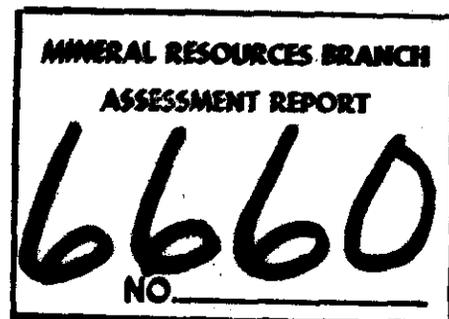


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COMINCO LTD.

SULLIVAN MINE

KIMBERLEY, B.C.

CANTON FRACTION GROUP ASSESSMENT REPORT

The following report describes the results of drilling D.D.H. 6420, a 459 m hole in the Kimberley area on the Canton Fraction crown granted mineral claim located in the Fort Steele Mining Division.

The NTS location is 82 F/9 E.

Latitude  $49^{\circ} 41'$  North.

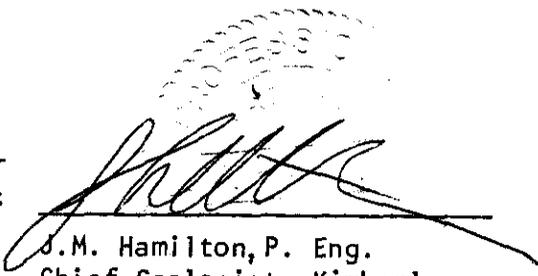
Longitude  $116^{\circ} 1.65'$  West.

Cominco Ltd., owner of the claims, was the operator of the exploration program.

P.W. Ransom is author of this report.

Date of Submission: March 1978.

Endorsed for  
Release by :

  
J.M. Hamilton, P. Eng.  
Chief Geologist, Kimberley

## Introduction

### i) Specific Location

D.D.H. 6420 is located on North Star Hill 3 km SSW of the Sullivan orebody. Access to the drill site is by road from the top of the Stemwinder ski run.

An index map, figure 1 is attached.

### ii) Property Definition

The property being investigated forms part of the Sullivan Mine claim group, owned by Cominco Ltd. Cominco Ltd. has operated the mine for about 70 years. The Sullivan orebody is the richest ore deposit in British Columbia and it has contributed a major proportion of the mineral wealth generated in the province.

### iii) One hole is being reported on in this report.

D.D.H. 6420 was drilled using H wireline tools, 9.6 cm in diameter, to a depth of 459 meters.

### iv) D.D.H. 6420 was collared on the Canton Fraction crown granted mineral claim.

Author's Qualifications

As author of this report, I, Paul W. Ransom certify that:

I am a geologist active in minerals exploration.

I am a graduate of McGill University with a degree of Bachelor of Science.

I have been continuously engaged in mining and exploration geology for twelve years.

I am a member of the Geological Association of Canada.

I supervised Cominco Ltd.'s Sullivan Mine area exploration drilling program in 1977.



*P.W. Ransom*

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

PWR:sjp  
March 8, 1978

## Detailed Technical Data and Interpretation

### i) Purpose

The purpose of D.D.H. 6420 was to test to a depth of 460 m the mineral potential of an area of poor outcrop on North Star Hill.

### ii) Results

No mineralization of economic value was encountered in D.D.H. 6420. A descriptive log accompanies this report.

### iii) Interpretation

D.D.H. 6420 drilled a sequence interpreted as Lower Aldridge sediments, consisting of argillaceous siltstones and argillaceous quartzites. These sediments are typical of sediments exposed to the west on North Star Hill. A series of faults separates these rocks from a Lower Aldridge conglomerate-bearing sequence to the east and north-east. One such fault was intersected from 443 m to 456 m. No significant mineralization was observed.

### iv) Conclusions

The mineral potential of the sequence of rocks drilled in D.D.H. 6420 has to be considered low in this area.



PATT  
L. 13930

GENEVA  
L. 3913

EUREKA  
L. 3920

UTOPIA  
L. 3034  
NO. 2

STEMWINDER  
L. 2998

ALLOT  
L. 6192

QUANTRELL  
L. 1383

ALL OVER  
L. 1384

LITTLE CHIEF  
L. 3569

BIG CHIEF  
L. 3567 FR.

DEAN  
L. 1382

PURL  
L. 13933

OVERT FR.  
L. 13932

MELTON  
L. 3568 FR.

CHAIRLIFT

GOLD BUG  
L. 6191

MIDNIGHT  
L. 1381

GREENHORN  
L. 3904

GOODL  
L. 2994

CANTON  
L. 5630 FR.

M  
L. 3909

FLUSH  
L. 13946

D.D.C.H G420

O.K. BARLIFT  
L. 658

KIMBERLEY SKI AREA.

FULL HOUSE  
L. 5631 FR.

