 8 to 22 inclusive and July 5 and 6. The project was managed by Archer, Cathro and Associates Ltd.

PROPERTY LOCATION AND ACCESS

The property consists of 82 contiguous mineral claims recorded in the Mayo Mining Division as follows:

CLAIM NAME	GRANT NUMBERS	EXPIRY DATES
Wernecke 1-8	Y97944-Y97951	21 April, 1978
Wernecke 21	Y97964	21 April, 1978
Wernecke 23	Y97966	21 April, 1978
Wernecke 25	Y97968	21 April, 1978
Wernecke 27	Y97970	21 April, 1978
Wernecke 9-20	Y97952-Y97963	21 April, 1977
Wernecke 22	Y97965	21 April, 1977
Wernecke 24	Y97967	21 April, 1977
Wernecke 28-42	Y97971-Y97985	21 April, 1977
Wernecke 43-82	YA1353-YA1392	30 September, 1976
Wernecke 26	Y97969	21 April, 1977

This work was carried out under Atomic Energy Control Board Exploration permit #MX18/76.

The property is located at latitude 65°07' north, and longitude 134°23' west on NTS claim sheet 106E/1, 120 airmiles northeast of Mayo. Access was by helicopter from the base camp at Kiwi Lake, ten miles to the northwest. Kiwi Lake may be reached by float equipped fixed wing aircraft from a charter base at Mayo, 120 miles to the southwest. Claims were previously staked in this vicinity in July 1910 but no sign of previous work has been found and the reason for staking is not known.

WORK COMPLETED

The central 44 claims of the group were mapped in detail and prospected with a McPhar TV1-A spectrometer equipped with a 1½" x 1½" crystal sensor and a Scintrex BGS1-S broadband scintillometer equipped with a 1" x 1" crystal sensor. (Figure Q-3) Counts per second on the scintillometer were converted to counts per minute by multiplying each reading by 120, an empirical correction which approximates the two instruments. In addition, a detailed radiometric survey was carried out on a grid over the main showing and a boulder plot compiled of radioactive boulders contained within the grid. (Figure Q-4). This survey was carried out with two different BGS1-S scintillometers. No attempt has been made to match readings since one of the instruments broke down before comparison was made.

ROCK TYPES

1. Mafic Volcanic

This rock is andesitic in composition with some slaty component. Bedding is obscure but can be recognized in some places. Four clevages are present which tend to obscure bedding. The rock is dark green to green-grey, fine grained and may be chloritized. Some spotted schists and phyllites are present.

2. Carbonate Breccia

A dolomitic rock which in most places is thinly laminated. Slump breccias are common with rotated blocks set in a more massive carbonate matrix. In places, sufficient silica is present to form a limy quartzite and in others, it forms a massive dolomite. The unit is buff weathering and buff to pale grey on fresh surfaces.

3. Argillite

The rock is black, slaty, and very fissile. It is very fine grained and grades, in places, to argillaceous tuff and slaty tuff. It is probably of more than one age although the most continuous exposure is between units 2 and 4.

4. Intermediate Volcanic

The rock is massive, green-grey, medium grained. In places it exhibits some schistocity. The weathered surfaces are dark green-grey with fresh surfaces somewhat paler. Composition is in the andesite-dacite range.

5. Cherty Tuff

The rock is well banded with bands to 2 cms. in width of alternating pale to medium green coloured material. It is very fine grained and may exhibit enough fissility to be phyllitic. The rock contains a high proportion of silica and in places may appear cherty.

6. Acid Volcanic

The rock is pale buff in colour, very fine grained, and weathers cream-white to greenish. It is probably tuffaceous in part and of rhyolite - rhyodacitic composition. It typically weathers in sharp spires.

INTRUSIVES

7. Breccia

An explosive polymict breccia containing subrounded to subangular fragments of pale grey to cream chert, dark volcanic and argillite, and fewer jasper and carbonate. The matrix is fine grained, grey, somewhat limy and may be pitted with rhomb shaped vugs (after siderite?). The matrix may also be dark brown and cherty towards the margins of the vent.

7 (a) Matrix highly altered by the addition of carbonate.

8. Dolomite Alteration

The rock is pale grey to cream in colour and contains abundant magnetite and some biotite. It weathers to a deep red-brown. This is an alteration product found both in the country rock and at the margins of vents.

9. Dyke Rock

Lamprophyre and other basic dykes. They are relatively narrow and cut all other members. Some may be Cretaceous in age.

