GM 52252

1993 ASSESSMENT REPORT, PERMIT 916 (KOGALUK PERMIT)

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DE GESTION DES COTES
QUEBEC

'93 OCT 26 10 :03

EXPLORATION EASTERN CANADA

PERMIT 916 (KOGALUK PERMIT)

UNGAVA PENINSULA, NORTHERN QUEBEC

LAT. 58°40'N - 59°01'N
LONG. 74°16'

1993 ASSESSMENT REPORT

OCTOBER 1993 V. GROSL

MER - S.I.S.E.M. 1994/02/17
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EXPLORATION EASTERN CANADA

PERMIT 916 (KOGALUK PERMIT)

1993 ASSESSMENT REPORT

OCTOBER 1993 V. GROSL

1. Summary

Permit 916 (Kogaluk Permit) is located on the Ungava Peninsula of Northern Quebec and is a 50/50 joint venture between SOQUEM and Cominco Ltd. The permit covers an area of 317 km² and was acquired in 1992.

Work in 1993 was conducted from three fly camps located along the Kogaluk River. The Kogaluk belt generally consists of metasedimentary assemblages including banded iron formation, mafic to felsic volcanic rocks of submarine nature and younger intrusives such as tonalite, granite, gabbro and pegmatites.

The metamorphic grade is greenstone to mid-amphibolite facies. Structurally the belt forms a narrow, NNW-oriented belt with steeply dipping planar fabric. Good potential exists for gold mineralization hosted by banded iron formation. Potential for volcanogenic massive sulphide mineralization is downgraded because of a limited occurrence of volcanic rocks.

Anomalous gold mineralization was detected in sulphidized banded iron formation in several locations in the central portion of the permit. Chip sampling indicated a number of areas with values of 2-6g/t over 1-2m width. The best value of 71.4g/t over 60cm was obtained from banded iron formation which carried 5-10% pyrrhotite, 5% pyrite and traces of chalcopyrite.

A 1994 program consisting of detailed geological mapping and prospecting, chip sampling, Magnetometer and HLEM geophysical surveying in the cental part of the permit is recommended. IP surveying might also be tried in selected areas.

It is recommended that 152km² of the permit be retained.

2. Location and Access

The Kogaluk Permit area occupies a narrow (approx. 4 km wide by 80 km long) strip of land located between latitudes 58°40'N to 59°01' N and at around longitude 74°16'W. The permit occupies portions of NTS sheet 34-J-8, 34-J-10, 34-J-15 and 34-O-2.

Access to the permit in 1993 was by float-equipped Beaver and Single Otter aircraft supplied by Johnny May Services from Kuujjuaq. The Beaver was on contract for the duration of the job and was shared by other Cominco-Soquem crews working in the general Minto area. Surface access was provided by inflatable boat from three fly camps established on the shores of the Kogaluk River. Kuujjuaq was used as a supply and expediting base for the first two weeks of the program and Povungnituk, a small Inuit community on the east coast of Hudson Bay, for the rest of the summer. Local businesses and the Co-op store were effectively used for services and supplies for the most of the summer.

3. Tenure

The Kogaluk permit is part of the 50/50 joint venture project in the Minto area, Ungava Peninsula, between Cominco Ltd. and Soquem. The Kogaluk permit covers an area of 317km^2 and expires in 1996. The 1993 expenditure requirements are $100/km plus $100/km fee payment. The permit areas are shown on plates 2a to 2c.

4. Previous work

1961-63	Geological Survey of Canada reconnaissance mapping (scale 1:1,000.000) by Stevenson,I.M. (characterized the Ungava Peninsula as largely high grade metamorphic and plutonic terrane).
1980's	GSC colour airmagnetic anomaly maps of Ungava Peninsula.
1989-1991	Geological Survey of Canada geological mapping by Percival,J.A.
1992	Cominco Ltd.-Soquem joint venture program consisting of air photo interpretation, geophysical and landsat images interpretation, aerial reconnaissance prospecting, geological mapping, prospecting, rock sampling and data interpretation.

5. Work performed in 1993

Field work on the Kogaluk permit was carried out by V. Grosl and B. Dejou geologists of Cominco, T. Skulski geologist on contract by the GSC and E. Kinnan student assistant of Soquem between July 11 and August 4,1993. Based on 1992 geological observations and air magnetics interpretation, fly camps were established in three locations on Kogaluk River with best access to the belt of supracrustal rocks. The work consisted of geological mapping on a scale of 1:50,000, grid mapping of selected areas at 1:500 and 1:5,000, geochemical stream and soil sampling, rock chip and grab sampling, Beep Mat prospecting and VLF surveying in the areas of previously determined anomalous sulphide content. Geochemical rock, stream and soil samples were shipped to the Cominco's Laboratory in Toronto and were analyzed for Cu,Pb,Zn,Ag,Au. Some whole rock analysis, petrographic studies and geochronological studies are in progress (T. Skulski, GSC).

6. Regional Geology

The Minto area is part of the Goudalie lithotectonic terrane as described by Percival et al (1991). The Goudalie terrane is comprised of biotite and hornblende tonalite and tonalitic gneisses, with lesser paragneisses and metavolcanic rocks. Diabase dykes oriented WNW cross cut all other lithologies except for later granitic veins (Percival et al, 1991). Metasediments and metavolcanic rocks form NNW-oriented belts ranging from 1 to 8km wide and 10's of km in length. These belts are commonly intruded by granitoid plutons which have an ovoid shape and generally occupy the centre of medium sized lakes. The areas between the greenstone belts or septae are characterized by granulite facies granodiorite and gneiss.

The metamorphic grade of the supracrustals generally varies from greenschist facies (chlorite-epidote assemblage) to upper amphibolite facies (garnet-cordierite-sillimanite-biotite assemblage). The orientation of the foliation as defined by mafic minerals (biotite and hornblende mainly) is generally belt parallel at N350. Most of the supracrustal rocks describe a dome and basin tectonic regime possibly related to multiple phases of deformation. The Goudalie terrane has many of the characteristics of granite-greenstone terranes of the southern Superior Province (Percival et al, 1991), and, by analogy, has potential to host VMS and Au deposits. The Goudalie terrane is in contact to the west with the Minto Lake terrane which is characterized by orthopyroxene-bearing diatexite and granite, and to the east with the Utsalik terrane composed mainly of distinctive orthopyroxene and hornblende-bearing granite and granodiorite. Both the eastern and western contacts of the Goudalie terrane are gradational.

