ARCHER, CATHRO
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Office of the Regional Manager Mines
MAR 2 1983
WHITEHORSE
Yukon Territory

NAT JOINT VENTURE

GEOLOGICAL AND GEOCHEMICAL REPORT

NARNIA 1-16 CLAIMS
(YA61605-YA61620)

RECEIVED
1 MAR 1983
MINING
RECORDER'S OFFICE
WHITEHORSE, Y.T.

DECEMBER, 1982

Claim Sheet 115F/9

Latitude 61°40'N; Longitude 140°02'W

W.D. Eaton, B.A., B.Sc.

Work done between July 25 and August 10, 1982

091433

BOX 4127, 3125 THIRD AVENUE, WHITEHORSE, Y.T. Y1A 3S9

(403) 667-4415

This report has been examined by the Geological Evaluation Unit under Section 58 (4) Yukon Quartz Mining Act and is allowed as representation work to the amount of $ 9200—.

P Watson

for Regional Manager, Exploration and Geological Services for Commissioner of Yukon Territory.

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INTRODUCTION

The Narnia claims were staked in July, 1981 to cover a 4 sq km area of anomalous gold and arsenic soil response in the vicinity of a Cretaceous(?) plug that intrudes volcanic rocks of the upper Paleozoic Station Creek Formation. Preliminary work by NAT that year returned gold values as high as 0.296 oz/ton in soil and 0.322 oz/ton in mineralized vein material but no specific area of interest was located.

NAT's 1982 program on Narnia included grid soil sampling over the centre of the anomalous area, geological mapping and reconnaissance chip sampling of outcrops to better define the source of the anomalies.

PROPERTY, LOCATION AND ACCESS

The Narnia property consists of 16 contiguous mineral claims registered in the name of Archer, Cathro & Associates (1981) Limited in the Whitehorse Mining District as follows:

Claim Name	Grant Number	Expiry Date
Narnia 1-16	YA61605-YA61620	28 April, 1984

The claims are located at latitude 61°40'N and longitude 140°02'W on NTS claim sheet 115F/9, about 300 km northwest of Whitehorse and 13 km west of the Donjek River bridge on the Alaska Highway. Access in 1982 was by helicopter from the NAT camp at Sanpete Creek and the work was done from a flycamp in the valley immediately north of the property.

PREVIOUS WORK

The ridge underlying the Narnia claims was first staked as the Larry claims in 1953 by Hudson Bay Mining & Smelting which conducted mapping and geophysical surveys. It was restaked in 1970 as the Garlic claims by Quintana Minerals Corp. Ltd. as part of a regional porphyry copper project. Quintana conducted mapping, soil sampling and a limited magnetic survey. Edith Creek, which bounds the south side of the property, has been placer mined about 5 km downstream.

PHYSIOGRAPHY AND GEOMORPHOLOGY

The Narnia claims lie on a west northwest-trending ridge in the Kluane Ranges west of the Shakwak Trench. Elevations range from 1340 to 1860 m. The ridge is lens shaped like most of the Kluane Ranges and is probably bounded by major right-lateral shears to the north and in the Edith Creek valley to the south. Both of these valleys were occupied by glaciers during the last advance and exhibit U-shaped cross-sections. The ridge between them is steep-sided (average 30° slope) with a narrow crest.

Outcrop is abundant on the north side of the ridge top but is rare on the south-facing slope where talus-filled gullies are separated by grass-covered ridges. Volcanic ash is only seen in the valley bottoms. Treeline is at about 1350 m and buckbrush (alder) is restricted to slopes below 1400 m.

GEOLOGY AND MINERALIZATION

General

The history of the Narnia property consists of complex episodes of alteration and shearing imposed on a simple geological setting. There are three major lithological units: Permian volcanic and volcaniclastic rocks (Pv); a composite gabbro-granodiorite pluton of probable Cretaceous age (Kgb-Kgd); and, minor felsic dykes (Kd). Figure G1 in the pocket illustrates the property geology and the units are briefly described below.