GENERAL GEOLOGY

The rocks on Wernecke Mountain represent a volcanogenic sequence composed mostly of tuffs. No flow structures have been recognized but the massive and mafic volcanics may be flows. There appears to be a break between unit 2 and unit 3 which might be an unconformity, along which an explosive breccia pipe has intruded. The underlying mafic volcanics (1) and thinly laminated carbonates (2) form a conformable highly folded sequence. Four different cleavages can be recognized in the volcanics plus a mineral lineation. The carbonates follow the upper contact of unit (1) but are nowhere seen in contact with unit (3). The succession upwards is black argillite (3), intermediate volcanics (4), green cherty tuffs (5), and acid volcanics (6). From place to place in this pile, argillite or argillitic tuff bands are present. They tend to form along the contacts with the different units. This succession is folded gently into a broad syncline along the long axis of the mountain. Two major faults crosscut the sequence with left hand movement of 250 metres on one and left hand movement of unknown amount on the other.

The succession of beds above unit (2) is relatively undeformed compared to units (1) and (2). Thus it is postulated that an unconformity exists between units (2) and (3). It is along this unconformity that the explosive breccia pipe has intruded. In the east, a thinly laminated carbonate forms both contacts with the breccia and to the west the upper contact is with slaty volcanics and the lower with acid volcanics. In both cases the breccia is seen to crosscut the existing bedding. The pipe does not follow the unit (2) and (4) contact exactly but appears to extend upwards into the unit (4). In other places small pods or discontinuous lenses of this breccia are present throughout the succession so it would appear to be one of the latest events. The chert or contact breccia may or may not be present at the edge of the breccia pipe. The matrix is cherty with rhomb shaped vugs and fragments are also chert. This unit appears to be discontinuous but this may be due to lack of outcrop in the area.

The lamprophyre dykes are seen to cut the breccia close to the northernmost fault.

There is an intrusive plug or vent on the west side of the mountain. This is represented by breccia surrounding a core of dolomitized material. There is a contact breccia of brick red-brown cherty material and the country rocks are baked acid volcanic. The numerous small pods of grey breccia in this area may represent agglomerate beds related to this vent.

Selective dolomitization has taken place and over short distances may be used as a marker bed. It forms relatively thin bands of deep red brown weathering, cream to pale grey dolomite containing abundant magnetite. This alteration appears to be associated with the vent breccias and is located discontinuously at their margins.

Age dating has been carried out on a specimen of brannerite in a weakly fractured rhyolite from the main showing at the north end of Quartet Mountain. An age of 745 million years was determined which compares to a K-Ar date of 1030 million years from an unmineralized specimen of volcanics from approximately 100 feet higher in the section.

ECONOMIC GEOLOGY

Prospecting in the area of mapping located some small spot highs of radioactivity but these were usually isolated boulders and talus. No in-place source could be located for any of them and in all cases they proved to be isolated with no boulder trains or other indications of large mineralized areas. A careful check failed to extend mineralization along strike of the favourable pink chert horizon. Spot highs only were located.

In the main area of mineralization, a radiometric survey was carried out and careful boulder prospecting completed. No mineralization was located in outcrop although it appears that the talus has not moved very far from its origin.

The survey indicates a mineralized area extending 500 feet along strike and while it is difficult to estimate the true width of the zone it would appear to be not more than 20 feet.

Traces of mineralization were located over a further 600 feet but the number of boulders indicate that the zone is thin and sparsely mineralized. Mineralization in the main zone is mostly in the form of large discrete brannerite crystals, with possibly some uraninite, widely disseminated in an erratic manner. In a few boulders smaller disseminated grains of brannerite were located. In both cases a typical red hematite alteration halo surrounds the mineralization. It should be noted however, that while the red alteration is always present with the mineralization, it is not diagnostic as it may also be present in barren rock. The mineralization appears to be secondary and confined to quartz filled fractures. In one place a fracture crosscuts the zone and contains concentrated mineralization. The fracture forms vugs which are lined with inward facing quartz crystals and filled with an amorphous buff carbonate. The mineralization is confined to the secondary quartz and for short distances along fractures into the wall rock. The red alteration halo extends 6 to 8 inches into the wall rock. On a smaller scale the same process appears to control the emplacement of the brannerite throughout the area. In almost all cases the mineralization is associated with quartz filled micro fractures. In the case of the smaller crystals, hairline micro fractures with no quartz appears to be the control.

It is postulated that the mineralization is a late feature to the fracture filling by solutions percolating along the edge of the breccia pipe. The change in chemistry of the rock, signified by distinct drop in the potassium content of the host rock as compared to the surrounding rocks, caused deposition of the uranium in the form of brannerite. To date no titanium minerals have been identified in the host rock but their presence is possible.