7. Local Geology

The Kogaluk supracrustal assemblage is a linear, NNW trending belt from 400 to 2,500m in width and about 100km long (including Tasiat permit), which in most part straddles the shores of Kogaluk River. The belt is generally delineated by younger tonalite intrusives on its east and west margins. It is dominated by metasedimentary rocks (greywacke, sandstone, siltstone, argillite) with about 10 to 20% volcanogenic rocks. The volcanic rocks are represented by massive and pillowed basalt to andesite flows, mafic to intermediate tuffs, and locally by aphyric to quartz-feldspar phyric rhyolite, dacite, and chert. In the central portion of the permit banded iron formation consisting of at least two separate horizons, one of which bears sulphides, constitutes a significant portion of the Kogaluk permit stratigraphy. Beside tonalite plutons, younger granitoid intrusives were encountered. Gabbro and diabase sills and dykes were found cutting both supracrustal and tonalite rocks. The youngest rocks encountered were pegmatite and aplite dykes.

The rocks to the west of the Kogaluk belt are predominantly paragneisses, while the rocks to the east are mainly granitoid gneisses. They are believed to be older possibly basement stratigraphy to the supracrustals.

The description of the lithologies in approximate chronologic order follows:

ARCHEAN

A) High Grade Metamorphic Rocks

Paragneiss grading into Diatexite underlie large areas in the centre of the Kogaluk permit (East and west of the Kogaluk River). This unit appears to be thickened due to tight folding. Gneissic banding is pronounced by segregation of coarser feldspar- (quartz)-biotite-(garnet, +sillimanite) from finer feldspar-biotite bands. Garnet crystals are mm's to cm's scale and are more common on the west side of the river. Sillimanite (up to 10% as 1 to 10mm large porphyroblasts) rich bands were observed in the same area. Pegmatoid and aplitic bands cm's to m's wide, parallel to gneissosity are very common. In the area east of the Kogaluk River paragneiss are injected by tonalite intrusions (probably along the axial planes of folds), from several meters to 10's of meters width. The injections are parallel to gneissosity and usually occupy topographic highs.

A band of Mafic Gneiss approx. 400m wide, interbedded in the above described paragneiss was mapped on the west side of Kogaluk River. This gneiss is banded with thick biotite, amphibole layers and thin plagioclase and quartz layers.

Orthogneiss exhibits thick layers of quartzo-feldspathic and thin biotite rich layers occurs mainly in the areas east of the Kogaluk River. Mapping of this unit was very restricted.

B) Supracrustal Rocks

Mafic to Intermediate Flows make up a very small portion (1%) of supracrustal package. A narrow band (several metres) of west facing, fairly well preserved mafic pillow basalts were found on the east shore of Kogaluk River in the southern portion of the permit. In the central portion of the permit is a 3 to 5m wide band of deformed pillow and breccia andesites, epidotized and silicified, with trace amount of sulphides.

Massive, nondescript bands of mafic to intermediate flows were observed in southern and central portions of the permit. This unit carried 3 to 15cm diameter clasts or breccia fragments epidotized and surrounded by rims of biotite. This unit is best exposed in the area north of Tonalite Lake.

Mafic Tuffs are finely bedded predominantly amphibole-biotite rich with 10 to 30% felsic (plagioclase) layers or fragments. This is the most widespread unit of volcanogenic origin. It was mapped throughout the Kogaluk belt, but is best exposed in the Grid-1 area.

Crystal Tuff of rhyolitic and dacitic composition occur in southern portion of the permit (Grid-1). They are 10 to 30m wide usually sericitized and composed of 10-25% quartz eyes. In the Grid-1 area, where it is best exposed, this rock appears lightly sheared. A narrow

band of aphyric, sericitized rhyolite was also observed in central portion of the permit in an area of very limited outcrop.

Dacite was mapped in the Grid-1 area. It is composed of 10-20% biotite flakes in a matrix of light grey feldspar and quartz.

Chert sediment is very rare and was encountered in only two locations. In the Grid-1 area it is from 2 to 30m thick and comprises recrystallized quartz with numerous bands and laminae of tourmaline. It is in contact with rhyolite and probably represents a quiescence period between the volcanic activity and subsequent sedimentation. Minor (< 1%) sulphides occur in this chert bed.

In the central portion of the permit a thin (50 cm's) chert horizon was encountered in the same stratigraphic position, but no sulphides were seen.

Banded Iron Formation is a prominent rusty weathering unit occurring intermittently over a 12km strike length in the central portion of the permit. It consists of at least two separate horizons, internally folded and separated by schists/gneisses. The thicker magnetite-chert banded horizon is 10-50m thick with bands of mm to cm scale. The sulphide-bearing magnetite iron horizon is 2 to 5m thick and associated with garnetiferous siliceous, metasediments. Epidote alteration is common. Sulphides (pyrite and pyrrhotite 2-10% and locally chalcopyrite 1%) occur as discontinuous layers, blotches and specks, and are often associated with chlorite and biotite enrichment.

Metasediments (Schists) are the most widespread package of rocks occurring throughout the belt and are represented by greywacke, argillite, conglomerate, sandstone and siltstone. Most common mineral assemblages are plagioclase-quartz-biotite-/garnet/+-sillimanite+-cordierite± pyrite±pyrrhotite. Pegmatitic bands and quartz veins parallel to schistosity are characteristically very common. In some areas (Grid-1, central portion of the permit) the sediments overlying the volcanics are silicified and may carry 2-10% sulphide specks and blotches in narrow (10-20cm's) layers. Garnet crystals may also be present. The sulphidic sediments may be the stratigraphic equivalent of the Banded Iron Formation.

Conglomerate beds composed of cm's size polymictic clasts of sedimentary and volcanic origin occur in southern and central portions of the permit.

Sandstone/Siltstone beds of arkosic composition are commonly massive white to light orange weathering and may be mistaken for intermediate volcanic rock.

Quartzite beds are typically white weathering, thin to thick bedded, finely grained, occasionally laminated, almost pure quartz siltstone or sandstone. This lithology is most prominent in the central portions of the permit.

Flow banded Rhyolite approx. 30m wide was followed over a 2km strike length in the

central portion of the permit. This rhyolite is distinctly different from rhyolites mapped in southern areas of the permit. It is fresh, grey with mm thick light feldspathic bands, probably younger than the above described stratigraphy.

C) Intrusive Rocks

Granitoid Intrusives (quartz-feldspar-biotite-amphibole) well foliated, older or contemporaneous with the supracrustals are mainly found in central portions of the permit. Tonalite Plutons (K-spar-quartz-biotite) mark the borders of the supracrustal belt. They appear to be concordant with the belt and are generally not foliated, although in some areas (central) moderately foliated tonalites with specks of pyrite were observed.
Granite Intrusions (quartz-feldspar-biotite$\pm$amphibole, massive, unfoliated, porphyritic, commonly cut by pegmatite dykes (K-spar-quartz-muscovite$\pm$garnet$\pm$tourmaline, were mapped mostly in central portions of the permit.

