Cominco Ltd./P.O. Box 2000/Kimberley, British Columbia, Canada

Cominco

Kimberley Operations February 25, 1975 .

BC Geological Survey
Assessment Report
05463

This is to certify that I, Paul Ransom, G.A.C., am a graduate geologist with a-degree from McGill University in 1966, and that I have been practicing my profession in geology and the mining Industry since that time.

P.W. Ransom G.A.C.

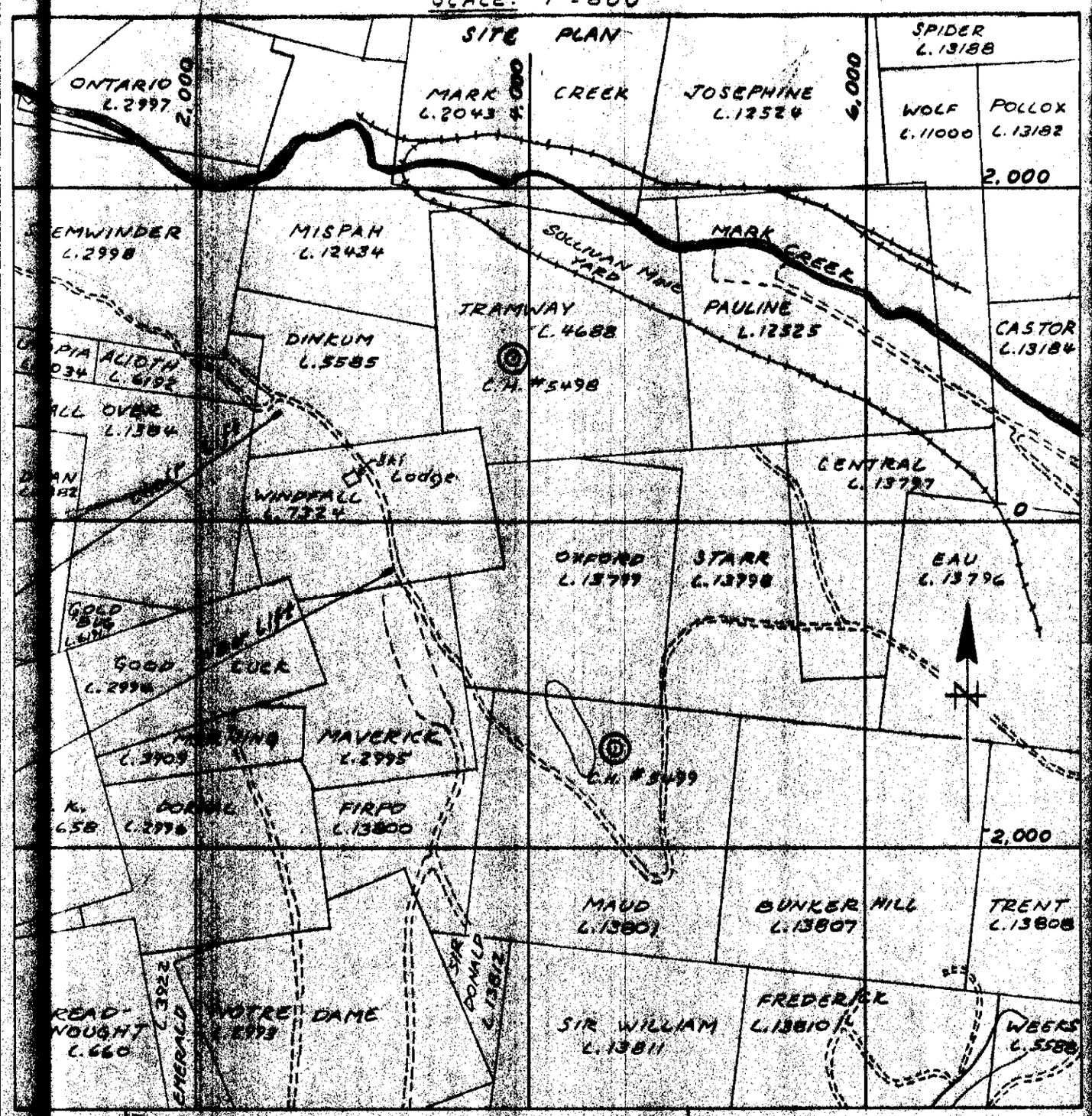
Geologist

MAPS
#1 Claim Location

COMINCO LIMITED

SULLIVAN MINE, KIMBERLEY, B.C.

SCALE: 1" = 800'



Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 5463 MAP #1

5463
MAP 1

Diamond Drill Geological Log

Cominco

Objective: Stratigraphic Information, North Star Hill

Sampled:

Logged By: P.W. Ransom

Date: Oct., Nov. 1974

Composites:

Block:	Sect.:	Place:	App. Bear:	App.: Dip.:	Length:
		Opposite 3900 Portal	0	-90	1916

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0

From	To	Discard:	Reason:
		KEEP - Core Location - Sullivan Mine Core Storage	

Latitude: 978.06 N

Departure: 3904.65 E

Elevation 4017.01

Down Hole Surveys:

Footage	Dip	True Bearing
225	-88½°	247°
490	-87°	087°
750	-82½°	087°
970	-80½°	080°
1170	-79¼°	reading in rods
1360	-77½°	reading in rods
1912	-68°	081°

Core Size

Hole No. 5498

Page

Diamond Drill Geological Log

Cominco

Objective:		Sampled:			
Logged By:	Date:	Composite%			
Block:	Sect.:	Place:	*pp. Bear:	App.: Dip.:	Length:

From 0 Discard: Reason:

From	To	Description
0	117	Overburden
117	160	Diorite, predominantly medium grained. One mm thick albite veinlets average of 1 per inch 117-136. Weakly sheared sections common varying 0 - 25° to c/a. Core appearance -- 30% broken. 158-160 Chill zone -- amphiboles in dark f.g. matrix. Contact with sediments appears to be 85° to c/a.
160	166	Siltite. some (A)S. Scattered fine beds, with finely dispersed Pyrrhotite. Core largely broke Some rusty fractures noted.
166	172	Zone of mixed sediments and diorite. This zone has a leached, slightly rotten appearance.
172	195.5	Granophyre. Fairly even - textured. uniformly disseminated P. Gradual increase.in arain-size 172-176, very fine to medium. First few feet indistinguishable from sediments. More mafic appearance 187-195.5. Patch with 2mm P cubes @ 189.5
195.5	200.5	Altered sediments, (A)S. Coarse Py patch 197.5
200.5	221	25 beds most 3 to 10 cm thick and 10-30 cm thick (14 each). The thickest (4 in all) less than 100 cm. All interpreted as graded with a minor 1 cm to 3 cm. A top, the remainder of the beds were generally siltite, rarely (Argillaceous) siltite. Transition A - S usually sharp. Dissem. sulfides. Sph. rarely galena noted over narrow bedded zones, the largest 8 cm. Nodule - like features noted, mainly P with Py and Sph. The&sulfides confined 210 - 221 Finely dissem. P. occurs throughout. See detailed breakdown

Core Size NQ

Hole NO. 5498 Page 1

40 Scale

Color Plot & Dips on Classes a Aver.

0

Diamond Drill Geological Log

Cominco

Objective:		Sampled:					40 Scale
Logged By:	Date:	Composites:					Color Plot & Dips / Ore Classes & Aver.
Block:	Sect.:	Place:	App. Bear:	App. Dip:	Length:		

From	To	Discard: Reason:
221	225	Siltite, 3 cm A band at top. Pale pink bands suggest sparsely dispersed Sph. Py on fractures.
225	226.5	Fracture zone. Broken core. Brecciated appearance. Vein with Qtz and Calcite occurs. Py on fratures.
226.5	229.5	Siltite, minor slightly A sections. An irregularly fractured and altered section @ 229 contains P, Py, Sph, and Gal. along a possibly altered sill 2 cm wide parallel to bedding.
229.5	231	Thin bedded section (4cm-30cm thicknesses). A Py fracture contains Sph and Gal where it crosses a mineralized bed.
231	233.5	Siltite - altered, numerous bleached cross fractures Splotchy e.g. Py near end, Gal, Sp, and P accompany it as well as being weakly disseminated.
233.5	265.0	Thin beds with occasional thicker bedded sections (over 2').
		Thin 233.5 - 234 Graded A - S
		Thick 234 - 235.5 (A)S, S. Py in fracts.
		Thin 235.5 - 236.5 Graded A - (A)S
		Thick 236.5 - 239.5 S, (A)S Py in few fracts. P dissem. in beds near 238.5
		Thin 239.5 - 243 Graded A - (A)S, S. P dissem. in silty beds. Py laminations noted. Hint of Sph.
		Thick 243 - 247 Banded and laminated. Predominantly uniform grain size (A)S Color variation (light to dark) and changes in P content are characteristic. One lam'd Py occurrence is cross bedded.
		Thin 247-247.5 (2 beds). The second contains Py grains in cross-bedded zone.

Core Siz NQ

Hole No. 5498 Page 2

Diamond Drill Geological Log

Cominco

Objective:	Sampled:	40 Scale
Logged By: Date:	Composites:	Color Plot & Dips / Ore Classes & Aver.

Block:	Sect.:	Place:	App. Bear:	App.: Dip.:	Length:

From	To	Discard:	Reason:

Thick 247.5 - 262 Thick beds, uniform (A)S, grey with several light colored lams. P, Py very sparse, occasional as lams. Disseminated Sph noted as well as fractures containing Py, Sph and Gal. From 259 - 259.5 is a cross laminated limy zone also 261.5 is a 2" laminated limy zone.

Thin 262 - 263 Py and dissem. sph noted.

Thick 263 - 264.3 Dk. grey AS, S with light grey laminae. 2 bands with disseminated Sph. Py fracture (1 bed)

Thin 264.3 - 265 Thin beds, SA - AS. Py fracture. Thick beds with occasional thin bed.

265.0 348.0 Most beds are laminated and banded. Sand AS are predominant with lesser A. The beds are graded in terms of hardness from soft to hard from top to base. Some basal portions are softer than the immediately overlying portion suggesting deposition of an unsorted layer before normal grading commenced. Several (15) short altered sections occur. A darkening of the core with attendant bleaching along fractures is characteristic, as well albite(?) phenocrysts are noted in some of the darkened sections, amphiboles at 323. Several dark and very hard zones, initially thought to be siltstone and part of normal graded sequences may be alteration zones. Sph occurs weakly disseminated in bands, laminae, irregular patches, some of the alteration zones and in the occasional concretion or nodule. Concretions or nodules occur sparsely from 290 - 318. Occasional fractures with Py, sometimes Sph and Gal were observed. Limy intervals @ 267.5 (2"), 271.5 (2"), 342 (4") calcite with actinolite. Numerous thin and hairline fractures with calcite. Six inch displacement on fault at 330. Very fine black laminae at 2 locations near end; 344.5 - 3" somewhat wavy and discontinuous, possibly cross laminated; 346 - 1.5". Very straight, even though discontinuities occur.

