ASSESSMENT REPORT
ON THE 1989
GEOLOGICAL, GEOCHEMICAL SURVEYING AND TRENCHING
ON
THE TIP AND TOP CLAIMS
RECORD No.s 2077-2080, 2637-2644

BONAPARTE LAKE AREA,
CARIBOO DISTRICT
CLINTON M. D. B. C

51 o 10 ', 120 o 45 '
NTS 92 P/2

FOR
NORTHGATE EXPLORATION LIMITED
SUITE 2701, P.O. BOX 143, 1 FIRST CANADIAN PLACE
TORONTO, CANADA, M5X 1C7, Tel. (416) 3[illegible]

OWNER: MICHAEL DICKENS
OPERATOR: NORTHGATE EXPLORATION LIMITED
PROJECT No. 1989-763

DATE SUBMITTED AUGUST 1989
WORK DONE: MAY 2 TO JULY 4, 1989

REPORT BY:
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PLATE 1

LOCATION MAP

1.0 INTRODUCTION

This report describes an exploration program consisting of trenching, geological mapping, and geochemical sampling carried out in 1989 on the TIP-TOP property situated in the Bonaparte Lake region of southwestern British Columbia (Plate 1). The property is located about 55 km northwesterly of the City of Kamloops. This is the second year that Northgate has conducted exploration for epithermal gold deposits on this property. It is being explored under the terms of an option with Michael Dickens, prospector, of Savona B. C.

The TIP-TOP property is situated in the southern portion of the physiographic region known as the Cariboo Plateau (GSC Map 1701). The property area is generally flat to gently rolling. Convenient access is via the paved section of Loon Lake Road from the Cariboo Highway to Loon Lake then by about 40 km of generally well maintained logging roads: the NE extension of Loon Lake Road, the 3400, 3300 and 3800 Roads. The area is also reached by logging roads from the North Thompson Highway via Bonaparte Lake and 3300 Road. Several other approaches involving the Deadman River Road from the Trans Canada Highway usually necessitate four wheel drive vehicle to connect with the Loon Lake and North Thompson routes.

The property consists of TIP # 1-6 and TOP # 1-6 which are contiguous 4 Post Claims totalling 181 Units (Plate 2). Evidence of widespread prospecting in the TOP claims, probably dating back to the 1930s, is found on the hill tops and in the sides of gullies particularly in TOP 2 and 3. Most of these old diggings are now overgrown. Stevenson, 1936, is the principal reference to early exploration in this area, describing mineralization in the Telluric prospect and the Moon Group on Massey Hill (Plate 6).

Work in 1989 consisted of geological mapping, geochemical sampling road surveying, linecutting and trenching. The work is summarized as follows:

1. Detailed geological mapping, generally of trenches 2000 square m. area (1:250 Plate 4). Work on TOP # 1.

2. Rock sampling of trenches: 64 samples analyzed variously for gold and multielements (Appendix 3, Plate 4). Work on TOP # 1.

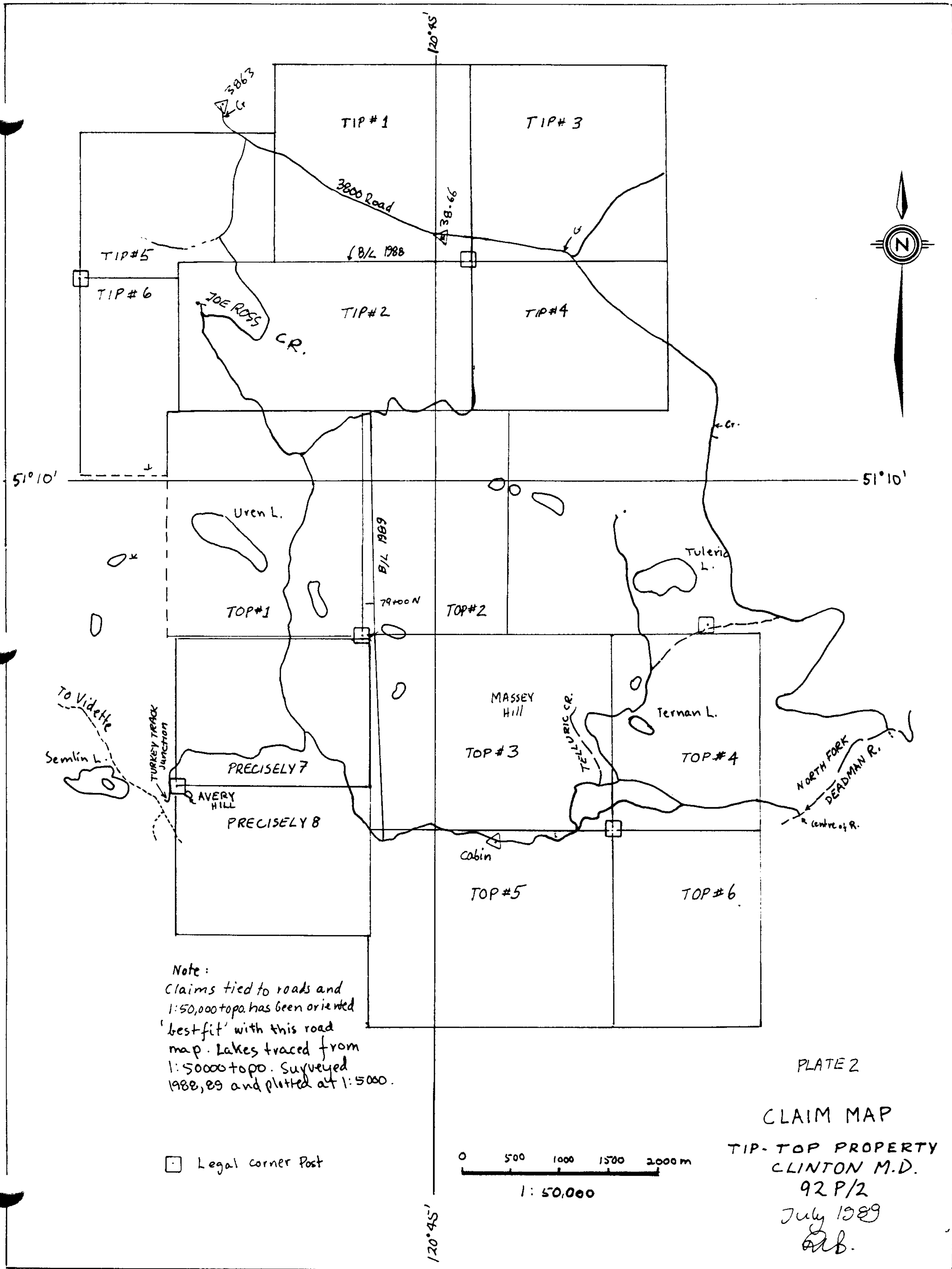
3. Reconnaissance geological mapping and geochemical sampling of 10 square km area with 6 rock samples and 202 soils. Work on TIP # 2, 5, 6, TOP # 1, 2, 3 (Appendices 2, 3, Plates 5, 6).

4. Linecutting total 17.3 km hand cut blazed and cedar lath picketed lines (Plates 5, 6). Work on TIP # 6, TOP # 1, 2, 3, 5.

5. Road survey for overall claim and line control: approx. 23 km. (Plates 5, 6 Appendix 6). Work on TIP # 2, TOP # 1-5.

6. Biogeochemical sampling: 23 outer bark samples (Plates 4, 5).

The principal objectives of this season's exploration were: 1. to develop a drill target with the aid of machine trenching, sampling and geological mapping in the principal showing on TIP # 1 M.C., and 2. to determine the overall distribution of gold in soils, in the previously unsampled portions of the TIP-TOP group. On TOP 1-6 this was to be accomplished by systematic soil sampling at 100 m intervals on lines spaced at 400 m throughout the claims. The geochemical data would be supplemented by 1:5000 scale geological mapping as outcrops permitted. The geochemical and geological components of the 1989 program were to include extending the 1988 soil grid on the TIP claims north and west to the property limits. For reasons of logistics, objective 2 was to be accomplished first. Establishment of ground control on the TOPs was well underway when word was received of a major shift in the operator's development priorities. To comply with the terms of the agreement prior to a probable abandonment of the option and to ensure the property received maximum benefit from the remaining expenditure, the emphasis shifted to the earlier stated primary objective: to develop a drill target in the TIP showing. The work on the TOPs was terminated after a first-pass geochemical program and not resumed because of other priorities.



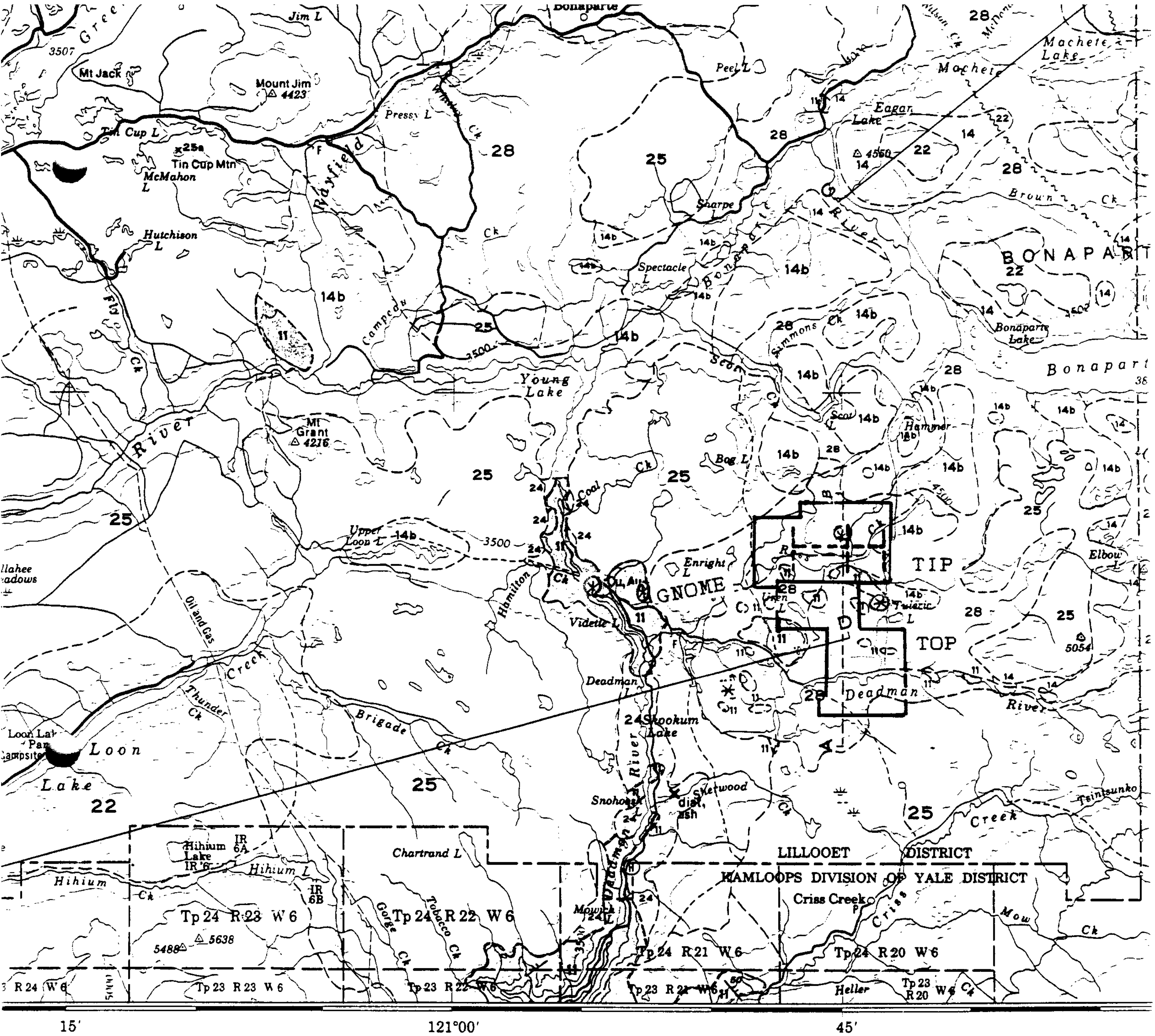
120°45'
3863
TIP #1
TIP # 3
3800 Road
38.66
B/L 1988
TIP#5
TIP #6
JOE ROSS
CR.
TIP#2
TIP#4
N
51°10'
51°10'
Uren L.
B/L 1989
79+00 N
TOP#1
TOP#2
Tuleria L.
MASSEY Hill
TELLURIC CR.
Ternan L.
To Vidette
TURKEY TRACK Junction
Semlin L.
PRECISELY 7
AVERY HILL
PRECISELY 8
TOP #3
TOP #4
NORTH FORK
DEADMAN R.
centre of R.
Cabin
TOP #5
TOP #6
Note:
Claims tied to roads and 1:50,000 topo has been oriented 'best fit' with this road map. Lakes traced from 1:50000 topo. Surveyed 1988, 89 and plotted at 1:5000.
Legal corner Post
0 500 1000 1500 2000 m
1: 50,000
120°45'
PLATE 2
CLAIM MAP
TIP-TOP PROPERTY
CLINTON M.D.
92 P/2
July 1989

2.0 PROPERTY

The TIP-TOP property consists of 12 contiguous 4 Post claims registered in the name of the owner. Relevant claim information is given below. The claims are shown on the attached Claim Map Plate 2. Portions of the property are shown at the 1:5000 scale including all Legal Corner Posts for the claims (Plates 5 and 6). We have tied-in some of the previously located Casa claims, which partly determine the boundaries of the TIP-TOP property.

CLAIM	RECORD NO.	UNITS	DATE RECORDED
TIP # 1	2077	16	20 Oct. 1986
TIP # 2	2078	18	"
TIP # 3	2079	16	"
TIP # 4	2080	12	"
TIP # 5	2643	12	18 July 1988
TIP # 6	2644	8	"
TOP # 1	2637	20	"
TOP # 2	2638	15	"
TOP # 3	2639	20	"
TOP # 4	2640	12	"
TOP # 5	2641	20	"
TOP # 6	2642	12	"

		181	



MAP 1278A

GEOLOGY

BONAPARTE LAKE

BRITISH COLUMBIA

Scale 1:250,000

Miles 4 0 4 8 12 Miles

Kilometres 6 0 6 12 18 Kilometres

PLATE 3

REGIONAL GEOLOGY

Au

CENOZOIC

QUATERNARY

RECENT

Unit	Description
29	*Blocky basalt flows*

PLEISTOCENE AND RECENT

Unit	Description
28	*Till, gravel, clay, silt, alluvium. (few if any bedrock exposures)*

PLEISTOCENE OR RECENT

Unit	Description
27	*Basaltic cinder cone (incorporates cobbles of older rocks)*

TERTIARY OR QUATERNARY

PLIOCENE OR PLEISTOCENE

Unit	Description
26	26a, *basaltic arenite, conglomerate breccia, rubble, basaltic flows, locally pillowed;* 26b, *extinct basaltic volcanoes, basaltic flows and cinder deposits*

TERTIARY

MIOCENE AND/OR PLIOCENE

Unit	Description
25	*Plateau lava; olivine basalt, basalt andesite, related ash and breccia beds; basaltic arenite;* 25a, *olivine gabbro plugs*

MIOCENE

Unit	Description
24	*DEADMAN RIVER FORMATION: shale, sandstone, tuff, diatomite, conglomerate, breccia*

OLIGOCENE

Unit	Description
23	*Andesite, dacite, felsite, related tuff and breccia; greywacke, shale; minor lignite and conglomerate*

EOCENE AND (?) OLIGOCENE

KAMLOOPS GROUP (21, 22)

Unit	Description
22	*SKULL HILL FORMATION: dacite, trachyte, basalt, andesite, rhyolite, related breccias*

EOCENE

Unit	Description
21	*CHU CHUA FORMATION: conglomerate, sandy shale, arkose, coal*

CRETACEOUS

Unit	Description
20	*RAFT AND BALDY BATHOLITHS AND SIMILAR GRANITIC ROCKS: biotite quartz monzonite and granodiorite; minor pegmatite, aplite, biotite-hornblende quartz monzonite;* 20a, *quartz diorite, diorite, granodiorite (may include some*

MESOZOIC

TRIASSIC OR JURASSIC

RHAETIAN OR HETTANGIAN

- **14** — *THUYA AND TAKOMKANE BATHOLITHS AND SIMILAR GRANITIC ROCKS: hornblende-biotite quartz diorite and granodiorite, minor hornblende diorite, monzonite, gabbro, hornblendite;* 14a, *diorite and syenodiorite;* 14b, *leuco-quartz monzonite and granodiorite*
- **13** — 13a, *fine- to medium-grained, pink to brown and grey syenite and monzonite;* 13b, *medium-grained, creamy-buff, locally coarsely porphyritic (K-feldspar) syenite and monzonite*

TRIASSIC

KARNIAN AND NORIAN

NICOLA GROUP

- **11** — *Augite andesite flows and breccia, tuff, argillite, greywacke, grey limestone;* 11a, *includes minor 3 and 10*
- **10** — *Black shale, argillite, phyllite, siltstone, black limestone*

PERMIAN AND/OR TRIASSIC

- **9** — *Serpentinite and serpentinized peridotite*

LATE PERMIAN (?) EARLY AND/OR MIDDLE TRIASSIC

PAVILION GROUP (7, 8)

- **8** — *Tuff, chert, argillite, limestone, greywacke, andesitic and basaltic flows*
- **7** — *Chert, argillite, siltstone; minor tuff and limestone*

PALEOZOIC

PERMIAN

GUADALUPIAN

CACHE CREEK GROUP (4 to 6)

- **6** — *MARBLE CANYON FORMATION: massive limestone, limestone breccia and chert; minor argillite, tuff, andesitic and basaltic flows*

WOLFCAMPIAN TO GUADALUPIAN

- **5** — *Argillite, basaltic flows, tuff, chert, limestone*
- **4** — *Basic volcanic flows, tuff, ribbon chert, limestone, argillite*
- **12** — 12a, *quartzite, quartz-phyllite, quartz-granule conglomerate, argillite, phyllite, calcareous phyllite, marble, greenschist, greenstone;* 12b, *dark grey and black argillite, siltstone, phyllite, minor limestone (Metamorphic equivalents 1, 2, 3, 10)*

PENNSYLVANIAN AND PERMIAN

MORROWAN TO GUADALUPIAN

- **3** — *Volcanic arenite, greenstone, argillite, phyllite; minor quartz-mica schist, limestone, basaltic and andesitic flows, amphibolite, conglomerate and breccia; includes small bodies of 16a*

MISSISSIPPIAN AND/OR LATER

SLIDE MOUNTAIN GROUP

- **2** — *FENNELL FORMATION: pillow lava flows, greenstone, foliated greenstone, greenschist, argillite, chert, minor amphibolite, limestone, breccia*

PROTEROZOIC (?)

WINDERMERE OR CAMBRIAN AND LATER

KAZA OR CARIBOO GROUP

- **1** — *Feldspathic quartz-mica schist, locally garnetiferous, micaceous quartzite, black siliceous phyllite, quartz-hornblende-mica schist, marble, chlorite schist, greenstone, amphibolite*

3.0 LOCATION, ACCESS AND PHYSIOGRAPHY

The TIP-TOP property is shown on the Location Map, Plate 1. A convenient access route for travelers from Vancouver is via the Cariboo Highway from Cache Creek and Loon Lake Road followed by generally well maintained logging roads. The travel time is approximately 1.5 to 2 hrs. from Cache Creek. After leaving the paved section of Loon Lake Road near the east end of Loon Lake, travel about 8 km northeasterly on Loon Lake road to the 3400 logging road (near road sign 34-39) go left onto 3400 and follow for about 2 km to start of 3300 Road at 33-37. Follow 3300 for about 25 km to start of 3800 near 33-62. The TIP showings are situated near 38-66 on the 3800.

Road access on the claims is highly variable ranging from good logging road, such as the 3800, to four wheel drive elsewhere. All known roads on the property are shown on Plates 5 and 6 (current report) and Plates 4a and 4b in Bruaset, 1989.

The terrain of the TIP- TOP property ranges from flat to gently rolling. The hills are typically forested with Lodgepole pine and Douglas fir and the low areas with spruce. Generally the bush is quite open. North facing slopes sometimes have thick stands of immature spruce which present problems to linecutting without chain saws.

Glacial striae trend SSE and SE in the Plate 4 map area. The direction of ice movement according to Campbell and Tipper, 1971, was towards the SSE. The local glacial direction and distribution of float in the lower till of TRENCH # 10 indicate that Unit 6a, one of the principal breccias in the TIP showing, probably extends well to the NE of the existing exposures in TRENCH # 9 (Plate 4).

4.0 REGIONAL GEOLOGY

The TIP-TOP property lies in the southwestern Intermontane Belt. Among the oldest rocks in the Belt area the Upper Triassic andesitic and basaltic volcanics of the Nicola Group which area thought to have been extruded from volcanic centers located in island arcs (Price and Douglas, p. 19) Upper Triassic volcanic centers probably existed above 200 M.Y. old batholiths such as the Thuya and Takomkane both of which lie on the postulated arc extending through the TIP-TOP property area and connecting with epizonal to mesozonal plutons of this age such as Guichon Batholith and the Copper Mountain stock situated to the south. The Upper Triassic Nicola volcanics have generally undergone regional metamorphism of the lower greenschist facies. The GSC Bonaparte Sheet (Map 1278 A, Plate 3 is the principal regional geological reference on the area. According to Plate 3, the Upper Triassic volcanics of the TIP-TOP area form a "window" in a Miocene volcanic field. However, to date, we have not found any outcrop of Miocene volcanics in the TIP-TOP claims.

Highly deformed Eocene rocks of the Skull Hill Fm., regionally, underlie the Miocene rocks. The Skull Hill rocks are equivalent to the Kamloops volcanics of the Kamloops-Savona area and consist of dacite, trachyte, basalt, andesite, rhyolite and related breccias. We assume that the rhyolite of the TIP showing are of the Skull Hill Fm.

The southwestern Intermontane Belt is structurally complex. It has been subjected to four periods of deformation ranging from pre-Middle Jurassic to Late Cretaceous-Early Tertiary. This latest deformation is related to dextral shearing along the regional Fraser Fault system (Monger, 1985 and Monger, et al, in print for DNAG). Accompanying regional extension, has produced a system of horsts and grabens. Horsts exposed older structural levels including high grade metamorphics and grabens received Eocene volcanics and sediments. The high-grade metamorphics exposed in the TIP-TOP property constitutes a recently recognized "core" complex.

5.0 TOP AREA RECONNAISSANCE GEOLOGY AND GEOCHEMISTRY

Geological mapping at the scale of 1:5000 (Plates 5, 6) has been carried out over most of the property in the area north of Deadman River. Overall, outcrop is very scarce, indeed. In 1988, we covered about 11 square km. mostly using the TIP grid for control. In 1989 we obtained about 20 square km. of far less systematic coverage. Time did not permit a follow up of the principal geochemical anomalies indicated in this year's reconnaissance.

The mapping on the TOP claims this year indicates southward and eastward extensions of the amphibolite grade metamorphics encountered on the TIP claims in last year's mapping. The fabric strikes 060 to 090 deg. in the northern portions of the map area and 090 to 115 deg. in the central and southern parts. All dips are vertical to 60 deg. northerly. We have not conducted any petrographic work on the metamorphics this year, and Charlie Greig's report in Appendix 1 of Bruaset, 1989, remains the only reference. The metamorphics mapped this year do not appear to vary noticeably from those mapped in 1988. The valley of Joe Ross Cr. mimics the strike of the local metamorphic fabric.

A traverse across Massey Hill indicates the area is underlain by metavolcanics which are occasionally veined by calcite. A rock sample near the top of the hill returned 15 ppb Au across 1.5m.

TABLE 1. SUMMARY OF ANOMALOUS GOLD IN ROCK SAMPLES

SAMPLE No.	LOCATION	PLATE	VALUE	WIDTH
RUB 89-295R	APPROX. 1240 m E. of B/L 87+00 N.	6	40 ppb.	0.1 m
324	Trench # 1	4	77	1.0 m
409	"	"	92	1.9 m
461	Trench # 6	"	18	1.5 m
600	Trench # 1	"	* 115	1.0 m
601	"	"	* 385	1.2 m
604	"	"	20	0.5 m
609	"	"	20	1.5 m

* Samples from this season's blast trenches in an exposure sampled in 1988 by a single chip sample over entire outcrop (area: 1.5 m X 4.5 m yielding 200 ppb Au. Sample RUB 88-109 Ref. BRUASET, 1988).

ANOMALOUS for gold was determined by inspection of the data in consultation with Table 2-1 in Levinson, 1980.