NORTH STAR  
L. 657

MADLE LEAF  
L. 2919

LATE NO. 1  
16849

JACK POT 17844

DREADNOUGHT  
L. 660

BRANDON  
L. 5629

BUCKHORN  
L. 659

LATE NO. 2  
16850

LATE NO. 87  
16933

ROWAN  
L. 4095

DAFFODIL  
L. 4094

NO. 60  
16908

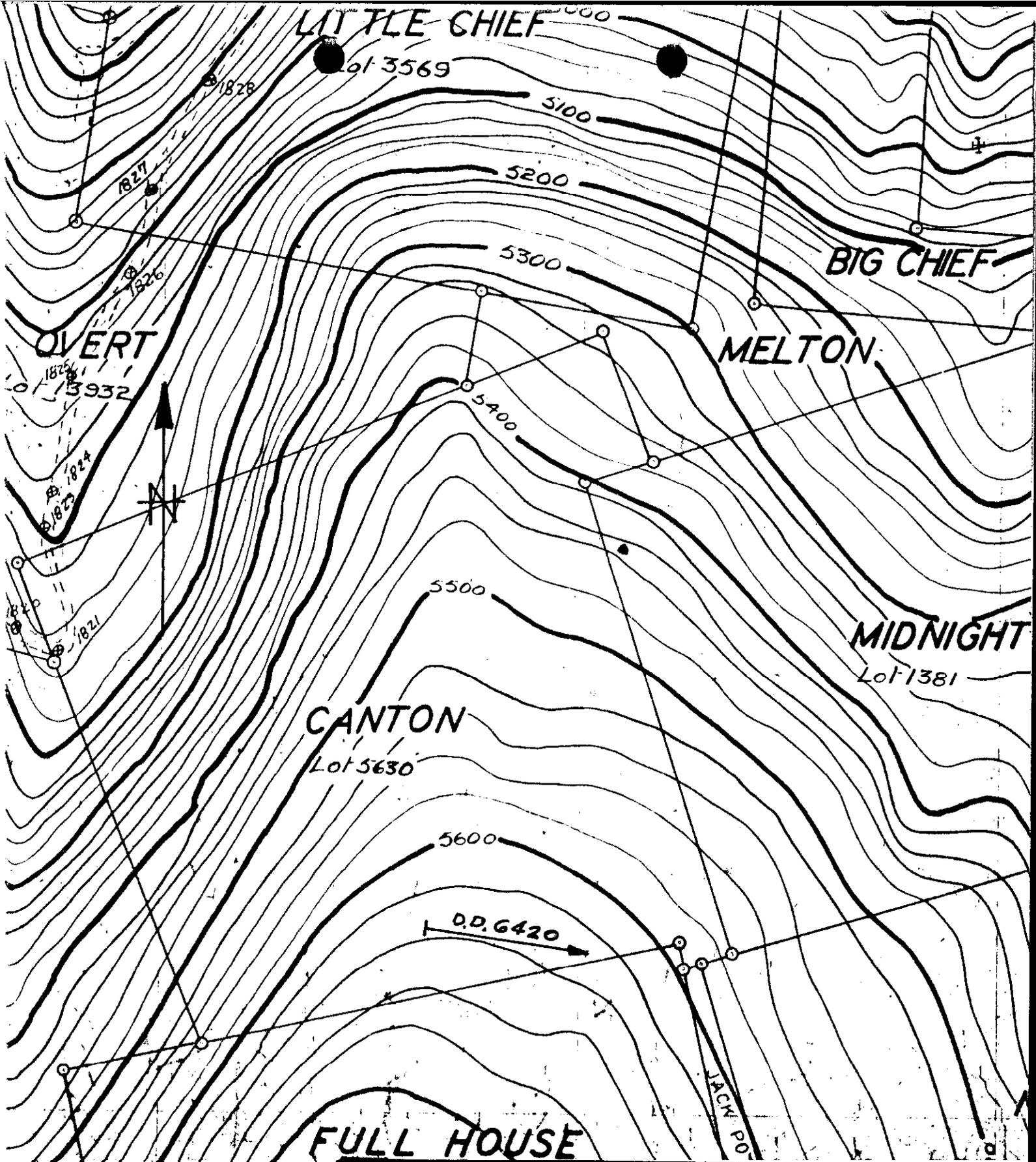
LATE NO. 5  
16907

COMINCO LTD.

SULLIVAN MINE

KIMBERLEY B.C.

CANTON FR. (C.G.M.C) GROUP



COMINCO LTD.  
SULLIVAN MINE                      KIMBERLEY B.C.  
CANTON C.G.M.C. - D.D.C.H 6420



# Diamond Drill Geological Log



Objective: Collared June 25, 1977 Sampled:  
 Completed July 12, 1977  
 Logged By: P. Klewchuk Date: Logged Nov. 1977 Composites:

Block: Sect: Place: App. Bear: App. Dip: Length:  
 North Star Hill, Canton Fraction Claim Lot 5630 Azim. 277° 58' 16" -75° 1506'

From To Discard: Reason:  
 Core stored in racks at Open Pit core lab.

*APW, R. Brown*

Collar Location: Lat. - 1618.49 S Apparent Angle on Lat Sect.  
 Dep. - 1980.08 W Collar all nearby  
 Elev. - 5589.27' 1076  
 1463

Down Hole Surveys: 1076' Dip - 71.5° Azim. 282° True  
 1463' Dip - 72° Azim. 284° True

Bed thickness classification in the drill log is as follows:

Lithology Abbreviations:

A Argillite AQ Argillaceous Quartzite  
 SA Silty Argillite Q Quartzite  
 AS Argillaceous Siltstone FQ Fine-grained Quartzite  
 S Siltstone

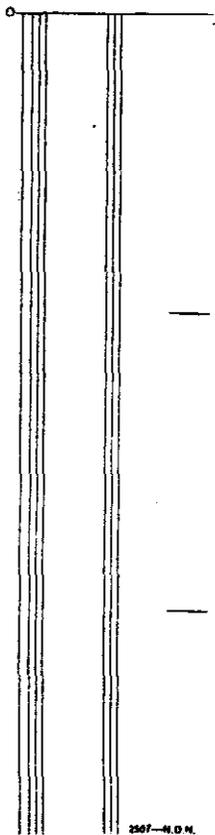
C.A. or c.a. = Core axis

BEDS	Very Thick Bedded	100 cm
	Thick Bedded	30 cm
	Medium Bedded	10 cm
	Thin Bedded	3 cm
	Very Thin Bedded	1 cm
LAMINAE	Laminated	0.3 cm
	Thinly Laminated	

Casing left in hole, wooden plug.

Core Size  
 HQ  
 12' - 1506' Inclusive  
 Hole No. Page  
 6420 1

40 Scale  
 Color Plot & Dips  
 Ore Classes & Aver.



# Diamond Drill Geological Log



40 Scale

Objective: \_\_\_\_\_ Sampled: \_\_\_\_\_  
 Color Plot & Dips \_\_\_\_\_ Ore Classes & Aver. \_\_\_\_\_

Logged By: P. Klewchuk Date: \_\_\_\_\_ Composites: \_\_\_\_\_

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

From To Discard: Reason:

0 12' No core.

12' 91.5' AS, A Medium bedded, occasionally thick or thin bedded. Dark to light gray.  
 Thin A tops, contacts are distinct to vague.  
 Alteration pervasive; light purple to very pale greenish coloration - silicification?  
 Bi spotting common, often confined to A tops. Bi largely chloritized.  
 Bleaching type alteration occurs along thin healed fractures which occur at various orientations.  
 Occasional weak development of discontinuous Po laminae eg. at 47', 53'.  
 Irregular (erosional?) bedding plane contact at 80.5'.  
 For the most part the lighter gray A tops of beds are narrow - usually 5 cm. or less.  
 Silty bottoms of beds are darker gray with purplish coloration.  
 Angle of bedding to C.A. 28' - 86° 60' - 83° 87' - 85°  
 41' - 84° 75' - 89°

91.5' 101.5' Zone of more irregular sedimentation. Mainly AS, minor S and A. Lighter gray A occurs as narrow bands,  
 <5 mm to 7 cm wide, and not necessarily as distinct bed tops.  
 Small (1/2 mm x 2 mm), elongate, randomly oriented light gray Xtals (chlorite?) are present in most of  
 the A bands. Metamorphism in silty parts of beds has produced abundant biotite, disseminated through  
 the core - not spotted.  
 Angle of bedding: 96' - 79°

Core Size  
 HQ  
 Note No. 6420 Page 2

# Diamond Drill Geological Log



40 Scale

Color Plot & Dips      Ore Classes & Aver.