348 385 Fault zone. (Fractured sections continue to occur up to 406). 75% of core is broken, slickensides frequently occur sub-parallel to core and sub-perpendicular to core. Py is common on most fracture surfaces. P filling a fracture up to 1"

Core Size NQ

Hole No. 5498 Page 3

Diamond Drill Geological Log

Cominco

Objective:		Sampled:				
Logged By:	Date:	Composites:				
Block:	Sect.:	Place:	App. Bear:	App.: Dip.:	Length:	

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0

From	To	Discard:	Reason:
348	385	Cont'd	
		wide occurs from 367 - 369, 437 - 371. Seems to be thick bedded A-AS-S to 370 and' thin bedded' A-AS-S 370 - 385.	
		Alteration: Dark dense bands (in more silty parts of some beds) may be an alteration; also some bleaching along fine fractures in some of these zones.	
		Mineralization: P - laminae, disseminated in bands up to 4", in fractures, in cross laminae and small irregular splotches, occasionally more toward the base of coarser beds. Some Py may occur in cross-laminae. Sph occurs mainly within the first 7 feet, primarily within a P-Py-Sph fracture and 2 altered zones. A narrow band of dissem Sph noted at start.	
385.0	392.6	Medium-thick bedded seds, predominantly S and AS with thin A tops. Thinly laminated at very end (for 6"). P observed sparingly as thin laminations and as discontinuous laminations. Cross-fractures contain P&Py. Sph obs at 389 (few fine specks).	
392.6	394.0	Predominantly S, some A. Cross - fractured moderately with P fillings. Has brecciated appearance, some pull-apart A layers noted.	
394.0	404.0	Thin and thick beds. The A tops of several thin beds near 397 are limy. One thick bed 399 - 401 is predominantly S. A 5 cm limy S bed occurs at 401.5 and it contains feldspathic porphyroblasts. Alteration is fairly intense last 18".	
404.0	405.0	Light grey silty-limestone.	

Core Size NQ

Hole NO. 5498 Page 4

Diamond Drill Geological Log

Cominco

Objective:			Sampled:		
Logged By:	Date:		Composites:		
Block:	Sect.:	Place:	App. Bear:	App.: Dip.:	Length:

From 0 Discard: Reason:

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0

From	To	Description
405.0	444.5	Thin-bedded sequence with occasional thick beds (S,AS with A tops). The A tops are generally 1 to 2 cm thick or less with fine white flecks; as well, round calcite grains about 1mm diameter and quartz grains 1mm diameter have been noted. Alteration is fairly intense near contact with overlying limy bed. Narrow weakly limy sections occur generally less than 5 cm thick. Occasional altered sections occur. Sulfides are fairly rare except for the occasional cross fracture and otherwise are more likely to occur near and in altered sections. Drillers report Cave @438 - 439.
444.5	446.0	Pale grey silty limestone.
446.0	471.0	Thin to med. bedded, primarily S and AS with A tops, a number of which are limy. There are some altered zones, the most intensely altered section is that underlying the 444.5 - 446.0 limestone. Weakly limy zones are noted in some of the altered sections. About 2cm dark and light laminated S is cross bedded at base of first altered section. Very dark brown hard dense S in last 6" is altered.
471.0	472.0	Impure limy AS, greenish with pale pink garnet porphyroblasts to 1 cm diam. Calcite filled fractures noted.
472.0	485.8	Medium (<2') bedded with some thin bedded sediments. Predominantly hard dark S, some AS, minor A (as tops). P occurs sparingly in fractions and laminated S fine disseminations. b e d top e t 4 8 3 .
485.8	486.5	Impure silty blue-grey limestone with pink garnets and actinolite.
486.5	500.0	Thin bedded sediments predominantly S with A tops. Three altered zones, 486.5 - 487 most intense.

Core Size NQ

Hole No. 5498 Page 5

2507—N.D.N.

Diamond Drill Geological Log

Cominco

Objective:	Sampled:
Logged By: Date:	Composites:

Block:	Sect.:	Place:	App. Sew:	App.: Dip.:	Length:

From o Discard: Reason:

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0

From	To	Description
500.0	552.5	Medium-bedded sediments with occasional thin-bedded sections the most extensive being; 515-517, 522-523, 529.5-530, 535.5-537, 539-539.5. Beds thicker toward end. Bases of thickest beds are the hardest (S). AS beds and A tops are common. Long narrow qtz - P fractures run along the core several feet (542-550). Altered zones occur every 5 to 10 feet. A 2" limy bed at 549. Strong alteration 552.0-552.5.
552.5	553.7	Light grey impure silty limestone. Darker cross laminations.
553.7	616.0	Thin-bedded sequence. Initially 3 large beds followed by more closely spaced beds. Narrow zones of P laminations and cross laminations up to 2 cm thick. Diffuse disseminated P noted also. Few fractures contain P, Py. Limy beds: 5cm, 2cm @ 556 (laminated, minor alteration), 8cm, @ 561 in more heavily altered zone; 4cm (laminated minor alteration) @ 577; 3cm @ 578; 10cm @ 580.5 (Cross-laminated); part of large nodule @ 584 (10 cm very, cross-laminated); 5cm (weak) @ 595; 602-602.8 (part of altered zone). 8cm (weak) @ 604. Pink albite or garnet porphyroblasts generally occur in the limy zones. These limy zones typically occur in altered sections. Altered zones are common, 6" - 2' wide. Core cut by numerous P-filled fractures 596-598 and 609-614.
616.0	617.0	Impure silty-limestone. Top 3" contain augen up to 4mm diameter. Uniform appearance, grey. TS of top.
617.0	646.0	Thin bedded sequence with occasional limy horizons and altered zones. Sediments appear to be (A)S where not altered with thin A tops (0.5-3cm) containing varying quantities of rounded grains of quartz. The beds have a gradation in hardness. A 6" bed for T.S.S.(4). Limy beds: 617.5-618 (Lam'd near top, augen); 620 (5cm); 627 (5cm, cross laminated); 634 (8cm, cross-lam); 635 (to 5cm, part of nodule); 639(part of alt'n zone 8cm); 642-643 (lenticular limy layers interfingering with altered siltstone. P-filled fractures 634. c/a 81° @620,

Core Size NQ

Hole No. 5498 Page 6

2507—N.D.N.