TABLE 2. SUMMARY OF SOIL AND SILT ANALYSES

Au, Ag, Mo, Cu and Mn are variously anomalous. Values for As are tabulated for added information. The tabulation is complete for the five principal elements considered even though only a few are anomalous. LEGEND: }ANOMALOUS, (THRESHOLD)

Sample No.	Soil Type	Claim Name	Map Ref.	Au ppm (15)	Ag ppm (0.7)	As ppm (50)	Mo ppm (3)	Cu ppm (100)	Mn ppm (850)
RUB.89-	S :								
231	C	TOP 3		<5	<0.2	20	}3	80	}1320
234	silt	"		"	"	5	2	66	}4460
241	B	"		"	"	10	"	}104	}1370
250	"	"		"	"	<5	<1	19	}955
252	"	"		"	"	10	"	16	}875
281	A	TOP 2		15	0.6	"	"	}252	245
283	"	"		"	"	5	}3	}518	235
287	"	"		<5	}1.2	10	}5	}1290	660
293	B	"		"	<0.2	<5	<1	9	}920
304	C	"		}70	"	"	"	12	335
307	B	"		<5	0.2	10	"	13	}905
RH. 89-	S :								
102	A	TOP 2		<5	<0.2	<5	}11	}173	485
114	B	"		}15	0.4	5	<1	7	450
119	A	"		<5	<0.2	15	}109	38	85
121	B	"		}50	0.4	10	<1	29	465
128	A	TOP 3		<5	<0.2	<5	}16	18	35
134	B	"		<5	0.6	15	<1	41	}1035
137	A	"		<5	"	<5	<1	46	}1080
147	B	TOP 5		"	0.4	"	"	}7	}1065
153	"	TOP 1		10	0.2	20	}4	32	520
155	"	"		5	<0.2	5	1	12	}1030
158	"	"		"	0.2	10	<1	14	}1200
162	"	"		}15	0.4	5	1	9	495
170	"	"		5	0.2	5	}6	94	50
171	A	"		<5	<0.2	<5	}7	7	20
175	B	"		}30	"	"	<1	11	220
177	A	"		}15	0.4	5	"	}207	285
180	B	TOP 2		<5	0.6	10	"	59	}985
189	B	TOP 1		}25	<0.2	5	"	8	135
195	A	TOP 6		10	0.2	10	1	}385	}1190
199	B	"		<5	<0.2	5	<1	17	}1040
209	C	"		}15	"	"	"	11	390

Stevenson, 1936, reports a pit blasted in a 2 inch quartz vein on Massey Hill. The vein was indicated to run 0.02 oz. Au and 0.4 oz. Ag. A large number of overgrown hand trenches and pits occur on the east and north sides of the hill. These total perhaps as many as 100 excavations. The hill 1.7 km north of Massey Hill is underlain by amphibolite grade metavolcanics containing rare felsic intrusions which are conformable with the fabric. Sample RUB 89 295 R returned anomalies in gold (40 ppb) and arsenic (130 ppm) across 0.1 m of sill. Traces of pyrite occur in a calcite stringers that cut the fabric. Quartz stringers are occasional controlled by the fabric. Further reconnaissance in this area should be carried out. In addition, the area lying 0.5 km to the north which is the site of a ESE trending valley occupied by 3 small lakes, should be samples and mapped in search for gold mineralization on trend with the Telluric showing on Tuleric # 1 M. C.

Traces of chalcopyrite occur in irregular pods of quartz in angular float in the steep hillside of Telluric Cr. about 0.7 km ESE of the summit of Massey Hill. This is on the eastern margin of the earlier noted concentric structure. A chip sample taken over 10.0 m at this site contains 15 ppb Au and 104 ppm Cu. In view of the high gold background in this sample and the large sample length further sampling should be done. According to Levinson, 1980, the crustal average of gold is 4 ppb. The sample in question at 15 ppb is slightly above the +5 ppb analytical error for samples at the 5 ppb detection limit.

Table 2 is a summary of soil anomalies in Au, Ag, Mo, Cu, and Mn. Arsenic is included in the tabulation because of its frequent association with gold elsewhere. In this soil data, As occurs at best in elevated levels; we would consider 50 ppm as the threshold for As in general (Levinson, 1980). The summary includes soil type because of a 1:1 correlation between highly organic soils and anomalous Cu and, or Mo. It appears that the organic content of soils could be the cause of the rather striking copper anomaly in the area centered about 300 m. east of B/L 87+00N. These are samples from boggy valley centers. The deeply incised valleys are probably melt water channels. They provide opportunities for geochemical penetration of this generally deeply drift covered area. It is noted that "C" horizon sample RUB 89-282 S gave background level Cu at 32 ppm compared to 252 ppm in the "A" horizon in the same hole. Additional sampling should be done in this area in order to confirm organic scavanging as the cause of this anomaly and in so doing, locate any obvious bedrock sources. A large area of unsampled ground occurs to the north of the copper anomalies. It is unlikely that this area has previously undergone soil sampling. Slightly pyritic rubble of foliated diorite (probable sub-outcropping Unit 3) occurs about 250 m easterly of RUB 89-282S. A soil sample taken at this point was not anomalous in gold and ICP run elements such as Cu and Mo. The anomalous Cu soils noted above contain low levels in Pb and Zn but silver is weakly anomalous at 0.6 to 1.2 ppm. Other ICP determined elements are also low. According to Levinson, 1980, silver tends to be enriched in the A horizon.

Another highly anomalous sample, this one 109 ppm Mo, occurs in a boggy area at B/L 80+00 N. This is an one element anomaly with copper at 38 ppm. On the south boundary of TOP # 2, we obtained 70 ppb Au in a soil sample near Identification Post 2E of TOP # 2. A soil sample at 71+00 N on the B/L gave 16 ppm Mo. Work in the general Vidette Lake area, and elsewhere, tends to support a geochemical association between gold and molybdenum. A few tens ppm Mo is normal for rock samples in the TIP showings area.

A number of strong lineaments occur in the TOP claims and of these the NW trend through the valley of Uren Lake is the most prominent. Assessing this trend was part of the basis for the reconnaissance on the TOP claims.

A routine check on the reproducibility of the soil data was done at the time of back-hoe trenching at 2+00 S L 24+00 W (Plate 5). We resampled the C horizon in the same hole as last year's sample RB 162 and obtained <5 ppb as compared to 480 ppb in the original run. A further check was made by running the balance of last year's pulp and this also gave <5 ppb. An optimistic explanation would be that a small grain of gold was contained in the RB 162 portion analyzed last year. The soil in the TIP area is quite sandy throughout the area north of Joe Ross Creek and fine sand is the principal component for the first 2 m of soil in the trenches of the TIP showing. The provenance of this fluvial material is assumed to be the Thuya Batholith. This sandy soil horizon is not conducive to effective soil geochemistry. This is the reason we have tried to develop a biogeochemical alternative for this property.

6.0 PREVIOUS WORK IN THE TIP SHOWING

The TIP # 1 showing is situated on TIP # 1 M.C. near 38-66 on the 3800 logging road. The area is marked by several large angular blocks of vuggy silica breccia. These had been pushed up on the shoulder of the road during its construction and were probably torn off a faulted section of breccia such as we now find exposed in the west side of Trench # 6. Mike Dickens, a self-thought prospector-geologist specializing in exploration for epithermal deposits recognized the significance of this material while the dust of the road construction was still flying and located the prospect as mineral claims in the Fall of 1986. Subsequently, he engaged the logger's Cat. to cut a few shallow trenches in the vicinity of the roadside boulders. This indicated a broad zone of brecciation on the north side of the road in the ditch area. This trench was filled in by the logger during the construction of a spur road to the north. The only other exposure of Unit 5 breccia occurs in the precursor of the current TRENCH # 1 which contained a variety of locally derived float boulders set in till. Hand trenching on an one square meter exposure of Unit 5 in this trench enlarged it to 1.5 m. X 4.5 m. The latter ran 200 ppb Au in a chip sample cut over 1.5 m. X 4.5 m (Bruaset, 1989).

7.0 TRENCHING PROGRAM

During this field season we engaged a Cat. 225 excavator on two occasions. We were able to obtain the excellent and convenient services of Ken Bolster, resident of the 34-47 area on the 3400 road.

The objective of the trenching was to define a drill target. Trenches were dug in the order numbered on Plate 4 with Trench # 8 the last in the first stage. The second stage commenced with extensions east (not indicated with arrow on Plate 4), west and north in Trench # 6 and following in the sequence indicated by letters, then Trenches # 9-14. The excavations coincided partly with pre-existing disturbed area. Plate 5 in Bruaset, 1989 indicates the extent of Cat. trenching prior to this season's work. The total area disturbed by this season's work is 1900 square meters. Of this, a total of 630 square meters constitute previously unreclaimed Cat. trenching. In the 630 figure due allowance has been made for previously disturbed area not disturbed by the current trenching program. This applies mainly to the eastern portion of Extension B which is narrower than the Cat. trench. About 170 square meters were reclaimed for various reasons including lack of bedrock, unstable sides and for the protection of cattle. All spoil piles were leveled at the end of the program and seeded with a mixture closely resembling that used by Ainsworth Lumber to reclaim this same cut block. In accordance with the above, this season's net disturbance amounts to 1100 square meters. Further infilling was not consider for technical reasons and at the request of the owner. A clean-up bucket was supplied and a water pump with fire hose was used for pressure washing exposures prior to mapping and sampling.

8.0 GEOLOGY OF THE TIP SHOWING

A zone characterized by brecciation, silicification, clay, sericite, and K-spar alteration is about 200 m in length and up to 50 m. wide (Plate 4). Strong silicification in the form of pervasive flooding of crackle brecciated leuco-monzogranite or granodiorite (Unit 5) forms an apparently continuous pod at least 86 m in length in the southwestern half of the alteration zone. At the NE end, a small rhyolite plug is intensely crackle brecciated (Unit 6a) over a width of at least 25 m. The latter is bounded by a zone of clay, sericite and K-spar alteration of undetermined width. The crackle breccia of Unit 5 is indicated to be up to 9 m thick at a dip of 60 deg. easterly. Unit 5 strikes 034 deg. The hangingwall of this breccia is characterized by strong bleaching over 22 m. Similar bleaching is found in the footwall but there the alteration is less intense overall. Biotite ranges from chloritic to fresh outside the hangingwall but does not survive in the bleached hangingwall. The hanging and footwalls are not as well exposed in TRENCHES 4 and 6 partly due to structural complication related to post-breccia faulting. The rock throughout the non-breccia portion of TRENCH # 1 is intensely fractured with northerly strikes dominant. Shearing is common particularly in the hangingwall. The hanging and footwalls contain abundant narrow quartz stringers. Rusty fractures occur throughout giving the rock an orange brown color, presumable due to jarosite (Harris, 1989). Pyrite is rarely seen. Minor fine pyrite is disseminated in areas of smokey quartz in samples RUB 89-463R in TRENCH # 6 and at RUB 89-804R in TRENCH # 2. Unit 5 breccia appears to have undergone two periods of brecciation. The first is crackle brecciation with angular unrotated fragments set in silica. Subsequent brecciation is characterized by abundant drusy cavities and rounded fragment lined with quartz. Samples RUB 89-600R and 601R are representative of this most intense form of brecciation. The highest gold values obtained in this showing comes from this portion of Unit 5 breccia. The rounding of the fragments suggests milling has taken place. This is a phenomenon associated with the central portion of breccia pipes which typically undergo the most intense brecciation and where rock fragments are semi-suspended in actively circulating medium such as water or gas (Richard and Courtright, 1958).

The fault gouge in TRENCH # 1 is 1 m wide and contains geochemically anomalous gold at 77 ppb. A similar gouge zone occurs in

TRENCH # 2 where it is 0.3 m wide and where a gouge sample contains 15 ppb gold. This is the highest gold value in TRENCH # 2. This structure is not seen in TRENCH # 6 but is assumed to occur on the east side of the outcrop where the bedrock overburden interface is steep. Fractures in this area strike parallel to the suspected fault and dip easterly. A fault is inferred in the west end of TRENCH # 1. Within the footwall area of this trench, prominent northerly trending extension fractures are indicated. These are shown as small scale faults. Another period of faulting, this time with apparent reverse displacements in the order of 0.3 m appear to be of recent origin because it offsets the glaciated surface of the outcrop.

Unit 6a crackle breccia is composed of dominantly rhyolite fragment which are angular and set in quartz. The "crackling" of this breccia is very intense with fragments showing little indication of rotation. The wall rock on the east side of Unit 6a is characterized by the same whitish and clayey feldspar that occurs in the hanging wall in TRENCH # 1. A weak quartz stockwork is present and limonitic fractures abound.

Angular blocks of Unit 6a occur in the till section of TRENCH # 10 suggesting, that this breccia may extend NE well beyond the present exposures. Unit 6a appears to be at least 25 m wide but the west site is not well exposed. We attempted to extend this structure westward with TRENCHES # 11 and 12. Soil samples taken from the bottom of these trenches gave less than 5 ppb Au. This structure developed in rhyolite is probably of Tertiary age and likely genetically related to Unit 5. Fragments of "clay" altered wallrock, Unit 4 ca occurs in Unit 6a. Rare fragments of Unit 6 occur in Unit 5 breccia. The gouge in the main fault in Trench # 2 contains rhyolite fragments of Unit 6 but we have yet to find Unit 6a in this material. The only known occurrence of rhyolite fragments in TRENCH # 1 are in the main fault zone about 2 m east of sample RUB 89-601R. The possibility that Unit 6a is the top of a breccia pipe should be considered. To date we have not obtained anomalous values in gold in this structure even though many bulky samples have been collected. Unit 6a appears to be comparatively unaffected by faulting.

9.0 DISCUSSION OF GEOLOGY

The geology of the TIP-TOP area is very complex and geological mapping is hampered by paucity of outcrop, lack of radiometric dates and current locally derived regional geological control.

This section summarizes the essential geology of the TIP-TOP area and discusses some of the structural possibilities that may impact on the gold potential of the property area. The author has read several regional geological papers by J.W.H. Monger of the G.S.C. and acknowledges discussions with him, Jack Souther, John Wheeler as well as C. Greig during the last two years but accepts full responsibility for any interpretation.

This report comes at a time when Northgate has decided to return the property to its owner. This is not so much a reflection on the potential of the property as much as a reflection on its early stage of development and the operator's desire to pursue the more advanced development opportunities available.

This season's reconnaissance mapping extended the area of indicated amphibolite facies regional metamorphism southward to include a triangular area of 8 square kilometers within which all known rock exposures contain amphibolite facies volcanics. Several strong lineaments occur in this "core" complex and gold mineralization and other gold indicators are known in the area. The limits of the apparent "core" complex remain undetermined. These rocks display strong fabric with 090 +/-25 deg. strike and steep dips (northerly) to vertically. The coarsest varieties of amphibolite retain a distinct augite porphyry appearance. Felsic sills containing gold and arsenic anomalies are occasionally controlled by the fabric. The protoliths are volcanics and volcaniclastics of the Upper Triassic Nicola Group and include possible coeval monzodiorite. Charles Greig (Appendix 1, in Bruaset, 1989, indicates temperatures in the range 450-600 deg. C. and pressures greater than 3 kbars (approx. 9 km in depth) are required to generate the phases and textures noted in the metavolcanics of this "core" complex.

The gold showing on TIP # 1 which underwent a major trenching program this season is associated with post-metamorphic intrusions which include high level granitic bodies of possible Cretaceous and/or Tertiary age. We have not found inclusions of Nicola basement, whether of amphibolite facies, or the typical lower greenschist rocks, in these intrusives. This is a possible indication that the country rocks of the post metamorphic intrusions may not be the Nicola. The nearest Nicola exposures are the metavolcanics in Joe Ross Cr. about 1 km to the south of the TIP showing. A post metamorphic dyke of the same lithology as that hosting Unit 5 breccia in the TIP showing cuts the metamorphic fabric in Joe Ross Cr. (Bruaset, 1989 Plate 4a).

The possibility of a deep seated fault trending along the valley of Joe Ross Cr. has been considered and its possible influence on gold mineralization in general. A multi-sample gold soil anomaly with coincident anomalous manganese was obtained in the valley of Joe Ross Cr. last year (Bruaset, 1989). A fault in Joe Ross Cr. could be of Tertiary age and could have been involved in uplift of the "core" complex. Such a structure could have had an important influence on convective circulation and mineralization. Alternately, the host of the TIP showing may have been emplaced in the contact of the Upper Triassic Thuya Batholith with basal Nicola volcanics. The most likely explanation for the presence of a "core" complex after the Nicola probably relate to the combined effect of deep denudation of the Nicola volcanics, and Tertiary block faulting, thereby exposing the base of the Nicola volcanics.

A conspicuous pattern of radial and concentric lineaments is apparent in the area of the TIP-TOP claims and these extend well to the west of the claims. This pattern can be recognized on the 1:50,000 scale topographic map of the area and appears in a second derivative interpretation of the regional aeromagnetic map. Lineaments defined by Joe Ross Cr. mark the possible northern and western margins of the concentric feature which is approximately 8 km in diameter. A resurgent caldera in the Upper Triassic rocks is a possible interpretation of this radial and concentric lineament pattern. It is notable that the principal structural trend in the TIP showing is nearly parallel to a nearby radial trend inferred from the 1:50,000 topographic map. Radial patterns of this type could result from caldera collapse with enhancement due to caldera resurgence. The margins of collapsed calderas, and particularly resurgent calderas, and associated radial structures, constitute particularly favorable prospecting ground for epithermal precious metal deposits in the well known San Juan volcanic field of Colorado and elsewhere. Nicola calderas would be submarine structures. Examples of submarine calderas with associated epithermal mineralization are reported from Japan (Kouda, and Koide, 1978). The major difficulty with the caldera theory in the TIP-TOP area is the survival of the structural integrity of the caldera during the metamorphism, subsequent phases of intrusions and Tertiary deformation.

The principal area of known geochemically anomalous gold occurs in TIP # 1. Here a series of breccias with associated sericite, clay and K-spar alteration form a zone approximately 50 m wide in its widest exposure. The zone is indicated be at least 200 m in length.

The zone contains the two mappable breccia units shown on Plate 4 at a scale of 1:250. The breccias are classified on the basis of the dominant fragment type but are probably closely related genetically. The dominant form of brecciation involves "crackling" with fragments remaining substantially in their pre-fracture position only to be heeled by quartz. The best example of this breccia type is Unit 6a. This unit is developed in rhyolite which is inferred to be a high level intrusion of Tertiary age. Geochemically anomalous gold has not been obtained in this unit. This unit is steeply dipping; contains a halo of sericite and clay alteration and is probably K-spar flooded based on petrographic work completed on similar material from TRENCH # 1 (Appendix 1).

The second breccia-type, Unit 5 is more complex than Unit 6a. It has undergone at least two periods of brecciation. Indeed, evidence exist for quartz veining in the host prior to the first period of brecciation. Fragment rounding in portions of Unit 5 breccia is apparent with the highest geochemical levels in gold (385 ppb over 1.2m) coming from a the most intensely brecciated section whose exposed dimensions are about 1.5 m X 4.5 m. The maximum exposed thickness of Unit 5 breccia is 9 m. This structure is cut by a series of faults, apparently including small scale block faulting, reverse and possibly strike slip movements.

The principal fault outcrops in TRENCHES # 1 and 2 and has associated significant thickness of gouge which ranges from quite strongly anomalous in gold in the first trench to slightly anomalous in the second. A strike change of about 25 deg. is required to join the two faults in TRENCHES # 1 and 2. It's possible that this apparent strike change is a hint to the nature of dilatent zones that may control gold mineralization and associated silica alteration strung out along a possible periodically reactivating structure. Minor artesian springs found in the area of this year's trenching could be clues to deep structures. A spring has been suggested in the area of 4+00 S L 6+00 W (Plate 5, Bruaset, 1989, Plate 4a). This water emerges somewhat to the southeast of the principal structural trend indicated in the TIP showing but could nevertheless be associated with it or one parallel to it. The mapping in the TIP showing area indicated that the principal fault exhibits considerable change in strike along its southwesterly trend. The Humble family, former local residents, are said to have derived their domestic water from this supply on a 12-month basis and they were of the opinion that it was spring fed (current local resident, Mr. Hummel, pers. comm.). The Humble spring is a possible indicator of a through-going structure on which geochemically anomalous gold has been indicated in the TIP showing.

The crackle breccias of the TIP are viewed as possible intermineral breccias that typically develop in the epithermal environment in response to episodic sealing of a fracture system followed by refracturing and boiling. Episodic boiling can deposit precious metals according to the Buchanan model. The Buchanan modal may be applicable in the event of single stage gold mineralization and for non-telescoped deposits. In the present situation, K-spar is seen as a prominent alteration mineral in the hangingwall (Appendix 1) and this is suggestive of exposure of a relatively deep structural level, according to the Buchanan model. Considering K -spar this model predicts the present structural position to be in or near the top of the gold zone (Buchanan, 1981)

10.0 BIOGEOCHEMISTRY

Bark from stumps and from standing trees were collected and analyses variously by graphite furnace AA and by neutron activation (Plates 4, 5, Table 3). In all cases, we sampled outer bark. Inner bark was sampled in a brief reconnaissance in 1988. The data from the 1988 survey is included in TABLE 3 because little comparative information is available. It is stressed that the 1988 data is ASH WEIGHT gold and the bulk of the 1989 data is DRY WEIGHT gold. The difference relates to the sample preparation which in the case of the graphite furnace A.A. method involves ashing with ash yields a function of the species sampled. For Douglas fir, the ash yield is roughly 1% thereby introducing a concentration factor of 100. In the case of Lodgepole pine and spruce, the ash yield is about 2% for a concentration factor of about 50. Therefore 2ppb dry weight for Lodgepole pine bark is roughly equivalent to 100 ppb ash weight and 1 ppb dry weight for Douglas fir bark is equivalent to 100 ppm ash weight. 0.5 ppb Au, or above in terms of DRY WEIGHT is probably significant (C. Dunn, 1989 pers. comm.). Dry weight results herein are obtained by the neutron activation method which involves preparation of a 15 g bark briquette and direct irradiation without ashing or the use of chemicals.

We sampled outer bark this year because of new information that became available after last season's sampling. Dunn, 1988 reported significantly higher gold contents in outer bark of red spruce than in inner bark. The principal purpose of the biogeochemical sampling this year was to determine whether or not the postulated NE extension of the TIP # 1 structure has a biogeochemical expression in gold based on Lodgepole pine outer bark. A few samples were collected from background on TIP # 1 and 2 (Plate 5). Samples containing <0.4 ppb (dry weight) gold are considered to be background by inspection of the data. A spruce bark sample collected from the edge of the cut block near 5+75 S. on L. 24+00 w. is probably anomalous at 0.5 ppb Au (dry weight). A nearby soil sample collected last year gave 210 ppb (Bruaset, 1989). A scattering of values in the range 1.4 to 4.9 ppb gold occurring along the NE extension of the TIP structure are all considered as "probable" ANOMALOUS. A line of detection value samples shown in the insert on Plate 4 suggest the structure may terminate in this area or lies between samples. Other interpretations are possible. Further biogeochemical sampling in this area could yield interesting results and should be undertaken.

Why sample bark? Biogeochemical sampling using bark may provide geochemical information on substrata not provided by other surface materials because root systems may extract elements from all soil horizons, their contained ground water and even bedrock. Unlike other biogeochemical sampling media the metal content of outer bark is relatively unaffected by seasonal variations in metal uptake of vegetation because the outer bark is dead and further accretion of bark is a slow process (Dunn, 1988 p.435). Bark anomalies drilled in the La Ronge gold belt, Saskatchewan have encountered gold mineralization along strike from known quartz-hosted gold of the Rod Zone at the Jolu Mine of Intl Mahogany Minerals and Corona Corp. Extensive sampling of this type was carried out at the Mascot Mine at Headley in 1988. Bark sampling is simple, rapid and cost efficient (Dunn, 1988). Brooks, 1972 provides useful background information about biogeochemistry.

TABLE 3 BIOGEOCHEMICAL (BARK) SUMMARY FOR GOLD
p. 1 of 3

Sample No.	Loc. Map ref. coord. etc	Date collected	Tree Type green/stump	Analysis Method	Gold ppb	1988 INNER bark ppb.
H8902BS	4	Early 04 89	Doug. fir	Graphite furnace AA	<20	2.0,2.0
H8904BS	4	"	"	"	<20	0.1
H8906BS	4	"	"	"	70	1.0
H8908BS	4	"	"	"	75	1.0, 1.2

ALL ASH WEIGHTS ABOVE

NOTE: two samples were collected at each of the above site: even numbered samples have suffix S (south side) and were analyzed by Min En; the odd numbered samples have suffix N (north side) and were analyzed by Bondar-Clegg.

ALL DRY WEIGHTS BELOW

RH8901BN (as 02BS)	4	Early 03 89	Doug. fir	Neutron A.	<0.1	N/D
RUB8906B		8 April 1988	"	"	"	"
RH8903BN (as 04BS)	4	"	"	"	"	"
RH8905BN (as 06BS)	4	"	"	"	"	"

TABLE 3. cont. p 2 of 3

RH8907BN (as 08BS)	4	"		"	"		"	"
RB8901B	5 near 24W/BL	"		Lodg. Pine	"		<0.1	N/D
RB8902B	5 near 24W/6S	"		Spruce	"		0.5	"
RB8903B	1988 7a TL10+00N 23+72W	"		Lodg. Pine	"		<0.1	"
RB8904B	1988 7a At soil RB160 L24+00W 10+00N	"	3 small	"	"		"	"
RB8905B	5 At soil RB 132 L6+00W 4+00N	"		"	"		"	"
RB8906B (listed above)	5 At RH89 01BN, 02BS	"		Doug. fir	"		"	"
RB8907B	See Pl. 5	"	Stump	Lodg. pine	"	TIP SHOWING AREA	1.4	"
RB8908B	5	"	"	"	"		2.5	"
RB8909B	5	"		"	"		1.4	"
RB8910B	5	"		"	"		4.9	"

TABLE 3. cont. p. 3 of 3

RB8911B	5	"	"	"	<0.1	"
RB8912B	5	" 3 small "		"	"	"
RB8913B	5	" 5 small "		"	"	"
RB8914B	5	" 3 small "		"	"	"
RB8915B	5	" 2 small "		"	0.3	"

NOTES: '2, 3, 5 small'refer to sampling of 2 or more trees where only undersize trees were available.

" STUMP" refers to samples scraped from Lodgepole pine stump in clearcut area logged 1986 or 1987.

Tyically, Douglas fir outer bark is lower than that of Lodgepole pine at the same location (data I have seen suggests the fir with about one third the gold content of the pine. Engelmann spruce tends to be about three times that of Douglas fir.(Ref. misc. data from C. Dunn)

11.0 CONCLUSIONS AND RECOMMENDATIONS

1. The TIP showing is located in a strong structure characterized by broad zones of brecciation, silicification and clay-sericite alteration with spotty geochemical anomalies in gold to 385 ppb across 1.2m or 200 ppb over an exposure measuring 1.5 m x 4.5 m.

2. Prominent potassic alteration of the hangingwall is suggestive of a possible structural position low in the system in or near the top of the gold zone (Buchanan model). This structural position assumes that the mineralizing system indicated has not been telescoped and is single stage.

3. Possible structures hosting gold in this system include veins, stockworks and breccia pipes. Such structures do host economic gold deposits elsewhere.