Objective:

Sampled:

Logged By: P. Klewchuk

Date:

Composites:

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

From      To      Discard:      Reason:

101.5' 214'      AS, A, S      Medium bedded with some thin and thick beds.  
 Light gray A tops and dark gray silty bottoms. A tops vary in thickness, commonly  $\leq 5$  cm.  
 Bedding plane contacts are commonly sharp, some are masked by metamorphism; internal con-  
 tacts usually gradual but some are sharp.  
 Alteration - very light green and purplish bleaching - silicification? occurs throughout.  
 Numerous zones of Bi and Po specks; these are usually concentrated as narrow bands in A  
 or near the base of beds. Bi specks or spots with central zone of Po are common.  
 Irregular (erosional?) contact at 113.5' with flame structure. Minor load cast features  
 at 149'.  
 Occasional development of elongate light gray chlorite (?) xtals in light gray A.  
 Cross laminations occur at 113' and 149'.  
 Discontinuous laminations in AS are common near 150'. The light colored laminae are calcareous.  
 Laminations also occur locally near 150' in A.  
 Concretions; at 144.5', weakly calcareous 2 cm x 4 cm.  
 near 163' - here associated with minor disruptions in the sed. layering & occurring  
 with thin irregular veinlets of calcite.  
 Calcite also occurs at 173.5' as thin veinlets and one 1 cm by 3 cm patch of c-gr. xtals.  
 Angle of bedding: 102' - 82°      150' - 82°      197' - 75°  
                          110' - 82°      166' - 79°      205' - 76°  
                          120' - 83°      185' - 79°

Core Size

HQ

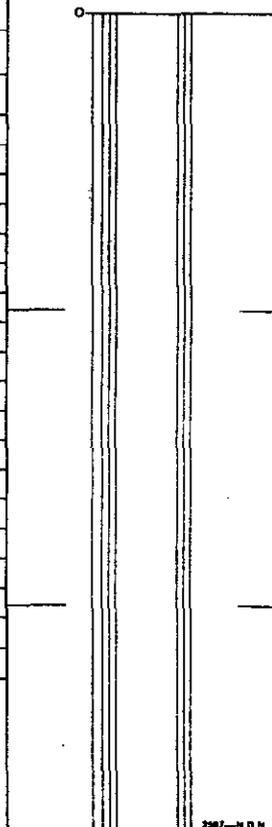
Minor brecciation associated with small fractures occurs just above  
 214'. Chlorite is developed along the fractures.

Core No.

6420

Page

3



# Diamond Drill Geological Log



40 Scale  
Color Plot & Dips    Ore Classes & Aver.

Objective: \_\_\_\_\_ Sampled: \_\_\_\_\_

Logged By: P. Klewchuk    Date: \_\_\_\_\_    Composites: \_\_\_\_\_

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

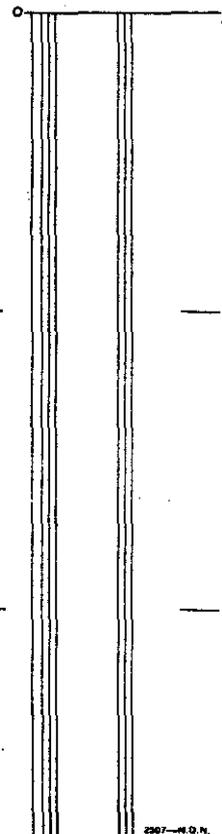
From To    Discard: \_\_\_\_\_    Reason: \_\_\_\_\_

214' 234'    A and AS in about equal proportions. Predominantly thick and very thick bedded with some very thin to laminated. A zones in most beds are quite thick. AS zones are typically laminated. Laminations are of varying thicknesses and are discontinuous. Lighter colored laminations are calcareous. Moderate development of Po, Bi and Chl spotting - these are usually confined to narrow zones in a bed but scattered throughout the interval. Minor porosity occurs near 225' - some vugs contain calcite. Bedding angles: 222' - 74°    230' - 68°

234' 256'    SA, A & AS Characterized by laminated and very thin beds, although half or more of the interval is of beds of medium thickness. At 239' a 10 cm wide bed is S or AQ. Some of the thicker beds contain AS which is discontinuously laminated; the lighter colored laminations are calcareous. Alteration is similar to the above interval (214' - 234') with both Bi and Po spotting common. Spotted alteration is most common in the lower 3' of the interval. Minor brecciation with associated chlorite development in the fractures occurs at 252-253'. Minor development of light gray chlorite (?) occurs in the light gray A. Bedding angles: 235' - 62°    241' - 58°    245' - 56°

256' 268'    Zone of broken, rusty core mainly A & SA. Individual fragments are laminated to massive. Some small scale brecciation is evident. Fault gouge occurs on narrow fractures; faulting evident but probably a relatively minor fault. Alteration appears a bit more intense immediately adjacent to this fracture zone for about 5' on either side.

Core Size  
HQ  
Note No.    Page  
6420    4



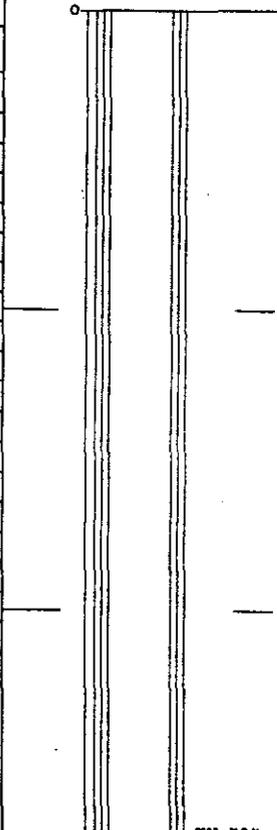
# Diamond Drill Geological Log



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

40 Scale
Color Plot & Dip
Ore Classes & Aver.

From	To	Discard:	Reason:
268'	323'	AS, A, S	<p>Thick and medium bedded light gray A tops vary from 3 cm thick to &gt;15 cm thick. Most beds coarsen to AS, some are S, a few are highly siliceous (still S).</p> <p>Interval is weakly to moderately altered; light greenish-gray bleaching and Bi and Po spotting are common. Chlorite (?) crystals are developed in light gray A.</p> <p>Bedding plane contacts only rarely sharp; most are gradational over 5mm. Internal contacts A to AS usually a bit more gradational - over 1 cm or 1.5 cm.</p> <p>Broken core from 315' to 317' and near 324'. Fracture at 5° to C.A. at 317' with some narrow calcite veinlets. Core angle: 284' - 75°    297' - 79° 289' - 79°    314' - 82°</p>
323'	376'	AS, S, A	<p>Typically thick and medium bedded with zones of thin and very thin beds which differentiate it from the above interval. Most commonly AS with some S and a few very siliceous, almost fine gr. Q beds (e.g. at 326.5', 328'). Some of the AS beds show weak development of discontinuous light laminae which are calcareous.</p> <p>Weak to moderate alteration present with Bi (Chl.) spotting common.</p> <p>Small rounded blebs of Po averaging 1-3 mm diam. are common especially in the lower half of the interval. Po blebs are concentrated along narrow zones (2-5 cm wide) which occur predominately in the argillaceous zones.</p> <p>338'-341' minor brecciation occurs along small irregular fractures. Fe oxidation along fractures has stained some of the fractured rock.</p> <p>Core angle: 331' - 82°    352' - 84°    375' - 86° 340' - 84°    366' - 79°</p>