Station Creek Formation (Pv) - The oldest rocks in the area belong to the predominantly volcanic Station Creek Formation. They include andesite and dacite flows, fine to coarse monolithogic and polymitic volcanic or epiclastic (slump) breccias, and rare volcanic sandstone and siltstone interlayers, which show graded bedding and convolute layering. Limestone outcrops in the valley north of the claims also belong to this formation. These rocks probably accumulated on the flanks of an island comprised of intermediate volcanics.

Cretaceous Gabbro and Granodiorite (Kgb, Kgd) - A 1 km in diameter plug, divided into two exposures by a west northwest-trending pendant of altered volcanic rocks, cuts the Paleozoic rocks in the centre of the property. Its easterly, more basic phase is a blocky weathering gabbro consisting of plagioclase, hornblende, magnetite and minor biotite. Although generally equigranular, textures in it are variable with comb layering and plagioclase hornblende pegmatites occurring in places. The granodiorite, by contrast, is pink and weathers to cobble-sized debris. It typically contains 45 percent plagioclase, 25 percent orthoclase, 20 percent quartz and 10 percent altered mafic minerals including chlorite and titanium and iron oxides. The granodiorite is equigranular and somewhat finer grained than

the gabbro. The intrusion is tentatively assigned a Cretaceous age based on its affinities with the Kluane intrusions.

Cretaceous Felsic Dykes - A few dykes outcrop within Palezoic country rocks near the periphery of the intrusion. They are cream-coloured, punky and friable and have undergone intense clay and/or sericite alteration.

Structure

Insufficient data is available from the Permian rocks to interpret bedding attitudes. Most faults and fractures trend north-northeast perpendicular to the inferred major faults north and south of the property and range from slickensided, hematite-coated surfaces in float to a 27 m wide fault along the eastern side of the intrusion. They probably represent second-order movements related to the overall right-lateral stress regime. Shears are developed in the Cretaceous intrusive rocks as well as in the Station Creek Formation. At least one felsic dyke and the two quartz-carbonate veins which returned high gold values show north to north-northeast trends.

Alteration

There are three distinct alteration regimes on the property. The most intense and most significant in terms of gold mineralization is limited to Station Creek Formation rocks in the roof pendant and in a 50 to 150 m wide band peripheral to the Cretaceous pluton. This complex zone exhibits widespread silicification and gossans with overprinted carbonate alteration and veining and relict areas of epidote, chlorite and hematite alteration. The other two regimes are in the pluton itself, where epidote, chlorite and hematite occur particularly along fractures; and in the Station Creek Formation away from the pluton, which has undergone either propylitic alteration or, more likely, low-grade regional metamorphism.

The alteration zone surrounding the pluton was investigated both in the field and in thin section. The following alteration styles characterize this zone:

Silicification occurs as cloudy, diffuse veins and is rarely pervasive. Silicified rocks typically contain 10 to 15 percent secondary quartz and are light green to caramel-coloured, depending on the relative amounts of sericite, chlorite, and iron-oxide present. In some, titanium oxide is found without chlorite, probably indicating removal of iron and magnesium.

Gossans occur sporadically within the zone, particularly west of the pluton. They are highly pyritic (up to 25 percent) and contain abundant subhedral quartz and secondary green phyllosilicate which, because of its intermediate optical properties, is probably a submicroscopic intermixture of biotite, chlorite and sericite.

Carbonate alteration is tan coloured and characteristically consists of superimposed fracture-controlled veins, the earliest of which were brecciated before the later veins were emplaced. The trends of individual veins parallel the local north to north-northeast fracture trend. A 27 m wide carbonate vein with traces of malachite and galena is found in the saddle east of the pluton. Below this saddle to the south, minor banded chalcedony and white gypsum lenses occur in the vein zone.

Carbonate alteration is dominantly fracture-controlled whereas silicification is not obviously related to faults or fractures. In one thin section, carbonate veinlets cut across stringers of quartz, suggesting that the carbonate veining occurred later than silicification.