4. The TIP # 1 structure as it is now exposed, mapped and sampled may warrant drilling. However, it would be in the interest of orderly exploration of the area to undertake geophysical surveying at this time with the objective of locating additional structures in the area of TIP # 1, 2, 5, and 6 generally in the area north of Joe Ross Cr. VLF-EMR should work well in this area where substantial silica alteration zones coupled with clay alteration are expected to produce detectable resistivity anomalies. Surveying should be done on E-W lines initially until structural trends have been determined. Target resulting from such a survey may be classified by biogeochemical methods followed by trenching.

5. Several gold anomalies of weak to moderate intensity occur on TOP # 2: 70 ppb in soil on the south boundary of TOP # 2, 40 ppb and 130 ppm arsenic occur in 10 cm wide felsic sill controlled by the metamorphic fabric in the east central portion of the claim. Further reconnaissance in these areas should be carried out.

6. Three strong copper anomalies in soil (up to 1290 ppm) with weak associated gold (up to 15 ppm) and slightly anomalous silver (up to 1.2 ppm) occur in the central portion of TOP 2. These anomalies should be investigated through further sampling in the northerly direction. It appears that these anomalies are due to accumulation of copper in organic soils. However, more sampling is needed to rule out bedrock sources of copper.

7. Continued small scale bark sampling is needed to develop sampling procedures and interpretation. The highest samples obtained in this season's work are anomalous and supportive of a NE extension of the TIP structure for at least 200 m beyond TRENCH # 6 (Plate 4). Outer bark should be sampled to keep any seasonal variations to a minimum.

Report by:

Ragnar Bruaset FGAC

Ragnar U. Bruaset & Associates Ltd.

August 3, 1989

12.0 SELECTED REFERENCES

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13.0 STATEMENT OF QUALIFICATION

I certify that:

1. I am a 1967 graduate of the University of British Columbia with a BSc. degree in geology and that I am a Fellow of the Geological Association of Canada.

2. I have been involved in geological mapping and soil and rock geochemical programs in diverse Cordilleran areas since my graduation including epithermal mineralizing environments in the Vidette Lake area and elsewhere.

3. This report is based on work carried out by me or under my direction on the TIP-TOP property on behalf of Northgate Exploration Limited.

Dated this 3rd day of August, 1989.

Ragnar U. Bruaset

Ragnar U. Bruaset

Ragnar U. Bruaset & Associates Ltd.

14.0 COST STATEMENT

ANALYSES	Bondar-Clegg, Chemex, Min En		$ 4669.93
WAGES and SALARIES			
	R. Hummel May 3, June 17, 1989		$3624.40
FEES			
	Ragnar U. Bruaset & Associates Ltd.		$20250.00
SURFACE TRANSPORTATION			
	4 X 4 truck rental:	$3450.03	
	Fuel	$511.15	
	Freight, courier, sundry transp.	$185.10	
	Subtotal:	$4146.28	$4146.28
DOMICILE	Meals and lodging		$1834.74
SUPPLIES	Stationery, flagging, string, grass seed, sample bags, pickets		$1792.83
EXCAVATOR CONTRACTOR	Ken Bolster		$8950.00
BLASTING CONTRACT	Promap		$2083.85
DRAFTING CONTRACT	Promap		$3123.38
REPRODUCTIONS	printing, reductions, photostat, mylar		$435.45
COMMUNICATION			$502.27
PETROGRAPHIC WORK	Jeff Harris		$267.75
	TOTAL		$51680.88

Please apply $2080.88 which is the difference between the total above and the sum of the work filed on the TIP-TOP Property on July 18, 1989 to the PAC account of the owner of the TIP-TOP claims.

APPENDIX 1

PETROGRAPHIC REPORT

APPENDIX 1

Harris
EXPLORATION SERVICES

MINERALOGY AND GEOCHEMISTRY

534 ELLIS STREET, NORTH VANCOUVER, B.C., CANADA V7H 2G6 TELEPHONE (604) 929-5867

Report for: R.U Bruaset,
5851 Halifax St.,
Burnaby, B.C.
V5B 2P4

Job 89-61

July 14th, 1989

PETROGRAPHIC STUDY OF ROCK SAMPLES FROM THE TIP-TOP CLAIMS, JOE ROSS CREEK AREA, B.C. (NTS 92P/2)

Introduction:

4 rock samples, numbered RUB 89-405, 410, 605 and 610, were submitted for examination.

All four samples appear to be leucocratic granitoid rocks. Two of them (#s 410 and 610) have a whitish, chalky appearance. The principal objective of the study was to determine whether this difference in appearance is due to alteration and, if so, of what kind.

Work done:

To check out the supposition that the alteration consisted of clays or fine-grained sericite, X-ray diffraction scans of the four samples were run. Patterns obtained were essentially identical in all cases, yielding the characteristic peaks for quartz and feldspars, but no low-angle peaks indicative of the presence of substantial proportions of clays or sericite.

To check out the possibility that the difference in appearance was perhaps caused by relatively minor clay/sericite development (below the levels detectable by whole rock XRD analysis), the four rocks were prepared as thin sections and examined under the petrographic microscope.

Results may be summarized as follows:

Samples 405 and 605 are essentially identical rocks, being weakly foliated, leucocratic granodiorites made up of about 22% quartz, 20% K-feldspar, 55% plagioclase and 2% biotite.

They have a grain size of 0.2 - 2.0mm and an interlocking granular texture of subhedral plagioclase grains and anhedral quartz and K-spar (microcline). Minor biotite is the only mafic, as scattered, small, scrappy flakes, typically pale in colour and somewhat bleached and/or chloritized. The weak but perceptible foliation is produced by the partial segregation of quartz and feldspar as somewhat elongate clumps. This is probably a primary feature related to the intrusion history. There is no evidence of metamorphic recrystallization.

As regards the major component feldspars, these rocks are essentially fresh, alteration being confined to faint traces of sericite flecking or dusting in the plagioclase.

Sample 405 contains traces of jarosite, as tiny disseminated grains, possibly pseudomorphous after original pyrite. Jarosite also occurs as specks in a single hairline veinlet of fine-grained secondary K-spar.

Sample 605 contains 0.5 - 1.0% epidote as disseminated tiny grains, mainly intergrown with biotite.

Samples 410 and 610 are clearly distinguished from the other two samples by a higher content of quartz and K-feldspar - the quartz being partly in the form of irregular networks of veinlets. These features are readily apparent on the stained cut-off blocks (q.v.).

These two rocks are totally devoid of mafics. They show an average modal composition of 26% quartz, 36% K-feldspar and 37% plagioclase - thus having the composition of quartz monzonites.

Sample 405 has a very weakly foliated texture, somewhat similar to that of 410 and 610 but less regular; Sample 605 is non-foliated and has a patchy, irregular (possibly breccia-controlled?) texture, dominated by a notably high content of K-feldspar.

The plagioclase in these two rocks shows a slight overall pervasive argillic turbidity and a dusting of minute sericite specks - though, quantitatively, this effect is very minor.

The discordant, fracture-controlled quartz veinlets (which sometimes have inclusions of fragmented feldspar) grade to fine-grained, intergranular quartz. In 605 the fabric is dominated by microgranular K-feldspar (adularia?) with intergrown quartz; this appears to be a flooding effect related to microbrecciation. The veinlet phase of quartz introduction cross-cuts this feature.

Both rocks contain minor jarosite - most abundantly (c.1%) in 610, where it forms tiny, disseminated granules and pseudomorphs, and intergranular wisps.

Summary:

Samples 405 and 605 are weakly foliated, essentially unaltered, leucocratic granodiorites.

Samples 410 and 610 are of quartz monzonitic composition, and show incipient granulation/brecciation, related K-spar/quartz flooding, and superimposed quartz veining.

No significant clay or sericite alteration is seen in any of the samples. Traces of jarosite are a distinctive component.

The two pairs of samples may represent different intrusive phases , or are possibly the same phase modified by microbrecciation and silica/K-spar introduction. Sample 610 may be an intermediate stage between 405/605 and 410.

J.F. Harris Ph.D.

APPENDIX 2

SOIL AND SILT CERTIFICATES

PROCEDURES

Chemex Labs Ltd.
Analytical Chemists * Geochemists * Registered Assayers
450 MATHESON BLVD .E., UNIT 54, MISSISSAUGA, ONTARIO, CANADA L4Z-1R5
PHONE (416) 890-0310

APPENDIX 2

To: NORTHGATE EXPLORATION LIMITED

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A8917097

Comments: CC: R. BRUASET

CERTIFICATE A8917097

NORTHGATE EXPLORATION LIMITED
PROJECT : 763 C4
P.O.# : NONE

Samples submitted to our lab in Vancouver, BC.
This report was printed on 13-JUL-89.

SAMPLE PREPARATION

CHEMEX CODE	NUMBER SAMPLES	DESCRIPTION
201	87	Dry, sieve -80 mesh; soil, sed.
238	87	ICP: Aqua regia digestion

• NOTE 1:

The 32 element ICP package is suitable for trace metals in soil and rock samples. Elements for which the nitric-aqua regia digestion is possibly incomplete are: Al, Ba, Be, Ca, Cr, Ga, K, La, Mg, Na, Sr, Ti, Tl, W.

ANALYTICAL PROCEDURES

CHEMEX CODE	NUMBER SAMPLES	DESCRIPTION	METHOD	DETECTION LIMIT	UPPER LIMIT
100	87	Au ppb: Fuse 10 g sample	FA-AAS	5	10000
921	87	Al %: 32 element, soil & rock	ICP-AES	0.01	15.00
922	87	Ag ppm: 32 element, soil & rock	ICP-AES	0.2	200
923	87	As ppm: 32 element, soil & rock	ICP-AES	5	10000
924	87	Ba ppm: 32 element, soil & rock	ICP-AES	10	10000
925	87	Be ppm: 32 element, soil & rock	ICP-AES	0.5	100.0
926	87	Bi ppm: 32 element, soil & rock	ICP-AES	2	10000
927	87	Ca %: 32 element, soil & rock	ICP-AES	0.01	15.00
928	87	Cd ppm: 32 element, soil & rock	ICP-AES	0.5	100.0
929	87	Co ppm: 32 element, soil & rock	ICP-AES	1	10000
930	87	Cr ppm: 32 element, soil & rock	ICP-AES	1	10000
931	87	Cu ppm: 32 element, soil & rock	ICP-AES	1	10000
932	87	Fe %: 32 element, soil & rock	ICP-AES	0.01	15.00
933	87	Ga ppm: 32 element, soil & rock	ICP-AES	10	10000
951	87	Hg ppm: 32 element, soil & rock	ICP-AES	1	10000
934	87	K %: 32 element, soil & rock	ICP-AES	0.01	10.00
935	87	La ppm: 32 element, soil & rock	ICP-AES	10	10000
936	87	Mg %: 32 element, soil & rock	ICP-AES	0.01	15.00
937	87	Mn ppm: 32 element, soil & rock	ICP-AES	5	10000
938	87	Mo ppm: 32 element, soil & rock	ICP-AES	1	10000
939	87	Na %: 32 element, soil & rock	ICP-AES	0.01	5.00
940	87	Ni ppm: 32 element, soil & rock	ICP-AES	1	10000
941	87	P ppm: 32 element, soil & rock	ICP-AES	10	10000
942	87	Pb ppm: 32 element, soil & rock	ICP-AES	2	10000
943	87	Sb ppm: 32 element, soil & rock	ICP-AES	5	10000
958	87	Sc ppm: 32 elements, soil & rock	ICP-AES	1	100000
944	87	Sr ppm: 32 element, soil & rock	ICP-AES	1	10000
945	87	Ti %: 32 element, soil & rock	ICP-AES	0.01	5.00
946	87	Tl ppm: 32 element, soil & rock	ICP-AES	10	10000
947	87	U ppm: 32 element, soil & rock	ICP-AES	10	10000
948	87	V ppm: 32 element, soil & rock	ICP-AES	1	10000
949	87	W ppm: 32 element, soil & rock	ICP-AES	10	10000
950	87	Zn ppm: 32 element, soil & rock	ICP-AES	2	10000

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To : NORTHGATE EXPLORATION LIMITED

P.O. BOX 143, 1 FIRST CANADIAN PLACE
TORONTO, ONTARIO
M5X 1C7

Project : 763 C4
Comments: CC: R. BRUASET

Page No. : 1-A
Tot. Pages: 3
Date : 08-JUN-89
Invoice # : I-8917097
P.O. # : NONE

CERTIFICATE OF ANALYSIS A8917097

T = Trench see Plate 4

SOILS

SAMPLE DESCRIPTION	PREP CODE		Au ppb FA+AA	Al %	Ag ppm	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	Ga ppm	Hg ppm	K %	La ppm	Mg %	Mn ppm
RUB-200S T#2	201	238	< 5	0.75	0.4	5	140	< 0.5	< 2	0.32	< 0.5	5	20	9	1.64	< 10	< 1	0.07	10	0.22	215
RUB-206S T#3	201	238	< 5	0.61	0.2	< 5	170	< 0.5	< 2	0.81	< 0.5	7	21	10	1.67	< 10	< 1	0.09	10	0.34	325
RUB-208S T#4	201	238	< 5	0.81	0.2	5	260	< 0.5	< 2	1.01	< 0.5	9	25	14	2.09	< 10	< 1	0.09	10	0.46	390
RUB-209S T#5	201	238	< 5	1.14	0.4	5	270	< 0.5	4	1.23	< 0.5	12	32	22	2.55	10	< 1	0.12	10	0.63	490
RUB-210S T#5	201	238	< 5	0.91	0.4	5	260	< 0.5	2	0.81	< 0.5	9	27	14	2.16	< 10	< 1	0.11	10	0.46	400
RUB-211S T#7	201	238	< 5	0.96	0.4	< 5	230	< 0.5	4	0.56	< 0.5	12	32	17	2.52	< 10	< 1	0.09	10	0.52	440
check on soil RB762 (1988) trench → RUB-214S L24+00W 2+00S	201	238	< 5	0.61	0.2	< 5	50	< 0.5	< 2	0.21	< 0.5	2	12	2	0.70	< 10	< 1	0.04	< 10	0.12	70
RUB-215S L24+00W 2+00S	201	238	< 5	0.33	0.4	5	100	< 0.5	2	0.34	< 0.5	5	18	5	1.34	< 10	< 1	0.04	10	0.15	190
RUB-221S Tullerie Cr	201	238	< 5	1.42	0.2	5	120	< 0.5	2	0.54	< 0.5	8	37	14	2.14	< 10	< 1	0.13	10	0.48	195
RUB-222S see Plate 6	201	238	< 5	1.61	0.2	5	90	< 0.5	< 2	0.30	< 0.5	12	36	14	2.43	< 10	< 1	0.11	10	0.43	415
RUB-223S "	201	238	< 5	1.98	0.4	5	260	< 0.5	2	0.64	< 0.5	6	21	31	1.62	< 10	< 1	0.11	10	0.31	135
Top 4 → RUB-224S "	201	238	< 5	2.93	0.2	5	130	< 0.5	< 2	0.20	< 0.5	13	33	13	2.78	< 10	< 1	0.11	< 10	0.40	185
RUB-225S "	201	238	< 5	0.93	0.2	< 5	60	< 0.5	< 2	0.42	< 0.5	8	32	10	2.06	< 10	< 1	0.08	10	0.40	215
RUB-226S "	201	238	< 5	2.08	0.6	< 5	150	< 0.5	2	0.68	< 0.5	12	39	51	2.93	10	< 1	0.12	10	0.52	270
Top 3 RUB-227S "	201	238	< 5	1.84	0.4	15	100	< 0.5	< 2	0.37	< 0.5	10	28	21	2.10	< 10	< 1	0.16	10	0.39	365
RUB-228S "	201	238	< 5	2.18	0.6	5	110	< 0.5	< 2	0.43	< 0.5	9	25	17	1.90	< 10	< 1	0.13	10	0.43	285
RUB-229S "	201	238	< 5	2.59	0.4	5	190	< 0.5	< 2	0.60	< 0.5	11	34	20	2.62	10	< 1	0.13	10	0.54	215
RUB-230S "	201	238	< 5	1.73	< 0.2	5	140	< 0.5	< 2	0.54	< 0.5	10	36	27	2.52	< 10	< 1	0.09	10	0.47	215
RUB-231S "	201	238	< 5	3.15	< 0.2	20	210	< 0.5	2	0.40	< 0.5	30	67	80	7.78	10	< 1	0.09	< 10	0.97	1320
RUB-232S "	201	238	< 5	1.78	0.4	< 5	180	< 0.5	< 2	0.37	< 0.5	6	26	10	1.96	< 10	< 1	0.14	10	0.39	155
RUB-233S "	201	238	< 5	3.18	0.2	< 5	240	< 0.5	2	0.27	< 0.5	11	35	20	2.97	< 10	< 1	0.10	< 10	0.46	285
RUB-234S SILT	201	238	< 5	1.18	< 0.2	5	300	< 0.5	2	2.00	< 0.5	18	53	66	3.31	< 10	< 1	0.18	< 10	0.80	4460
TOP 3 ↓ RUB-235S Tullerie Cr	201	238	< 5	1.38	0.2	5	120	< 0.5	< 2	0.35	< 0.5	8	25	10	1.89	< 10	< 1	0.10	< 10	0.30	215
RUB-236S "	201	238	< 5	1.72	0.2	< 5	130	< 0.5	< 2	0.34	< 0.5	7	24	11	1.85	< 10	< 1	0.16	< 10	0.33	265
RUB-237S "	201	238	< 5	2.10	0.2	5	200	< 0.5	< 2	0.64	< 0.5	13	49	18	3.38	< 10	< 1	0.33	10	0.65	445
RUB-238S "	201	238	< 5	1.55	< 0.2	5	150	< 0.5	< 2	0.41	< 0.5	10	36	18	2.47	< 10	< 1	0.27	< 10	0.51	445
RUB-239S "	201	238	< 5	1.47	< 0.2	< 5	100	< 0.5	2	0.42	< 0.5	10	41	22	2.63	< 10	< 1	0.19	10	0.50	400
RUB-240S "	201	238	< 5	1.54	0.2	< 5	120	< 0.5	< 2	0.66	< 0.5	8	33	15	2.36	< 10	< 1	0.14	10	0.43	220
RUB-241S "	201	238	< 5	2.98	< 0.2	10	340	< 0.5	2	0.52	< 0.5	23	28	104	4.91	< 10	< 1	0.67	< 10	1.48	1370
ORGANIC silt → RUB-243S "	201	238	< 5	0.79	< 0.2	< 5	80	< 0.5	2	0.91	< 0.5	5	26	49	1.45	< 10	< 1	0.09	< 10	0.42	330
TOP#3 RUB-244S MASSEY HILL	201	238	< 5	2.05	< 0.2	< 5	190	< 0.5	< 2	0.34	< 0.5	8	26	13	2.32	< 10	< 1	0.16	< 10	0.36	455
RUB-245S MASSEY HILL	201	238	< 5	2.39	< 0.2	5	200	< 0.5	< 2	0.30	< 0.5	9	24	12	2.43	< 10	< 1	0.08	< 10	0.30	515
RUB-248S "	201	238	< 5	1.62	< 0.2	5	130	< 0.5	< 2	0.37	< 0.5	10	32	14	2.55	< 10	< 1	0.17	< 10	0.51	295
RUB-250S "	201	238	< 5	2.27	< 0.2	< 5	450	< 0.5	< 2	0.48	< 0.5	11	36	19	3.07	< 10	< 1	0.21	10	0.54	955
RUB-252S "	201	238	< 5	2.68	< 0.2	10	320	< 0.5	< 2	0.37	< 0.5	10	27	16	2.71	< 10	< 1	0.21	10	0.41	875
RUB-257S "	201	238	< 5	2.66	< 0.2	5	250	< 0.5	< 2	0.42	< 0.5	11	29	18	2.83	< 10	2	0.16	10	0.51	555
RUB-258S "	201	238	< 5	2.42	0.2	10	220	< 0.5	< 2	0.77	< 0.5	7	28	32	2.66	< 10	1	0.11	10	0.36	225
RUB-259S "	201	238	< 5	1.93	0.2	< 5	180	< 0.5	2	0.31	< 0.5	8	25	10	2.35	< 10	1	0.10	< 10	0.27	730
RUB-260S "	201	238	< 5	1.49	0.2	< 5	160	< 0.5	2	0.50	< 0.5	8	27	20	2.24	< 10	1	0.08	10	0.39	235
RUB-261S "	201	238	< 5	2.04	< 0.2	5	180	< 0.5	< 2	0.64	< 0.5	14	41	16	3.28	< 10	1	0.1[illegible]	10	0.81	380

B. Cargill

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"A", "B", "C" . soil horizon

soils + silt

	SAMPLE DESCRIPTION	PREP CODE		Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sr ppm	Ti %	Tl ppm	U ppm	V ppm	W ppm	Zn ppm
C	RUB-200S	201	238	1	0.02	10	810	4	< 5	2	40	0.13	10	< 10	40	< 10	32
	RUB-206S	201	238	< 1	0.03	13	870	< 2	< 5	2	73	0.13	< 10	< 10	41	< 10	34
	RUB-208S	201	238	< 1	0.04	20	930	< 2	< 5	2	139	0.16	< 10	< 10	48	< 10	44
	RUB-209S	201	238	< 1	0.06	27	970	< 2	< 5	3	166	0.19	< 10	< 10	55	10	54
C	RUB-210S	201	238	< 1	0.04	19	900	< 2	< 5	3	101	0.17	< 10	< 10	51	< 10	44
C	RUB-211S	201	238	< 1	0.05	26	960	4	< 5	3	152	0.21	< 10	< 10	58	< 10	48
C	RUB-214S	201	238	< 1	0.01	3	220	4	< 5	1	26	0.14	< 10	< 10	18	< 10	16
C	RUB-215S	201	238	< 1	0.03	7	690	< 2	< 5	1	41	0.12	< 10	< 10	38	< 10	26
C	RUB-221S	201	238	< 1	0.03	16	560	< 2	< 5	4	39	0.25	< 10	< 10	53	< 10	46
B	RUB-222S	201	238	< 1	0.02	21	1620	< 2	< 5	3	23	0.19	< 10	< 10	53	< 10	114
C	RUB-223S	201	238	< 1	0.04	21	690	4	< 5	3	47	0.13	10	20	48	< 10	70
B	RUB-224S	201	238	1	0.02	27	1780	< 2	5	2	21	0.21	< 10	< 10	54	< 10	58
C	RUB-225S	201	238	< 1	0.03	11	610	< 2	< 5	3	36	0.23	< 10	< 10	55	< 10	36
C	RUB-226S	201	238	< 1	0.04	23	400	< 2	5	4	50	0.32	10	< 10	62	< 10	50
B	RUB-227S	201	238	1	0.03	18	360	2	< 5	4	35	0.20	< 10	< 10	47	< 10	40
C	RUB-228S	201	238	< 1	0.05	16	190	4	< 5	3	37	0.18	< 10	< 10	29	< 10	32
	RUB-229S	201	238	< 1	0.05	26	760	2	< 5	3	53	0.20	10	< 10	51	< 10	46
	RUB-230S	201	238	1	0.03	22	470	< 2	< 5	3	32	0.22	< 10	< 10	58	< 10	42
	RUB-231S	201	238	3	0.01	26	2120	2	5	14	35	0.06	10	< 10	189	10	176
	RUB-232S	201	238	< 1	0.02	14	450	6	< 5	3	35	0.17	10	10	35	< 10	62
B	RUB-233S	201	238	2	0.03	29	2010	< 2	< 5	4	25	0.20	< 10	< 10	55	< 10	90
oo. silt	RUB-234S	201	238	2	0.02	21	1600	2	5	4	107	0.08	10	< 10	57	< 10	52
B	RUB-235S	201	238	< 1	0.03	11	700	2	< 5	2	31	0.17	< 10	< 10	39	< 10	64
	RUB-236S	201	238	< 1	0.02	12	690	6	< 5	2	28	0.17	< 10	< 10	34	< 10	68
	RUB-237S	201	238	1	0.03	17	1840	4	< 5	5	53	0.28	< 10	< 10	73	< 10	98
	RUB-238S	201	238	1	0.02	14	850	2	< 5	4	31	0.19	< 10	< 10	55	< 10	58
C	RUB-239S	201	238	< 1	0.02	16	750	4	< 5	4	35	0.24	< 10	< 10	62	< 10	52
B	RUB-240S	201	238	< 1	0.02	14	640	4	< 5	3	39	0.20	10	< 10	52	< 10	62
B	RUB-241S	201	238	2	0.02	17	1610	< 2	< 5	5	33	0.25	< 10	< 10	114	10	148
silt	RUB-243S	201	238	1	0 02	12	780	2	< 5	2	54	0.12	< 10	< 10	37	< 10	38
B	RUB-244S	201	238	< 1	0.02	14	560	2	< 5	2	28	0.16	10	< 10	44	< 10	84
	RUB-245S	201	238	< 1	0.02	15	580	4	5	2	22	0.17	< 10	< 10	45	< 10	68
	RUB-248S	201	238	< 1	0.01	14	570	< 2	< 5	3	24	0.17	10	< 10	57	< 10	56
	RUB-250S	201	238	< 1	0.01	20	1790	2	< 5	5	38	0.15	10	10	58	< 10	144
	RUB-252S	201	238	< 1	0.02	18	960	4	< 5	4	34	0.16	< 10	< 10	52	< 10	96
	RUB-257S	201	238	< 1	0.02	19	750	2	< 5	3	34	0.18	< 10	< 10	51	< 10	120
	RUB-258S	201	238	< 1	0.03	17	380	< 2	< 5	5	39	0.14	< 10	< 10	42	< 10	44
	RUB-259S	201	238	< 1	0.02	12	1210	4	< 5	2	24	0.12	10	10	44	< 10	88
C	RUB-260S	201	238	< 1	0.02	13	140	2	< 5	4	40	0.16	< 10	< 10	45	< 10	36
	RUB-261S	201	238	< 1	0.05	22	400	< 2	< 5	8	62	0.19	< 10	< 10	73	< 10	54