PROTEROZOIC

Diabase dykes and sills, often gabbroic, are the youngest intrusions in the permit. They are generally 10's of metres wide crosscutting the supracrustal and intrusive rocks.

Structure

The belt trends at roughly 330°. The beds are mostly vertically to steeply west and east dipping. Preliminary observations indicate an antiformal structure with granitoid intrusion and tonalite in its core in the central portion of the belt. Minor folds in the belt plunge steeply north and south.

Alteration

Silicification, sericitization associated with tourmaline and sulphide enrichment was found in the southern portion of the belt (Grid-1). Strong carbonate (ankerite, dolomite) and silica alteration with minor tourmaline and sulphide mineralization are found crosscutting the stratigraphy (sediments and volcanics) in the northern portion of the belt. Silica and epidote alteration of the sulphidic iron formations is very prominent in the central portion of the permit. A number of locations exhibit strong silicification with associated tourmaline and sulphide mineralization within volcanic and sedimentary package. Biotite and chlorite are also enriched in banded iron formation in the areas of sulphide mineralization.

Mineralization

Disseminated pyrite hosted by rhyolite (quartz-sericite schist), chert and silicified metasediments was observed in several locations in the Grid-1 area (Kogaluk South). Pyrite was locally accompanied by traces of chalcopyrite in the chert and rhyolite. Outcrops which carried considerable (2-10%) sulphides were chip sampled and analyzed for Cu, Pb, Zn, Ag,

Au. Elevated Cu, Au values were obtained from silicified sediment, rhyolite and chert. Best result was 812ppm Cu and 600ppb Au from the chert horizon and 1000ppb Au from a pyrite-speckled rhyolite float. All analyses are plotted on the attached Plate-3 and listed on Table-1.

Best sulphide mineralization hosted by intermittently exposed banded iron formation was found in northern portion of the permit approx. 5km SSE of Lake Tikimuattuup Quamaningua (Figure-1). About 5-20% pyrite/pyrrhotite and locally chalcopyrite occur as disseminations, blotches and mm layers over 0.5 to 2m widths. Quartz, biotite, chlorite and sometimes epidote are also present. Chip sampling of this mineralization revealed a number of anomalous gold locations in order of 2-6g/t over 1-2m width. The best result was 71.4g/t over 0.6m width. Additional chip sampling is needed to better determine the exact width and continuity of gold mineralization.

Disseminated pyrite associated with 10-20cm's wide quartz veins with tourmaline crystals, and hosted by metasediments, was also found in the same general area. Best gold value was 807ppb/.8m.

8. Geochemistry

Soil and stream silt samples were taken mostly on recce traverses and on a few grid lines. The best soil was developed in the areas of small dry ponds and in depressions between outcrops. Scattered anomalous Cu and Au (up to 600ppm Cu and 200ppb Au) were obtained in the Kogaluk South area.

Geochemical results are plotted on Plates 5, 6, 10 to 13 incl. Figures 1,2, and 3 and plates 2 to 6 incl. show rock geochemistry and location of mineralized samples.

Whole rock lithogeochemical analysis were done on 2 samples to date in the Grid-1 area. Additional analysis are in progress (T. Skulski - G.S.C.). Results will be examined at a future date.

9. Conclusions and Recommendations

The 1993 summer program downgraded the potential for base metal mineralization on the Kogaluk permit, but defined in more detail areas of best potential for gold mineralization. Because of the limited thickness and strike extent of volcanic rocks the occurrence of the VMS style mineralization is unlikely, however there are two major areas of good potential for gold mineralization.

i) The southern portion of the permit which is underlain by tourmaline bearing chert, sericitized rhyolite and silicified metasediments revealed a few gold anomalous areas in 1992 and 1993. This area should be explored further in 1994 with follow-up mapping and sampling, magnetometer surveying, and possibly some IP surveying in

selected areas.

ii) The central portion of the permit has an extensive strike length of sulphidized and altered banded iron formation which carries anomalous gold in a number of sampled locations. One sample assayed 71.4g/t over 60cm. It is recommended that areas of the central portion of the permit be covered by Magnetometer and HLEM surveys to better define extensions of the banded iron formation and to help define drilling targets.

It is recommended that 152km^2 be retained.

10. Finance

The Kogaluk permit expenditure for 1993 was $126,632. Statement of Expenditures is attached.

11. References

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STATEMENT OF EXPENDITURES

MINING EXPLORATION PERMIT 914 (KOGALUK)

Staff Costs:	$ 47,400
Transportation:	$ 23,800
Camp Costs:	$ 13,600
Expediting:	$ 1,462
Mob and Demob:	$ 11,000
Assaying:	$ 9,570
Freight:	$ 6,900
Report Writing, Drafting, Reproduction:	$ 12,900
Total:	$126,632

TABLE 1

ROCK ANALYSES

COMINCO LTD. TOR. MINTO RECCE. TL93-047 JULY22/93

KOGALUK (SOUTH)

ROCKS (V. GROSL)

	SAMPLE #		Cu ppm	Pb ppm	Zn ppm	Ag ppm	Au ppb
1	VG-93- 4		6	28	64	<1	<10
2	7		2	28	56	<1	<10
3	8		<1	30	80	<1	<10
4	9		2	22	16	<1	90
5	10		120	26	36	<1	302
6	11		8	48	120	<1	24
7	12		18	40	70	<1	44
8	13		82	6	12	<1	42
9	13 A			MISSING			
10	14		6	20	38	<1	12
11	15		10	28	70	1	30
12	16		150	24	52	1	150
13	17		22	4	30	4	1000
14	19		44	24	40	1	171
15	20		4	30	44	1	90
16	21		22	16	34	<1	<10
17	22		4	26	92	<1	<10
18	23		14	20	64	<1	12
19	24		14	18	16	<1	171
20	25		104	18	34	1	150
21	26		8	30	86	<1	16
22	28	0-2 M	1	22	24	<1	12
23	28	2-4 M	<1	24	22	1	41
24	28	4-6 M	18	22	26	1	199
25	28	6-7.5 M	58	24	22	<1	186
26	30		10	30	76	1	65
27	34 A		<1	20	34	<1	22
28	34 B		1	34	26	1	40
29	34 C		4	36	28	<1	344
30	33		<1	32	28	1	101