Diamond Drill Geological Log

Cominco

Objective:		Sampled:				
Logged By:	Date:	Composites:				
Block:	Sect.:	Place:	App. Bear:	App.: Dip.:	Length:	

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0

From	To	Discard:	Reason:
617.0	646.0	76° @ 645.	
646.0	649.0	Lamprophyre dike, contains biotite. Porphyritic, 70% coarse feldspar in very fig. dark brown-black matrix which contains considerable calcite. Contacts: 646.0 is 11°, muddy, 1" wide foliated zone; 649.; is 20°, foliated.	
649.0	702.0	Thin bedded sequence, rare limy zones, only slight evidence of alteration. Short zones were fractured, some broken. P laminae and disseminations over widths of about 1cm noted, however not common. Limy zones: 656.5 - 656.8 (lam'd); 668.5-668.8 (uniform light grey with augen); 686.5 (3cm); 690 (1cm); 700 (3cm). c/a 80° @ 680'. Sample with P lams at base of S bed for T.S. 659. Beds are predominantly dark S with 1 to 3 cm A tops. The A is typically med. grey, uniform sometimes a little limy with fine white specks after 680 and with quartz grains after 690. P in fractures especially 679.	
702.0	712.0	Broken ground with mud 702 - 705. Slickensides observed on several fragments. Alteration of some of the core. Py (Marcasite?) observed on many fracture surfaces.	
712	870	Thin bedded sequence, some beds up to 2'. Some of the thicker beds show alteration which sometimes has $CaCO_3$ associated with it. Beds are typically S and (A)S with 0.5 to 3 cm A tops. Tops often contain qtz grains or white flecks. Core broken 735-736.5. Minor fracturing with associated Py. Limy zones are not common: 715 - 715.8 (in alt'd zone); 733.5 734.0 (Grey and pink banded in alt'd zone); 738 (3cm); 741 (6cm); 771 (6cm); 779.5 - 780; 782 (3cm); 827.5 (6cm alt'd). Altered zones occur at 5 to 10' intervals, they have reddish stain, bleaching of fractures, are very hard, pinkish-white augen are common.	

Core Size NQ

Hole No. 5498 Page 7

. Diamond Drill Geological Log

Cominco

Objective:		Sampled:				40 Scale
Logged By:	Date:	Composites:				Color Plot & Dips / Ore Classes & Aver.
Block:	Sect.:	Place:	App. Bear:	App.: Dip.:	Length:	0
From 0	Discard:	Reason:				

From	To	Description
		A tops are very thin 755-790, generally less than 3 cm elsewhere. Thin P laminae and thin weakly dissem. and laminated P bands occur irregularly, however they are a typical feature of this section. From 755-60 these P features are abundant. Good P lams @ 778.5 (2cm). Several Pyrrhotite bands 841-846 P in fractures ¼" - ½" wide @ 751, 753, 759. Section of 1 to 2 cm of black graphitic laminae noted 817-818.5; 826.9-827 (which is the same as a cut off one @ 809.5); 866 (1cm). Fractured (not broken) zones; 810-11, 813-15, 819-20. Mud 847-856 (no core). 2 t.s. @ 773.0 with white flecks in A - half of specimen to V. Ethier of U of A. c/a 72° @ 750, 78° @ 800, 74° @ 847.
870	893	Largely altered: 870-72; 874-79, 889-93. Intervening thin bedded sediments not altered or only slightly altered. Alteration appears reddish cut by green fractures, massive green 878-79. A very well laminated zone 884-884.5, over printed by alteration.
893	899	"Limestone". 40% grey lenticular bands and laminae of limy siltstone. Matrix is dark brownish siltstone.
899	973.5	Sediments, thin bedded, alteration is fairly extensive though not 100%. Core is about 75% broken 932-948, 956-fractured zone similar in appearance to 813-15 occurs from 951-955 and 960-64. Calcite noted in fractures. Extremety fine laminae occur 910.5-914.0 -- fine white laminae in dark brown matrix, slightly limy in middle. Fine grey laminae 952-953. Patches of spotted alteration occur at 948.5, 965 and 966. Limy sections: 908.5-909, 910, 910.5 (3cm); 915.5 (4cm); 916 (6cm), 922 (6cm), 970.5 (6cm). The first 3 are typically cross laminated, the remainder evenly laminated. c/a 68° @ 925; 50° @ 955.
		Driller reports crack 940-945. End of NQ core.

Core Size NQ

Hole No. 5498 Page 8

2507—N.D.N.