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SOILS

SAMPLE DESCRIPTION	PREP CODE		Au ppb FA+AA	Al %	Ag ppm	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	Ga ppm	Hg ppm	K %	La ppm	Mg %	Mn ppm
RUB-262S	201	238	< 5	2.09	< 0.2	< 5	230	< 0.5	< 2	0.76	< 0.5	10	32	25	2.60	10	1	0.10	20	0.47	515
RUB-264S	201	238	< 5	2.85	< 0.2	< 5	380	< 0.5	2	0.41	< 0.5	9	33	17	2.78	10	< 1	0.17	10	0.46	220
RUB-265S	201	238	10	2.36	< 0.2	10	390	< 0.5	4	0.67	< 0.5	9	36	37	3.25	10	< 1	0.13	20	0.71	190
RUB-266S	201	238	< 5	2.18	< 0.2	10	320	< 0.5	2	0.46	< 0.5	9	31	24	2.63	10	1	0.11	10	0.54	475
RUB-267S	201	238	< 5	1.59	< 0.2	5	200	< 0.5	2	0.28	< 0.5	8	27	11	2.17	10	< 1	0.09	10	0.38	370
RUB-268S	201	238	< 5	1.78	< 0.2	< 5	160	< 0.5	< 2	0.23	< 0.5	6	21	8	1.97	< 10	1	0.09	< 10	0.26	300
RUB-269S	201	238	< 5	1.56	< 0.2	< 5	160	< 0.5	< 2	0.55	< 0.5	6	25	11	2.10	< 10	< 1	0.14	< 10	0.33	290
RUB-270S	201	238	< 5	1.40	< 0.2	< 5	130	< 0.5	2	0.31	< 0.5	8	27	8	2.26	< 10	< 1	0.15	< 10	0.37	440
RUB-271S	201	238	< 5	1.82	< 0.2	5	190	< 0.5	2	0.22	< 0.5	8	25	10	2.07	< 10	< 1	0.08	< 10	0.29	260
RUB-272S	201	238	< 5	1.39	< 0.2	< 5	150	< 0.5	< 2	0.30	< 0.5	6	25	9	1.88	< 10	< 1	0.10	< 10	0.28	390
RUB-275S 6+00W	201	238	< 5	1.85	0.2	5	230	< 0.5	< 2	0.24	< 0.5	8	22	13	1.99	< 10	2	0.19	< 10	0.39	780
RUB-276S 4+50W	201	238	< 5	1.62	< 0.2	5	110	< 0.5	2	0.36	< 0.5	9	25	12	2.10	< 10	< 1	0.16	< 10	0.42	635
RUB-277S 3+00W	201	238	< 5	2.32	< 0.2	< 5	170	< 0.5	2	0.27	< 0.5	11	33	21	2.72	< 10	< 1	0.24	< 10	0.64	520
RUB-278S 1+50W	201	238	< 5	1.86	0.2	< 5	100	< 0.5	< 2	0.22	< 0.5	6	22	13	1.77	< 10	< 1	0.08	< 10	0.30	260
RUB-279S 0+00W	201	238	< 5	1.93	< 0.2	5	160	< 0.5	< 2	0.31	< 0.5	8	24	15	2.11	< 10	< 1	0.10	< 10	0.28	170
RUB-280S	201	238	< 5	1.57	0.2	< 5	90	< 0.5	< 2	0.32	< 0.5	6	22	16	1.56	10	< 1	0.09	10	0.32	150
RUB-281S	201	238	15	1.82	0.6	10	150	< 0.5	2	1.63	< 0.5	9	36	252	2.72	10	< 1	0.23	20	0.63	245
RUB-282S	201	238	10	1.01	0.4	5	70	< 0.5	2	0.64	< 0.5	6	36	32	2.27	10	< 1	0.13	10	0.54	165
RUB-283S	201	238	15	1.80	0.6	5	200	< 0.5	< 2	1.76	< 0.5	9	44	518	1.91	10	< 1	0.14	20	0.58	235
RUB-284S	201	238	< 5	1.94	0.2	10	140	< 0.5	2	0.62	< 0.5	8	23	20	2.09	10	< 1	0.18	10	0.43	215
RUB-285S	201	238	< 5	1.58	0.2	5	110	< 0.5	< 2	0.50	< 0.5	6	28	16	2.10	10	1	0.15	10	0.38	190
RUB-286S	201	238	< 5	2.36	< 0.2	5	90	< 0.5	2	0.52	< 0.5	22	53	34	3.29	10	< 1	0.27	10	0.99	490
RUB-287S	201	238	< 5	2.27	1.2	10	250	1.0	4	2.47	0.5	9	54	1290	2.28	10	< 1	0.25	20	0.58	660
RUB-288S	201	238	< 5	1.77	0.2	< 5	150	< 0.5	2	0.27	< 0.5	6	21	15	1.76	10	1	0.07	< 10	0.20	120
RUB-289S	201	238	< 5	1.85	0.2	5	110	0.5	< 2	0.33	< 0.5	9	23	12	2.14	10	1	0.14	< 10	0.37	210
RUB-290S	201	238	< 5	2.09	0.2	10	200	0.5	2	0.35	< 0.5	9	25	24	2.29	< 10	1	0.18	10	0.39	530
RUB-291S	201	238	< 5	1.67	< 0.2	10	140	< 0.5	< 2	0.37	< 0.5	10	30	20	2.47	< 10	2	0.12	10	0.35	455
RUB-292S	201	238	< 5	1.23	< 0.2	< 5	100	< 0.5	< 2	0.36	< 0.5	6	20	12	1.80	< 10	1	0.12	< 10	0.25	355
RUB-293S	201	238	< 5	1.55	0.2	< 5	210	< 0.5	< 2	0.36	< 0.5	7	21	9	1.85	< 10	< 1	0.11	< 10	0.28	920
RUB-296S	201	238	< 5	1.71	< 0.2	< 5	200	< 0.5	< 2	0.27	< 0.5	8	21	10	1.98	< 10	< 1	0.16	< 10	0.32	505
RUB-298S	201	238	< 5	3.06	0.2	< 5	280	0.5	< 2	0.38	< 0.5	11	30	22	2.83	10	2	0.29	10	0.52	620
RUB-299S	201	238	< 5	1.34	0.2	10	170	< 0.5	< 2	0.30	< 0.5	6	24	9	1.84	< 10	< 1	0.17	< 10	0.27	450
RUB-300S	201	238	< 5	2.09	0.2	5	180	< 0.5	< 2	0.27	< 0.5	9	30	11	2.53	10	2	0.11	< 10	0.33	375
RUB-301S	201	238	< 5	1.17	0.2	< 5	100	< 0.5	< 2	0.23	< 0.5	5	19	5	1.52	< 10	< 1	0.11	< 10	0.20	425
RUB-302S	201	238	< 5	0.99	0.2	5	80	< 0.5	2	0.22	< 0.5	5	19	8	1.47	< 10	1	0.10	< 10	0.21	395
RUB-303S	201	238	10	1.25	< 0.2	5	160	< 0.5	2	0.48	< 0.5	9	25	18	2.19	< 10	1	0.20	10	0.39	585
RUB-304S	201	238	70	1.63	< 0.2	< 5	140	< 0.5	2	0.47	< 0.5	11	30	12	2.68	< 10	1	0.14	< 10	0.42	335
RUB-305S	201	238	10	1.13	< 0.2	5	70	< 0.5	< 2	0.28	< 0.5	5	22	8	1.50	< 10	< 1	0.05	< 10	0.25	115
RUB-306S	201	238	5	1.11	< 0.2	10	100	< 0.5	< 2	0.24	< 0.5	6	20	13	1.89	< 10	1	0.04	< 10	0.24	185
RUB-307S	201	238	< 5	1.75	0.2	10	280	< 0.5	< 2	0.36	< 0.5	11	26	13	2.39	< 10	< 1	0.15	< 10	0.47	905

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450 MATHESON BLVD. E., UNIT 54, MISSISSAUGA,
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PHONE (416) 890-0310

To : NORTHGATE EXPLORATION LIMITED

P.O. BOX 143, 1 FIRST CANADIAN PLACE
TORONTO, ONTARIO
M5X 1C7

Project : 763 C4
Comments: CC: R. BRUASET

Date : 08-JUN-89
Invoice # : I-8917097
P.O. # : NONE

"A","B","C" soil horizons

CERTIFICATE OF ANALYSIS A8917097

	SAMPLE DESCRIPTION	PREP CODE		Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sr ppm	Ti %	Tl ppm	U ppm	V ppm	W ppm	Zn ppm
"B"	RUB-262S	201	238	1	0.05	18	300	6	< 5	5	73	0.20	< 10	< 10	57	< 10	36
	RUB-264S	201	238	< 1	0.03	22	1880	8	< 5	5	45	0.17	< 10	< 10	49	< 10	74
	RUB-265S	201	238	< 1	0.04	23	450	8	< 5	8	77	0.17	< 10	< 10	50	< 10	42
	RUB-266S	201	238	< 1	0.02	19	260	10	< 5	6	51	0.14	< 10	< 10	45	< 10	58
	RUB-267S	201	238	< 1	0.02	14	370	8	< 5	2	33	0.17	< 10	< 10	41	< 10	36
	RUB-268S	201	238	1	0.01	11	940	4	< 5	1	30	0.13	< 10	< 10	36	< 10	52
	RUB-269S	201	238	< 1	0.02	16	810	2	< 5	2	48	0.17	< 10	< 10	41	< 10	44
	RUB-270S	201	238	< 1	0.02	10	330	< 2	< 5	2	28	0.26	< 10	< 10	54	< 10	52
	RUB-271S	201	238	< 1	0.02	14	1490	< 2	< 5	2	21	0.18	< 10	< 10	43	< 10	70
	RUB-272S	201	238	< 1	0.02	11	1170	< 2	< 5	2	26	0.19	< 10	< 10	40	< 10	58
	RUB-275S	201	238	1	0.02	13	1450	4	< 5	3	23	0.15	< 10	< 10	41	< 10	84
	RUB-276S	201	238	1	0.02	12	620	< 2	< 5	2	28	0.19	< 10	< 10	50	< 10	58
	RUB-277S	201	238	1	0.02	17	1350	2	< 5	4	19	0.19	< 10	< 10	64	< 10	114
	RUB-278S	201	238	< 1	0.02	16	1420	2	< 5	2	19	0.15	< 10	< 10	36	< 10	74
	RUB-279S	201	238	< 1	0.02	20	1670	< 2	< 5	2	30	0.16	< 10	< 10	40	< 10	50
'B'	RUB-280S	201	238	< 1	0.02	14	170	8	< 5	3	25	0.20	< 10	< 10	37	< 10	22
'A'	RUB-281S	201	238	< 1	0.03	31	1380	4	< 5	12	77	0.11	< 10	< 10	62	< 10	78
'C'	RUB-282S	201	238	< 1	0.03	11	850	< 2	< 5	9	39	0.14	< 10	< 10	54	< 10	26
'A'	RUB-283S	201	238	3	0.04	32	1860	6	< 5	6	72	0.19	< 10	< 10	58	< 10	54
'B'	RUB-284S	201	238	< 1	0.03	15	540	6	< 5	3	32	0.14	< 10	< 10	36	< 10	64
C	RUB-285S	201	238	< 1	0.03	12	270	6	< 5	4	29	0.18	< 10	< 10	44	< 10	38
C	RUB-286S	201	238	< 1	0.02	26	840	6	< 5	3	24	0.21	< 10	< 10	71	< 10	126
A	RUB-287S	201	238	5	0.03	74	2260	6	< 5	9	102	0.09	< 10	< 10	47	< 10	60
B	RUB-288S	201	238	< 1	0.02	17	870	10	< 5	2	26	0.16	< 10	< 10	38	< 10	24
B	RUB-289S	201	238	1	0.02	15	250	6	< 5	2	24	0.20	< 10	< 10	54	< 10	32
B	RUB-290S	201	238	< 1	0.02	18	520	< 2	< 5	5	34	0.16	< 10	< 10	44	< 10	78
C	RUB-291S	201	238	< 1	0.02	16	310	< 2	< 5	4	29	0.18	< 10	< 10	50	< 10	52
B	RUB-292S	201	238	< 1	0.02	9	300	< 2	< 5	2	23	0.15	< 10	< 10	39	< 10	30
	RUB-293S	201	238	< 1	0.02	12	1150	< 2	< 5	1	30	0.13	< 10	< 10	35	< 10	74
	RUB-296S	201	238	< 1	0.02	13	620	< 2	< 5	2	21	0.15	< 10	< 10	39	< 10	104
	RUB-298S	201	238	1	0.01	21	1850	4	< 5	4	30	0.17	< 10	< 10	54	< 10	90
C	RUB-299S	201	238	< 1	0.02	10	440	4	< 5	2	32	0.17	< 10	< 10	37	< 10	44
C	RUB-300S	201	238	< 1	0.02	16	410	< 2	< 5	2	32	0.21	< 10	< 10	46	< 10	62
C	RUB-301S	201	238	< 1	0.01	6	320	4	< 5	1	22	0.15	< 10	< 10	34	< 10	40
B	RUB-302S	201	238	< 1	0.02	5	220	< 2	< 5	1	19	0.15	< 10	< 10	34	< 10	26
B	RUB-303S	201	238	< 1	0.02	12	440	2	< 5	3	39	0.16	< 10	< 10	52	< 10	40
C	RUB-304S	201	238	< 1	0.01	17	1310	< 2	< 5	2	42	0.20	< 10	< 10	61	< 10	66
B	RUB-305S	201	238	< 1	0.01	8	140	< 2	< 5	1	19	0.15	< 10	< 10	37	< 10	20
B	RUB-306S	201	238	< 1	0.01	12	870	< 2	< 5	2	18	0.15	< 10	< 10	44	< 10	32
"B"	RUB-307S	201	238	< 1	0.02	17	1540	4	< 5	2	29	0.19	< 10	< 10	53	< 10	92

B. Cargill

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P.O. BOX 143, 1 FIRST CANADIAN PLACE
TORONTO, ONTARIO
M5X 1C7
Project : 763 C4
Comments: CC: R. BRUASET

Date : 08-JUN-89
Invoice # : I-8917097
P.O. # : NONE

CERTIFICATE OF ANALYSIS A8917097

SOILS

SAMPLE DESCRIPTION	PREP CODE		Au ppb FA+AA	Al %	Ag ppm	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	Ga ppm	Hg ppm	K %	La ppm	Mg %	Mn ppm
RUB-308S TOP#2	201	238	5	1.34	0.2	< 5	120	< 0.5	< 2	0.70	< 0.5	5	36	13	1.82	< 10	< 1	0.04	10	0.44	155
RUB-309S "	201	238	5	1.94	0.4	10	170	< 0.5	< 2	0.25	< 0.5	9	38	10	2.79	< 10	< 1	0.07	< 10	0.28	405
RUB-310S "	201	238	< 5	2.02	< 0.2	10	150	< 0.5	< 2	0.25	< 0.5	9	31	12	2.15	< 10	2	0.10	< 10	0.32	190
RUB-311S TOP#1	201	238	< 5	1.37	< 0.2	5	60	< 0.5	< 2	0.25	< 0.5	6	27	6	1.91	< 10	< 1	0.04	< 10	0.19	115
RUB-312S "	201	238	< 5	1.77	0.2	5	130	< 0.5	2	0.17	< 0.5	6	21	7	1.80	< 10	< 1	0.07	< 10	0.19	270
RUB-313S "	201	238	< 5	1.80	< 0.2	< 5	130	< 0.5	< 2	0.23	< 0.5	6	25	9	2.18	< 10	1	0.08	< 10	0.30	155
RUB-314S .	201	238	< 5	1.43	0.2	5	80	< 0.5	2	0.65	< 0.5	9	36	19	2.67	< 10	< 1	0.11	10	0.72	270

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Project :
Comments: CC: R.U. BRUASET

Page No. : 1
Tot. Pages: 1
Date : 04-JUL-89
Invoice # : I-8919075
P.O. # : NONE

CERTIFICATE OF ANALYSIS A8919075

C = "C" Horizon T = Trench Plate 4 SOILS APPENDIX 2

SAMPLE DESCRIPTION	PREP CODE		Au NAA ppb
"C" RUB89466S T#12	201	--	2
"C" RUB89467S T#11	201	--	< 1

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Project : 763 C4
Comments: CC: R. BRUASET

Page No. : 3-B
Tot. Pages: 3
Date : 08-JUN-89
Invoice # : I-8917097
P.O. # : NONE

CERTIFICATE OF ANALYSIS A8917097

B,C soil horizons

	SAMPLE DESCRIPTION	PREP CODE		Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sr ppm	Ti %	Tl ppm	U ppm	V ppm	W ppm	Zn ppm
"B"	RUB-308S	201	238	< 1	0.04	10	470	< 2	< 5	4	50	0.25	< 10	< 10	49	< 10	30
"C"	RUB-309S	201	238	< 1	0.02	21	1960	2	< 5	3	21	0.24	< 10	< 10	63	< 10	86
"B"	RUB-310S	201	238	< 1	0.02	18	1520	< 2	< 5	3	20	0.20	< 10	< 10	41	< 10	50
	RUB-311S	201	238	< 1	0.01	12	1240	2	< 5	2	21	0.17	< 10	< 10	44	< 10	30
	RUB-312S	201	238	< 1	0.02	13	1180	< 2	< 5	1	16	0.14	< 10	< 10	34	< 10	42
	RUB-313S	201	238	1	0.01	13	770	< 2	< 5	2	22	0.18	< 10	< 10	43	< 10	46
"B"	RUB-314S	201	238	< 1	0.04	17	550	2	< 5	4	44	0.29	< 10	< 10	67	< 10	42

B. Cargill

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APPENDIX 2

To: BRUASET, R. U.
5851 HALIFAX ST.
BURNABY, BC
V5B 2P4
Project :
Comments:

**Page No. : 1
Tot. Pages: 1
Date : 16-JUL-89
Invoice # : I-8920337
P.O. # : NONE

CERTIFICATE OF ANALYSIS A8920337

SOIL

SAMPLE DESCRIPTION	PREP CODE		Au ppb FA+AA									
RUB 89 900S	214	--	< 5	Rerun of RB162 pulp. RB162: 480 ppb Au Ref. Bruaset, 1988 Chemex Cert. A8824826 see also Chemex Certificate A8917097 RUB89214S. This is "C" horizon in same hole as RB162.								

CERTIFICATION : [signature]

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TORONTO, ONTARIO
M5X 1C7

A8917369

Comments: CC: RU BRUASET & ASSOC LTD.

CERTIFICATE A8917369

NORTHGATE EXPLORATION LIMITED
PROJECT :
P O # : NONE

Samples submitted to our lab in Vancouver, BC.
This report was printed on 13-JUL-89.

SAMPLE PREPARATION

CHEMEX CODE	NUMBER SAMPLES	DESCRIPTION
201	119	Dry, sieve -80 mesh; soil, sed.
238	119	ICP: Aqua regia digestion

* NOTE 1:

The 32 element ICP package is suitable for trace metals in soil and rock samples. Elements for which the nitric-aqua regia digestion is possibly incomplete are: Al, Ba, Be, Ca, Cr, Ga, K, La, Mg, Na, Sr, Ti, Tl, W.

ANALYTICAL PROCEDURES

CHEMEX CODE	NUMBER SAMPLES	DESCRIPTION	METHOD	DETECTION LIMIT	UPPER LIMIT
100	119	Au ppb: Fuse 10 g sample	FA-AAS	5	10000
921	119	Al %: 32 element, soil & rock	ICP-AES	0.01	15.00
922	119	Ag ppm: 32 element, soil & rock	ICP-AES	0.2	200
923	119	As ppm: 32 element, soil & rock	ICP-AES	5	10000
924	119	Ba ppm: 32 element, soil & rock	ICP-AES	10	10000
925	119	Be ppm: 32 element, soil & rock	ICP-AES	0.5	100.0
926	119	Bi ppm: 32 element, soil & rock	ICP-AES	2	10000
927	119	Ca %: 32 element, soil & rock	ICP-AES	0.01	15.00
928	119	Cd ppm: 32 element, soil & rock	ICP-AES	0.5	100.0
929	119	Co ppm: 32 element, soil & rock	ICP-AES	1	10000
930	119	Cr ppm: 32 element, soil & rock	ICP-AES	1	10000
931	119	Cu ppm: 32 element, soil & rock	ICP-AES	1	10000
932	119	Fe %: 32 element, soil & rock	ICP-AES	0.01	15.00
933	119	Ga ppm: 32 element, soil & rock	ICP-AES	10	10000
951	119	Hg ppm: 32 element, soil & rock	ICP-AES	1	10000
934	119	K %: 32 element, soil & rock	ICP-AES	0.01	10.00
935	119	La ppm: 32 element, soil & rock	ICP-AES	10	10000
936	119	Mg %: 32 element, soil & rock	ICP-AES	0.01	15.00
937	119	Mn ppm: 32 element, soil & rock	ICP-AES	5	10000
938	119	Mo ppm: 32 element, soil & rock	ICP-AES	1	10000
939	119	Na %: 32 element, soil & rock	ICP-AES	0.01	5.00
940	119	Ni ppm: 32 element, soil & rock	ICP-AES	1	10000
941	119	P ppm: 32 element, soil & rock	ICP-AES	10	10000
942	119	Pb ppm: 32 element, soil & rock	ICP-AES	2	10000
943	119	Sb ppm: 32 element, soil & rock	ICP-AES	5	10000
958	119	Sc ppm: 32 elements, soil & rock	ICP-AES	1	100000
944	119	Sr ppm: 32 element, soil & rock	ICP-AES	1	10000
945	119	Ti %: 32 element, soil & rock	ICP-AES	0.01	5.00
946	119	Tl ppm: 32 element, soil & rock	ICP-AES	10	10000
947	119	U ppm: 32 element, soil & rock	ICP-AES	10	10000
948	119	V ppm: 32 element, soil & rock	ICP-AES	1	10000
949	119	W ppm: 32 element, soil & rock	ICP-AES	10	10000
950	119	Zn ppm: 32 element, soil & rock	ICP-AES	2	10000

Chemex Labs Ltd.

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Project :
Comments: CC: RU BRUASET & ASSOC. LTD.