The zone of strong alteration may coincide with an earlier hornfels zone around the pluton. Only traces of hornfels texture remain including fine-grained subpolygonal plagioclase- quartz- chlorite aggregates in the unaltered portions of otherwise silicified volcanic rocks and traces of anhedral reddish-brown biotite preserved within quartz grains.

The zone of strong alteration terminates abruptly east and west of the pluton against dark green volcanic rocks which contain abundant matrix chlorite as well as epidote, hematite and minor malachite on fractures and shears.

The intrusion itself contains chloritized hornblende and biotite, partly sericitized plagioclase, epidote and hematite on fracture surfaces. The intrusive rocks are nowhere silicified or gossanous and one of the galena-bearing carbonate alteration zones narrows abruptly from 2 m wide in metavolcanics to a single 5 cm vein within the gabbro. Thus the intrusive contact itself is also an alteration boundary.

GEOCHEMISTRY

General

Figure G2 in the pocket illustrates geochemical results from soil and rock sampling done on a 1200 by 800 m grid covering the area of anomalous gold response delineated by 1981 traverses. The geochemical surveys were controlled by two 800 m long baselines trending at 032° and joined by an 800 m long tie line which parallels the ridge top through the centre of the property. Soil samples were taken from C horizon soil at 50 m intervals on compass- and topofil-controlled lines spaced 100 m apart. Baselines were marked with 1 m lath pickets while soil sample locations were marked with 0.5 m lath pickets bearing the sample bag number

and grid coordinates. A total of 292 soil samples were taken. Reconnaissance chip samples were taken from 29 outcrops representing a variety of lithologies and alteration types with the sample locations marked with flagging.

All samples were sent to Chemex Labs Ltd. in North Vancouver, B.C. and were analyzed for gold by fire assay with a NAA finish. Analytical techniques are summarized in Appendix III.

Results

Anomalous gold values (up to 1053 ppb Au) are concentrated within the zone of strong alteration in the Station Creek Formation. The average response in soils from this zone is 167 ppb Au over an area of 0.3 sq km, compared with 47 ppb Au in the unaffected Station Creek Formation and 13 ppb in the intrusion. The general consistency of gold values within the anomaly is probably indicative of fine-grain size, as a pronounced "nugget effect" is not present.

Rock samples in general returned much lower gold values than soils from any given area. The highest rock value was 438 ppb Au from a 10 m wide chip sample across a weakly malachite-stained quartz-carbonate vein in the saddle on the eastern baseline near the location of the 1981 soil sample which assayed .296 oz/ton Au. Typical gold values from silicified outcrops in the strongly altered zone range from <1 to 216 ppb.

DISCUSSION AND CONCLUSION

Gold mineralization on the Narnia claims occurs within a zone of strong alteration in upper Paleozoic volcanic rocks which surround and form a pendant within a small Cretaceous pluton. Thin section data suggests that alteration was superimposed on a hornfelsed zone. The pluton itself is neither altered nor mineralized.

The alteration zone shows evidence of two phases: (1) early silicification accompanied by pyrite and phyllosilicates, none of which show structural control except proximity to the intrusion; and, (2) later carbonate ± galena, malachite and quartz veining controlled by north to north-northeast trending shears. Most soil samples taken from this zone returned anomalous gold values (up to 1053 ppb Au). Only a few gold values from rocks are in this range and most are derived from mineralized carbonate veins.

Three explanations can be advanced for this discrepancy:

(1) gold values are strongly enhanced in soils by preferential weathering of sulphides;

(2) gold values in soils reflect small, high-grade sources such as the carbonate veins; and,

(3) outcrops, although strongly silicified or gossanous, are not as enriched in gold as recessive weathering zones, which were not sampled.

It is improbable that disseminated sulphides will be preferentially separate from gold in an environment such as Narnia where mechanical processes dominate over chemical weathering, and relatively few high-grade carbonate veins have been found. Therefore, the gold values in soil are most likely derived from an extensive stockwork of hairline, carbonate-filled fractures developed in recessive weathering rocks surrounding the more resistant, silicified outcrops.

Respectfully submitted,

ARCHER, CATHRO & ASSOCIATES (1981) LIMITED

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.