Diamond Drill Geological Log

Cominco

Objective:		Sampled:			
Logged By:	Date:	Composites			
Block:	sect.:	Place:	App. Bear:	App.: Dip.:	Length:
From 0	Discard:	Reason:			

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0

974	1006	Start BQ core. SA - AS with very hard altered sections, Banded with some sections containing very fine laminations. 6" good laminations at 986. Several short limy sections. c/a 53° @ 980, 60° @ 1000. Possible granules at 993, 997 and 1004, are composed chiefly of P and in 1 case chlorite and P.
1006	1132	Laminated and banded sediments, primarily AS with occasional A laminations and limy beds. Sample for t.s. @ 1020 AS with fine grey laminae, easily scratched. Fine diffuse laminae occur practically throughout. They are generally grey or brown when in a limy or altered zone. Bands without these fine laminae noted more frequently after 1045. Cross laminae noted in limy zones 1009.5, 1015, 1017, 1031.5. Limy zones: 1009 (10cm); 1013-1013.5; 1021.5 (6cm); 1031.5 (6cm); 1032.5-1033 (dard grey uniform resembles AS); 1036.5-1037 (med. grey, dark green spots and P. Specimen for t.s. from base) 1045 (5cm); 1058.5 (4cm); 1061 (5cm); 1070.5 (2cm); 1071 (4cm); 1078 (4cm); 1082.5 (6cm); 1108-10.5 (dark grey massive, some cross bedded and lenticular) 1111 - 13.5 (in altered zone); 119 (4cm); 127 (8cm), 1130-1130.7, 1131.5 (3cm). Sulfides generally rare but noted at: 1025 (1cm bed, denser toward base); 1037.5 (very fine laminae); 1039 3cm disseminated 0.5mm P grains, bleached fractures extend 2 - 3 cm from this bed); 1039.8 (4 bands 0.5 to 1cm ea P in dark (A?)S, P grains fine to 1mm); 1042 (2cm-2 small laminated P bands); 1044 (1cm dissem. band); 1051.5 (0.5 cm irregular P band); 1055 (2cm, 30% dissem. P grains to 1mm); 1056 (4cm 10% P grains); 1058 (1cm graded P); 1079 (2cm with f.g. dissem. ZnS), 1082.5-1083 (3 sets P lams); 1088 (Fracture Zn Specks); 1097 (Fracture Zn), 1101-1102.5, 1106 (Zn Specks), 1108, 1111-12 (specks P, ZnS) and few other less significant P occurrences occur. 1124 Fine Plans 2 cm. Alteration gen. unsignificant until 1085 then a few altered zones and broken core to end. c/a 42° @ 1020; 47° @ 1040; 55° @ 1062, 63° @ 1084, 66° @ 1100
1132	1142.0	Lamprophyre dike. Mud reported 1137-1142. Dike is dark with numerous white phenocrysts and abundant biotite. Phenocyrysts and dark matrix effervesce strongly with dilute HCl. TOP contact 19°. 1136-37 broken, the rest solid

Core Size BQ

Hole No. 5498

2307—N.D.K.

Diamond Drill Geological Log

Cominco

Objective:	Sampled:	40 Scale
Logged By: Date:	Composites:	Color Plot & Dips / Ore Classes & Aver.

Block:	Sect.:	Place:	App. Bear:	App.: Dip.:	Length:

From	To	Discard: Reason:
1142.0	1155.9	Medium bedded AS. Most of core broken. Some short altered sections noted. c/a @ end 70°.
1155.5	1160	Lamprophyre dike. Solid core. Not nearly so effervesent as 1132-42. Similar in other respects. Top contact 37°, bottom contact probably 18°.
1160	1208	Thin bedded, banded, and weakly laminated sediments AS, ASQ, and A bands. A bands noted to have quartz grains, some A bands have no quartz at base and then grade upward. The A bands are typically thin, often 5mm thick. Several short altered sections noted. A few fine P fractures also observed. c/a 58° @ 1162'; 60° @ 1200'. A 3 cm limy bed @ 1180.
1208	1265	Thin bedded sedimants with characteristically light grey A bands, a few dark A bands also occur, occasional medium beds are found. The beds are well graded and may cosist of ASQ and SQ in places. Limy beds: 12 5.5-12 5.5 (banded limy quartzite); 1239.5 - 40.3 (impure limestone with prismatic green phenocrysts at contact - T.S.). Narrow P bands were observed but they are rather insignificant. c/a 60° @ 1225; 61° @ 1250.
1265	1336	Thin to medium bedded ASQ and f.g. AQ with narrow A bands. Generally a medium grey color becomes reddish brown after 1320 where it is more altered and tending to grade into the next section. Five short (5cm) dark siliceous spotted bands in first 12'. A greyish-green spotted altered section 1287-88 has calcite filled fractures. Occasional short well laminated sections occur some faintly laminated ASQ discernable. Alteration typically affects only short sections. Occasional broken core and slickenside noted. Pyrrhotite bands occur infrequently. A fairly distinct patterned set of laminations noted @ 1295 however this section is highly silicified. c/a 53° @ 1275'; 58° @ 1300'; 65° @ 1325'.

Core Size

Hole No. 5498 Page 10

2507—N.D.N.

Diamond Drill Geological Log

Cominco

Objective:		Sampled:			
Logged By:	Date:	Composites:			
Block:	Sect.:	Place:	App. Bear:	App.: Dip.:	Length:

40 Scale

Color Plot & Dips | Ore Classes & Aver.