Date : 12-JUN-89
Invoice # : I-8917369
P.O. # : NONE

CERTIFICATE OF ANALYSIS A8917369

SOILS

APPENDIX 2

SAMPLE DESCRIPTION	PREP CODE	Au ppb FA+AA	Al %	Ag ppm	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	Ga ppm	Hg ppm	K %	La ppm	Mg %	Mn ppm
1989 B/L																				
RH89-100S 99+00N	201 238	< 5	1.99	0.2	10	160	0.5	< 2	0.29	< 0.5	12	21	31	2.49	10	< 1	0.18	< 10	0.50	245
RH89-101S 98+00N	201 238	< 5	1.55	< 0.2	20	120	0.5	< 2	0.26	< 0.5	6	17	16	1.62	10	< 1	0.10	< 10	0.25	120
RH89-102S 97+00N	201 238	< 5	0.22	< 0.2	< 5	220	< 0.5	< 2	5.48	< 0.5	7	5	173	0.72	< 10	< 1	0.01	< 10	0.25	485
RH89-103S 96+00N	201 238	< 5	1.67	0.2	5	130	0.5	< 2	0.31	< 0.5	8	22	15	1.69	10	< 1	0.08	< 10	0.27	110
RH89-104S 95+00N	201 238	< 5	1.37	0.2	5	170	0.5	< 2	0.43	< 0.5	9	20	14	2.08	10	< 1	0.14	< 10	0.54	410
RH89-105S 94+00N	201 238	< 5	1.17	< 0.2	5	90	0.5	< 2	0.32	< 0.5	5	19	8	1.70	10	< 1	0.15	< 10	0.31	145
RH89-106S	201 238	< 5	2.45	< 0.2	10	260	1.0	2	0.39	< 0.5	11	27	17	2.49	10	< 1	0.16	< 10	0.44	490
RH89-107S	201 238	< 5	1.66	< 0.2	< 5	110	0.5	< 2	0.37	< 0.5	10	21	17	2.27	10	< 1	0.12	< 10	0.56	195
RH89-108S 91+00N	201 238	< 5	1.93	< 0.2	20	150	1.0	< 2	0.58	< 0.5	11	20	20	2.01	10	< 1	0.14	10	0.43	435
RH89-109S 90+00N	201 238	< 5	2.38	0.2	10	140	1.0	< 2	0.44	< 0.5	9	25	13	2.33	10	< 1	0.12	< 10	0.35	255
RH89-110S 89+00N	201 238	< 5	1.78	< 0.2	5	170	1.0	< 2	0.43	< 0.5	9	23	9	2.08	10	< 1	0.16	< 10	0.44	645
RH89-111S	201 238	< 5	2.22	0.2	10	170	0.5	< 2	0.35	< 0.5	9	26	13	2.24	10	< 1	0.11	< 10	0.40	240
RH89-112S 87+00N	201 238	< 5	2.07	0.2	< 5	180	1.0	< 2	0.38	< 0.5	9	27	14	2.16	10	< 1	0.12	10	0.30	210
RH89-113S	201 238	10	1.80	0.4	5	120	1.0	4	0.31	< 0.5	8	24	10	1.99	10	< 1	0.07	< 10	0.26	175
RH89-114S 85+00N	201 238	15	1.56	0.4	5	130	0.5	< 2	0.26	< 0.5	8	19	7	1.85	10	< 1	0.06	< 10	0.22	405
RH89-115S 84+00N	201 238	< 5	1.78	0.2	< 5	150	0.5	< 2	0.21	< 0.5	6	23	10	1.94	10	< 1	0.07	< 10	0.27	205
RH89-116S	201 238	< 5	1.52	0.2	5	100	0.5	< 2	0.17	< 0.5	6	17	9	1.74	10	1	0.04	< 10	0.19	360
RH89-117S 82+00N	201 238	< 5	0.97	< 0.2	< 5	80	0.5	< 2	0.18	< 0.5	6	19	5	1.66	< 10	1	0.03	< 10	0.17	170
RH89-118S	201 238	< 5	1.41	0.2	5	90	0.5	< 2	0.25	< 0.5	5	20	6	1.77	10	< 1	0.05	< 10	0.18	195
RH89-119S 80+00N	201 238	< 5	0.29	< 0.2	15	100	0.5	< 2	4.26	< 0.5	4	22	38	1.52	< 10	1	0.01	< 10	0.27	85
RH89-120S 79+00N	201 238	< 5	2.59	0.4	10	250	< 0.5	< 2	0.51	< 0.5	16	41	23	3.64	20	1	0.17	10	0.62	600
RH89-121S	201 238	50	2.71	0.4	10	290	< 0.5	4	0.47	< 0.5	17	44	29	3.80	20	< 1	0.14	10	0.82	465
RH89-122S	201 238	< 5	2.73	0.6	10	250	< 0.5	4	0.43	< 0.5	11	28	19	2.65	10	< 1	0.10	10	0.47	505
RH89-123S	201 238	5	1.78	0.4	10	90	< 0.5	2	0.25	< 0.5	9	32	10	2.23	10	1	0.06	< 10	0.24	170
RH89-124S 75+00N	201 238	< 5	2.03	0.4	10	110	< 0.5	4	0.22	< 0.5	8	27	8	2.24	10	< 1	0.09	< 10	0.26	385
RH89-125S 74+00N	201 238	< 5	1.16	0.4	< 5	100	< 0.5	2	0.31	< 0.5	5	27	7	1.80	10	< 1	0.08	< 10	0.23	135
RH89-126S 73+00N	201 238	< 5	2.63	0.6	10	280	< 0.5	4	0.54	< 0.5	10	27	15	2.14	10	< 1	0.06	10	0.53	130
RH89-127S 72+00N	201 238	< 5	1.02	0.2	5	110	< 0.5	4	1.46	< 0.5	8	20	15	1.78	10	2	0.10	10	0.50	170
RH89-128S 71+00N	201 238	< 5	0.30	< 0.2	< 5	90	< 0.5	< 2	2.14	< 0.5	1	9	18	0.74	< 10	< 1	0.01	< 10	0.23	35
RH89-129S 70+00N	201 238	< 5	1.06	0.4	5	70	< 0.5	2	0.22	< 0.5	5	25	6	1.83	10	< 1	0.04	< 10	0.21	155
RH89-130S 69+00N	201 238	< 5	1.46	0.4	< 5	80	< 0.5	2	0.25	< 0.5	6	24	7	1.86	10	< 1	0.06	< 10	0.20	190
RH89-131S	201 238	< 5	1.53	0.4	5	90	< 0.5	4	0.24	< 0.5	5	21	6	1.72	10	< 1	0.13	< 10	0.26	190
RH89-132S 67+00N	201 238	< 5	2.42	0.4	15	160	< 0.5	4	0.32	< 0.5	11	37	16	2.95	10	1	0.20	< 10	0.54	330
RH89-133S	201 238	< 5	2.12	0.4	20	130	< 0.5	4	0.34	< 0.5	13	43	23	3.03	10	< 1	0.29	10	0.60	695
RH89-134S 65+00N	201 238	< 5	2.90	0.6	15	220	< 0.5	4	0.34	< 0.5	17	38	41	3.20	10	< 1	0.19	10	0.72	1035
RH89-135S 64+50N	201 238	< 5	1.74	0.6	15	120	< 0.5	2	0.40	< 0.5	5	26	16	1.89	10	1	0.19	10	0.37	270
RH89-136S 64+00N	201 238	< 5	1.31	0.4	10	120	< 0.5	2	0.42	< 0.5	10	37	18	2.39	10	< 1	0.26	10	0.50	565
RH89-137S 63+70N	201 238	< 5	2.71	0.6	< 5	220	< 0.5	2	0.47	< 0.5	11	42	46	3.03	10	1	0.31	10	0.58	1080
RH89-138S 63+00N	201 238	< 5	1.60	0.4	5	120	< 0.5	2	0.27	< 0.5	8	29	9	2.10	10	< 1	0.15	< 10	0.33	395
RH89-139S 62+00N	201 238	< 5	1.24	0.4	< 5	130	< 0.5	< 2	0.27	< 0.5	5	26	6	1.76	10	[illegible]	[illegible]	< 10	[illegible]	325

B. Cardi[illegible]

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PHONE (416) 890-0310

To : NORTHGATE EXPLORATION LIMITED

P.O. BOX 143, 1 FIRST CANADIAN PLACE
TORONTO, ONTARIO
M5X 1C7
Project :
Comments: CC: RU BRUASET & ASSOC. LTD.

Date : 12-JUN-89
Invoice # : I-8917369
P.O. # : NONE

CERTIFICATE OF ANALYSIS A8917369

SAMPLE DESCRIPTION	PREP CODE		Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sr ppm	Ti %	Tl ppm	U ppm	V ppm	W ppm	Zn ppm
RH89-100S	201	238	< 1	0.02	21	840	8	< 5	3	20	0.18	< 10	< 10	63	< 10	50
RH89-101S	201	238	< 1	0.02	9	180	12	< 5	2	23	0.15	< 10	< 10	35	< 10	24
RH89-102S	201	238	11	0.01	27	1300	< 2	< 5	< 1	303	< 0.01	< 10	10	49	< 10	6
RH89-103S	201	238	< 1	0.03	13	210	6	< 5	2	26	0.17	< 10	< 10	43	< 10	24
RH89-104S	201	238	< 1	0.02	11	520	4	< 5	3	27	0.16	< 10	< 10	59	< 10	38
RH89-105S	201	238	< 1	0.02	7	230	6	< 5	2	23	0.12	< 10	< 10	41	< 10	26
RH89-106S	201	238	< 1	0.02	23	2690	2	< 5	4	31	0.15	< 10	< 10	47	< 10	78
RH89-107S	201	238	< 1	0.02	16	640	4	< 5	3	21	0.18	< 10	< 10	60	< 10	42
RH89-108S	201	238	1	0.02	14	330	6	< 5	3	34	0.18	< 10	< 10	49	< 10	34
RH89-109S	201	238	< 1	0.03	21	1720	4	< 5	3	34	0.17	< 10	< 10	49	< 10	50
RH89-110S	201	238	1	0.02	15	590	4	< 5	3	25	0.17	< 10	< 10	50	< 10	58
RH89-111S	201	238	< 1	0.03	21	1180	8	< 5	3	25	0.19	< 10	< 10	50	< 10	56
RH89-112S	201	238	< 1	0.02	23	1590	6	< 5	3	34	0.17	< 10	< 10	45	< 10	46
RH89-113S	201	238	< 1	0.02	17	1370	8	< 5	3	23	0.17	< 10	< 10	47	< 10	24
RH89-114S	201	238	< 1	0.02	13	1050	10	< 5	2	22	0.17	< 10	< 10	48	< 10	38
RH89-115S	201	238	< 1	0.02	17	1240	14	< 5	2	17	0.17	< 10	< 10	44	< 10	34
RH89-116S	201	238	< 1	0.01	14	1690	8	< 5	2	13	0.13	< 10	< 10	38	< 10	42
RH89-117S	201	238	< 1	0.01	10	870	8	< 5	1	12	0.14	< 10	< 10	45	< 10	20
RH89-118S	201	238	< 1	0.01	13	1540	4	< 5	1	20	0.14	< 10	< 10	41	< 10	26
RH89-119S	201	238	109	0.02	10	1010	2	5	< 1	159	0.01	< 10	20	49	< 10	< 2
RH89-120S	201	238	< 1	0.02	24	860	6	< 5	4	38	0.32	< 10	< 10	97	< 10	68
RH89-121S	201	238	< 1	0.03	28	540	8	5	4	37	0.34	< 10	< 10	100	< 10	86
RH89-122S	201	238	< 1	0.02	25	1520	12	5	3	31	0.19	< 10	< 10	58	< 10	96
RH89-123S	201	238	< 1	0.02	18	1200	8	< 5	3	21	0.20	< 10	< 10	57	< 10	38
RH89-124S	201	238	< 1	0.02	18	1560	8	< 5	2	17	0.20	< 10	< 10	53	< 10	44
RH89-125S	201	238	< 1	0.02	10	1110	8	< 5	2	26	0.19	< 10	< 10	45	< 10	10
RH89-126S	201	238	< 1	0.07	29	600	14	< 5	4	48	0.21	< 10	< 10	50	< 10	42
RH89-127S	201	238	< 1	0.08	12	680	8	< 5	2	90	0.16	< 10	< 10	53	< 10	22
RH89-128S	201	238	16	0.02	11	600	10	< 5	< 1	85	0.04	10	< 10	29	< 10	< 2
RH89-129S	201	238	< 1	0.01	10	780	8	< 5	2	18	0.19	< 10	< 10	48	< 10	12
RH89-130S	201	238	< 1	0.01	14	1300	12	< 5	2	19	0.16	< 10	< 10	44	< 10	32
RH89-131S	201	238	< 1	0.02	12	510	10	< 5	2	20	0.17	< 10	< 10	40	< 10	22
RH89-132S	201	238	< 1	0.02	17	340	14	< 5	3	32	0.20	< 10	< 10	67	< 10	34
RH89-133S	201	238	< 1	0.02	16	440	12	< 5	4	27	0.17	< 10	< 10	71	< 10	58
RH89-134S	201	238	< 1	0.02	29	1560	10	< 5	5	26	0.17	< 10	< 10	66	< 10	104
RH89-135S	201	238	< 1	0.03	13	330	12	< 5	4	29	0.18	< 10	< 10	40	< 10	30
RH89-136S	201	238	< 1	0.02	16	410	10	< 5	4	32	0.25	< 10	< 10	62	< 10	44
RH89-137S	201	238	< 1	0.03	29	670	10	5	8	40	0.20	< 10	< 10	61	< 10	76
RH89-138S	201	238	< 1	0.02	13	460	10	< 5	2	23	0.22	< 10	< 10	50	< 10	44
RH89-139S	201	238	< 1	0.02	9	420	12	< 5	2	25	0.20	< 10	< 10	43	< 10	28

Chemex Labs Ltd.

Analytical Chemists * Geochemists * Registered Assayers

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PHONE (416) 890-0310

To : NORTHGATE EXPLORATION LIMITED

P.O. BOX 143, 1 FIRST CANADIAN PLACE
TORONTO, ONTARIO
M5X 1C7

Project :
Comments: CC: RU BRUASET & ASSOC. LTD.

Date : 12-JUN-89
Invoice # : I-8917369
P.O. # : NONE

CERTIFICATE OF ANALYSIS A8917369

SOILS

SAMPLE DESCRIPTION	PREP CODE	Au ppb FA+AA	Al %	Ag ppm	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	Ga ppm	Hg ppm	K %	La ppm	Mg %	Mn ppm
[A89 B/L] RH89-140S [61+00N]	201 238	10	1.35	0.6	25	140	< 0.5	2	0.52	< 0.5	8	26	11	1.90	10	< 1	0.11	10	0.29	380
RH89-141S	201 238	< 5	1.30	0.6	< 5	160	< 0.5	2	0.60	< 0.5	7	31	16	2.09	10	< 1	0.13	10	0.57	250
RH89-142S [59+00N]	201 238	< 5	1.35	0.2	5	150	< 0.5	< 2	0.30	< 0.5	7	24	12	1.90	< 10	< 1	0.07	10	0.26	400
RH89-143S	201 238	5	1.94	0.2	5	150	< 0.5	4	0.56	< 0.5	9	39	12	2.94	10	1	0.23	10	0.79	295
RH89-144S [57+00N]	201 238	< 5	1.29	0.4	5	130	< 0.5	4	0.65	< 0.5	5	30	19	2.00	10	< 1	0.15	10	0.48	185
RH89-145S [56+00N]	201 238	10	1.66	0.4	10	180	< 0.5	2	0.46	< 0.5	5	27	9	1.89	10	< 1	0.07	10	0.29	150
RH89-146S [55+00N]	201 238	< 5	1.61	0.4	10	180	< 0.5	2	0.27	< 0.5	7	27	8	1.94	10	2	0.12	< 10	0.27	680
RH89-147S	201 238	< 5	1.52	0.4	< 5	200	< 0.5	< 2	0.31	< 0.5	8	26	7	1.91	10	< 1	0.13	< 10	0.24	1065
RH89-148S	201 238	< 5	2.03	0.4	< 5	190	< 0.5	4	0.27	< 0.5	8	29	11	2.30	10	< 1	0.09	10	0.32	340
RH89-149S [52+00N]	201 238	< 5	1.42	0.4	5	120	< 0.5	< 2	0.66	< 0.5	15	45	21	2.91	10	1	0.08	10	0.78	440
[L.99+00N:] RH89-150S [12+00W]	201 238	< 5	0.87	< 0.2	5	60	< 0.5	< 2	0.25	< 0.5	6	20	9	1.37	< 10	< 1	0.05	< 10	0.28	200
RH89-151S [13+00W]	201 238	5	1.37	0.2	< 5	100	< 0.5	< 2	0.33	< 0.5	6	26	10	1.60	< 10	< 1	0.07	< 10	0.31	140
RH89-152S [14+00W]	201 238	< 5	2.42	0.4	15	180	< 0.5	2	0.31	< 0.5	12	36	37	2.77	< 10	< 1	0.16	< 10	0.63	380
RH89-153S [15+00W]	201 238	10	1.58	0.2	20	80	< 0.5	< 2	0.33	< 0.5	15	37	32	3.48	< 10	1	0.16	10	0.71	520
RH89-154S [16+00W]	201 238	5	1.40	< 0.2	10	160	< 0.5	< 2	0.40	< 0.5	9	26	15	2.09	< 10	< 1	0.10	10	0.35	460
RH89-155S [17+00W]	201 238	5	1.19	< 0.2	5	260	< 0.5	< 2	0.30	< 0.5	7	19	12	1.55	< 10	1	0.08	< 10	0.25	1030
RH89-156S [18+00]	201 238	< 5	1.36	< 0.2	< 5	120	< 0.5	< 2	0.26	< 0.5	9	28	17	2.19	< 10	< 1	0.15	< 10	0.40	385
RH89-157S [19+00]	201 238	< 5	1.34	0.4	15	290	< 0.5	2	0.30	< 0.5	9	23	19	1.96	< 10	< 1	0.14	< 10	0.28	665
RH89-158S [20+00W]	201 238	5	1.49	0.2	10	280	< 0.5	< 2	0.24	< 0.5	9	24	14	1.99	< 10	1	0.08	< 10	0.27	1200
RH89-159S [L95+00N: 20+00W]	201 238	< 5	1.01	0.2	5	90	< 0.5	< 2	0.26	< 0.5	6	20	7	1.68	< 10	1	0.07	< 10	0.20	275
RH89-160S [19+00W]	201 238	< 5	0.76	< 0.2	< 5	80	< 0.5	< 2	0.14	< 0.5	6	14	5	1.42	< 10	2	0.02	< 10	0.13	180
RH89-161S [18+00W]	201 238	< 5	1.34	0.2	10	150	< 0.5	< 2	0.23	< 0.5	10	20	12	1.86	< 10	1	0.06	< 10	0.27	510
RH89-162S [17+00W]	201 238	15	1.19	0.4	5	80	< 0.5	< 2	0.24	< 0.5	7	22	9	1.73	< 10	2	0.12	< 10	0.28	495
RH89-163S [16+00]	201 238	< 5	1.17	0.4	5	90	< 0.5	< 2	0.22	< 0.5	6	18	7	1.54	< 10	1	0.10	< 10	0.20	305
RH89-164S [15+00]	201 238	< 5	1.86	0.2	< 5	210	< 0.5	< 2	0.19	< 0.5	6	18	8	1.55	< 10	< 1	0.07	< 10	0.19	190
RH89-165S [14+00W]	201 238	< 5	0.72	0.4	< 5	40	< 0.5	< 2	0.19	< 0.5	5	16	3	1.17	< 10	< 1	0.05	< 10	0.14	90
RH89-166S [13+00W]	201 238	< 5	1.53	0.2	5	120	< 0.5	< 2	0.24	< 0.5	7	19	8	1.68	< 10	< 1	0.05	< 10	0.22	280
RH89-167S [12+00W]	201 238	< 5	1.27	0.2	5	90	< 0.5	< 2	0.20	< 0.5	6	24	8	1.73	< 10	< 1	0.05	< 10	0.24	170
RH89-168S [11+00W]	201 238	< 5	1.87	0.4	5	130	< 0.5	< 2	0.23	< 0.5	8	22	7	2.11	10	< 1	0.05	< 10	0.23	125
RH89-169S [10+00W] [L99+00N:]	201 238	< 5	1.35	0.4	5	100	< 0.5	< 2	0.32	< 0.5	8	25	7	1.83	< 10	< 1	0.06	< 10	0.27	225
RH89-170S [11+00W]	201 238	5	0.65	0.2	5	90	< 0.5	< 2	3.15	0.5	9	11	94	0.94	< 10	2	0.04	< 10	0.21	50
RH89-171S [10+00W]	201 238	< 5	0.07	< 0.2	< 5	30	< 0.5	< 2	5.25	< 0.5	1	< 1	7	0.09	< 10	1	0.01	< 10	0.17	20
RH89-172S [9+00W]	201 238	< 5	1.92	0.2	< 5	110	< 0.5	< 2	0.17	< 0.5	7	20	7	1.77	< 10	1	0.05	< 10	0.19	305
RH89-173S [8+00W]	201 238	< 5	2.08	< 0.2	5	80	< 0.5	2	0.23	< 0.5	10	28	13	2.41	< 10	1	0.06	< 10	0.40	135
RH89-174S [7+00W]	201 238	< 5	1.05	< 0.2	5	60	< 0.5	< 2	0.18	< 0.5	4	12	3	0.97	< 10	3	0.03	< 10	0.13	60
RH89-175S [6+00W]	201 238	30	1.84	< 0.2	< 5	140	< 0.5	2	0.27	< 0.5	9	25	11	2.30	< 10	< 1	0.06	< 10	0.31	220
RH89-176S [5+00W]	201 238	5	1.70	< 0.2	< 5	80	< 0.5	< 2	0.24	< 0.5	10	27	11	2.42	< 10	1	0.07	< 10	0.35	180
RH89-177S [4+00W]	201 238	15	1.16	0.4	5	120	< 0.5	4	10.05	< 0.5	6	22	207	1.44	< 10	< 1	0.09	< 10	0.55	285
RH89-178S [3+00W]	201 238	< 5	2.50	0.4	15	160	< 0.5	2	0.37	< 0.5	14	27	23	2.85	10	< 1	0.15	< 10	0.51	375
RH89-179S [2+00W]	201 238	< 5	2.14	0.2	5	100	< 0.5	8	0.57	< 0.5	16	37	42	3.61	10	< 1	0.21	10	0.87	335

[Handwritten margin notes: TOP #3; TOP #5; TOP #1; L99+00N; L95+00N; L99+00N]

[Signature: B. Cargill]

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SAMPLE DESCRIPTION	PREP CODE		Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sr ppm	Ti %	Tl ppm	U ppm	V ppm	W ppm	Zn ppm
RH89-140S	201	238	< 1	0.03	11	220	10	< 5	3	40	0.19	< 10	< 10	45	< 10	20
RH89-141S	201	238	< 1	0.04	11	750	8	< 5	4	45	0.20	< 10	< 10	50	< 10	22
RH89-142S	201	238	< 1	0.02	11	660	14	< 5	2	27	0.19	< 10	< 10	42	< 10	20
RH89-143S	201	238	< 1	0.03	14	510	4	< 5	6	49	0.26	< 10	< 10	83	< 10	36
RH89-144S	201	238	< 1	0.03	11	410	8	< 5	3	48	0.20	< 10	< 10	43	< 10	18
RH89-145S	201	238	< 1	0.03	12	430	10	< 5	3	38	0.22	< 10	< 10	41	< 10	18
RH89-146S	201	238	< 1	0.02	13	1450	8	< 5	3	25	0.19	< 10	< 10	40	< 10	46
RH89-147S	201	238	< 1	0.02	10	1990	10	< 5	2	31	0.16	< 10	< 10	37	< 10	78
RH89-148S	201	238	< 1	0.02	17	2140	12	< 5	3	23	0.19	< 10	< 10	47	< 10	50
RH89-149S	201	238	< 1	0.03	20	1120	6	< 5	5	57	0.28	< 10	< 10	75	< 10	40
RH89-150S	201	238	< 1	0.02	8	410	8	< 5	2	19	0.15	< 10	< 10	37	< 10	8
RH89-151S	201	238	< 1	0.02	11	210	8	< 5	2	23	0.20	< 10	< 10	39	< 10	10
RH89-152S	201	238	< 1	0.02	24	1400	12	< 5	5	25	0.15	< 10	< 10	64	< 10	72
RH89-153S	201	238	4	0.01	18	590	14	< 5	5	27	0.12	< 10	< 10	82	10	58
RH89-154S	201	238	< 1	0.01	15	1080	12	< 5	2	34	0.14	< 10	< 10	49	< 10	50
RH89-155S	201	238	1	0.01	13	1350	14	< 5	2	31	0.11	< 10	< 10	34	< 10	46
RH89-156S	201	238	1	0.01	14	310	8	< 5	3	23	0.18	< 10	< 10	54	< 10	34
RH89-157S	201	238	< 1	0.02	12	620	10	< 5	2	35	0.15	< 10	< 10	45	10	52
RH89-158S	201	238	< 1	0.01	14	1480	8	< 5	2	20	0.14	< 10	< 10	45	< 10	92
RH89-159S	201	238	< 1	0.02	9	280	6	< 5	2	23	0.17	< 10	< 10	42	< 10	16
RH89-160S	201	238	< 1	0.01	6	980	8	< 5	1	13	0.11	< 10	< 10	39	< 10	18
RH89-161S	201	238	< 1	0.01	12	700	4	< 5	2	20	0.14	< 10	< 10	43	< 10	34
RH89-162S	201	238	1	0.02	10	220	8	< 5	2	34	0.14	< 10	< 10	40	< 10	20
RH89-163S	201	238	< 1	0.02	11	330	6	< 5	1	22	0.14	< 10	< 10	34	< 10	18
RH89-164S	201	238	< 1	0.01	14	1590	10	< 5	2	24	0.11	< 10	< 10	25	< 10	22
RH89-165S	201	238	< 1	0.01	3	90	6	< 5	1	17	0.16	< 10	< 10	31	< 10	2
RH89-166S	201	238	< 1	0.02	14	1100	8	< 5	2	22	0.14	< 10	< 10	40	< 10	30
RH89-167S	201	238	< 1	0.02	12	1080	10	< 5	2	18	0.15	< 10	< 10	44	< 10	22
RH89-168S	201	238	< 1	0.02	14	500	4	< 5	2	23	0.17	< 10	< 10	48	< 10	18
RH89-169S	201	238	< 1	0.02	9	190	12	< 5	2	27	0.20	< 10	< 10	49	< 10	26
RH89-170S	201	238	6	0.01	19	960	4	< 5	1	147	0.05	< 10	< 10	47	< 10	18
RH89-171S	201	238	7	0.01	1	600	4	< 5	< 1	218	< 0.01	< 10	< 10	2	< 10	< 2
RH89-172S	201	238	< 1	0.02	13	1650	12	< 5	2	15	0.14	< 10	< 10	38	< 10	30
RH89-173S	201	238	< 1	0.02	13	320	8	< 5	2	19	0.18	< 10	< 10	60	< 10	12
RH89-174S	201	238	< 1	0.02	5	100	6	< 5	1	18	0.15	< 10	< 10	23	< 10	< 2
RH89-175S	201	238	< 1	0.02	16	1190	6	< 5	2	28	0.16	< 10	< 10	54	< 10	20
RH89-176S	201	238	< 1	0.01	23	430	6	< 5	2	19	0.19	< 10	< 10	59	< 10	26
RH89-177S	201	238	< 1	0.03	27	1510	< 2	< 5	2	326	0.07	< 10	< 10	29	< 10	56
RH89-178S	201	238	< 1	0.02	26	1630	12	< 5	3	24	0.17	< 10	< 10	61	10	62
RH89-179S	201	238	< 1	0.01	22	660	12	< 5	5	49	0.20	< 10	< 10	89	10	46

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Project :
Comments: CC: RU BRUASET & ASSOC LTD