	KOGALUK SOUTH	NO.					
38	EK-93- 1	816	5	46	84	1	22
39	2	817	12	36	70	<1	<10
40	3	818	<1	26	52	<1	<10
41	4	819	42	30	86	<1	34
42	5	820	80	22	40	<1	157
43	6	821	144	30	42	<1	500
44	7	822	124	24	24	<1	79

COMINCO LTD. TOR. MINTO RECCE. TL93-047 JULY22/93

KOGALUK (SOUTH)

ROCKS (V. GROSL)

	SAMPLE #			Cu ppm	Pb ppm	Zn ppm	Ag ppm	Au ppb
45	EK-93- 8	A	823	144	30	46	<1	108
46	8	B	824	812	30	86	1	450
47	8	C	825	520	12	20	<1	214
48	8	D	826	240	8	14	<1	55
49	8		827	90	8	18	<1	55
50	8	F	828	232	4	12	<1	129
51	8	G	829	116	<1	16	<1	600
52	8	H	830	112	1	14	<1	111
53	8	I	831	240	6	24	<1	87
54	8	J	832	160	8	16	<1	108
55	9	A	833	46	18	36	<1	94
56	9	B	834	40	14	38	<1	18
57	9	C	835	18	20	40	<1	22
58	BD-93- 7		801	38	30	26	<1	58
59	9		802	38	32	130	<1	<10
60	10		803	46	14	22	<1	161
61	10		804	22	28	22	<1	101
62	10		805	2	24	20	<1	98
63	10		806	42	20	36	<1	154
64	10	B	807	1	24	30	<1	18
65	10	A	808	64	8	22	<1	108
66	11		809	78	30	38	<1	101
67	15		810	168	24	50	<1	34
68	16		811	4	6	14	<1	32
69	17		812	36	36	62	<1	<10
70	20	A	813	2	20	20	<1	22
71	20	B	814	32	32	118	1	20
72	20	C	815	12	12	18	<1	168
73	24		836	52	36	64	<1	<10
74	29		837	28	88	210	<1	227
75	EK-93 10		838	22	50	64	<1	347
76	VG-93 28	A	28A	8	20	26	<1	38

CU,PB,ZN,AG TOTAL EXTRACTION A.A. finish

AU HOT BROMINE EXTRACTION A.A. finish

COMINCO LTD. TOR. MINTO RECCE. TL93-053 AUG 23/93

KOGALUK NORTH

ROCKS (V. GROSL)

	SAMPLE #		Cu ppm	Pb ppm	Zn ppm	Ag ppm	Au ppb
1	VG-93- 101	C .5M	18	48	122	1	65
2	VG-93- 103	A COMP	160	38	84	<1	16
3	VG-93- 103	B	28	12	40	1	29
4	VG-93- 105	A	20	30	56	1	185
5	VG-93- 105	B	10	32	208	<1	119
6	TS-279- 93	A-7801	106	30	96	<1	47
7	TS-290- 93	A-7802	56	24	150	1	41
8	TS-340- 93	A-7803	48	30	74	<1	29
9	TS-340- 93	A-7804	50	28	66	<1	43
10	TS-350A 93	A-7805	4	10	24	<1	<10
11	TS-350B 93	A-7806	2	34	36	<1	11
12	TS-350C 93	A-7807	8	40	100	<1	36
13	TS-280- 93	A-7808	184	44	244	<1	13
14	EK-93- 42	870	184	28	64	1	108
15	EK-93- 40	871	8	42	92	<1	<10
16	EK-93- 45	872	26	46	160	<1	358
17	EK-93- 44	873	28	30	102	<1	29
18	EK-93- 41	874	2	40	106	<1	29
19	BD-93- 66	875	8	86	116	<1	216
20	BD-93- 69	876	162	38	82	3	22
21	BD-93- 70	877	44	20	94	<1	<10
22	BD-93- 71	878	68	24	124	1	22
23	BD-93- 72	879	12	14	74	<1	<10
24	BD-93- 73	880	28	22	70	<1	<10
25	BD-93- 81	MISSING					
26	VG-93- 116		236	26	134	1	16
27	VG-93- 118		404	22	124	3	63
28	VG-93- 119	MISSING					
29	EK-93- 60	7809	2	18	32	<1	13
30	EK-93- 63	7810	46	22	80	<1	<10
31	EK-93- 64	7811	8	20	42	<1	31
32	EK-93- 50	7812	<1	26	64	<1	13
33	EK-93- 56	7813	82	12	112	<1	29
34	BD-93- 55	864	432	28	150	<1	47
35	BD-93- 56	865	32	24	119	<1	16
36	VG-93- 93	866	20	20	64	<1	59
37	BD-93- 58	867	<1	28	100	<1	190
38	BD-93- 59	868	<1	10	48	3	156
39	BD-93- 60	869	2	24	92	<1	587
40	VG-93- 94	CH-0	6	22	30	<1	365
41	VG-93- 94	CH-1	38	24	94	<1	<10
42	VG-93- 94	CH-2	62	24	60	<1	<10
43	VG-93- 94	CH-3	28	24	74	<1	<10
44	VG-93- 94	CH-4	<1	30	84	<1	<10
45	VG-93- 94	CH-5	8	26	76	<1	<10
46	VG-93- 94	CH-6	22	24	76	<1	<10
47	VG-93- 98	CH-1	14	22	100	<1	3800

COMINCO LTD. TOR. MINTO RECCE. TL93-053 AUG 23/93
KOGALUK NORTH
ROCKS (V. GROSL)

	SAMPLE #		Cu ppm	Pb ppm	Zn ppm	Ag ppm	Au ppb
48	VG-93- 98	CH-2	26	20	160	<1	607
49	VG-93- 98	CH-3	22	18	100	<1	6200
50	VG-93- 101	A	100	20	66	<1	6280
51	VG-93- 101	B	<1	16	44	<1	543