Core Size  
Note No. 6420

12

# Diamond Drill Geological Log



Objective: \_\_\_\_\_ Sampled: \_\_\_\_\_

Logged By: P. Klewchuk Date: \_\_\_\_\_ Composites: \_\_\_\_\_

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

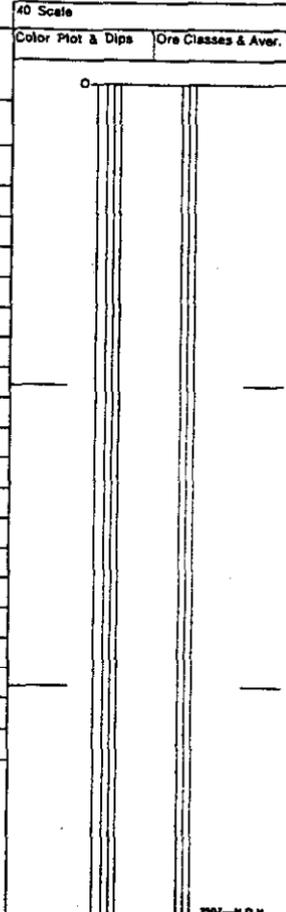
From To Discard: Reason:

376' 383.5' A, SA Laminated to very thin bedded. A few beds are thin and medium bedded. Beds are light gray to dark bluish gray in color. Bedding plane contacts are sharp, with only a few minor irregularities. Core angle: 381' - 87°

383.5' 418' A, AS, S Bedding thickness varies considerably from laminated to thick bedded. Beds are relatively thin nearer the top and bottom of the interval with thicker beds from 396' to 412'. Color is light gray (A) to darker bluish gray (AS and S). Bleaching is fairly common in the thicker beds - light green coloration along thin planar zones which look like healed fractures but commonly show no indication of earlier breaking. Argillaceous tops usually form about 50% of beds but non consistent. Small Po blebs 1-2 mm diam. are present, not abundant. These occur most often in argillaceous zones and at base of beds. Certain of the AS/S zones contain weakly calcareous zones; dissem. CaCO<sub>3</sub> and very weak laminations. Bedding plane contacts are most often very sharp, a few are somewhat irregular. Minor f. gr. Py occurs along a few narrow fractures. Core angle: 389' - 86° 396' - 88° 413' - 83°

418' 419.5' Breccia Angular fragments, mainly A & SA, averaging 2-4 cm across in a matrix of rusty fault gouge. Fault represented by this bx is probably relatively small.

Core Size \_\_\_\_\_  
 Note No. 6420 Page 6



# Diamond Drill Geological Log



Objective:			Sampled:			40 Scale					
Logged By: P. Kiewchuk			Date:			Color Plot & Dips					
Composites:			Ore Classes & Aver.								
Block:	Sect.:	Place:	App. Bear:	App. Dip.:	Length:						
From	To	Discard:	Reason:								
419.5'	426.5'	A,SA,AS	Medium, thin and very thin bedded. A & SA predominates with minor AS. Medium gray to dark bluish gray color. Minor pale green bleaching occurs in the silty zones. A few zones of small (1-2 mm diam.) Po blebs are present. At 421.5' a clast (?) of SA 3 cm thick, width of core, is present. Physical shape indicates a clast and the underlying sediments are disturbed. Core angle: 424' - 88°								
426.5'	451'	A,SA minor AS	Medium and thick bedded, few thinner beds. Light gray to dark blue-gray. Bedding plane contacts quite distinct. Minor bleaching (pale green color) along narrow fractures. Few small zones of Po blebs. More silty zones commonly contain vague white laminations which are calcareous. 446' 1 cm wide calcite-qtz.-chlorite vein parallel to bedding. Core angle: 433' - 87° 447' - 89°								
451'	501.5'	AS,S	Thick and very thick beds; thinner beds are rare. Bedding plane contacts here are characteristically indistinct. Some argillaceous zones may not be bed tops. Color is predominantly darker bluish gray. Weak white discontinuous laminations in silty zones are calcareous. Minor small calcite-quartz filled fractures (1 mm to 1 cm wide) occur infrequently. A few zones of Po blebs are present. Core angle: 473' - 89° 478' - 86° 489' - 88°								
			Core Size								
			Hole No. 6420						Page 7		

# Diamond Drill Geological Log



40 Scale

Color Plot & Dips    Ore Classes & Aver.

Objective:

Sampled:

Logged By: P. Klewchuk

Date:

Composites:

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

From    To    Discard:                      Reason:

501.5' 520.5'    Zone of broken, rusty core-fault zone. 5' core loss 509'-514'. Fault gouge at 514.5'  
Mainly SA, A and minor AS. One bed near 517' is AQ.

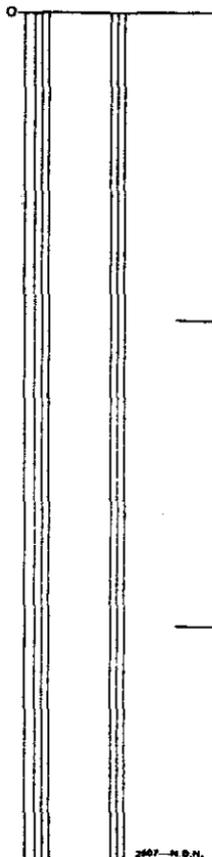
520.5' 532'    AQ, AS, SA    Thick bedded, few beds medium thickness. Broken core 531'-532.  
This interval may contain only 3 or 4 beds; bedding planes are not distinct.  
Alteration has produced spotting in upper 3' - chlorite?  
Bedding at 526' - 80°.

532' 603'    AS, SA, minor A    Predominantly thick-bedded, occasionally medium bedded, with a few thin beds.  
Argillaceous tops lighter gray with silty parts of beds darker bluish gray.  
A few thin beds near 560' show sedimentary compaction/loading features; irregular bedding plane surfaces with flame structures. Otherwise bedding planes are mainly sharp and regular. Bit scour obscures some of the bedding plane, etc. features.  
Alteration is evident as local light green colored bleaching. Irregular rounded blebs of Po occur throughout the interval. Thin fractures often have f, gr. Py on the fracture surfaces.  
540' - 543' zone where Qtz. vein (s) up to 3 cm wide occur at low angles to core axis (5°).  
Core angle: 535' - 78°                      590' - 77°  
                  560' - 78°                      597' - 82°  
                  577' - 84°