Date : 12-JUN-89
Invoice # : I-8917369
P.O. # : NONE

CERTIFICATE OF ANALYSIS A8917369

SOILS

SAMPLE DESCRIPTION	PREP CODE		Au ppb FA+AA	Al %	Ag ppm	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	Ga ppm	Hg ppm	K %	La ppm	Mg %	Mn ppm
RH89-180S	201	238	< 5	2.47	0.6	10	160	< 0.5	4	0.53	< 0.5	21	31	59	3.12	10	< 1	0.12	10	0.64	985
RH89-181S	201	238	< 5	1.96	0.4	5	130	< 0.5	2	0.37	< 0.5	17	21	20	2.95	10	< 1	0.14	< 10	0.61	420
RH89-182S	201	238	10	2.59	0.2	10	190	< 0.5	4	0.32	< 0.5	11	26	19	2.53	10	< 1	0.09	< 10	0.38	155
RH89-183S	201	238	10	1.70	0.6	10	130	< 0.5	4	0.34	< 0.5	10	30	24	2.03	10	< 1	0.10	10	0.44	310
RH89-184S	201	238	5	2.05	0.6	5	160	< 0.5	6	0.29	< 0.5	10	26	14	2.25	10	< 1	0.09	10	0.31	285
RH89-185S	201	238	5	1.54	0.4	< 5	120	< 0.5	4	0.21	< 0.5	6	16	12	1.65	< 10	< 1	0.09	10	0.22	355
RH89-186S	201	238	< 5	1.31	0.2	10	150	< 0.5	4	0.19	< 0.5	6	21	7	1.99	< 10	< 1	0.05	< 10	0.25	395
RH89-187S	201	238	< 5	1.93	0.4	5	130	< 0.5	4	0.26	< 0.5	6	20	12	1.91	10	< 1	0.09	< 10	0.23	350
RH89-188S	201	238	10	1.39	< 0.2	5	150	< 0.5	< 2	0.55	< 0.5	4	15	14	1.54	< 10	< 1	0.04	10	0.21	260
RH89-189S	201	238	25	0.86	< 0.2	5	60	< 0.5	2	0.21	< 0.5	5	22	8	1.67	< 10	< 1	0.04	< 10	0.19	135
RH89-190S	201	238	< 5	1.13	0.2	5	80	< 0.5	4	0.20	< 0.5	6	20	8	1.90	< 10	< 1	0.13	< 10	0.26	270
RH89-191S	201	238	5	0.80	0.2	5	80	< 0.5	< 2	0.17	< 0.5	4	17	5	1.44	< 10	< 1	0.07	< 10	0.16	170
RH89-192S	201	238	< 5	0.75	< 0.2	10	40	< 0.5	< 2	0.17	< 0.5	3	13	3	1.17	< 10	< 1	0.05	< 10	0.15	95
RH89-193S	201	238	< 5	1.07	0.2	< 5	100	< 0.5	< 2	1.15	< 0.5	5	28	8	1.94	10	< 1	0.11	10	0.34	165
RH89-194S	201	238	< 5	1.67	0.2	< 5	120	< 0.5	< 2	0.45	< 0.5	5	21	6	1.90	< 10	< 1	0.08	10	0.30	115
RH89-195S	201	238	10	1.75	0.2	10	330	0.5	< 2	1.04	< 0.5	11	27	385	1.65	< 10	1	0.09	70	0.40	1190
RH89-196S	201	238	5	1.18	< 0.2	< 5	120	< 0.5	< 2	0.74	< 0.5	8	30	20	1.85	< 10	< 1	0.07	10	0.46	155
RH89-197S	201	238	< 5	2.67	< 0.2	10	120	< 0.5	< 2	0.20	< 0.5	8	27	8	1.84	< 10	1	0.07	< 10	0.20	160
RH89-198S	201	238	< 5	1.96	< 0.2	10	140	< 0.5	< 2	0.22	< 0.5	5	28	7	2.03	< 10	2	0.06	< 10	0.20	170
RH89-199S	201	238	< 5	3.40	< 0.2	5	280	< 0.5	2	0.36	< 0.5	12	42	17	3.08	< 10	< 1	0.12	10	0.33	1040
RH89-200S	201	238	< 5	1.38	< 0.2	< 5	90	< 0.5	< 2	0.20	< 0.5	5	16	6	1.52	< 10	1	0.06	< 10	0.18	135
RH89-201S	201	238	< 5	1.83	< 0.2	10	130	< 0.5	< 2	0.25	< 0.5	10	25	10	2.14	< 10	1	0.09	10	0.19	565
RH89-202S	201	238	< 5	1.72	< 0.2	5	90	< 0.5	< 2	0.16	< 0.5	6	19	6	1.71	< 10	1	0.04	< 10	0.17	95
RH89-203S	201	238	< 5	0.96	< 0.2	< 5	70	< 0.5	2	0.15	< 0.5	4	16	4	1.20	< 10	< 1	0.03	< 10	0.12	110
RH89-204S	201	238	< 5	3.17	< 0.2	5	200	0.5	4	0.25	< 0.5	9	25	11	2.33	< 10	< 1	0.08	< 10	0.22	200
RH89-205S	201	238	< 5	2.95	< 0.2	5	190	0.5	2	0.23	< 0.5	11	27	13	2.47	10	< 1	0.09	10	0.33	295
RH89-206S	201	238	< 5	2.22	< 0.2	5	110	0.5	2	0.16	< 0.5	8	25	9	2.28	< 10	< 1	0.05	< 10	0.22	365
RH89-207S	201	238	< 5	1.32	< 0.2	5	230	0.5	2	0.53	< 0.5	10	29	14	4.23	< 10	< 1	0.06	10	0.33	705
RH89-208S	201	238	< 5	1.68	< 0.2	15	150	< 0.5	2	0.71	< 0.5	6	26	9	2.45	< 10	< 1	0.05	10	0.44	130
RH89-209S	201	238	15	2.67	< 0.2	5	150	0.5	2	0.17	< 0.5	9	31	11	2.74	< 10	< 1	0.09	< 10	0.35	390
RH89-210S	201	238	< 5	3.29	0.2	15	190	0.5	2	0.15	< 0.5	10	33	13	3.13	10	< 1	0.07	< 10	0.37	795
RH89-211S	201	238	< 5	4.09	0.4	10	200	0.5	2	0.14	< 0.5	8	23	14	2.37	10	< 1	0.06	10	0.26	445
RH89-212S	201	238	< 5	1.90	< 0.2	10	110	< 0.5	2	0.12	< 0.5	6	19	7	2.16	< 10	< 1	0.05	< 10	0.22	550
RH89-213S	201	238	< 5	3.10	0.4	10	180	0.5	< 2	0.14	< 0.5	8	24	9	2.36	10	< 1	0.06	< 10	0.27	710
RH89-214S	201	238	< 5	1.97	0.2	5	150	< 0.5	2	0.13	< 0.5	7	22	6	2.28	< 10	< 1	0.05	< 10	0.20	740
RH89-215S	201	238	< 5	2.64	0.2	10	160	0.5	< 2	0.15	< 0.5	9	25	10	2.62	< 10	< 1	0.05	< 10	0.31	435
RH89-216S	201	238	< 5	3.01	< 0.2	< 5	220	< 0.5	< 2	0.16	< 0.5	10	25	9	2.59	< 10	< 1	0.07	< 10	0.36	460
RH89-217S	201	238	< 5	2.56	< 0.2	10	220	< 0.5	2	0.25	< 0.5	10	29	13	2.90	10	< 1	0.10	< 10	0.47	350
RH89-218S	201	238	< 5	2.46	0.2	5	180	< 0.5	2	0.18	< 0.5	11	37	14	2.86	< 10	< 1	0.05	< 10	0.46	385

Chemex Labs Ltd.
Analytical Chemists • Geochemists • Registered Assayers
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Project :
Comments: CC: RU BRUASET & ASSOC LTD.

Date : 12-JUN-89
Invoice # : I-8917369
P.O. # : NONE

CERTIFICATE OF ANALYSIS A8917369

SAMPLE DESCRIPTION	PREP CODE	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sr ppm	Ti %	Tl ppm	U ppm	V ppm	W ppm	Zn ppm
RH89-180S	201 238	< 1	0.02	46	730	6	< 5	3	29	0.18	< 10	< 10	74	10	86
RH89-181S	201 238	< 1	0.02	22	1120	6	< 5	3	22	0.17	< 10	< 10	73	10	74
RH89-182S	201 238	< 1	0.02	28	2950	8	< 5	4	29	0.15	< 10	< 10	47	10	82
RH89-183S	201 238	< 1	0.02	21	430	12	< 5	4	29	0.18	< 10	< 10	53	< 10	36
RH89-184S	201 238	< 1	0.02	23	1950	14	< 5	3	30	0.17	< 10	< 10	48	10	70
RH89-185S	201 238	< 1	0.02	14	370	12	< 5	3	20	0.12	< 10	< 10	39	< 10	20
RH89-186S	201 238	< 1	0.01	14	2110	10	< 5	2	20	0.12	< 10	< 10	48	< 10	46
RH89-187S	201 238	< 1	0.02	15	990	10	< 5	2	21	0.13	< 10	< 10	40	10	16
RH89-188S	201 238	1	0.02	12	210	10	< 5	2	34	0.08	< 10	< 10	26	< 10	14
RH89-189S	201 238	< 1	0.01	9	200	2	< 5	1	17	0.15	< 10	< 10	50	< 10	2
RH89-190S	201 238	< 1	0.01	10	420	6	< 5	2	18	0.14	< 10	< 10	48	< 10	18
RH89-191S	201 238	< 1	0.01	7	690	2	< 5	1	17	0.11	< 10	< 10	36	< 10	6
RH89-192S	201 238	< 1	0.01	5	110	8	< 5	1	17	0.15	< 10	< 10	31	< 10	< 2
RH89-193S	201 238	< 1	0.03	9	150	2	< 5	3	57	0.18	< 10	< 10	49	< 10	12
RH89-194S	201 238	< 1	0.02	8	200	6	< 5	3	36	0.15	< 10	< 10	36	< 10	8
RH89-195S	201 238	1	0.04	60	1190	14	< 5	6	84	0.09	< 10	< 10	52	10	10
RH89-196S	201 238	1	0.03	19	590	6	< 5	4	58	0.18	< 10	< 10	60	10	16
RH89-197S	201 238	< 1	0.02	23	1620	12	< 5	2	21	0.17	< 10	< 10	38	< 10	46
RH89-198S	201 238	< 1	0.02	19	1110	8	< 5	2	24	0.22	< 10	< 10	46	10	34
RH89-199S	201 238	< 1	0.03	31	1040	8	< 5	5	47	0.17	< 10	< 10	56	10	78
RH89-200S	201 238	< 1	0.02	12	210	8	< 5	1	23	0.16	< 10	< 10	36	< 10	34
RH89-201S	201 238	< 1	0.02	21	1430	6	< 5	2	30	0.15	< 10	< 10	44	< 10	64
RH89-202S	201 238	< 1	0.01	15	840	10	< 5	1	22	0.17	< 10	< 10	34	< 10	42
RH89-203S	201 238	< 1	0.01	8	380	8	< 5	1	20	0.16	< 10	< 10	28	< 10	16
RH89-204S	201 238	< 1	0.02	34	1850	8	< 5	3	36	0.15	< 10	< 10	35	< 10	56
RH89-205S	201 238	< 1	0.02	30	2180	10	< 5	3	31	0.18	< 10	< 10	47	< 10	106
RH89-206S	201 238	< 1	0.02	20	1000	4	< 5	2	15	0.19	< 10	< 10	54	< 10	60
RH89-207S	201 238	< 1	0.02	12	860	< 2	< 5	5	56	0.13	< 10	< 10	62	10	14
RH89-208S	201 238	1	0.06	8	550	8	< 5	3	71	0.18	< 10	< 10	61	< 10	24
RH89-209S	201 238	< 1	0.02	24	1230	14	< 5	2	21	0.21	< 10	< 10	63	10	88
RH89-210S	201 238	< 1	0.02	29	910	12	< 5	3	18	0.23	< 10	< 10	69	< 10	114
RH89-211S	201 238	< 1	0.03	23	1370	16	< 5	4	15	0.20	< 10	< 10	44	10	106
RH89-212S	201 238	< 1	0.02	16	550	10	< 5	2	16	0.16	< 10	< 10	57	< 10	84
RH89-213S	201 238	1	0.02	22	890	14	< 5	2	14	0.18	< 10	< 10	47	< 10	92
RH89-214S	201 238	< 1	0.01	17	1600	2	< 5	1	14	0.16	< 10	< 10	52	< 10	90
RH89-215S	201 238	< 1	0.02	21	1500	8	< 5	2	16	0.20	< 10	< 10	59	< 10	84
RH89-216S	201 238	< 1	0.01	25	1150	8	< 5	2	18	0.20	< 10	< 10	52	< 10	92
RH89-217S	201 238	< 1	0.01	23	970	12	< 5	2	24	0.22	< 10	< 10	66	< 10	102
RH89-218S	201 238	< 1	0.01	26	720	8	< 5	2	19	0.25	< 10	< 10	69	< 10	72

APPENDIX 2.

PROCEDURES FOR SOIL SAMPLING, SAMPLE PREPARATION AND ANALYSIS

1. The B horizon was sampled whenever present but in its absence, C or A would be taken. In general, the first soil below A was sampled usually at depths in the range 15-20 cm. The typical B is fine sandy textured soil of red, orange, yellow or reddish brown color indicating iron accumulation. Typical C is sandy textured. Clay from till is another parent soil occasionally sampled. Humus soils consist largely of decaying grass and or wood with minor silt size material. Samples were stored in conventional large size Kraft soil envelopes They were dug with a long handled shovel. The character of the soil and aspect of the terrain were recorded. After air drying in the field, samples were shipped to Chemex Labs Ltd. in North Vancouver for geochemical determinations for gold and 32 elements ICP.

2. Sample preparation: Samples were dried and screened to -80 mesh with reject being saved.

3. Analysis for gold: A ten gram sample was put through a routine fire assay procedure inquarting with silver. The resulting silver bead after cupellation was dissolved in nitric acid and aqua regia. The resulting solution was analyzed by atomic absorption with background corrections.

4. Analysis by ICP: A 0.5 g sample of -80 mesh was digested with nitric acid and aqua regia for approximately 2 hrs. The resulting solution was diluted to 25 mill and analyzed by ICP.

APPENDIX 3

ROCK CERTIFICATES

PROCEDURES

Chemex Labs Ltd.

Analytical Chemists • Geochemists • Registered Assayers

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Project :
Comments: CC: RAGNAR U. BRUASET

Page No. : 1
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P.O. # : NONE

CERTIFICATE OF ANALYSIS A8916712

T – Trench   Rocks   APPENDIX 3

SAMPLE DESCRIPTION	PREP CODE		Au ppb FA+AA
RUB89200 R T#2	205	--	< 5
RUB89201 R T#2	205	--	< 5
RUB89202 R T#2	205	--	< 5
RUB89203 R T#2	205	--	< 5
RUB89204 R T#2	205	--	< 5
RUB89212 R T#8	205	--	< 5
RUB89213 R T#6	205	--	< 5
RUB89220 R BL (1989) near 52+20N	205	--	< 5

(Margin notes: Plate 4 for RUB89200–RUB89204; Plate 5 for RUB89220)

CERTIFICATION : [signature]

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TORONTO, ONTARIO
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A8917096

Comments: CC: R. BRUASET

CERTIFICATE A8917096

NORTHGATE EXPLORATION LIMITED
PROJECT : 763 C4
P O # : NONE

Samples submitted to our lab in Vancouver, BC.
This report was printed on 13-JUL-89.

SAMPLE PREPARATION

CHEMEX CODE	NUMBER SAMPLES	DESCRIPTION
205	5	Rock Geochem: Crush,split,ring
238	5	ICP: Aqua regia digestion

* NOTE 1:

The 32 element ICP package is suitable for trace metals in soil and rock samples. Elements for which the nitric-aqua regia digestion is possibly incomplete are: Al, Ba, Be, Ca, Cr, Ga, K, La, Mg, Na, Sr, Ti, Tl, W.

ANALYTICAL PROCEDURES

CHEMEX CODE	NUMBER SAMPLES	DESCRIPTION	METHOD	DETECTION LIMIT	UPPER LIMIT
100	5	Au ppb: Fuse 10 g sample	FA-AAS	5	10000
921	5	Al %: 32 element, soil & rock	ICP-AES	0.01	15.00
922	5	Ag ppm: 32 element, soil & rock	ICP-AES	0.2	200
923	5	As ppm: 32 element, soil & rock	ICP-AES	5	10000
924	5	Ba ppm: 32 element, soil & rock	ICP-AES	10	10000
925	5	Be ppm: 32 element, soil & rock	ICP-AES	0.5	100.0
926	5	Bi ppm: 32 element, soil & rock	ICP-AES	2	10000
927	5	Ca %: 32 element, soil & rock	ICP-AES	0.01	15.00
928	5	Cd ppm: 32 element, soil & rock	ICP-AES	0.5	100.0
929	5	Co ppm: 32 element, soil & rock	ICP-AES	1	10000
930	5	Cr ppm: 32 element, soil & rock	ICP-AES	1	10000
931	5	Cu ppm: 32 element, soil & rock	ICP-AES	1	10000
932	5	Fe %: 32 element, soil & rock	ICP-AES	0.01	15.00
933	5	Ga ppm: 32 element, soil & rock	ICP-AES	10	10000
951	5	Hg ppm: 32 element, soil & rock	ICP-AES	1	10000
934	5	K %: 32 element, soil & rock	ICP-AES	0.01	10.00
935	5	La ppm: 32 element, soil & rock	ICP-AES	10	10000
936	5	Mg %: 32 element, soil & rock	ICP-AES	0.01	15.00
937	5	Mn ppm: 32 element, soil & rock	ICP-AES	5	10000
938	5	Mo ppm: 32 element, soil & rock	ICP-AES	1	10000
939	5	Na %: 32 element, soil & rock	ICP-AES	0.01	5.00
940	5	Ni ppm: 32 element, soil & rock	ICP-AES	1	10000
941	5	P ppm: 32 element, soil & rock	ICP-AES	10	10000
942	5	Pb ppm: 32 element, soil & rock	ICP-AES	2	10000
943	5	Sb ppm: 32 element, soil & rock	ICP-AES	5	10000
958	5	Sc ppm: 32 elements, soil & rock	ICP-AES	1	100000
944	5	Sr ppm: 32 element, soil & rock	ICP-AES	1	10000
945	5	Ti %: 32 element, soil & rock	ICP-AES	0.01	5.00
946	5	Tl ppm: 32 element, soil & rock	ICP-AES	10	10000
947	5	U ppm: 32 element, soil & rock	ICP-AES	10	10000
948	5	V ppm: 32 element, soil & rock	ICP-AES	1	10000
949	5	W ppm: 32 element, soil & rock	ICP-AES	10	10000
950	5	Zn ppm: 32 element, soil & rock	ICP-AES	2	10000

Chemex Labs Ltd.
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To : NORTHGATE EXPLORATION LIMITED
P.O. BOX 143, 1 FIRST CANADIAN PLACE
TORONTO, ONTARIO
M5X 1C7
Project : 763 C4
Comments: CC: R. BRUASET

Date : 07-JUN-89
Invoice # : I-8917096
P.O. # : NONE

CERTIFICATE OF ANALYSIS A8917096

P = Plate   Rocks   APPENDIX 3

SAMPLE DESCRIPTION	PREP CODE		Au ppb FA+AA	Al %	Ag ppm	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	Ga ppm	Hg ppm	K %	La ppm	Mg %	Mn ppm
Tulleric Cr. P 6 → RUB89-241R	205	238	15	2.61	0.2	15	380	< 0.5	2	2.04	< 0.5	16	72	50	4.64	10	3	1.15	< 10	1.65	1105
RUB89-242R	205	238	10	1.53	< 0.2	20	90	0.5	< 2	2.76	< 0.5	11	77	110	2.96	< 10	1	0.39	< 10	0.90	635
MASSEY HILL → RUB89-254R	205	238	15	2.32	0.4	15	450	< 0.5	2	2.35	< 0.5	27	226	156	3.10	10	< 1	1.30	< 10	2.29	580
1.7 Km N. of MASSEY HILL { RUB89-294R	205	238	15	1.83	0.2	5	240	< 0.5	4	1.89	< 0.5	15	58	49	2.95	10	< 1	0.64	< 10	1.14	520
RUB89-295R	205	238	40	1.07	0.2	130	70	0.5	4	6.01	< 0.5	20	59	71	4.12	< 10	1	0.34	< 10	1.57	915

CERTIFICATION : B. Cargh[illegible]

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Date : 07-JUN-89
Invoice # : I-8917096
P.O. # : NONE

CERTIFICATE OF ANALYSIS A8917096

SAMPLE DESCRIPTION	PREP CODE		Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sr ppm	Ti %	Tl ppm	U ppm	V ppm	W ppm	Zn ppm
RUB89-241R	205	238	< 1	0.06	7	1090	6	< 5	7	57	0.30	< 10	< 10	99	< 10	54
RUB89-242R	205	238	6	0.06	11	1000	< 2	5	11	49	0.05	< 10	< 10	62	< 10	12
RUB89-254R	205	238	< 1	0.03	55	2290	2	< 5	5	76	0.20	< 10	< 10	86	< 10	20
RUB89-294R	205	238	2	0.16	16	1220	2	< 5	9	54	0.28	< 10	< 10	110	< 10	34
RUB89-295R	205	238	2	0.05	18	690	2	5	18	218	0.06	< 10	< 10	67	< 10	70

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A8917095

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CERTIFICATE A8917095

NORTHGATE EXPLORATION LIMITED
PROJECT : 763 C4
P.O. # : NONE

Samples submitted to our lab in Vancouver, BC.
This report was printed on 13-JUL-89.

SAMPLE PREPARATION

CHEMEX CODE	NUMBER SAMPLES	DESCRIPTION
255	7	RUSH Rock Geo:crush,split,ring

ANALYTICAL PROCEDURES

CHEMEX CODE	NUMBER SAMPLES	DESCRIPTION	METHOD	DETECTION LIMIT	UPPER LIMIT
101	7	Au ppb: Fuse 10 g sample	FA-NAA	1	10000

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Project : 763 C4
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CERTIFICATE OF ANALYSIS A8917095

T #1 = Trench #1   Rocks   APPENDIX 3

PLATE #4

SAMPLE DESCRIPTION	PREP CODE		Au NAA ppb
RUB89-320R T#1	255	--	5
RUB89-321R	255	--	3
RUB89-322R	255	--	4
RUB89-323R	255	--	4
RUB89-324R	255	--	77
RUB89-325R	255	--	4
RUB89-326R	255	--	3

CERTIFICATION : [signature]

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NORTHGATE EXPLORATION LIMITED
PROJECT :
P.O. # : NONE

Samples submitted to our lab in Vancouver, BC.
This report was printed on 13-JUL-89.

SAMPLE PREPARATION

CHEMEX CODE	NUMBER SAMPLES	DESCRIPTION
205	12	Rock Geochem: Crush,split,ring
238	12	ICP: Aqua regia digestion

* NOTE 1:

The 32 element ICP package is suitable for trace metals in soil and rock samples. Elements for which the nitric-aqua regia digestion is possibly incomplete are: Al, Ba, Be, Ca, Cr, Ga, K, La, Mg, Na, Sr, Ti, Tl, W.

ANALYTICAL PROCEDURES

CHEMEX CODE	NUMBER SAMPLES	DESCRIPTION	METHOD	DETECTION LIMIT	UPPER LIMIT
101	12	Au ppb: Fuse 10 g sample	FA-NAA	1	10000
921	12	Al %: 32 element, soil & rock	ICP-AES	0.01	15.00
922	12	Ag ppm: 32 element, soil & rock	ICP-AES	0.2	200
923	12	As ppm: 32 element, soil & rock	ICP-AES	5	10000
924	12	Ba ppm: 32 element, soil & rock	ICP-AES	10	10000
925	12	Be ppm: 32 element, soil & rock	ICP-AES	0.5	100.0
926	12	Bi ppm: 32 element, soil & rock	ICP-AES	2	10000
927	12	Ca %: 32 element, soil & rock	ICP-AES	0.01	15.00
928	12	Cd ppm: 32 element, soil & rock	ICP-AES	0.5	100.0
929	12	Co ppm: 32 element, soil & rock	ICP-AES	1	10000
930	12	Cr ppm: 32 element, soil & rock	ICP-AES	1	10000
931	12	Cu ppm: 32 element, soil & rock	ICP-AES	1	10000
932	12	Fe %: 32 element, soil & rock	ICP-AES	0.01	15.00
933	12	Ga ppm: 32 element, soil & rock	ICP-AES	10	10000
951	12	Hg ppm: 32 element, soil & rock	ICP-AES	1	10000
934	12	K %: 32 element, soil & rock	ICP-AES	0.01	10.00
935	12	La ppm: 32 element, soil & rock	ICP-AES	10	10000
936	12	Mg %: 32 element, soil & rock	ICP-AES	0.01	15.00
937	12	Mn ppm: 32 element, soil & rock	ICP-AES	5	10000
938	12	Mo ppm: 32 element, soil & rock	ICP-AES	1	10000
939	12	Na %: 32 element, soil & rock	ICP-AES	0.01	5.00
940	12	Ni ppm: 32 element, soil & rock	ICP-AES	1	10000
941	12	P ppm: 32 element, soil & rock	ICP-AES	10	10000
942	12	Pb ppm: 32 element, soil & rock	ICP-AES	2	10000
943	12	Sb ppm: 32 element, soil & rock	ICP-AES	5	10000
958	12	Sc ppm: 32 elements, soil & rock	ICP-AES	1	100000
944	12	Sr ppm: 32 element, soil & rock	ICP-AES	1	10000
945	12	Ti %: 32 element, soil & rock	ICP-AES	0.01	5.00
946	12	Tl ppm: 32 element, soil & rock	ICP-AES	10	10000
947	12	U ppm: 32 element, soil & rock	ICP-AES	10	10000
948	12	V ppm: 32 element, soil & rock	ICP-AES	1	10000
949	12	W ppm: 32 element, soil & rock	ICP-AES	10	10000
950	12	Zn ppm: 32 element, soil & rock	ICP-AES	2	10000

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Page No. : 1-A
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Date : 18-JUN-89
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P.O. # : NONE

CERTIFICATE OF ANALYSIS A8917859

Rocks APPENDIX 3

Trench #1 Extension "B"

SAMPLE DESCRIPTION	PREP CODE		Au NAA ppb	Al %	Ag ppm	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	Ga ppm	Hg ppm	K %	La ppm	Mg %	Mn ppm
RUB89400 R	205	238	< 1	0.41	< 0.2	5	50	< 0.5	< 2	0.06	< 0.5	1	81	9	0.75	< 10	< 1	0.18	< 10	0.07	115
RUB89401 R	205	238	< 1	0.82	< 0.2	5	90	< 0.5	< 2	0.12	< 0.5	6	83	21	1.58	< 10	< 1	0.20	< 10	0.23	200
RUB89402 R	205	238	< 1	0.54	< 0.2	< 5	70	< 0.5	< 2	0.09	< 0.5	1	98	6	0.77	< 10	2	0.11	< 10	0.10	70
RUB89403 R	205	238	< 1	0.59	< 0.2	< 5	60	< 0.5	< 2	0.09	< 0.5	1	89	6	1.13	< 10	2	0.11	< 10	0.12	85
RUB89404 R	205	238	< 1	0.56	< 0.2	< 5	60	< 0.5	< 2	0.08	< 0.5	2	83	9	0.93	< 10	< 1	0.08	< 10	0.12	95
RUB89405 R	205	238	< 1	0.53	< 0.2	10	70	< 0.5	< 2	0.08	< 0.5	3	89	7	1.25	< 10	< 1	0.08	< 10	0.14	135
RUB89406 R	205	238	1	0.47	< 0.2	< 5	70	< 0.5	< 2	0.07	< 0.5	1	90	5	0.90	< 10	1	0.07	< 10	0.08	70
RUB89407 R	205	238	< 1	0.52	< 0.2	5	90	< 0.5	< 2	0.06	< 0.5	1	91	1	0.61	< 10	1	0.22	< 10	0.05	30
RUB89408 R	205	238	< 1	0.53	< 0.2	10	60	< 0.5	< 2	0.06	< 0.5	< 1	98	1	0.68	< 10	< 1	0.21	< 10	0.05	35
RUB89409 R	205	238	92	0.40	< 0.2	< 5	80	< 0.5	< 2	0.05	< 0.5	< 1	108	1	0.77	< 10	< 1	0.21	< 10	0.04	30
RUB89410 R	205	238	< 1	0.38	< 0.2	5	110	< 0.5	< 2	0.05	< 0.5	< 1	87	2	0.77	< 10	< 1	0.21	< 10	0.04	45
RUB89411 R	205	238	2	0.34	1.2	5	70	< 0.5	< 2	0.02	< 0.5	< 1	83	3	0.31	< 10	< 1	0.24	< 10	0.02	35

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Page No. : 1-B
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Date : 18-JUN-89
Invoice # : I-8917859
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CERTIFICATE OF ANALYSIS A8917859

SAMPLE DESCRIPTION	PREP CODE		Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sr ppm	Ti %	Tl ppm	U ppm	V ppm	W ppm	Zn ppm
RUB89400 R	205	238	29	0.03	4	130	4	< 5	< 1	37	< 0.01	< 10	< 10	18	< 10	46
RUB89401 R	205	238	3	0.04	8	310	< 2	< 5	1	23	< 0.01	< 10	< 10	27	< 10	46
RUB89402 R	205	238	7	0.06	4	120	< 2	< 5	< 1	37	< 0.01	< 10	< 10	15	< 10	24
RUB89403 R	205	238	3	0.06	5	200	< 2	< 5	< 1	25	< 0.01	< 10	< 10	17	< 10	28
RUB89404 R	205	238	12	0.06	5	170	< 2	< 5	< 1	32	< 0.01	< 10	< 10	18	< 10	22
RUB89405 R	205	238	15	0.06	4	230	< 2	< 5	< 1	28	< 0.01	< 10	< 10	19	< 10	26
RUB89406 R	205	238	16	0.06	5	160	2	< 5	< 1	35	< 0.01	< 10	< 10	13	< 10	22
RUB89407 R	205	238	6	0.05	4	110	2	< 5	< 1	36	< 0.01	< 10	< 10	8	< 10	8
RUB89408 R	205	238	14	0.04	3	90	2	< 5	< 1	31	< 0.01	< 10	< 10	9	< 10	8
RUB89409 R	205	238	20	0.05	4	140	8	< 5	< 1	54	< 0.01	< 10	< 10	11	< 10	6
RUB89410 R	205	238	32	0.05	2	120	6	< 5	< 1	53	< 0.01	< 10	< 10	10	< 10	6
RUB89411 R	205	238	21	0.01	2	20	2	< 5	< 1	23	< 0.01	< 10	< 10	10	< 10	2

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A8917967

Comments: CC: R.U. BRUASET

CERTIFICATE A8917967

NORTHGATE EXPLORATION LIMITED
PROJECT :
P.O. # : NONE

Samples submitted to our lab in Vancouver, BC.
This report was printed on 13-JUL-89.