KOGALUK NORTH

58	BD-93- 47		850	<1	18	34	<1	10
59	BD-93- 47		851	<1	24	26	<1	18
60	VG-93- 81		852	<1	16	30	<1	103
61	VG-93- 79			16	20	60	<1	15
62	VG-93- 81			<1	22	28	<1	13
63	VG-93- 81			<1	34	116	1	22
64	VG-93- 81	B		358	38	140	1	15
65	VG-93- 84		1.5M	30	30	68	<1	455
66	VG-93- 85		0-.6M	72	12	26	<1	228
67	VG-93- 85		.6-1.4M	60	12	20	<1	807
68	VG-93- 85		1.4-2.0	24	24	50	<1	43
69	VG-93- 85	B		26	30	120	<1	18
70	BD-93- 49	A	853	2	28	88	<1	5100
71	BD-93- 49	B	854	<1	30	68	1	147
72	BD-93- 49	C	855	202	36	100	2	3560
73	BD-93- 50		856	14	18	14	<1	16
74	BD-93- 51		857	4000	26	120	5	71400
75	VG-93- 86		CH-1	18	26	64	<1	137
76	VG-93- 86		CH-2	8	22	36	<1	187
77	VG-93- 86		CH-3	210	26	80	<1	738
78	VG-93- 86	B		28	22	50	<1	241
79	VG-93- 89			11	8	4	<1	106
80	VG-93- 92			4	8	16	<1	2100
81	BD-93- 52		858	300	26	60	<1	1800
82	BD-93- 53		859	2	40	60	2	32
83	BD-93- 54		860	50	30	106	1	444
84	BD-93- 54	B1	861	100	26	110	<1	202
85	BD-93- 54	B2	862	320	26	88	1	902
86	BD-93- 54	C	863	688	20	72	1	1400

CU,PB,ZN,AG TOTAL EXTRACTION A.A. finish

COMINCO LTD. TOR. MINTO RECCE. TL93-073 SEPT 16/93

KOGALUK NORTH

ROCKS (V. GROSL)

	SAMPLE #		Cu ppm	Pb ppm	Zn ppm	Ag ppm	Au ppb
1	VG-93- 67 839		82	50	118	<1	38
2	VG-93- 67 840		64	36	56	<1	50
3	VG-93- 67 841		58	46	126	<1	65
4	VG-93- 67 842		12	42	76	<1	55
5	VG-93- 67 843		28	54	110	<1	170
6	VG-93- 67 844		72	54	116	<1	150
7	VG-93- 67	0-2 M	12	52	76	<1	60
8	VG-93- 67	2-4 M	5	42	34	<1	50
9	VG-93- 67	4-6 M	5	46	50	<1	58

CU,PB,ZN,AG TOTAL EXTRACTION A.A. finish

AU HOT BROMINE EXTRACTION A.A. finish

COMINCO LTD. TOR. MINTO RECCE. TL93-098 SEPT 11/93
KOGALUK

ROCKS

SAMPLE #				Cu ppm	Pb ppm	Zn ppm	Ag ppm	Au ppb	RECHECK Au ppb
K-1									
1	7210	0	1.1	80	32	96	<1	625	
2	7211	1.1	1.7	270	28	70	<1	159	
3	7212	1.7	2.5	8	20	96	<1	246	
4	7213	2.5	3.2	320	24	92	<1	1000	1016
5	7214	3.2	4.2	210	18	74	<1	1760	1800
6	7215	4.2	5.2	304	14	66	<1	1160	923
7	7216	5.2	6.1	612	22	82	<1	5400	5400
8	7217	6.1	6.6	272	16	74	<1	9000	9200
9	7218	6.6	7.1	346	24	78	<1	1470	1455
10	7219	7.1	7.9	368	22	62	<1	1816	1700
11	7220	7.9	8.9	160	26	104	<1	3200	3360
12	7221	8.9	10.3	4	26	94	<1	38	
13	7222	10.3	11.7	40	30	90	<1	<10	
14	7223	11.7	12.7	54	38	140	<1	125	
15	7224	12.7	14.0	94	30	126	<1	14	
16	7225	14.0	15.0	12	30	92	<1	28	
17	7226	15.0	16.0	2	34	116	<1	12	
18	7227	16.0	17.0	362	36	120	<1	522	
19	7228	17.0	18.0	52	34	130	<1	190	
20	7229	18.0	18.9	26	30	124	<1	<10	
21	7230	18.9	19.5	10	28	154	<1	73	
22	7231	21.2	21.65	114	38	114	1	1000	1078
23	7232	21.65	22.00	914	32	38	<1	186	
24	7233	22.00	22.60	174	20	46	<1	3100	3040
25	7234	22.60	23.70	316	30	40	<1	234	
K-3									
26	7235	0.0	0.9	14	34	128	<1	59	
27	7236	0.9	1.4	58	20	76	<1	3100	3100
28	7237	1.4	1.8	204	32	78	<1	1888	1950
29	7238	1.8	2.4	110	22	74	<1	2716	
30	7239	2.4	3.0	400	34	82	<1	390	
31	7240	3.0	4.0	54	36	78	<1	1910	
32	7241	4.0	4.9	96	26	88	<1	3560	3800
33	7242	4.9	5.65	158	20	70	<1	1772	1650
34	7243	5.65	6.5	246	24	66	<1	3680	3455
35	7244	6.5	7.3	54	36	74	<1	693	
36	7245	7.3	8.2	2	40	116	<1	567	
K-2									
37	7246	0.0	0.65	22	32	64	<1	83	
38	7247	0.65	1.7	236	24	50	<1	3520	3200
39	7248	1.7	2.7	286	28	56	<1	502	

AU HOT BROMINE EXTRACTION A.A. finish
CU,PB,ZN,AG TOTAL EXTRACTION A.A. finish

COMINCO LTD. TOR. MINTO RECCE. TL93-098 SEPT 11/93

KOGALUK

ROCKS

	SAMPLE #			Cu ppm	Pb ppm	Zn ppm	Ag ppm	Au ppb	RECKECK Au ppb
K-4									
40	7249	0.0	0.6	148	34	94	<1	56	
41	7250	0.6	0.8	480	28	50	<1	1214	
42	7251	0.8	1.8	48	30	114	<1	<10	
43	7252	1.8	2.8	82	36	124	<1	<10	
44	7253	2.8	3.4	56	34	110	<1	102	
45	7254	3.4	4.4	66	32	36	<1	166	
46	7255	4.4	4.95	234	26	58	<1	89	
47	7256	4.95	5.6	122	28	46	<1	164	
48	7257	6.15	7.0	22	34	84	<1	12	