Core Size

Note No. 6420

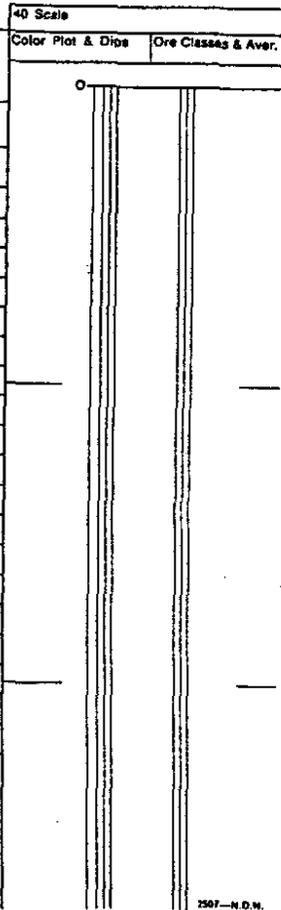
Page 8



# Diamond Drill Geological Log



Objective:			Sampled:				
Logged By: P. Klewchuk			Date:				
Block:			Composites:				
From		To	Discard:	Reason:	App. Bear:	App. Dip:	Length:
603'	609.5'	A, SA	Laminated to very thin bedded. Light gray to dark bluish gray. Bedding plane contacts are commonly sharp but often irregular. Poorly developed flame-structure type feature at 605'. Bedding planes commonly at 85-90° to core axis.				
609.5'	619	AQ, Q	About 4 beds with narrow argillaceous tops. One 60 cm bed, base at 616.5' is quite pure f. gr. Q, with minor concentrations of PbS, Po and a bit of Py. Po also occurs near 610.5' as irregular blebs in a narrow zone ~3 cm wide. The good Q bed contains numerous narrow branching Qtz.-filled, healed fractures up to 5 mm wide. Bedding planes are 85-90° to c.a.				
619'	648'	AS, S, AQ, SA, A	Interval contains beds of various thicknesses and different lithologies. Predominantly medium and thick bedded, 10-15% thin bedded. One very thick (~2 m) AQ bed, base at 645.5'. Argillaceous tops of beds are commonly narrow (2-3 cm) with darker blue gray silty sections comprising most of the interval. Most bedding planes are sharp; a few show minor irregularities - compaction features? 623.5' argillite clast .3 mm x 1.5 cm in AS 638' concretionary feature in A Bedding planes are commonly at 80-85° to c.a. One at 625' is at 65° to c.a.				
648'	662'	SA, A	Predominantly very thin, thin and medium bedded, a few thick beds. Thinner beds are 30-50% A (1-3 cm A tops). Numerous bedding plane contacts show irregularities most of which				



Core Size

Note No. 6420

Page 9



# Diamond Drill Geological Log



40 Scale

Color Plot & Dips      Ore Classes & Aver.

Objective:

Sampled:

Logged By: P. Klewchuk      Date:

Composites:

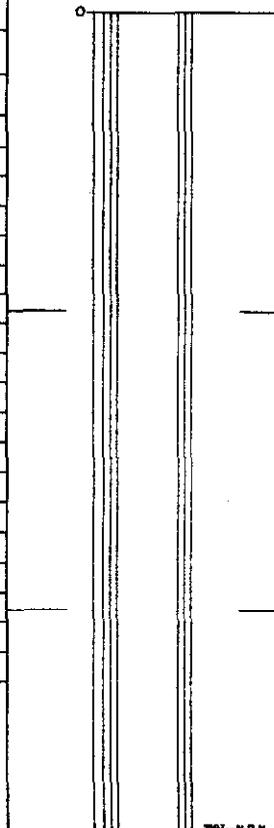
Block:      Seat:      Place:      App. Bear:      App. Dip.:      Length:

From      To      Discard:      Reason:

709'    734'    Q,S, Minor    Thick bedded, a few medium and thin beds. Beds have light gray A or SA tops a few cm thick, A & SA grading rapidly to S or Q.  
 Most of the beds are a f. gr. relatively light gray Q with darker bluish-gray S.  
 Bedding planes are quite sharp. Near 727' 2 bedding planes are irregular, apparently due to minor displacement along near-vertical fractures shortly after deposition.  
 At 717' a 3-4 cm wide Qtz. vein containing Py and Chl extends for about 1 m at 15° to 20° to c.a.  
 At 732' a 15 cm length of core contains white-pink concentrates of Qtz. and garnet. Core angle is 80 - 85°.

734'    769.5    AS,S,SA    Medium-thick bedded, a few thin and very thin beds. Sediment lithology varies considerably; Minor Q,A this interval is characterized by numerous lens-like layers of A within coarser-grained beds, although many individual beds don't contain A lenses.  
 Numerous zones of pink garnets are present, usually in association with development of Bi and occasionally Po.  
 Very thin (< 0.5 mm) lamellae of Bi (?) and Po are developed in A zones in the lower 10' of the interval. The discontinuous nature of these lamellae (often less than 2 mm long) indicates their origin may be metamorphic.  
 At 769.2' is a 3 cm x 6 cm concretion of Bi, Chl and Po in A.  
 Most bedding planes are sharp and regular. Core angle is about 85°.

Core Size  
 Note No. 6420      Page 11



# Diamond Drill Geological Log



Objective: \_\_\_\_\_ Sampled: \_\_\_\_\_  
 Logged By: P. Klewchuk Date: \_\_\_\_\_ Composites: \_\_\_\_\_

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

From To Discard: Reason:

769.5'	804'	S,Q	<p>Thick and very thick bedded with a few thinner beds. A tops are relatively narrow - usually 5 cm. At least 4 of the thicker beds in the interval are good fine gr. Q. Bleaching effects of alteration have caused local very light green mottling of the textures. A few very thin beds at 784' show flame structures and minor irregularities along bedding planes due to compaction.</p> <p>Zones of pink garnets occur through the interval.</p> <p>From 777' to 781' Qtz. veins to 7 or 8 cm wide at 30° to c.a. contain minor PbS, ZnS, Py, Chl, garnets (to 7 mm diam. but poorly developed - light pink in colour), and tourmaline? as very small black needles. Minor Cpy is also present.</p> <p>Small blebs of Po occur, usually in the coarser-grained sediments i.e. in Q.</p> <p>Bedding planes are generally sharp averaging 80-85° to c.a.</p>
804'	808.5'	AS,A	<p>Thin and medium bedded. Bedding planes are fairly sharp, a few are a bit irregular.</p> <p>The upper A zones of most beds in the interval contain numerous lenses of A &amp; SA, grading downward into a basal AS. Bedding planes are at 85° to c.a.</p>
808.5'	842'	S,AQ,AS	<p>Medium-thick bedded. Generally the upper 10 cm or so of the beds are graded, lower portions are variably silty or quartzitic. One very thick (1.5 m) S bed base at 813'. One very thick (2 m) AQ bed base at 819'.</p> <p>Alteration effects appear to be stronger toward the lower part of the interval. Pale green bleaching locally creates a mottled texture. Development of pink garnets is often associated with this alteration.</p>