SAMPLE PREPARATION

CHEMEX CODE	NUMBER SAMPLES	DESCRIPTION
205	14	Rock Geochem: Crush,split,ring
238	14	ICP: Aqua regia digestion

* NOTE 1:

The 32 element ICP package is suitable for trace metals in soil and rock samples. Elements for which the nitric-aqua regia digestion is possibly incomplete are: Al, Ba, Be, Ca, Cr, Ga, K, La, Mg, Na, Sr, Ti, Tl, W.

ANALYTICAL PROCEDURES

CHEMEX CODE	NUMBER SAMPLES	DESCRIPTION	METHOD	DETECTION LIMIT	UPPER LIMIT
993	14	Au ppb: Fuse 30 g sample	FA-NAA	1	10000
921	14	Al %: 32 element, soil & rock	ICP-AES	0.01	15.00
922	14	Ag ppm: 32 element, soil & rock	ICP-AES	0.2	200
923	14	As ppm: 32 element, soil & rock	ICP-AES	5	10000
924	14	Ba ppm: 32 element, soil & rock	ICP-AES	10	10000
925	14	Be ppm: 32 element, soil & rock	ICP-AES	0.5	100.0
926	14	Bi ppm: 32 element, soil & rock	ICP-AES	2	10000
927	14	Ca %: 32 element, soil & rock	ICP-AES	0.01	15.00
928	14	Cd ppm: 32 element, soil & rock	ICP-AES	0.5	100.0
929	14	Co ppm: 32 element, soil & rock	ICP-AES	1	10000
930	14	Cr ppm: 32 element, soil & rock	ICP-AES	1	10000
931	14	Cu ppm: 32 element, soil & rock	ICP-AES	1	10000
932	14	Fe %: 32 element, soil & rock	ICP-AES	0.01	15.00
933	14	Ga ppm: 32 element, soil & rock	ICP-AES	10	10000
951	14	Hg ppm: 32 element, soil & rock	ICP-AES	1	10000
934	14	K %: 32 element, soil & rock	ICP-AES	0.01	10.00
935	14	La ppm: 32 element, soil & rock	ICP-AES	10	10000
936	14	Mg %: 32 element, soil & rock	ICP-AES	0.01	15.00
937	14	Mn ppm: 32 element, soil & rock	ICP-AES	5	10000
938	14	Mo ppm: 32 element, soil & rock	ICP-AES	1	10000
939	14	Na %: 32 element, soil & rock	ICP-AES	0.01	5.00
940	14	Ni ppm: 32 element, soil & rock	ICP-AES	1	10000
941	14	P ppm: 32 element, soil & rock	ICP-AES	10	10000
942	14	Pb ppm: 32 element, soil & rock	ICP-AES	2	10000
943	14	Sb ppm: 32 element, soil & rock	ICP-AES	5	10000
958	14	Sc ppm: 32 elements, soil & rock	ICP-AES	1	100000
944	14	Sr ppm: 32 element, soil & rock	ICP-AES	1	10000
945	14	Ti %: 32 element, soil & rock	ICP-AES	0.01	5.00
946	14	Tl ppm: 32 element, soil & rock	ICP-AES	10	10000
947	14	U ppm: 32 element, soil & rock	ICP-AES	10	10000
948	14	V ppm: 32 element, soil & rock	ICP-AES	1	10000
949	14	W ppm: 32 element, soil & rock	ICP-AES	10	10000
950	14	Zn ppm: 32 element, soil & rock	ICP-AES	2	10000

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Date : 26-JUN-89
Invoice # : I-8917967
P.O. # : NONE

CERTIFICATE OF ANALYSIS A8917967

Rocks

APPENDIX 3

SAMPLE DESCRIPTION	PREP CODE		Au NAA ppb	Al %	Ag ppm	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	Ga ppm	Hg ppm	K %	La ppm	Mg %	Mn ppm
RUB-89 437R	205	238	3	0.32	0.2	5	70	< 0.5	< 2	0.06	< 0.5	1	74	4	0.49	< 10	< 1	0.23	10	0.04	45
RUB-89 440R	205	238	1	0.22	0.2	5	40	< 0.5	< 2	0.05	< 0.5	< 1	72	5	0.49	< 10	< 1	0.08	< 10	0.02	40
RUB-89 450R	205	238	2	0.17	0.2	< 5	40	< 0.5	< 2	0.03	< 0.5	< 1	102	4	0.40	< 10	< 1	0.14	< 10	< 0.01	20
RUB-89 451R	205	238	1	0.22	0.2	< 5	40	< 0.5	< 2	0.02	< 0.5	< 1	158	2	0.43	< 10	1	0.18	< 10	< 0.01	20
RUB-89 452R	205	238	1	0.20	0.2	< 5	40	< 0.5	< 2	0.02	< 0.5	< 1	106	3	0.36	< 10	1	0.15	< 10	< 0.01	20
RUB-89 454R	205	238	3	0.15	0.6	< 5	60	< 0.5	< 2	0.02	< 0.5	< 1	97	2	0.34	< 10	< 1	0.11	< 10	0.01	30
RUB-89 455R	205	238	2	0.24	< 0.2	5	100	< 0.5	< 2	0.05	< 0.5	< 1	129	2	0.56	< 10	< 1	0.13	< 10	0.02	20
RUB-89 456R	205	238	2	0.22	0.4	< 5	130	< 0.5	< 2	0.04	< 0.5	< 1	139	2	0.76	< 10	1	0.10	< 10	0.02	15
RUB-89 460R	205	238	3	0.18	0.4	10	70	< 0.5	< 2	0.03	< 0.5	1	147	18	0.77	< 10	1	0.07	10	0.02	20
RUB-89 461R	205	238	18	0.26	0.4	10	160	< 0.5	< 2	0.06	< 0.5	1	173	33	1.11	< 10	< 1	0.09	20	0.05	25
RUB-89 462R	205	238	2	0.15	< 0.2	5	70	< 0.5	< 2	0.04	< 0.5	< 1	132	4	0.50	< 10	2	0.04	< 10	0.02	35
RUB-89 463R	205	238	10	0.32	0.6	25	100	< 0.5	< 2	0.08	< 0.5	6	108	108	1.87	< 10	< 1	0.08	50	0.08	25
RUB-89 464R	205	238	2	0.23	< 0.2	15	100	< 0.5	< 2	0.05	< 0.5	< 1	126	4	0.80	< 10	< 1	0.13	< 10	0.02	25
RUB-89 469R	205	238	2	0.20	0.2	< 5	100	< 0.5	< 2	0.05	< 0.5	< 1	127	3	0.68	< 10	< 1	0.09	< 10	0.02	20

B. Cardi

Chemex Labs Ltd.
Analytical Chemists • Geochemists • Registered Assayers
450 MATHESON BLVD. E., UNIT 54, MISSISSAUGA,
ONTARIO, CANADA L4Z-1R5
PHONE (416) 890-0310

To : NORTHGATE EXPLORATION LIMITED

P.O. BOX 143, 1 FIRST CANADIAN PLACE
TORONTO, ONTARIO
M5X 1C7

Project :
Comments: CC: R U. BRUASET

Date : 26-JUN-89
Invoice # : I-8917967
P.O. # : NONE

CERTIFICATE OF ANALYSIS A8917967

SAMPLE DESCRIPTION	PREP CODE		Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	Sb ppm	Sc ppm	Sr ppm	Ti %	Tl ppm	U ppm	V ppm	W ppm	Zn ppm
RUB-89 437R	205	238	9	0.05	3	40	12	< 5	< 1	23	< 0.01	< 10	< 10	3	< 10	4
RUB-89 440R	205	238	21	0.06	3	40	8	< 5	< 1	18	< 0.01	< 10	< 10	4	< 10	2
RUB-89 450R	205	238	23	0.02	2	20	6	< 5	< 1	14	< 0.01	< 10	< 10	1	< 10	< 2
RUB-89 451R	205	238	20	0.03	2	20	8	< 5	< 1	15	< 0.01	< 10	< 10	1	< 10	< 2
RUB-89 452R	205	238	20	0.03	1	20	8	< 5	< 1	14	< 0.01	< 10	< 10	1	< 10	< 2
RUB-89 454R	205	238	95	0.01	1	30	8	< 5	< 1	25	< 0.01	< 10	< 10	< 1	< 10	< 2
RUB-89 455R	205	238	7	0.06	2	80	2	< 5	< 1	38	< 0.01	< 10	< 10	2	< 10	< 2
RUB-89 456R	205	238	15	0.06	2	170	2	< 5	< 1	60	< 0.01	< 10	< 10	2	< 10	< 2
RUB-89 460R	205	238	37	0.04	4	250	6	< 5	< 1	45	< 0.01	< 10	< 10	5	< 10	< 2
RUB-89 461R	205	238	25	0.05	5	530	4	< 5	< 1	78	< 0.01	< 10	< 10	11	< 10	< 2
RUB-89 462R	205	238	28	0.03	2	80	4	< 5	< 1	29	< 0.01	< 10	< 10	6	< 10	< 2
RUB-89 463R	205	238	25	0.02	12	1220	6	< 5	1	86	< 0.01	< 10	< 10	15	< 10	10
RUB-89 464R	205	238	14	0.07	2	150	4	< 5	< 1	51	< 0.01	< 10	< 10	6	< 10	< 2
RUB-89 469R	205	238	9	0.06	2	140	6	< 5	< 1	45	< 0.01	< 10	< 10	7	< 10	< 2

B. Cargill

Chemex Labs Ltd.
Analytical Chemists • Geochemists • Registered Assayers
450 MATHESON BLVD. E., UNIT 54, MISSISSAUGA, ONTARIO, CANADA L4Z-1R5
PHONE (416) 890-0310

To: NORTHGATE EXPLORATION LIMITED

P.O. BOX 143, 1 FIRST CANADIAN PLACE
TORONTO, ONTARIO
M5X 1C7

A8919076

Comments: CC: R. BRUASET

CERTIFICATE A8919076

NORTHGATE EXPLORATION LIMITED
PROJECT :
P.O. # : NONE

Samples submitted to our lab in Vancouver, BC.
This report was printed on 13-JUL-89.

SAMPLE PREPARATION

CHEMEX CODE	NUMBER SAMPLES	DESCRIPTION
205	24	Rock Geochem: Crush,split,ring

ANALYTICAL PROCEDURES

CHEMEX CODE	NUMBER SAMPLES	DESCRIPTION	METHOD	DETECTION LIMIT	UPPER LIMIT
983	24	Au ppb: Fuse 30 g sample	FA-AAS	5	10000

APPENDIX 3

Chemex Labs Ltd.
Analytical Chemists • Geochemists • Registered Assayers
450 MATHESON BLVD., E., UNIT 54, MISSISSAUGA,
ONTARIO, CANADA L4Z-1R5
PHONE (416) 890-0310

To : NORTHGATE EXPLORATION LIMITED
P.O. BOX 143, 1 FIRST CANADIAN PLACE
TORONTO, ONTARIO
M5X 1C7
Project :
Comments: CC: R BRUASET

Date : 29-JUN-89
Invoice # : I-8919076
P.O. # : NONE

CERTIFICATE OF ANALYSIS A8919076

Rocks

	SAMPLE DESCRIPTION	PREP CODE		Au ppb FA+AA
Trench #13	RUB89501R	205	--	< 5
	RUB89506R	205	--	< 5
	RUB89508R	205	--	< 5
	RUB89509R	205	--	5
Trench 9	RUB89512R	205	--	< 5
Trench #1	RUB89600R	205	--	115
	RUB89601R	205	--	385
	RUB89602R	205	--	< 5
	RUB89603R	205	--	< 5
	RUB89604R	205	--	20
	RUB89605R	205	--	< 5
	RUB89606R	205	--	< 5
Trench #1 Extension "A"	RUB89607R	205	--	< 5
	RUB89608R	205	--	15
	RUB89609R	205	--	20
	RUB89610R	205	--	5
Trench #2	RUB89800R	205	--	15
	RUB89801R	205	--	< 5
	RUB89802R	205	--	< 5
	RUB89803R	205	--	< 5
	RUB89804R	205	--	< 5
	RUB89805R	205	--	< 5
	RUB89806R	205	--	< 5
	RUB89807R	205	--	< 5

Hugh Vonk

APPENDIX 3

PROCEDURES FOR ROCK GEOCHEMICAL PREPARATION AND ANALYSIS

1. Rock chip samples underwent primary and secondary crushing to 1/8 ". The sample was then riffle split and approximately 150 g was pulverized to -100 mesh.

2. Samples were analyzed variously for gold by fire assay and A.A. with 5 ppb detection limit, and occasionally by fire assay-NAA with 1 ppb detection limit and occasionally by 32 element-ICP using the same procedure as for soil (APPENDIX 2).

APPENDIX 4

BARK CERTIFICATES

PROCEDURES

Bondar-Clegg & Company Ltd.
5420 Canotek Road
Ottawa, Ontario
K1J 8X5
(613) 749-2220 Telex 053-3233

BONDAR-CLEGG

APPENDIX 4

Geochemical Lab Report

REPORT: 089-51270.0 (PARTIAL)

REFERENCE INFO:

CLIENT: BRUASET & ASSOCIATES
PROJECT: NONE

SUBMITTED BY: R. BRUASET
DATE PRINTED: 29-MAY-89

ORDER	ELEMENT		NUMBER OF ANALYSES	LOWER DETECTION LIMIT	EXTRACTION	METHOD
1	Au	Gold	19	0.1 PPB		Neutron Activation

RESULTS TO FOLLOW FOR: Ag As Ba Br Cd Ce Co Cr Fe Ir La Mo Na Ni Rb Sb Sc Se Sn
Ta Th U W Zn RASAWT

SAMPLE TYPES	NUMBER	SIZE FRACTIONS	NUMBER	SAMPLE PREPARATIONS	NUMBER
OTHER	19	-10	19	Weighing	19
				Milling	19

REPORT COPIES TO: R. BRUASET

INVOICE TO: R. BRUASET

Bondar-Clegg & Company Ltd.
5420 Canotek Road
Ottawa, Ontario
K1J 8X5
(613) 749-2220 Telex 053-3233

BONDAR-CLEGG

Geochemical Lab Report

REPORT: 089-51270.0

PROJECT: NONE

SAMPLE NUMBER	ELEMENT UNITS	Au PPB
RB-89-01B		<0.1
RB-89-02B		0.5
RB-89-03B		<0.1
RB-89-04B		<0.1
RB-89-05B		<0.1
RB-89-06B		<0.1
RB-89-07B		1.4
RB-89-08B		2.5
RB-89-09B		1.4
RB-89-10B		4.9
RB-89-11B		<0.1
RB-89-12B		<0.1
RB-89-13B		<0.1
RB-89-14B		<0.1
RB-89-15B		0.3
RH-89-01B.N		<0.1
RH-89-03B.N		<0.1
RH-89-05B.N		<0.1
RH-89-07B.N		<0.1

Bondar-Clegg & Company Ltd.
5420 Canotek Road
Ottawa, Ontario
K1J 8X5
(613) 749-2220 Telex 053-3233

BONDAR-CLEGG

Geochemical Lab Report

REPORT: 089-51270.0 (COMPLETE)

REFERENCE INFO:

CLIENT: BRUASET & ASSOCIATES
PROJECT: NONE

SUBMITTED BY: R. BRUASET
DATE PRINTED: 29-MAY-89

ORDER		ELEMENT	NUMBER OF ANALYSES	LOWER DETECTION LIMIT	EXTRACTION	METHOD
1	Sc	Scandium	19	0.05 PPM		Neutron Activation
2	Fe	Iron	19	100 PPM		Neutron Activation
3	Sm	Samarium	19	0.02 PPM		Neutron Activation
4	Na	Sodium	19	100 PPM		Neutron Activation
5	Ce	Cerium	19	0.2 PPM		Neutron Activation
6	Rb	Rubidium	19	1 PPM		Neutron Activation
7	La	Lanthanum	19	0.2 PPM		Neutron Activation
8	Cr	Chromium	19	1 PPM		Neutron Activation
9	Co	Cobalt	19	1 PPM		Neutron Activation
10	Ni	Nickel	19	5 PPM		Neutron Activation
11	Zn	Zinc	19	5 PPM		Neutron Activation
12	As	Arsenic	19	0.1 PPM		Neutron Activation
13	Se	Selenium	19	1 PPM		Neutron Activation
14	Br	Bromine	19	0.2 PPM		Neutron Activation
15	Mo	Molybdenum	19	0.1 PPM		Neutron Activation
16	Ag	Silver	19	1 PPM		Neutron Activation
17	Cd	Cadmium	19	1 PPM		Neutron Activation
18	Sb	Antimony	19	0.02 PPM		Neutron Activation
19	Ba	Barium	19	10 PPM		Neutron Activation
20	Ta	Tantalum	19	0.1 PPM		Neutron Activation
21	W	Tungsten	19	0.1 PPM		Neutron Activation
22	Ir	Iridium	19	5 PPB		Neutron Activation
23	Au	Gold	19	0.1 PPB		Neutron Activation
24	Th	Thorium	19	0.1 PPM		Neutron Activation
25	U	Uranium	19	0.05 PPM		Neutron Activation
26	RASAWT	Raw Sample Weight	19	g		

Bondar-Clegg & Company Ltd.
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Ottawa, Ontario
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BONDAR-CLEGG

Geochemical Lab Report

REPORT: 089-51270.0

PROJECT: NONE PAGE 1A

SAMPLE NUMBER	ELEMENT UNITS	Sc PPM	Fe PPM	Sm PPM	Na PPM	Ce PPM	Rb PPM	La PPM	Cr PPM	Co PPM	Ni PPM	Zn PPM
RB-89-01B		<0.05	130	<0.02	<100	<0.6	<1	<0.2	2	<1	<5	36
RB-89-02B		<0.05	<100	<0.02	<100	<0.6	2	<0.2	<1	<1	<5	75
RB-89-03B		0.10	230	0.02	110	<0.6	<1	<0.2	<1	<1	<5	35
RB-89-04B		0.10	<100	0.03	130	<0.6	<1	<0.2	<1	<1	<5	33
RB-89-05B		0.09	140	0.02	170	<0.6	1	<0.2	2	<1	<5	35
RB-89-06B		0.11	350	0.03	210	<0.6	<1	<0.2	1	<1	<5	12
RB-89-07B		0.07	180	<0.02	170	<0.5	<1	<0.2	<1	<1	<5	13
RB-89-08B		0.12	430	0.03	370	0.6	<1	<0.2	2	<1	<5	17
RB-89-09B		0.09	290	0.02	200	<0.5	<1	<0.2	<1	<1	<5	32
RB-89-10B		0.11	340	0.03	210	<0.6	<1	0.2	2	<1	<5	57
RB-89-11B		<0.05	<100	<0.02	<100	<0.6	<1	<0.2	<1	<1	<5	20
RB-89-12B		0.06	150	<0.02	<100	<0.5	<1	<0.2	<1	<1	<5	33
RB-89-13B		0.07	180	<0.02	<100	<0.6	<1	<0.2	<1	<1	<5	44
RB-89-14B		<0.05	230	<0.02	<100	<0.5	<1	<0.2	2	<1	<5	32
RB-89-15B		0.07	200	<0.02	<100	<0.6	<1	<0.2	<1	<1	<5	26
RH-89-01B.N		<0.05	<100	<0.02	<100	<0.5	<1	<0.2	<1	<1	<5	11
RH-89-03B.N		<0.05	100	<0.02	<100	0.7	<1	<0.2	<1	<1	<5	<10
RH-89-05B.N		<0.05	<100	<0.02	<100	<0.4	<1	<0.2	<1	<1	<5	10
RH-89-07B.N		<0.05	120	<0.02	<100	<0.5	<1	<0.2	<1	<1	<5	11

Bondar-Clegg & Company Ltd.
5420 Canotek Road
Ottawa, Ontario
K1J 8X5
(613) 749-2220 Telex 053-3233

BONDAR-CLEGG

Geochemical Lab Report

REPORT: 089-51270.0

PROJECT: NONE

SAMPLE NUMBER	ELEMENT UNITS	As PPM	Se PPM	Br PPM	Mo PPM	Ag PPM	Cd PPM	Sb PPM	Ba PPM	Ta PPM	W PPM	Ir PPB
RB-89-01B		<0.1	<1	2.0	0.1	<1	<1	<0.02	11	<0.1	<0.1	<5
RB-89-02B		<0.1	<1	1.8	<0.1	<1	<1	<0.02	88	<0.1	<0.1	<5
RB-89-03B		<0.1	<1	3.6	<0.1	<1	<1	0.04	31	<0.1	<0.1	<5
RB-89-04B		0.1	<1	3.8	<0.1	<1	<1	0.03	34	<0.1	<0.1	<5
RB-89-05B		<0.1	<1	2.8	0.2	<1	<1	0.02	25	<0.1	<0.1	<5
RB-89-06B		0.4	<1	1.8	0.2	<1	<1	0.02	72	<0.1	<0.1	<5
RB-89-07B		<0.1	<1	1.7	<0.1	<1	<1	<0.02	15	<0.1	<0.1	<5
RB-89-08B		0.1	<1	2.9	0.1	<1	<1	0.02	29	<0.1	<0.1	<5
RB-89-09B		<0.1	<1	1.0	0.2	<1	<1	<0.02	24	<0.1	<0.1	<5
RB-89-10B		<0.1	<1	2.6	0.2	<1	<1	0.03	50	<0.1	<0.1	<5
RB-89-11B		<0.1	<1	2.4	<0.1	<1	<1	<0.02	17	<0.1	<0.1	<5
RB-89-12B		<0.1	<1	2.0	0.2	<1	<1	<0.02	18	<0.1	<0.1	<5
RB-89-13B		<0.1	<1	2.3	0.2	<1	<1	<0.02	18	<0.1	<0.1	<5
RB-89-14B		<0.1	<1	2.2	0.1	<1	<1	0.02	18	<0.1	<0.1	<5
RB-89-15B		<0.1	<1	2.8	0.2	<1	<1	0.03	22	<0.1	<0.1	<5
RH-89-01B.N		0.2	<1	0.5	0.2	<1	<1	<0.02	55	<0.1	<0.1	<5
RH-89-03B.N		<0.1	<1	0.5	0.2	<1	<1	<0.02	19	<0.1	<0.1	<5
RH-89-05B.N		0.1	<1	0.4	0.1	<1	<1	0.02	31	<0.1	<0.1	<5
RH-89-07B.N		<0.1	<1	0.8	0.1	<1	<1	0.03	24	<0.1	<0.1	<5

Bondar-Clegg & Company Ltd.
5420 Canotek Road
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K1J 8X5
(6'`` 749-2220 Telex 053-3233

BONDAR-CLEGG

Geochemical Lab Report

REPORT: 089-51270.0

PROJECT: NONE

SAMPLE NUMBER	ELEMENT UNITS	Au PPB	Th PPM	U PPM	RASAWT g
RB-89-01B		<0.1	<0.1	<0.05	110.9
RB-89-02B		0.5	<0.1	<0.05	148.4
RB-89-03B		<0.1	<0.1	<0.05	74.7
RB-89-04B		<0.1	<0.1	<0.05	96.7
RB-89-05B		<0.1	<0.1	<0.05	130.3
RB-89-06B		<0.1	<0.1	<0.05	79.2
RB-89-07B		1.4	<0.1	<0.05	50.3
RB-89-08B		2.5	<0.1	<0.05	34.3
RB-89-09B		1.4	<0.1	<0.05	41.8
RB-89-10B		4.9	<0.1	<0.05	25.0
RB-89-11B		<0.1	<0.1	<0.05	109.2
RB-89-12B		<0.1	<0.1	<0.05	101.3
RB-89-13B		<0.1	<0.1	<0.05	97.4
RB-89-14B		<0.1	<0.1	<0.05	103.2
RB-89-15B		0.3	<0.1	<0.05	56.6
RH-89-01B.N		<0.1	<0.1	<0.05	85.7
RH-89-03B.N		<0.1	<0.1	<0.05	96.2
RH-89-05B.N		<0.1	<0.1	<0.05	82.6
RH-89-07B.N		<0.1	<0.1	<0.05	91.8

MIN • EN LABORATORIES [redacted]

SPECIALISTS IN MINERAL ENVIRONMENTS
CHEMISTS • ASSAYERS • ANALYSTS • GEOCHEMISTS

VANCOUVER OFFICE:
705 WEST 15TH STREET
NORTH VANCOUVER, B.C. CANADA V7M 1T2
TELEPHONE (604) 980-5814 OR (604) 988-4524
TELEX: VIA U.S.A. 7601067 • FAX (604) 980-9621

TIMMINS OFFICE:
33 EAST IROQUOIS ROAD
P.O. BOX 867
TIMMINS, ONTARIO CANADA P4N 7G7
TELEPHONE: (705) 264-9996

APPENDIX 4

Certificate of GEOCHEM

Company: RAGNAR U.BRUASET & ASSOC. LTD.
Project:
Attention: R.BRUASET

File: 9-221/P1
Date: APR.13/89
Type: BIOGEOCHEM

We hereby certify the following results for samples submitted.