CONCLUSIONS AND RECOMMENDATIONS

Numerous occurrences of mineralization on the Wernecke claims proved to be isolated spot occurrences of brannerite crystals. In only one place is there sufficient concentration of these crystals to be called a mineralized zone. This zone (20 feet x 500 feet) contains scattered crystals of brannerite which would not appear to be of sufficient grade to be interesting. Channel or chip sampling of the occurrence is not possible as mineralization was not located in place. Grab samples from boulders and frequency of boulders downslope from the zone indicate that size and grade are not sufficient to sustain further work.

APPENDIX

Specimen Description

Specimen A - Brannerite in weakly fractured light coloured Unit 3 metavolcanics from the Main Showing at the north end of Quartet Mountain on the Wernecke claims. A K-Ar date of 1.03 billion years was obtained from a specimen of Unit 3 in the same area but slightly higher (100' ±) in the section.

Specimen B - Brannerite crystal in weakly quartz veined Unit 5 argillite from the locality now staked as the Gnuckles claims.

Specimen C - Brannerite crystal from the east striking vein on the Otis claims.

Specimen D - Brannerite crystal from the north striking vein on the Otis claims.

Specimen E - Small pocket of pitchblende from a barite vein cutting hematite on the Igor claims.

Specimen F - Pitchblende in carbonate-Unit 3 breccia from headwall of Pterd cirque. The original specimen assayed 7.67% U_3O_8 and is described on page 52 of the 1975 WJV report.

DONALD F. SCHUTZ, President

TELEDYNE ISOTOPES
50 VAN BUREN AVENUE
WESTWOOD, NEW JERSEY 07675
(201) 664-7070 TELEX: 13-4474

28 July 1976

Mr. A. R. Archer
Archer, Cathro and Assoc. Ltd.
1016 Standard Building
510 West Hastings Street
Vancouver, B.C. V6B 1LB

Dear Mr. Archer: Re: W. O. 3-4589-142

We have analyzed the six uranium bearing minerals submitted to us for U/Pb age determinations with the following results:

			Isotopic Abundance (Atom %)				Isotopic Ratios		
Sample	% U	% Pb	Pb^{204}	Pb^{206}	Pb^{207}	Pb^{208}	Pb^{206}/U^{238}	Pb^{207}/U^{235}	Pb^{207}/Pb^{206}
A	34.69	1.286	.012	90.634	5.764	3.590	.03930	.3374	.0636
B	34.84	0.442	.020	88.495	5.619	5.866	.01317	.1112	.0635
C	22.24	0.438	.010	87.899	5.286	6.805	.02022	.1645	.0601
D	25.97	0.641	.052	88.368	6.132	5.428	.02593	.2275	.0694
E	4.986	0.886	.0090	91.937	7.469	.585	.1908	2.113	.0812
F	14.86	0.675	.035	92.590	5.840	1.535	.04965	.4068	.0631

The ages of the minerals were calculated as follows:

Sample	Pb^{208}/U^{238} (m.y.)	Pb^{207}/U^{235} (m.y.)	Pb^{207}/Pb^{206}
A	249	295	745
B	84	107	742
C	129	155	623
D	165	208	929
E	1126	1153	1249
F	312	346	728

The pattern of these ages is in all cases typical of that which develops when lead is lost or uranium is gained in the system. Detailed interpretation of discordant ages is beyond the scope of our routine analytical services inasmuch as a knowledge of the geological relationships of the minerals is required. I have, however, enclosed a discussion of discordant ages from Lead Isotopes in Geology (Russell-Farquhar, 1960) to provide you with some basic information on interpretation of the data.

If I can be of help to you in pursuing further study of the data presented, please let me know.

Yours truly,

Donald F. Schutz
President

DFS:mm
enclosure: Pages 104-107, Lead Isotopes in Geology,
Russell-Farquhar, 1960

THE UNIVERSITY OF BRITISH COLUMBIA
2075 WESBROOK PLACE
VANCOUVER, B.C., CANADA
V6T 1W5

DEPARTMENT OF
GEOLOGICAL SCIENCES

June 24, 1976

Mr. Al Archer
Archer, Cathro & Associates Ltd.
Box 4127
Whitehorse, Yukon Territory
Y1A 3S9

Dear Al:

Enclosed are the K-Ar results for sample WJV(3-4). The light coloured sample was not suitable for dating as the K content was too low. There was sufficient material in WJV(3-4) for a single date, and it was preferable to do this rather than mix the dark specimens even though they are from the same unit.