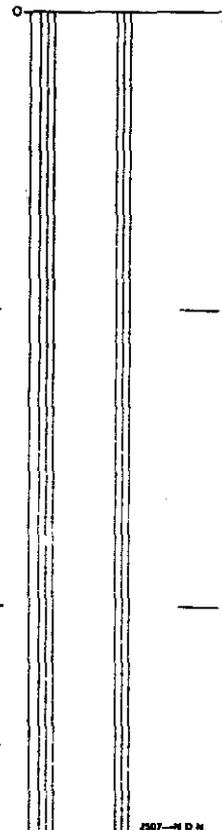
Core Size

Hole No. 6420

Page

12

40 Scale  
 Color Plot & Dips  
 Ore Classes & Aver.



# Diamond Drill Geological Log



Objective: \_\_\_\_\_ Sampled: \_\_\_\_\_

Logged By: P. Kiewchuk Date: \_\_\_\_\_ Composites: \_\_\_\_\_

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

From To Discard: \_\_\_\_\_ Reason: \_\_\_\_\_

	842'	Cont'd	Bedding plane contacts are generally sharp; angle to c.a. is about 85° throughout.
842'	855'		Zone of more intense alteration. Thin-medium bedded with a few very thin beds. Alteration has apparently hardened the rock (silicification?). A tops are recognizable by their lighter gray colour and development of small dark grains of cordierite. Most beds probably S or AS. Pale green bleaching is quite strong throughout the interval. Narrow zones of small, irregular rounded blebs of Po are common. At 843' a small section appears strongly altered; a 1 cm wide bed is essentially all f. gr. silica- appears more like a chem. precipitate than a sed. quartzite. This may be an effect of a silicification process. Bedding planes are quite sharp and regular at about 80° to c.a.
855'	884'	Q,S, Minor A	Generally thick bedded, some med. and thin beds. A tops usually thin, <5 cm. A few thin beds near 861' display flame structures at the bedding plane contacts. Core is moderately broken from 877.5 to 882.5. The lower 2-3' of this interval is more argillaceous. Minor Py is present in a FQ at 858.5'. Bedding angle is about 80° to c.a.
884'	928'	Fault Zone	Alternating broken core, foliated, brecciated sediments with quartz and calcite veining and short sections of relatively unaffected sediments.
		884-886	Broken core mainly A & SA, probably thin bedded.
		886-888	Foliated, brecciated sediments with quartz and calcite veining, at about 25° to core axis.

Core Size

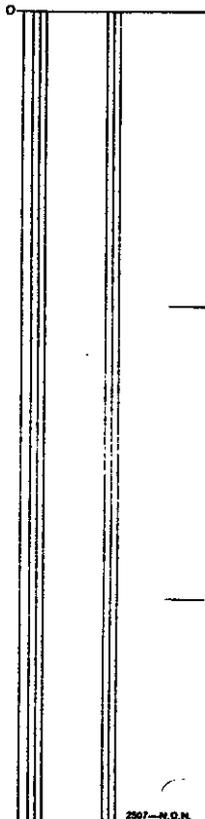
Note No.

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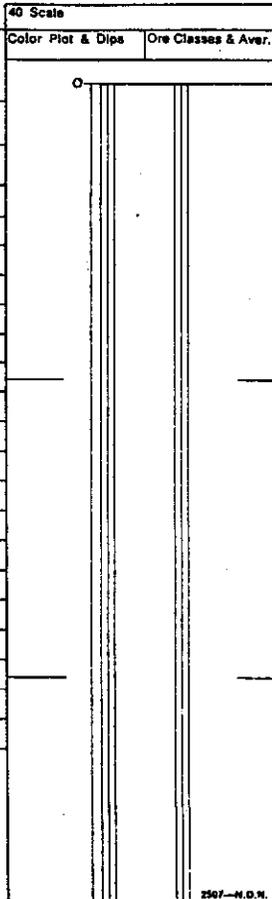
40 Scale  
Color Plot & Dip  
Ore Classes & Aver.



# Diamond Drill Geological Log



Objective:			Sampled:		
Logged By: P. Klewchuk			Date:		
Block:			Composites:		
Sect.:		Place:		App. Bear:	App. Dip.:
From		To	Discard:	Reason:	
928'	888-898	Q,S,SA Thick, medium and thin bedded. Some broken core near 895'. Core angle is 80-85° to c.a.			
	898-900	Bx, foliated seds, abundant calcite. Foliation about 25° to c.a.			
	900-918	S,AS,Q; SA & A tops. Thick and medium bedded. Includes local zones of bx and foliation. Foliation at 20-25° to c.a. Abundant calcite veining associated with bx, foliated zones. Some alteration is present - pale green bleaching. Bedding planes here are fairly sharp, generally at 80-85° to c.a.			
	918-928	Core variably broken - strongly fragmented for the most part. Lithologies A to S; bed thicknesses not known. Bx, foliated zones are present, with associated calcite. Calcite also occurs in small fractures. Impression is that this entire zone 884-928 represents a significant fault.			
928'	1003.5	Predominantly S,Q,AS Thick, very thick and medium bedded with a few thin beds. Q beds are generally thickest and comprise 30-40% of interval. Local zones are more argillaceous with bands &/or lenses of A in more silty beds. Alteration is strong to moderate throughout with pale greenish bleaching quite common. Garnet, chlorite and Po are developed locally. Alteration effects are most evident in the Q beds, probably due to ease of migration of fluids.			
	928-936	Mainly medium bedded AS.			
	936-959	Q,S,AS Beds are thicker, notably less A. Q beds are thickest. Narrow zone (< 10 cm wide) of strongly foliated seds. at 948'. Seds. are strongly sheared but zone is well recrystallized. Foliation is at 15°-30° to c.a. Minor Po in this zone.			Core Size
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# Diamond Drill Geological Log



40 Scale  
Color Plot & Dips      Ore Classes & Aver.

Objective: \_\_\_\_\_ Sampled: \_\_\_\_\_  
 Logged By: P. Klewchuk      Date: \_\_\_\_\_      Composites: \_\_\_\_\_  
 Block: \_\_\_\_\_ Sect: \_\_\_\_\_ Piece: \_\_\_\_\_ App. Bear: \_\_\_\_\_ App. Dip.: \_\_\_\_\_ Length: \_\_\_\_\_

From To Discard: Reason:

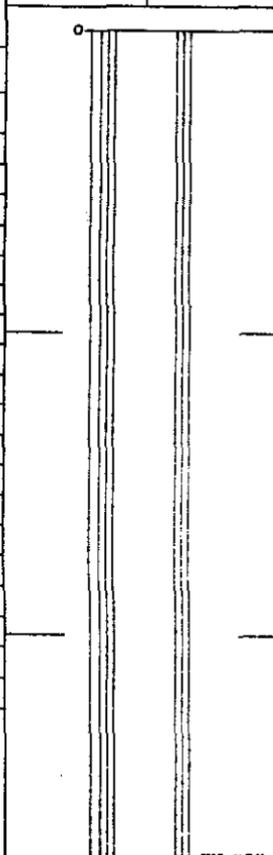
1003.5	959-985.5	Medium-thick bedded S, AS, Minor Q. Some A clasts locally. Bands and lenses of A in SA common. 2-5 mm wide band (bed?) of Po at 976'. Irregular small patches of Po occur elsewhere in the section.
	985.5-1003.5	Thick-very thick bedded Q. Some S. SA tops are generally <10 cm thick. A few A rip-up clasts are present at 986.5 in the upper (AS) part of a Q bed. Qtz. vein at 995.5 20 cm x 1 cm with minor Py, Po. Thin healed fractures with discontinuous very small lenses of ZnS and Po at 999.5 at 20° to c.a. Core angles: 931' - 86°      960' - 80°      979' - 80° 934' - 80°      969' - 80°

1003.5	1030'	S, AS, Q	Thick and medlum bedded, few thinner beds. The upper 12' of the interval is notably more argillaceous than the immediately preceding interval; argillaceous tops of beds comprise about 1/2 of the bed - predominant lithology is AS. Zones of AS contain numerous A lenses or rip-up clasts most of which are wavy or irregular. Q & SQ in this interval commonly show most intense alteration - pale green bleaching. Bi, Chl and pink garnets are developed in Q zones. Narrow fracture fillings near 1007.5' are of qtz., calcite, Py and Po. Po is rather common throughout the interval, usually concentrated along zones parallel to bedding. The Po occurs as small elongate or rounded blebs up to 3 mm diam.
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Bedding plane angle to c.a. 77° to 82°.

Core Size \_\_\_\_\_

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# Diamond Drill Geological Log

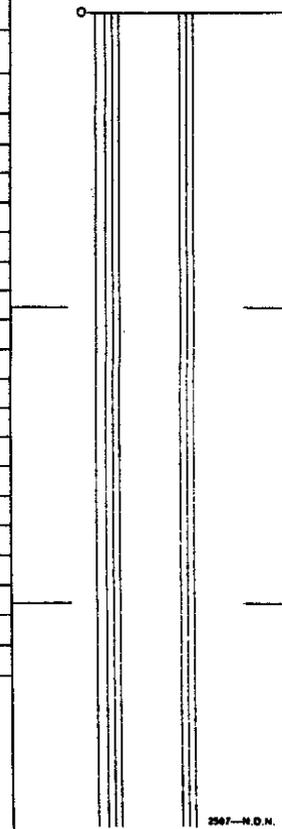


Objective: \_\_\_\_\_ Sampled: \_\_\_\_\_  
 Logged By: P. Klewchuk Date: \_\_\_\_\_ Composites: \_\_\_\_\_  
 Block: \_\_\_\_\_ Sect: \_\_\_\_\_ Place: \_\_\_\_\_ App. Bear: \_\_\_\_\_ App. Dip.: \_\_\_\_\_ Length: \_\_\_\_\_

40 Scale  
 Color Plot & Dips  
 Ore Classes & Aver.

From To Discard Reason

1030	1048	S,AS,A, Minor SQ	Medium and thin bedded, about 5% very thin bedded. Bi and Po (med. gr.) developed in S at 1037'. Minor Po & Py are present; at 1031' Po is concentrated along 2 concretionary - like features which are developed in a discontinuously laminated A-AS bed. Po is disseminated through the sed. although it is concentrated along particular zones; Py occurs most commonly along fractures but is also occasionally found disseminated in association with Po. Core angle: 1032' - 70°    1036.5' - 78°    1045.5' - 74°
1048	1051.5	A,SA	Laminated and very thin bedded. Po is common, usually concentrated at base of beds. Minor ZnS at 1051.5. Core angle 76°.
1051.5	1076	S,SQ,AS,A	Medium-thick bedded S, SQ alternating with relatively narrow zones of laminated and very thin bedded A and SA. Po is again common in minor amounts throughout the interval. Minor ZnS is present at 1051.7' in a 2-3 mm wide band of calcite parallel to bedding. Minor ZnS with CaCO <sub>3</sub> also at 1059.5 and at 1062.5. Minor Py is present locally but uncommon. Cross laminations occur at 1065.4'. 1070' - laminations in S. Core angle: 1055' - 75°    1060' - 85°    1070' - 85°



1076	1084	A,SA,S Minor SQ	Mainly laminated and very thin bedded with minor thicker SQ and S beds. Po fairly common; at 1083' Po is concentrated along the base of one bed along what appears to be a local depression, as though
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# Diamond Drill Geological Log



40 Scale

Objective:

Sampled:

Color Plot & Dips

Ore Classes & Aver.

Logged By: P. Klewchuk

Date:

Composites:

Block:

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Place:

App. Bear:

App. Dip:

Length:

From

To

Discard:

Reason:

	1084		Cont'd	sedimentary Po was concentrated here. Po most commonly is secondary, with small blebs to 3-4 mm across developed usually near the bases of beds. Core angle about 85° throughout.
	1084	1108.5	Q,S,SA,A	Zone of variable bed thickness and lithology. Predominantly f Q and S which tend to be thick bedded. Numerous beds of thin, very thin and laminated thickness occur throughout the interval.
			1084-1089.5	Thick bedded Q, moderately altered by pale bleaching.
			1089.5-1094	Thin to laminated beds, A, SA and S. 30 cm thick S bed at 1090-1091 is internally laminated. Bi, Py and Po abundant along a 5 cm wide zone parallel to bedding at 1091.
			1094-1100.5	Mainly Q, bleached. Calcite along laminations, disseminated, in S at 1098.5'. Po occurs locally as small rounded blebs along narrow zones parallel to bedding. Py occurs locally along very small fractures.
			1100.5-1108.5	AS,S,A,Q Laminated to medium bedded. Py and Po locally common. Chl. is associated with Py at 1104.5. Minor ZnS and Po along fractures with calcite at 1101.5. Light colored, weakly calcareous laminations at 1104.5'. Core angle: 1091' - 75° 1103' - 78° 1093' - 85° 1108' - 82°
	1108.9	1170.9	Q,S Minor A & SA	Commonly thick bedded, occasionally thin bedded to laminated. Thicker beds are usually separated by narrow zones of thinner beds. Po is quite common in minor amounts, occurring as thin discontinuous lenses and small rounded blebs which are usually

Core Size

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# Diamond Drill Geological Log