AU HOT BROMINE EXTRACTION A.A. finish

CU,PB,ZN,AG TOTAL EXTRACTION A.A. finish

TABLE 2

SOIL ANALYSES

COMINCO LTD. TOR. MINTO RECCE. (KOGALUK SOUTH) TL93-046 JULY 21/93

SOILS V. GROSL

	TOR. LAB NUMBER	SAMPLE #	FIELD CO-ORDINATES		Cu ppm	Pb ppm	Zn ppm	Ag ppm	Au ppb	ORGANIC	RECHECKS Au ppb
1	B9300292	172198	0+00	2+00	5	4	43	<1	3	3	
2	B9300293	172199			10	17	24	<1	1	3	
3	B9300294	172200			9	4	27	<1	<1	0	
4	B9300295	172201			<1	7	133	<1	<1	4	
5	B9300296	172202			12	12	37	<1	<1	4	
6	B9300297	172203			9	6	31	<1	14	2	15
7	B9300298	172204			1	11	40	<1	2	4	
8	B9300299	172197			6	9	32	<1	<1	1	
9	B9300300	185003			<1	8	49	<1	<1	0	
10	B9300301	185004			10	8	40	<1	2	3	
11	B9300302	185005			<1	7	16	<1	2	3	
12	B9300303	185006			<1	8	55	1	<1	0	
13	B9300304	185002			17	9	65	<1	<1	4	
14	B9300305	185009			138	10	145	<1	10	3	9
15	B9300306	185010			192	14	36	<1	<1	3	
16	B9300307	185011			21	11	57	<1	1	0	
17	B9300308	185012			41	8	27	<1	<1	3	
18	B9300309	185013			25	15	45	<1	<1	4	
19	B9300310	185101			120	11	49	<1	<1	3	
20	B9300311	185102			184	8	26	<1	2	4	
21	B9300312	185030			6	9	7	<1	2	3	
22	B9300313	185031			<1	13	141	<1	<1	3	
23	B9300314	185103			<1	14	18	<1	<1	3	
24	B9300315	185104			<1	10	31	<1	6	1	
25	B9300316	185105			3	4	4	<1	<1	1	
26	B9300317	185106			17	7	12	<1	7	2	
27	B9300318	185107			<1	13	52	<1	1	3	
28	B9300319	185108			29	6	37	<1	100	1	26
29	B9300320	185109			12	11	31	<1	18	1	15
30	B9300321	185110			<1	5	37	<1	9	0	10
31	B9300322	185111			<1	8	27	<1	4	0	2
32	B9300323	185007			19	5	36	<1	38	1	44
33	B9300324	185008			35	6	53	<1	26	0	30
34	B9300325	172237			1	10	24	<1	2	0	
35	B9300326	172238			2	4	15	<1	<1	0	
36	B9300327	172239			3	7	33	<1	<1	0	
37	B9300328	172240			26	19	87	<1	<1	1	
38	B9300329	172241			MISSING						
39	B9300330	172242			<1	11	5	<1	2	1	
40	B9300331	185011			MISSING						
41	B9300332	185016			MISSING						
42	B9300333	185017			6	10	29	<1	<1	1	

COMINCO LTD. TOR. MINTO RECCE. TL93-046 JULY 21/93
(KOGALUK SOUTH)
SOILS V. GROSL

	TOR. LAB NUMBER	SAMPLE #	FIELD CO-ORDINATES	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Au ppb	ORGANIC	RECHECKS Au ppb
43	B9300334	185020		2	8	36	<1	<1	0	
44	B9300335	185021		36	6	6	<1	<1	2	
45	B9300336	185022		324	9	8	<1	1	1	
46	B9300337	185026		16	5	21	<1	15	1	15
47	B9300338	185027		11	11	48	<1	10	2	
48	B9300339	185029		18	4	10	<1	3	3	
49	B9300340	185032		5	4	14	<1	10	1	
50	B9300341	185033		3	8	64	<1	<1	2	
51	B9300342	185034		42	5	22	<1	<1	2	
52	B9300343	185035		8	6	14	<1	<1	2	
53	B9300344	185036		<1	7	21	<1	<1	2	
54	B9300345	185037		<1	4	27	<1	<1	0	
55	B9300346	185038		4	13	32	<1	2	2	
56	B9300347	185039		29	7	34	<1	2	0	

CU,PB,ZN,AG HOT HNO3 A.A. finish
AU HOT BROMINE EXTRACTION FLAMLESS A.A. finish

COMINCO LTD. TOR. MINTO RECCE. TL93-054 AUG24/93

KOGALUK NORTH

SOILS V. GROSL

	TOR. LAB NUMBER	SAMPLE #	FIELD CO-ORDINATES	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Au ppb	ORGANIC
1	B9300441	171761		15	22	79	<1	<1	4
2	B9300442	171762		29	16	159	<1	1	3
3	B9300443	171763		19	11	27	<1	3	4
4	B9300444	171760		34	12	89	1	6	3
5	B9300445	185081		24	8	48	<1	20	0
6	B9300446	185095		3	6	30	<1	<1	0
7	B9300447	185093		10	8	31	<1	<1	0
8	B9300448	185124		16	7	44	<1	1	2
9	B9300449	185146		37	3	33	<1	2	1
10	B9300450	185147		40	4	54	<1	<1	1
11	B9300451	185150		92	15	63	<1	<1	4
12	B9300452	185151		33	4	39	<1	3	0
13	B9300453	185152		65	9	74	<1	5	0
14	B9300454	185153		36	3	30	<1	<1	0
15	B9300455	185154		44	7	42	<1	<1	0
16	B9300456	185155		19	5	32	<1	16	0
17	B9300457	185156		32	8	64	<1	3	0
18	B9300458	185157		31	9	37	<1	<1	4
19	B9300459	185158		42	7	37	<1	<1	0
20	B9300460	185159		180	5	26	<1	2	4
21	B9300461	185160		27	7	56	<1	26	0
22	B9300462	185161		9	9	16	<1	3	0
23	B9300463	185162		6	8	39	<1	<1	4
24	B9300464	185163		43	7	65	<1	<1	0
25	B9300465	185164		6	5	22	<1	<1	0
26	B9300466	185165		77	14	75	<1	1	3
27	B9300467	185166		27	7	34	<1	1	0
28	B9300468	185167		37	11	32	<1	<1	4
29	B9300469	185042		<1	6	18	<1	<1	0
30	B9300470	185043		50	7	14	<1	3	4
31	B9300471	185052		31	10	56	<1	2	1
32	B9300472	185053		13	12	25	<1	2	3
33	B9300473	185064		12	6	30	<1	<1	0
34	B9300474	185138		26	9	48	<1	<1	0
35	B9300475	185139		37	9	37	<1	<1	0
36	B9300476	185140		32	14	44	<1	<1	2
37	B9300477	185141		41	10	22	<1	<1	2
38	B9300478	185142		17	8	54	<1	<1	0
39	B9300479	185143		11	8	24	<1	<1	0
40	B9300480	185144		13	12	63	<1	<1	0
41	B9300481	185145		19	5	20	<1	1	4
42	B9300482	185100		17	11	27	<1	1	0
43	B9300483	185123		25	16	81	<1	<1	3