From	To	Discard:	Reason:

1336 1427 Thin-bedded and laminated A and AQ, though finer grained A-AS is more characteristic of the first 20'. The quartzitic beds are very argillaceous throughout. The entire section has a characteristic banding and is a medium to light grey in color. Altered zones, generally less than 1 foot thick but up to 2 feet thick occur throughout this section (less frequent in the middle). A trace of P noted in the fine grained portion in the first 20' rarely noted after. From 1344-47 is an altered zone with minor carbonate and irregular fractures containing P. At 1350.5 is a rounded feature, possibly a concretionary stain (2cm x 3cm). Laminations at very end are wavy and vary in thickness. Specimens for T.S. 1351.5 base of 10cm bed and A portion of underlyingbed; 1385 a hard dark band, overlying a soft A(Q). c/a 62° 1350'; 65° @ 1375; 65° @ 1400'; 72° @ 1425'.

1427 1441 Altered zone - sediments darkened and criss-crossed with a multitude of fine pale green bleached fractures. A pink-green section @ 1429 suggestive of albitization (T.S. sample). Several spotted spherulite - granule bearing bands observed. More intriguing however is that some of these granule bands contain angular light colored patches up to 5mm that may represent salt casts, two for t.s. 1436 base of a 10cm bed of AS, and 1437, in the middle of a 10 cm AS bed.

1441 1542 A zone of sediments, predominantly banded and laminated SA - AS, characterized by a profusion of spherulite - granule bands 2 - 5 cm thick and spotty laminated zones of possibly similar genesis. The coarser granulite - sherulite zones appear to vary in abundance and thickness through this section, the spotty laminated zones are more characteristic of 1470 - 1510. Laminated bands of the "black mud" type are at 1516 (10cm) and 1530 (6cm). The granules or spherulites are of several types generally round to elliptical; (1) dark centres, lighter halos, in a dark matrix (2) solid light, (3) Solid dark. Occasional irregular bedding contact looks stylolitic. Samples for T.S.1570.5 Spherules appear to be related to post-depositional Structures. Band in last

Core Size

Hole No. 5498 Page 11

2507—N.D.N.

Diamond Drill Geological Log

Cominco

Objective:		Sampled:				
Logged By:	Date:	Composites:				
Block:	Sect.:	Place:	App. Bear:	App.: Dip.:	Length:	
From 0	Discard:	Reason:				

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0

From	To	Description
1441	1542	Cont'd.
		foot consists of quartz grains in a pyrrhotite matrix. c/a 70° @ 1450'; 63° @ 1475'; 66° @ 1500'; and 60° @ 1525'.
		Small gouge @ 1518'.
1542	1590	Spotted sediments, some fine-grained banded siliceous section and some AS. The more siliceous sediments are often
		spotted with greenish flecks. Some textures are relict granule-type. Banding and sometimes laminations are common.
		Core appears to have been brittle and is broken through most of the section. T.S. 1550 - sample has albitic look,
		several such zones occur.
1590	1630	Altered sediments - greenish to bleached appearance, fracturing variable. Broken core 1626 - 30.
1630	1643	Rotten and broken diorite with mud 1634-37.
1643	1736	Coarse - grained gradually diminishing to medium - grained diorite. Mud and lamprophyre fragments 1649-1652.
1736	1740	Lamprophyre dike. Top contact @ 50°, bottom contact probably 15°.
1740	1886	Medium-grained diorite, slightly lighter looking than previous section. Occasional 2 foot greyish zone noted.
		Micaceous zone, a little broken core, 1832-38 (rods stuck here). Grain size gradually diminishing slightly (still
		medium), greyish tone practically continuous after 1850.
1886	1899	This section starts off with about 2 feet of mylonite slightly broken in middle
		(T.S.); then medium - grained diorite slightly broken to 1895; then soft material

Core Size

Hole No. 5498 Page 12

Diamond Drill Geological Log

Comnco

40 Scale

Objective:

Sampled:

Logged By: Date:

Composites:

Color Plot & Dips Ore Classes & Aver.

Block:	Sect.:	Place:	App. Bear:	App.: Dip.:	Length:

From	To	Discard: Reason:
1886	1899	Cont'd.
		of indeterminate grain size 1895 - 1899.
1899	1916	Heavily altered diorite, fine-grained and some relict medium grained texture. Core slightly broken.
		END.

Signed P.W. Ransom, G.A.C.

Core Size

Hole No. 5498 Page 13

Diamond Drill Geological Log

Cominco

Objective:	Sampled:
Logged By: Date:	Composites:

Block:	Sect.:	Place:	App. Bear:	App.: Dip.:	Length:

From	To	Discard:	Reason:

Runs	Shorts	Runs	Shorts	Runs	Shorts	Runs	Shorts	Runs	Shorts	Runs	Shorts	Runs	Shorts	Runs	Shorts
127	0.5	268	0	445.5	1.0	644.5	0	827	0	962	0				
136	2.0	278	0	455	0	655	0	837	0	964	0.5				
140	0	288	0	465	0	666	0	847	0	967	0				
145	0	298	0	468	0	676	0	856	9.0	969	0				
152	0	308	0	478	0	686	0	865.5	0.5	973	0				
162	0	318	0	478	0	696	0.5	868	0.5	973.5	0				
164	1.0	328	0	497	0	702	1.0	871.5	0.5						
165	0.5	338	0	507	0	705(mud)	3.0	876.5	0						
168	1.0	348	0	517	0	708	0	886	0						
170	1.0	350	0	527	0	712	1.0	894	0						
180	0	351	0	537	0	722	0	899	0.5						
191	1.0	355	1.0	547	0	732	0	904.	0						
200	0	361	1.5	557	0	742	0	907	0						
208	0	367	0	561	0	751	1.0	916	0						
210	0	376	0	564	2.0	761	0	927	0						
211	0	381	2.0	574	0	764	0	930	0						
221	0	383	0	584	0	774	0	935.5	0.5						
226	1.5	393	0(+1)	594	0	783	1.0	937.5	0						
228	0	403	0(+1)	604	0	794	0	940	0.5						
238	0	413	0(+1)	614	0	797	0	945	4.5						
248	0	423.5	0.5	624	0	807	0	948	0						
250	0	[illegible]	1.0	[illegible]	0	817	0	950	0						

Core Size

Hole No. 5498 Page 14

40 Scale

Color Plot & Dips | Ore Classes & Aver.