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

APPENDIX II - PERSONNEL

Name	Address	Position
J. Nelson	2980 West 8th, Vancouver, B.C.	Geologist
D. Eaton	6108 Burns Street, Burnaby, B.C.	Geologist
A. Reid	151 Goulburn Road, Ottawa, Ontario	Student Assistant
L. Cymbalisty	1602 #5 Morey Road, Nanaimo, B.C.	Student Assistant
D. Lister	c/o 106A - 93 Lewes Blvd., Whitehorse, Y.T.	Student Assistant

APPENDIX III - ANALYTICAL TECHNIQUES

PREPARATION

All soil samples were dried and sieved through an ASTM 35 mesh screen (0.50 mm). The minus 35 mesh fraction was then pulverized and homogenized in a ring grinder to approximately minus 100 mesh (0.15 mm). For drill core and grab and chip rock samples, the entire sample was crushed and split. A subsample was then pulverized in a ring grinder to approximately minus 100 mesh.

ANALYTICAL TECHNIQUES

Gold was analyzed by a "combo technique" consisting of a fire assay followed by neutron activation.

140°02'

61°40'

61°39'30"

Pv

KTgd

KTgb

silicified

dike from KTgd

sheared green andesite w/ hem on fractures / trace mal

pink silicified dacite?

porphyritic dacite

recently silicified zone

carbonate vein 1.75m

minor gossan

weakly altered

gossan 2.3

gossan pyrite + chlorite - qz veins

silicified zone

pink silicification

dark green andesites

pink-and-green alteration

silicified andesite

chlorite - pyrite

silicified zone(s)

pink granodiorite

andesite breccia + rounded qz pebbles or amygdules

epidote stringers

carbonate vein + qtz

gabbro with plagioclase - hornblende pegmatite

hematite, epidote on shears

felsic dyke; silicified andesite

carbonate vein + trace qtz

felsic dyke

traces malachite

andesite

andesite flow breccia

silicified andesite flow

andesite breccia + epidote stringers

chalcedony in clasts

gypsum

felsic dyke (N)

Narnia 1 2 3 4

BL

N

LOCATION MAP

SCALE - 1:2500

50 25 0 25 50 75 100 Metres

100 50 0 100 200 300 Feet

MAP AREA

Koidern

White River

Alsek River

ALASKA - YUKON

Dalton Hwy

Burwash Landing

Kluane Lake

KLUANE NATIONAL PARK

141° 140° 139° 62° 61°

LEGEND

CRETACEOUS-TERTIARY

KTgd / KTgb — Composite pluton, pink granodiorite and dark green gabbro

UPPER PALEOZOIC

Pv — Station Creek Formation: andesite and dacite breccia, flows, minor epiclastic sediments

Limit of outcrop

Geological contact – defined, approximate

Fault

Limit of strong silicification, gossans, carbonate veining

Gossanous outcrop or talus

Thin section description (see Appendix II)

Figure G1

ARCHER, CATHRO & ASSOCIATES (1981) LIMITED

GEOLOGY

NARNIA DETAIL

NAT JOINT VENTURE

SCALE - 1:2500

50 25 0 25 50 75 100 Metres

100 50 0 100 200 300 Feet

Jan/83

091433

To accompany report dated Dec./82

140°02'

61°40'

61°39'30"

Ki

Pv

BL

Narnia

LOCATION MAP

SCALE - 1:1,000,000

MAP AREA

KLUANE NATIONAL PARK

Koidern

White River

Alaska Hwy

Dalton Hwy

Burwash Landing

Kluane Lake

ALASKA YUKON

LEGEND

CRETACEOUS

Ki — Composite gabbro/granodiorite stock

PERMIAN and Older

Pv — Station Creek Formation
Andesite breccia, flows and minor epiclastic sediments

Geological contact

Limit of strong alteration

43 — Soil sample location with Au values in ppb

150 — Chip sample location with Au values in ppb

Figure **G2**

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GOLD GEOCHEMISTRY

NARNIA DETAIL

NAT JOINT VENTURE

SCALE - 1:2500

Jan/83

091433