CU,PB,ZN,AG HOT HNO3 A.A. finish

AU HOT BROMINE EXTRACTION FLAMLESS A.A. finish

COMINCO LTD. TOR. MINTO RECCE. TL93-054 AUG24/93
KOGALUK NORTH
SOILS V. GROSL

	TOR. LAB NUMBER	SAMPLE #	FIELD CO-ORDINATES	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Au ppb	ORGANIC
44	B9300484	172244		27	14	65	<1	<1	2
45	B9300485	185082		<1	7	11	<1	2	0
46	B9300486	185083		<1	5	22	<1	1	0
47	B9300487	185084		<1	4	16	<1	<1	1
48	B9300488	185094		4	8	11	<1	<1	4

CU,PB,ZN,AG HOT HNO3 A.A. finish
AU HOT BROMINE EXTRACTION FLAMLESS A.A. finish

COMINCO LTD. TOR. MINTO RECCE. TL93-079 SEPT 24/93
(KOGALUK SOUTH)
SOILS V. GROSL

	TOR. LAB NUMBER	SAMPLE #	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Au ppb	ORGANIC
1	B9300623	185030		MISSING				
2	B9300624	185031		MISSING				
3	B9300625	185112	13	11	24	<1	9	0
4	B9300626	185113	14	15	26	<1	3	0
5	B9300627	185114	18	13	34	<1	1	0
6	B9300628	185115	34	14	43	<1	20	0
7	B9300629	185116	22	15	50	<1	3	0
8	B9300630	185117	2	12	27	<1	6	0
9	B9300631	185118	5	15	32	<1	2	4
10	B9300632	185119	2	13	22	<1	1	1
11	B9300633	185120	8	18	32	<1	<1	4
12	B9300634	185121	15	12	43	<1	1	0
13	B9300635	185122	41	11	38	<1	4	2
14	B9300636	185125	31	14	78	<1	1	0
15	B9300637	185126	10	21	48	<1	3	0
16	B9300638	185127	19	18	21	<1	2	3
17	B9300639	185128	37	24	53	<1	3	2
18	B9300640	185129	14	16	38	<1	<1	0
19	B9300641	185130	15	17	42	<1	<1	0
20	B9300642	185149	148	33	65	<1	5	4

CU,PB,ZN,AG HOT HNO3 A.A. finish
AU HOT BROMINE EXTRACTION FLAMLESS A.A. finish

COMINCO LTD. TOR. MINTO RECCE. TL93-080 SEPT 24/93
(KOGALUK CENTRAL)
SOILS V. GROSL

	TOR. LAB NUMBER	SAMPLE #	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Au ppb	ORGANIC
1	B9300643	185099	7	8	16	<1	2	0
2		185084		MISSING				
3		185083		MISSING				
4	B9300644	185085	48	11	28	<1	6	4
5	B9300645	185086	100	11	85	<1	1	1
6	B9300646	185087	11	7	26	<1	<1	0
7	B9300647	185088	10	8	26	<1	<1	0
8	B9300648	185089	14	9	28	<1	<1	3
9	B9300649	185090	<1	7	26	<1	12	2
10	B9300650	185091	<1	7	20	<1	14	3
11	B9300651	185092	78	9	27	<1	<1	4

CU,PB,ZN,AG HOT HNO3 A.A. finish
AU HOT BROMINE EXTRACTION FLAMLESS A.A. finish

COMINCO LTD. TOR. MINTO RECC. TL93-082 SEPT24/93
KOGALUK SOUTH, CENTRE

SOILS AND SILTS

	TOR. LAB NUMBER	SAMPLE #	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Au ppb	ORGANIC
1	B9300655	185131	65	13	63	<1	3	4
2	B9300656	185132	18	8	66	<1	10	2
3	B9300657	185133	32	10	42	<1	10	1
4	B9300658	185134	3	13	16	<1	3	0
5	B9300659	185135	12	9	44	<1	3	0
6	B9300660	171754	35	10	62	<1	<1	1
7	B9300661	171755	42	8	31	<1	2	4
8	B9300662	171756	<1	6	32	<1	1	4
9	B9300663	171757	14	8	38	<1	4	4
10	B9300664	171758	24	9	24	<1	2	3
11		171759		MISSING				
12	A9300113	185136	17	8	28	<1	<1	0
13	A9300114	185137	18	8	39	<1	3	1