0

2507—N.D.N.

COMINCO LTD.

SULLIVAN MINE KIMBERLEY, B.C.

CORE HOLE DIAMOND DRILL NO. 5498 (TRAMWAY GROUP)
COST SUMMARY

Date	Invoice	Expenditure	
Oct. 16/74	029	$11,521.40	Not acceptable - previous year.
Nov. 1/74	030	$14,028.90	Drilling
Nov. 15/74	031	$ 7,251.05	Drilling
Dec. 2/74	033	$ 5,210.82	Drilling
Feb. 7/75	039	$ 1,244.80	Pull casing.
Oct. 16 - Nov. 30/74	-	$ 3,040.00	Cominco Geological Supervision, dip surveying, core logging and report preparation.
Nov. 1974	-	$ 210.00	Truck rental.
Nov. 1974 (Attached)		$ 770.00	Incidental
Total Cost		$43,276.97	
Cost per foot 0-1916'		$ 22.59	
Useable Expenditures for Assessment Credits		$31,755.57	= 158 years

ALB/es
Sullivan Mine
February 18, 1975

INVOICE NUMBER

029

Cominco Ltd.,
P. Oi Box 2000,
Kimberley, B. C.

WESCORE DRILLING LTD.

BOX 760,
INVERMERE, B.C.
(604) 342-9932

PROJECT	P.O. NO.	TERMS NET	INVOICE DATE
North Star	S 9008 R	30 days	Oct. 16, 1974

DETAILS	HOURS OR FOOTAGE	RATE	AMOUNT
Diamond Drilling			
Preparing Drill Site (1 day - 3 men)	24 hrs.	9.20	220.80
Overburden 0'-117'	117 ft	10.90	1275.30
Core Drilling 117'-500'	383 ft	10.30	3944.90
500'-761'	261 ft	11.10	2897.10
Drill Mud - 58½ bags		5.85	342.23
Quik Trol - 2 bags		6.15	12.30
Tannex - 1 bag		20.60	28.60
Cellex - 1 bag		116.05	116.05
Caustic Soda - 1 bag		rb.55	14.55
Kwik Seal - 165 lbs.		0.71	117.15
Diesiel Fuel - 75 gals.		0.46	36.00
Wheat Bran - 150 lbs.		7.50	7.50
Cement - 6 bags		9.65	57.90
Kutwell Oil - 45 gals.		63.50	63.50
Mud Circulation -	24 hrs.	30.14	723.36
Cementing -	9 hrs.	30.14	271.26
Core Boxes - 60 NQ Core Boxes		4.50	270.00
200 BQ Core Boxes		4.50	900.00
Trucking Cat		112.50	112.50
Install Extra Waterline	12 hrs.	9.20	110.40
		TOTAL	11521.40

Not acceptable - previous years work. OK 10%

CORE DRILLING
SURFACE AND UNDERGROUND

MINE AND EXPLORATION DRILLING
DAM AND FOUNDATION TESTING

Members of the Canadian Diamond Drilling Association

TO

Cominco Ltd.,
P. 0. Box 2000,
Kimberley, B. C.

INVOICE NUMBER
. 030

WESCORE DRILLING LTD.

BOX 760,
INVERMERE, B.C.
(604) 342-9932

PROJECT	P.O. NO.	TERMS NET	INVOICE DATE
North Star	S 9008 R	30 days	Nov. I, 1974

DETAILS	HOURS OR FOOTAGE	RATE	AMOUNT
Diamond Drilling			
Hole NO. 5498			
Core Drilling 761' - 973'	212'	11.10	2353. 20
973' -1000'	27'	10.26	277. 02
1000' -1500'	500'	11.10	5550. 00
1500 -1916'	416'	11.90	4950. 40
Dip Tests	5½ hrs	27.40	150. 70
Installing Casing 0' - 973'	4 hrs	40.26	161. 04
Cementing	18½ hrs	30.14	557. 59
Cement - 3 bags		9.65	28. 95
		TOTAL 4	14028. 90

CORE DRILLING
SURFACE AND UNDERGROUND

MINE AND EXPLORATION DRILLING
DAM AND FOUNDATION TESTING

Member of the Canadian Diamond Drilling Association

TO

Cominco Ltd.
P. O. Box 2000.
Kimberley, B. C.

INVOICE NUMBER
031

WESCORE DRILLING LTD.

BOX 760,
INVERMERE, B.C.
(604) 342-9932

PROJECT	P.O. NO.	TERMS NET	INVOICE DATE
North Star	S 9008 R	30 days	Nov. 15, 1974

DETAILS	HOURS OR FOOTAGE	RATE	AMOUNT
Diamond Drilling			
Hole No. 3498			
Caustic Soda - 3 bags		14.55	43.65
Wheat Bran - 150 lbs.		7.50	7.50
Quik Trol - 6 bags		6.15	36.90
41 BQ Drill Rods		41.16	1687.56
118 Feet NW Casing		6.98	823.64
1 NW Casing Shoe		256.20	256.20
Install Extra Waterline	22 hr	9.20	202.40
Cementing, Getting Out Rods, Working On Casing			
2 men	44 hr	27.40	1205.60
3 men	70 hr	36.60	2562.00
1 man	8 hr	18.20	145.60
cat - D6	14 hr	20.00	280.00
		TOTAL $	7251.05

CORE DRILLING
SURFACE AND UNDERGROUND

MINE AND EXPLORATION DRILLING
DAM AND FOUNDATION TESTING

Member of the Canadian Diamond Drilling Association

INVOICE NUMBER 031

Cominco Ltd
P. O. Box 2000,
Kimberley, B. C.