Sample Number	AU* PPB	Sample no
H89-02BS	<20	H 89-02BS
H89-04BS	<20	H 89-04BS
H89-06BS	70	H 89-06BS
H89-08BS	75	H 89-08BS

*ASH WEIGHT BASIS

Certified by ____________

MIN-EN LABORATORIES LTD.

Biogeochemistry

DIRECT IRRADIATION/INAA

Direct Irradiation and Instrumental Neutron Activation Analysis (INAA) is an excellent method for biogeochemical analysis since there is no ashing or chemical treatment of the samples required. The entire sample can be used for additional testing if requested when submitted. Prices include pressing and shrink-wrapping a screened or macerated sample into a briquette, but do not include other sample preparation procedures shown separately below. Turnaround time is typically 8-10 days for samples prepackaged for irradiation.

GOLD + 24 — 25 Element Biogeochemical Package

	Humus		Vegetation	
Element	**Option 1 8 g Briquette**	**Option 2 8 g Briquette**	**Option 1 15 g Briquette**	**Option 2 30 g Briquette**
Gold	1 ppb	0.5 ppb	0.1 ppb	0.05 ppb
Antimony	0.1 ppm	0.05 ppm	0.02 ppm	0.01 ppm
Arsenic	0.5 ppm	0.2 ppm	0.1 ppm	0.05 ppm
Barium	50 ppm	20 ppm	10 ppm	5 ppm
Bromine	1 ppm	0.5 ppm	0.2 ppm	0.1 ppm
Cadmium	2 ppm	1 ppm	0.5 ppm	0.2 ppm
Cerium	2 ppm	1 ppm	0.2 ppm	0.1 ppm
Chromium	10 ppm	5 ppm	1 ppm	0.5 ppm
Cobalt	2 ppm	1 ppm	0.5 ppm	0.2 ppm
Iridium	20 ppb	10 ppb	5 ppb	2 ppb
Iron	0.1 %	0.05 %	100 ppm	50 ppm
Lanthanum	1 ppm	0.5 ppm	0.2 ppm	0.2 ppm
Molybdenum	0.5 ppm	0.2 ppm	0.1 ppm	0.05 ppm
Nickel	10 ppm	5 ppm	5 ppm	2 ppm
Rubidium	5 ppm	2 ppm	1 ppm	0.5 ppm
Samarium	0.05 ppm	0.02 ppm	0.02 ppm	0.01 ppm
Scandium	0.1 ppm	0.05 ppm	0.05 ppm	0.02 ppm
Selenium	5 ppm	2 ppm	1 ppm	0.5 ppm
Silver	2 ppm	1 ppm	0.5 ppm	0.2 ppm
Sodium	0.02 %	0.01 %	100 ppm	50 ppm
Tantalum	0.5 ppm	0.2 ppm	0.1 ppm	0.05 ppm
Thorium	0.5 ppm	0.2 ppm	0.1 ppm	0.05 ppm
Tungsten	1 ppm	0.5 ppm	0.1 ppm	0.05 ppm
Uranium	0.1 ppm	0.05 ppm	0.05 ppm	0.01 ppm
Zinc	50 ppm	25 ppm	5 ppm	2 ppm
Price:	**$10.75**	**$14.75**	**$12.75**	**$17.75**

SAMPLE PREPARATION FOR BIOGEOCHEMICAL SAMPLES

- — Humus: drying and sieving to -10 mesh .... $ 1.10
- — Humus: drying, and milling to -150 mesh .... $ 2.15
- — Vegetation: Washing, drying, macerating and blending .... $ 5.50
- — Vegetation: as above, plus ash 30 g .... $ 7.00
- — Vegetation: as above, plus ash 150 g $12.00
- — Vegetation: wet ashing (50 g or less) .... $ 6.25

Surcharges may apply to macerating very hard plant materials, consult laboratory. Special preparation procedures are available on request.

Additional ashing charges may apply when insufficient ash is produced in the initial burn.

GEOMICROBIAL ASSAY

Spore Count of *B. Cereus*, including sample preparation .... $ 6.50/sample
100 or more samples/submittal .... $ 6.00/sample

APPENDIX 4.

PROCEDURES FOR BARK SAMPLING, SAMPLE PREPARATION AND ANALYSIS

1. Samples of bark were collected from Douglas fir (Pseudotsuga menziesii) and Lodgepole pine (Pinus Contorta). The outer bark was sampled. Each sample consisted of a gusset soil envelope full of material. A new paint scraper was used whose handle had been covered with electrician's tape to eliminate possible contamination from the painted handle. Samples were collected variously from standing trees and stumps. In the case of stumps, the trees were cut either in 1986 or 1987. Some times in order to get sufficient sample, bark would be scraped from several trees within a few square meter area.

2. Samples were submitted to Min En Labs for preparation and gold determinations as follows:

Sample preparation:

The entire sample was dried at about 105 o C.

B. Dry samples were ground in a Wiley mill to 20 mesh.

C. The raw sample was ashed.

3. Analysis

A. Gold was determined from the total ash by aqua regia, methyl isobutyl ketone extraction and read on graphite furnace AA. Gold results are reported as ash weight.

NOTE: In the case of the OUTER Douglas fir bark samples submitted, one geochem. sample bag full of bark was insufficient material to yield a detection limit below 20 ppb. Please refer to Bruaset, 1989 for Min En result on INNER Douglas fir bark which demonstrates a remarkable degree of reproducibility in check samples at the 0.1 ppb detection limit using the graphite furnace A.A method. (See results on Table 3 p. 16).

APPENDIX 5

GROUND CONTROL

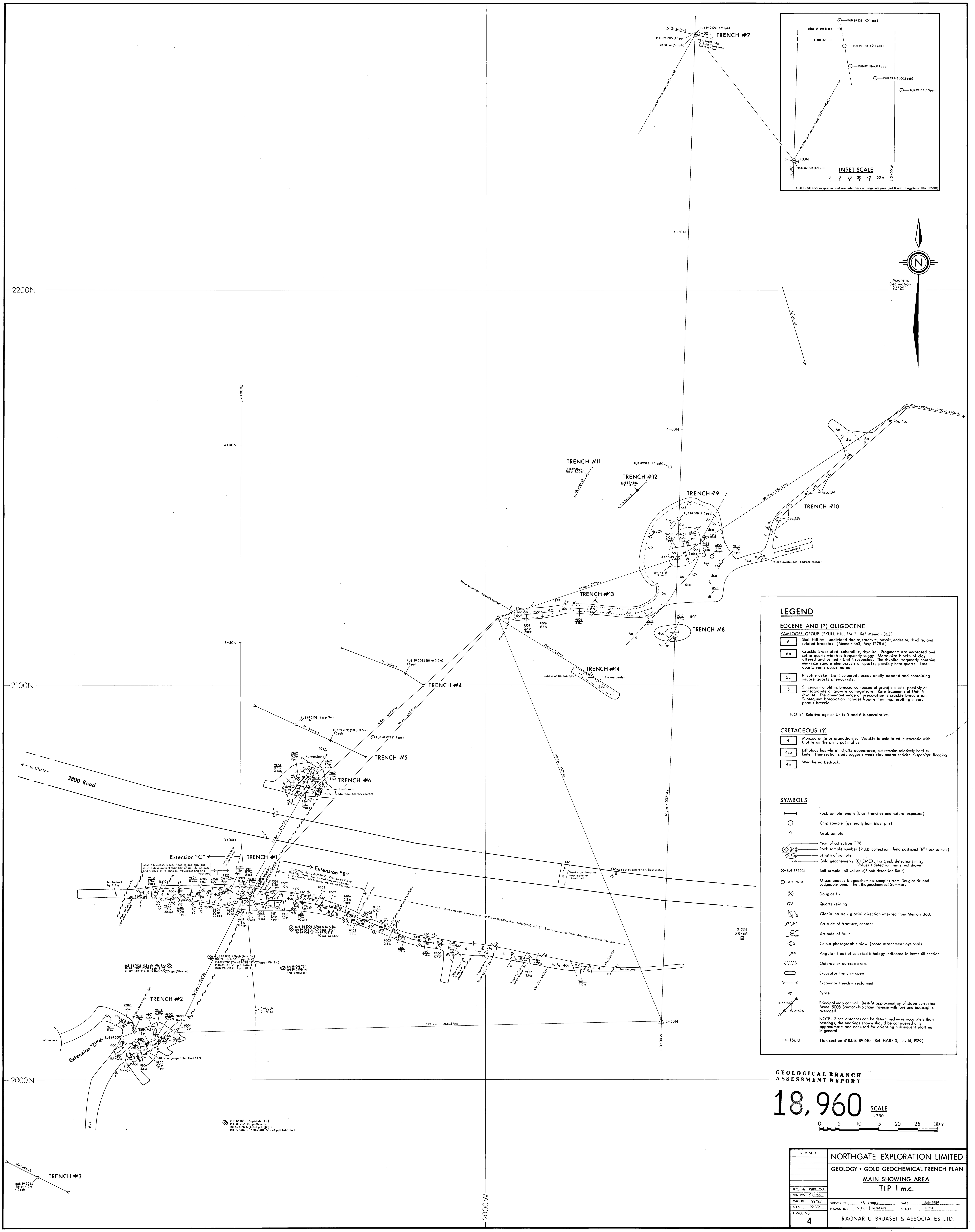
APPENDIX 5

GROUND CONTROL

All known roads in the property area not previously tied-in were surveyed in this program. Roads were surveyed at road center. Front and backsight bearings were taken for each chainage and averaged. Each set of directions averaged consisted of readings not differing in excess of two degrees absolute, typically, a set of bearings would differ by one degree, or less. Stations were placed at convenient locations along the road for later tie-in of geology, lines, claim posts etc. A loop has been run from TL 12+00 S and L 24+00 W to the Legal Corner Post of TULERIC # 1 M. C. via the 3800 and Deadman River roads (Plates 5, 6). The 3800 Road section was done last year (Bruaset, 1989). The closure is indicated on Plate 6. The closure is consistent with a long loop (25 km) such as this which involves hundreds of chainages. All traversing was done with slope correction. Distances were measured by NCI-type hip chains that had been checked with a 50 m standard length nylon chain and found to be correct within 0.25 %. Bearings were determined by Model 5008 plastic Bruntons. The imprecise closure is consistent with a long traverse such as this which involves hundreds of chainages and plotting on 1:5000 scale where distances measured to one tenth meter are interpolated within the range of five meters in plotting.

Stations plotted along the various roads (Plates 5, 6) denote road center except as otherwise indicated. The convention in the field is that the road center point lies at the intersection of an imaginary line through local flagged stations on both sides of the road with the road center line. The imaginary lines trend approximately at right angles to the road center line. We chose this type of ground control because many of the older roads in the area are almost totally unrecognizable on the available aerial photographs and this allowed us to establish stations for tie-ins.

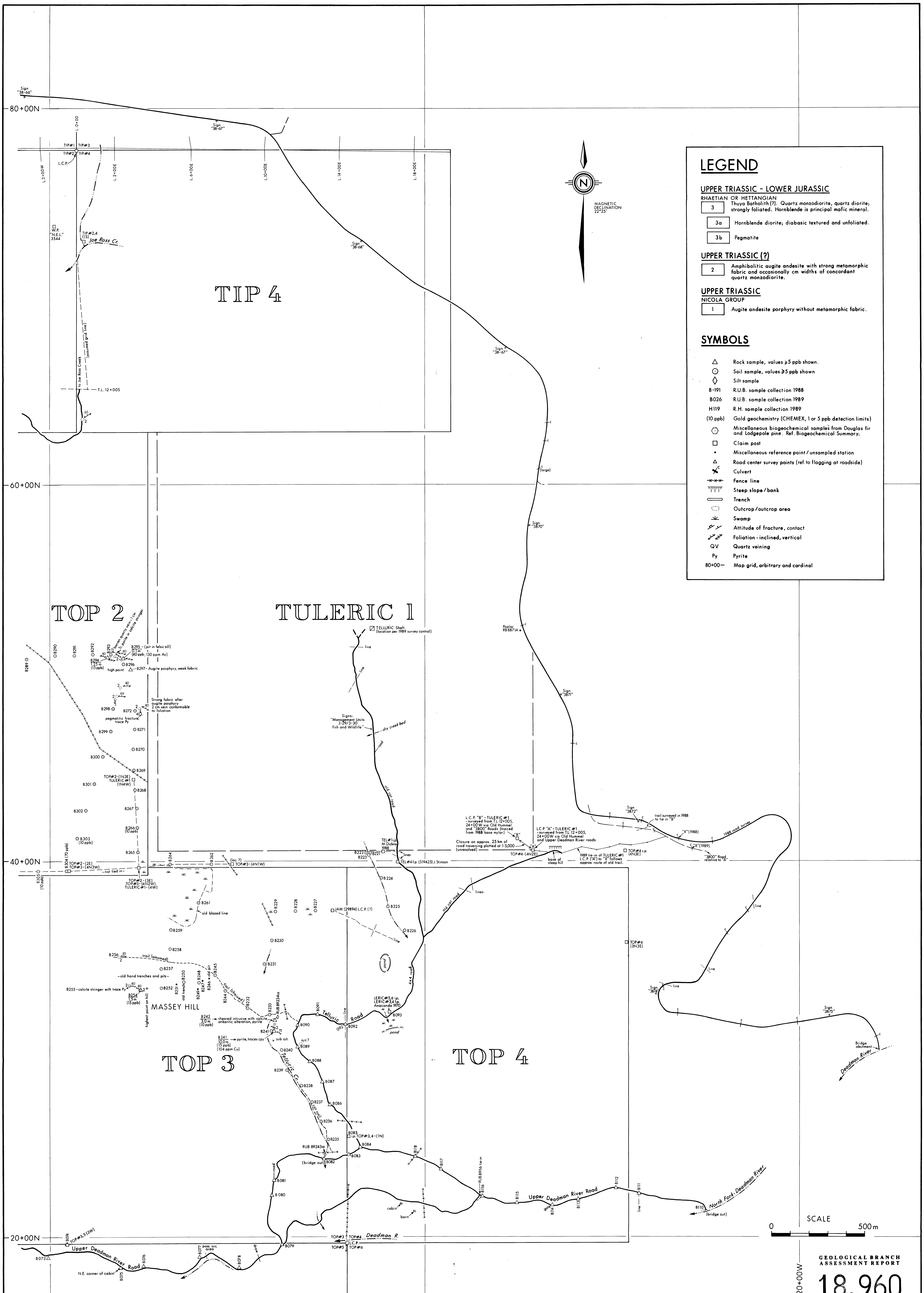
Grid lines are blaze, brushed out and marked with 2-foot cedar lath pickets at 50 m intervals. The lines are non-slope corrected. Roads, fences, claim posts, creeks, lines etc. encountered during the line cutting were tied-in.



TRENCH #1
TRENCH #2
TRENCH #3
TRENCH #4
TRENCH #5
TRENCH #6
TRENCH #7
TRENCH #8
TRENCH #9
TRENCH #10
TRENCH #11
TRENCH #12
TRENCH #13
TRENCH #14
Extension "B"
Extension "C"
Extension "D"
3800 Road
to Clinton
2200N
2100N
2000N
2000W
INSET SCALE
Magnetic Declination 22°25'
LEGEND
EOCENE AND (?) OLIGOCENE
KAMLOOPS GROUP (SKULL HILL FM.? Ref. Memoir 363)
6 Skull Hill Fm. - undivided dacite, trachyte, basalt, andesite, rhyolite, and related breccias (Memoir 363, Map 1278A)
6a Crackle brecciated, spherulitic, rhyolite, Fragments are unrotated and set in quartz which is frequently vuggy. Metre-size blocks of clay altered and veined - Unit 4 suspected. The rhyolite frequently contains mm-size square phenocrysts of quartz; possibly beta quartz. Late quartz veins occas. noted.
6c Rhyolite dyke. Light coloured; occasionally banded and containing square quartz phenocrysts.
5 Siliceous monolithic breccia composed of granitic clasts, possibly of monzogranite or granite compositions. Rare fragments of Unit 6 rhyolite. The dominant mode of brecciation is crackle brecciation. Subsequent brecciation includes fragment milling, resulting in very porous breccia.
NOTE: Relative age of Units 5 and 6 is speculative.
CRETACEOUS (?)
4 Monzogranite or granodiorite. Weakly to unfoliated leucocratic with biotite as the principal mafics.
4ca Lithology has whitish, chalky appearance, but remains relatively hard to knife. Thin-section study suggests weak clay and/or sericite. K-spar/qtz. flooding.
4w Weathered bedrock.
SYMBOLS
Rock sample length (blast trenches and natural exposure)
Chip sample (generally from blast pits)
Grab sample
Year of collection (198-)
Rock sample number (R.U.B. collection - field postscript "R" = rock sample)
Length of sample
Gold geochemistry (CHEMEX, 1 or 5ppb detection limits, Values <detection limits, not shown)
RUB 89 200S Soil sample (all values <5 ppb detection limit)
RUB 89/88 Miscellaneous biogeochemical samples from Douglas fir and Lodgepole pine. Ref. Biogeochemical Summary.
Douglas fir
QV Quartz veining
Glacial striae - glacial direction inferred from Memoir 363.
Attitude of fracture, contact
Attitude of fault
Colour photographic view (photo attachment optional)
Angular float of selected lithology indicated in lower till section.
Outcrop or outcrop area.
Excavator trench - open
Excavator trench - reclaimed
py Pyrite
3+67.3N 2+50N Principal map control. Best-fit approximation of slope-corrected Model 5008 Brunton-hip chain traverse with fore and backsights averaged.
NOTE: Since distances can be determined more accurately than bearings, the bearings shown should be considered only approximate and not used for orienting subsequent plotting in general.
TS610 Thin-section #R.U.B. 89 610 (Ref: HARRIS, July 14, 1989)
GEOLOGICAL BRANCH
ASSESSMENT REPORT
18,960
SCALE
1:250
0 5 10 15 20 25 30m
REVISED
NORTHGATE EXPLORATION LIMITED
GEOLOGY + GOLD GEOCHEMICAL TRENCH PLAN
MAIN SHOWING AREA
TIP 1 m.c.
PROJ. No. 1989-763
MIN. DIV. Clinton
MAG. DEC. 22°25'
N.T.S. 92P/2
DWG. No. 4
SURVEY BY: R.U. Bruaset
DATE: July 1989
DRAWN BY: P.S. Hall (PROMAP)
SCALE: 1:250
RAGNAR U. BRUASET & ASSOCIATES LTD.


TIP 5
TIP 6
TIP 2
TOP 1
TOP 2
TOP 3
See PLATE No. 4
MAGNETIC DECLINATION 22°25'
1988 BASELINE
Hummel Road
Old Hummel Road
Old Humble Road
Joe Ross Cr.
Uren Lake
Lake
Deadman River
Upper Deadman River Road
MIKE JUNCTION
TURKEY TRACK JUNCTION
CASA #4 (L.C.P. not tied in)
Hummel main bldg (loc. approx.)
water too deep to cross in Sept. 1988
Rubbley outcrop of foliated diorite
Augite porphyry Andesite
River uncrossable on date of line cutting
80+00N
60+00N
40+00N
20+00N
100+00W
80+00W
60+00W
SCALE
0
500 m
GEOLOGICAL BRANCH ASSESSMENT REPORT
18,960
REVISED
NORTHGATE EXPLORATION LIMITED
GEOLOGY + GOLD GEOCHEMICAL RECONNAISSANCE
"TOP" AREA - West Half
SURVEY BY: R.U. Bruaset
DRAWN BY: P.S. Hall (PROMAP LTD)
MINING DIV: Clinton
DATE: July 1989
SCALE: 1:5,000
N.T.S. GRID: 92P/2
PROJ. No. 1989-763
DWG. No. 5
RAGNAR U. BRUASET & ASSOCIATES LTD.
See PLATE No. 6 for Legend

TIP 5
TIP 6
TIP 2
TOP 1
TOP 2
TOP 3
See PLATE No. 4
MAGNETIC DECLINATION 22°25'
80+00N
60+00N
40+00N
20+00N
100+00W
80+00W
60+00W
1988 BASELINE
Hummel Road
Old Hummel Road
Old Humble Road
Joe Ross Cr.
Uren Lake
Upper Deadman River Road
Deadman River
MIKE JUNCTION
TURKEY TRACK JUNCTION
CASA #4 (L.C.P. not tied in)
GEOLOGICAL BRANCH
ASSESSMENT REPORT
18,960
SCALE
0
500 m
See PLATE No.6 for Legend
REVISED
PROJ. No. 1989-763
DWG. No. 5
NORTHGATE EXPLORATION LIMITED
GEOLOGY + GOLD GEOCHEMICAL RECONNAISSANCE
"TOP" AREA - West Half
SURVEY BY: R.U. Bruaset
DRAWN BY: P.S. Hall (PROMAP LTD.)
MINING DIV: Clinton
DATE: July 1989
SCALE: 1:5,000
N.T.S. GRID: 92P/2
RAGNAR U. BRUASET & ASSOCIATES LTD.



GEOLOGICAL BRANCH
ASSESSMENT REPORT

18,960

REVISED	NORTHGATE EXPLORATION LIMITED
	GEOLOGY + GOLD GEOCHEMICAL RECONNAISSANCE "TOP" AREA - East Half
PROJ. No. 1989-763	SURVEY BY: R.U. Bruaset — DATE: July 1989 DRAWN BY: P.S. Hall (PROMAP LTD.) — SCALE: 1: 5,000 MINING DIV: Clinton — N.T.S. GRID: 92P/2
DWG. No. 6	RAGNAR U. BRUASET & ASSOCIATES LTD.


80+00N
60+00N
40+00N
20+00N
60+00W
40+00W
20+00W
TIP 4
TOP 2
TULERIC 1
TOP 3
TOP 4
TOP 5
TOP 6
MASSEY HILL
Joe Ross Cr.
Telluric Road
Upper Deadman River Road
Deadman R.
North Fork Deadman River
Deadman River
MAGNETIC DECLINATION 22°25'
LEGEND
UPPER TRIASSIC - LOWER JURASSIC
RHAETIAN OR HETTANGIAN
3 Thuya Batholith (?). Quartz monzodiorite, quartz diorite; strongly foliated. Hornblende is principal mafic mineral.
3a Hornblende diorite; diabasic textured and unfoliated.
3b Pegmatite
UPPER TRIASSIC (?)
2 Amphibolitic augite andesite with strong metamorphic fabric and occasionally cm widths of concordant quartz monzodiorite.
UPPER TRIASSIC
NICOLA GROUP
1 Augite andesite porphyry without metamorphic fabric.
SYMBOLS
Rock sample, values ≥5 ppb shown.
Soil sample, values ≥5 ppb shown
Silt sample
8-191 R.U.B. sample collection 1988
B026 R.U.B. sample collection 1989
H119 R.H. sample collection 1989
(10 ppb) Gold geochemistry (CHEMEX, 1 or 5 ppb detection limits)
Miscellaneous biogeochemical samples from Douglas fir and Lodgepole pine. Ref. Biogeochemical Summary.
Claim post
Miscellaneous reference point / unsampled station
Road center survey points (ref. to flagging at roadside)
Culvert
Fence line
Steep slope / bank
Trench
Outcrop / outcrop area
Swamp
Attitude of fracture, contact
Foliation - inclined, vertical
QV Quartz veining
Py Pyrite
80+00— Map grid, arbitrary and cardinal
GEOLOGICAL BRANCH
ASSESSMENT REPORT
18,960
SCALE
0 500 m
REVISED
NORTHGATE EXPLORATION LIMITED
GEOLOGY + GOLD GEOCHEMICAL RECONNAISSANCE
"TOP" AREA - East Half
SURVEY BY: R.U. Bruaset
DRAWN BY: P.S. Hall (PROMAP LTD.)
MINING DIV: Clinton
DATE: July 1989
SCALE: 1: 5,000
N.T.S. GRID: 92P/2
PROJ. No. 1989-763
DWG. No. 6
RAGNAR U. BRUASET & ASSOCIATES LTD.