CU,PB,ZN,AG HOT NITRIC ACID EXTRACTION A.A. finish
Au HOT BROMINE EXTRACTION A.A. finish

COMINCO LTD. TOR. MINTO RECCE. TL93-083 SEPT 24/93
KOGALUK NORTH
SOILS V. GROSL

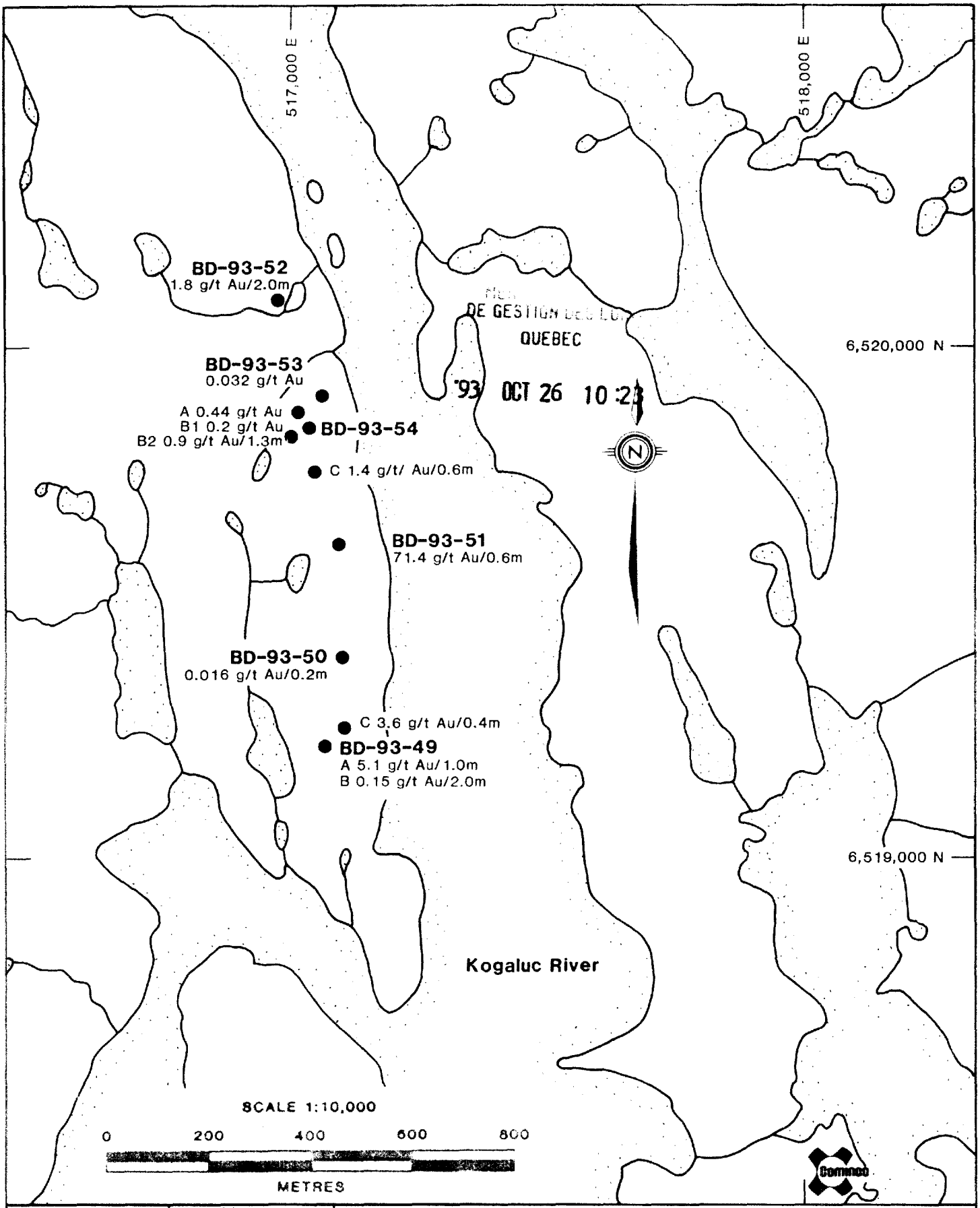
	TOR. LAB NUMBER	SAMPLE #	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Au ppb	ORGANIC
6	B9300665	185047	5	4	17	<1	<1	1
7	B9300666	185048	3	13	58	<1	<1	4
8	B9300667	185049	1	13	34	<1	8	4
9	B9300668	185050	<1	8	24	<1	10	4
10	B9300669	185046	111	11	29	<1	3	4
11	B9300670	185180	103	6	31	<1	4	4
12	B9300671	185181	94	21	63	<1	7	4
13	B9300672	185182	77	17	123	<1	<1	1
14	B9300673	185044	33	11	50	<1	<1	4
15	B9300674	185045	86	9	15	<1	<1	4
16	B9300675	185040	18	8	36	<1	<1	2
17	B9300676	185041	8	17	74	<1	4	0
18	B9300677	185054	23	19	44	<1	<1	3
26		185057	37	10	33	<1	<1	4

CU,PB,ZN,AG HOT HNO3 A.A. finish
AU HOT BROMINE EXTRACTION FLAMLESS A.A. finish

COMINCO LTD. TOR. MINTO RECCE. TL93-084 SEPT 24/93
(KOGALUK SOUTH)
SOILS V. GROSL

	TOR. LAB NUMBER	SAMPLE #	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Au ppb	ORGANIC
1	B9300678	185014	<1	3	34	<1	1	4
2	B9300679	185016	12	4	26	<1	16	0
3	B9300680	185018	5	<1	12	<1	6	0
4	B9300681	185023	23	9	41	<1	14	3
5	B9300682	185025	19	13	30	<1	10	4
6	B9300683	172241	19	12	51	<1	<1	2
7	B9300684	172243	5	13	29	<1	<1	0
8	B9300685	172246	<1	5	14	<1	<1	0
9	B9300686	165 ???	3	7	95	<1	<1	4
10	B9300687	165 ???	18	11	43	<1	<1	3

CU,PB,ZN,AG HOT HNO3 A.A. finish
AU HOT BROMINE EXTRACTION FLAMLESS A.A. finish



Drawn by: B.D.	Traced by: R.V.
Revised by: Date	Revised by: Date

KOGALUC NORTH

BD-93-51

N.T.S. 34 J/15

Scale:	Date:	Plate:
1:10,000	October 1993	7

LAKE

E

CH-0
1.7m
(6,22,30,365)

CH-1
1.5m
(38,24,94,<10)

CH-2
1.0m
(62,24,60,<10)

KOGALUC RIVER NORTH

ALTERED ZONE
Q-Carb (Mg,Fe) -Tourmaline
(py,chalco tr)
Channel Sampling

CH-3
1.4m
(28,24,74,<10)

CH-4
2.0m
(<1,30,84,<10)

CH-5
2.0m
(8,26,76,<10)

LEGEND

(6,22,30,365) Cu,Pb,Zn,Au
ppm ppb

N.T.S. 34-J-15

UTM E 517000
N 6520800

CH-6
1.5m
(22,24,76,<10)

70m to W Shore

KOGALUC RIVER

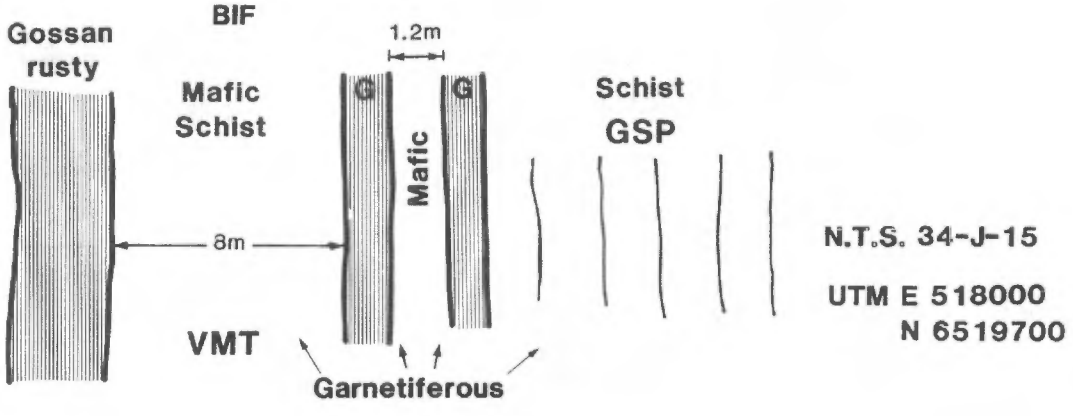
W

Drawn by: V.G.	Traced by: L.S.	
Revised by / Date	Revised by / Date	

KOGALUC RIVER NORTH
VG-93-94

Scale: Not to scale Date: July 1993

W E



VG-93-98

LEGEND

(6,22,30,365) Cu,Pb,Zn,Au
ppm ppb

V.G.		L.S.	

KOGALUC NORTH
GOSSAN

Scale: Not to scale Date: July 1993 Plate: 9