WESCORE DRILLING LTD.

BOX 760,
INVERMERE B.C.
(604) 342 9932

PROJECT	P.O. NO.	TERMS NET	INVOICE DATE
North Star	S 9008 R	30 days	Dec. 2, 1974

DETAILS		HOURS OF FOOTAGE	RATE	AMOUNT
Diamond Drilling				
Hole No. 5498				
970 Feet Casing (97)			46.26	4487.22
1 BW Shoe			176.40	176.40
Working On Casing	2 men	12 hrs	27.40	328.80
	1 man	12 hrs	18.70	218.40
Moving From Hole No. 5498 to Hole No. 5499				
Over 32 Man Hrs	4 men	17 hrs.	45.80	778.60
	3 men	8 hrs.	36.60	292.80
	2 men	17 hrs.	27.40	465.80
Cat - D6		10 hrs.	20.00	200.00
Hole No. 5499				
Overburden	0'-142'	142'	10.90	1547.80
Core Drilling	142'-424'	282'	10.30	2904.60
Drill Mud - 55 bags			5.85	321.75
Kwik Seal - 110 lbs.			0.71	78.10
Wheat Bran - 100 lbs.			5.00	5.00
Diesiel Fuel - 50 gals			0.48	24.00
Heating Water - 2 tanks propane			24.80	24.80
Mud Circulation		15 hrs.	30.14	452.10
Cementing, Drilling Out Cement	2 men	31 hrs.	30.14	934.34
	1 man	4 hrs.	18.20	72.80
PO NQ Core Boxes			4.50	360.00
Dip Test		1 hr.	27.40	27.40
			TOTAL $	13700.71

CORE DRILLING
SURFACE AND UNDERGROUND

MINE AND EXPLORATION DRILLING
DAM AND FOUNDATION TESTING

Member of the Canadian Diamond Drilling Association

TO

Cominco Ltd.,
P. O. Box 2000,
Kimberley, B. C.

INVOICE NUMBER
039

WESCORE DRILLING LTD.

BOX 760,
INVERMERE, B.C.
(604) 342-9932

PROJECT	P.O. NO.	TERMS NET	INVOICE DATE
North Star	S 9006 R	30 days	Feb. 7, 1975

DETAILS		HOURS OR FOOTAGE	RATE	AMOUNT
Diamond Drilling				
Hole No. 5499				
Reaming, pulling Casing		36 hrs	30.14	1085.04
1 BW Casing shoe			176.40	176.40
1 BW Casing Bit			261.25	261.25
1 BW Casing Shell			196.75	196.75
Getting Rods Out	2 men	10 hrs	27.40	274.00
	3 men	16 hrs	36.60	585.60
	4 men	16 hrs	45.80	732.80
40 BQ Rods			41.16	1646.40
142 Feet NW Casing			6.98	991.16
1 NW Casing Shoe			256.20	256.20
Move back to #5498	2 men	8 hrs	27.40	219.20
and pull casing	3 men	8 hrs	36.60	292.80
	4 men	16 hrs	45.80	732.80
4 Bags cement			44.23	44.23
D6 Cat		17 hrs	20.00	340.00
Trucking Cat			132.50	132.50
Mob. & Demob.			600.00	600.00
TOTAL DUE				8567.13
Credit				
Rethread Rods			605.00	605.00
62 NQ Rods (Casing)			46.26	2868.12
118 Feet NW Casing			6.98	823.64
TOTAL CREDIT				4296.76
			TOTAL $	4270.37

CORE DRILLING
SURFACE AND UNDERGROUND

MINE AND EXPLORATION DRILLING
DAM AND FOUNDATION TESTING

Member of the Canadian Diamond Drilling Association

P. W. Ransom
245 - 107th Avenue
Kimberley, B.C.

December 13, 1974

INVOICE

Cominco Ltd.
Box 2000'
Kimberley, B.C.

In account with Cominco Ltd:

Rental of GMC 4 wheel drive, License No. 550-536, for the month of November at a rate of $200.00 per month.

Order No. S7312V

1 month	$200~00
tax 5%	$ 10.00
TOTAL	$210.00

P W. Ransom
Geologist

PWR:sjm

cc: JWC
PWR

COMINCO LTD.

SULLIVAN MINE KIMBERLEY, B.C.

RECAPITULATION OF SUPPLIES AND LABOUR
CHARGES SUPPLIED BY COMINCO LTD.
TO WESTCORE DRILLING LTD.

Reference - Attached Cost Collection Reports.

Group	Date	Amount $	Remarks
	November 1974	29	Valves - Drill rig water supply line.
	"	8	" " " " "
	"	41	5 bags - fondu cement.
	"	60	Wire and cable - down-the-hole blasting.
	"	8	Energizer - " " " "
	"	48	Labour - machining drill rods.
	"	576	" " " "
Tramway	Total $	770	
	December 1974	118	Fleck Bros. - plastic hose.
	"	183	21 sacks - fondu cement.
	"	1	Energizer batteries.
	"	245	Labour - machining drill rods
	"	390	" " " "
Maud	Total $	937	

ALB/es
Sullivan Mine
February 18, 1975