Cost of 1 K-Ar age on WJV(3-4) is $250.00. Please make the cheque payable to the Department of Geological Sciences, U.B.C. and mail back to me. Thank you.

Sincerely yours,

Joe

Joe E. Harakal

JEH/ch

Enclosure

THE UNIVERSITY OF BRITISH COLUMBIA
VANCOUVER 8, CANADA

DEPARTMENT OF
GEOLOGICAL SCIENCES

(K-AR ANALYTICAL DATA AND AGE DETERMINATION)

Sample No.	WJV (3-4): Dark specimen
Material Analyzed.	Whole Rock (30-70 mesh)
Potassium (% K)[1]	$\bar{X} = 5.11 \pm 0.00$ (2)
Ar^{*40} / Total Ar^{40}	0.978
Ar^{*40} (10^{-5}cc STP/g)	28.085
Ar^{*40}/K^{40}	8.059×10^{-2}
Apparent Age.	1.03 ± 0.04 Billion years

Sample No.	
Material Analyzed.	
Potassium (% K)[1]	
Ar^{*40} / Total Ar^{40}	
Ar^{*40} (10^{-5}cc STP/g)	
Ar^{*40}/K^{40}	
Apparent Age.	

Footnotes: 1. Number in parenthesis refers to number of K analyses.

Constants Used: $\lambda_e = 0.585 \times 10^{-10} yr^{-1}$

$\lambda_\beta = 4.72 \times 10^{-10} yr^{-1}$

$K^{40} / K = 1.19 \times 10^{-4}$

Ar^{*40} refers to radiogenic Ar^{40}.

σ = standard deviation.


LOCATION MAP
WERNECKE CLAIMS I-82
MAYO MINING DISTRICT
1:1,000,000
0 5 10 20 30 mi
Margaret Lake
Kiwi Lake
W.J.V. CAMP
Quartet Lakes
WERNECKE I-82
Fairchild Lake
W.J.V. CAMP
Snake R.
Wind R.
Bonnet Plume R.
Hart R.
Hart Lake
Beaver R.
Kathleen Lake
McQuesten Lake
65°00'
64°00'
ELSA
KENO HILL
Mayo Lake
MAYO
Stewart R.
135°00'
134°00'
WERNECKE CLAIMS I-82
MAYO MINING DISTRICT
1" = 1/2 mile
QUARTET LAKES
MAIN SHOWING
LEGEND
INTRUSIVES
9 Lamprophyre and basic dykes
8 Dolomitic alteration with magnetite and biotite
7 Breccia - explosive polymict breccia containing subrounded to subangular fragments of chert, volcanic, siltstone, rhyolite.
7a Same as above with altered limy matrix
VOLCANICS
6 Acid volcanics, rhyolite to rhyodocite, pale buff very fine grained, may be tuffaceous in part. May be of more than one age.
5 Cherty tuff - banded light and dark green siliceous very fine grained water-laid tuffs. May contain some phyllitic horizons.
4 Intermediate volcanics - massive, green grey medium grained. Some schistose bands.
3 Argillite, argillaceous tuff, slatey tuff, black, very fine grained. May be of more than one age.
2 Carbonate breccia, massive dolomite, thinly laminated siliceous carbonate, limy quartzite.
1 Mafic volcanics, spotted schists, phyllites
Bedding, strike and dip.
Fault
Geologic contact
Outcrop
Creek
6000 Radiometric reading in counts / minute. McPhar TV I-A
Radiometric survey baseline
x Specimen station
Figure Q 3
ARCHER, CATHRO & ASSOC.
WERNECKE JOINT VENTURE
GEOLOGY
of
Wernecke Claims I-82
1 cm = 30 metres
TO ACCOMPANY REPORT DATED 30/9/76
DATE July 1976
C.J. RILEY

LEGEND

• 500 BOULDER LOCATION WITH RADIOMETRIC VALUE IN COUNTS / MINUTE WITH SCINTREX B.G.S. I S #5

68 READINGS TAKEN WITH B.G.S. I S #3

70 READINGS TAKEN WITH B.G.S. I S #5

TOPOGRAPHIC CONTOUR INTERVAL: 20'

Figure Q4 ARCHER CATHRO & ASSOC.

WERNECKE JOINT VENTURE

RADIOMETRIC SURVEY

of

Wernecke Claims I-82

1" = 50 feet

TO ACCOMPANY REPORT DATED 30/9/76

DATE July 1976	C.J. RILEY