Objective:			Sampled:			40 Scale		
Logged By: P. Klewchuk			Date:			Color Plot & Dips		
Block:			Sect.:			Ore Classes & Aver.		
Place:			App. Bear:			Composites:		
App. Dip.:			Length:					
From	To	Discard:	Reason:					
	1256	Cont'd	Calcite occurs in a concretion minimum 20 cm long by minimum 6 cm wide at 1189'. A few silty beds near 1225' are also calcareous..					
			1227-1231 Mainly thin and very thin bedded A & SA.					
			(Note 1.5' section of core missing near 1204')					
			Core angles: 1192' - 76°		1228' - 77°		1247' - 76°	
			1208' - 79°		1233' - 80°			
1255	1256	A, SA, AS	Thin and very thin bedded. Minor Po is very common, occurring as local concentrations in irregular small blebs - Po here is essentially concretionary in nature although the concretions are small (few mm diam.).					
			Bedding plane contacts are sharp. Core angle is 70° - 80°.					
1264	1297	S, AS	a few beds may be silty f. gr. Q. Predominantly thick bedded. A few beds are of thin and medium thickness. Alteration is quite strong; bleaching to a pale green-gray color is common.					
			Numerous calcareous concretions are evident, usually with associated blebs of Po.					
			Alteration is more intense in the lower part of the interval. Small fracture fillings of Qtz. and calcite are associated with the alteration.					
			Very minor ZnS occurs at 1271.5'. Core angle is quite uniform at 75-80° to c.a.					
1297	1300		Zone of moderate to intense shearing. Top half of this interval is quite strongly foliated with abundant quartz and calcite veining; lower half of the interval is moderately fractured with green (chlorite?) coloration along fractures, along with minor Qtz. and calcite				Core Size	
							Hole No. 6420	
							Page 19	

# Diamond Drill Geological Log



40 Scale

Objective:

Sampled:

Color Plot & Dips

Ore Classes & Aver.

Logged By: P. Klewchuk

Date:

Composites:

Block:

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Place:

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Length:

From

To

Discard:

Reason:

1300 Cont'd veining. The core is only moderately broken; fractures are healed. Foliation or shearing occurs at approximately 20° to c.a. although it is variable.

1300 1337 S,AS,A Predominantly thick-bedded with 15-20% medium-thin beds. Generally similar to 1264'-1297'. Tops of beds are variable lithologically; where they are good A they are easy to distinguish but some bed tops are silty and with the pervasive alteration these bed tops are often difficult to distinguish. Minor Po is fairly common, as are calcareous concretions with small blebs of Po. 1325.5' 5 cm wide zone of cross laminations. Core angle is about 80° throughout.

1337 1347 AS,S Thin-medium bedded. Po common in minor amounts. A few calcareous concretions present, usually with associated Po. Some of the Po occurs as distinct small concretions. Calcite vein 1.5 cm wide at 1346.7'. Weak brecciation at 1339.5'; a few angular fragments of A in AS matrix. Bedding planes are quite sharp. Core angle is 65° - 70° to c.a.

1347 1373.5 SA,AS Apparently thick and medium bedded but bedding planes are indistinct. Alteration is locally quite strong - core bleached. Numerous small Qtz.-calcite veins are present. Part of this interval (1358 - 1368) may represent a minor fault - core is moderately broken. Bedding planes are locally flattened to 25° to c.a. No intense shearing is evident, though Po is fairly common in minor amounts, often associated with carbonate.

Core Size

Hole No. 6420

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# Diamond Drill Geological Log

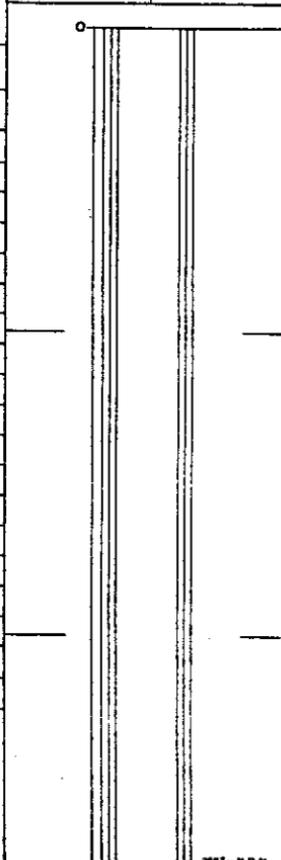


Objective: \_\_\_\_\_ Sampled: \_\_\_\_\_  
 Logged By: P. Klewchuk Date: \_\_\_\_\_ Composites: \_\_\_\_\_  
 Block: \_\_\_\_\_ Sect: \_\_\_\_\_ Place: \_\_\_\_\_ App. Bear: \_\_\_\_\_ App. Dip.: \_\_\_\_\_ Length: \_\_\_\_\_

40 Scale  
 Color Plot & Dips  
 Ore Classes & Avar.

From To Discard: Reason:

1373.5	Cont'd	Distinct small Po concretions are present. A few calcareous concretions are present - they obliterate sedimentary features. Minor Py occurs along narrow fractures - at 1349.5' a 2 cm diam. mass of Py occurs in a 3 cm wide Qtz. vein. Core angle about 40°, locally flattened to 25° (near 1355').	
1373.5	1392	AS, SA	<p>Predominantly medium-thin bedded with a few thick and very thin beds.</p> <p>Po is quite common in minor amounts, as distinct concretions and as small blebs concentrated along zones parallel to bedding, usually near the base of beds.</p> <p>A number of small veins of Qtz. and calcite are present - usually with associated Po.</p> <p>Minor Py occurs along narrow fractures. Minor ZnS is present locally near 1379.5'. In one place it is disseminated with Po in a SA bed - in another place it occurs at the bedding plane contact of 2 beds.</p> <p>Core angle: 50° at 1381'.</p>
1392	1439.5	AS, SA, Minor A	<p>Predominantly medium bedded but with numerous thick, thin and very thin beds. Bed tops are often silty and not easily distinguished. Minor Po is present, similar to previous few intervals. Bleaching alteration is present but not strong. A few carbonate concretions with associated minor Po are present.</p> <p>Core angle: 1400' - 50°      1424' - 52°                  1406' - 53°      1439' - 66°                  1417' - 53°</p>



Core Size

Hole No. 6420

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# Diamond Drill Geological Log



Objective: \_\_\_\_\_ Sampled: \_\_\_\_\_

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

From To Discard: \_\_\_\_\_ Reason: \_\_\_\_\_

1439.5 | 1454 | S,AS,SA,A | Thick and medium bedded, few thin beds. Most bedding planes are distinct. Minor Po is locally disseminated in the sediments. Py occurs in small veins; at 1440.5' a 1 cm wide vein is mainly Py with Qtz. A small calcareous concretion is present at 1444'. Core angle is about 50° to c.a.

1454 | 1495.9 | Fault Zone | Core is broken throughout, locally quite intensely. Intense shearing is evident, commonly at about 45° to c.a. Numerous larger pieces of core (to 20 cm long) are A, SA & AS, usually thin and very thin bedded. Fault gouge, slickensiding with chlorite and strong brecciation indicates a fault of major proportions.

1495.5 | 1506 | AS,SA,A | Medium, thick and thin bedded. Moderately altered with bleaching most intense near 1501' at a 5 cm wide calcareous concretion. Minor f. gr. Py occurs along small narrow fractures. No noticeable significant difference from upper side of fault zone. Core angle: 1498' - 70° 1505' - 75°

1506' End

Core Size

Hole No.

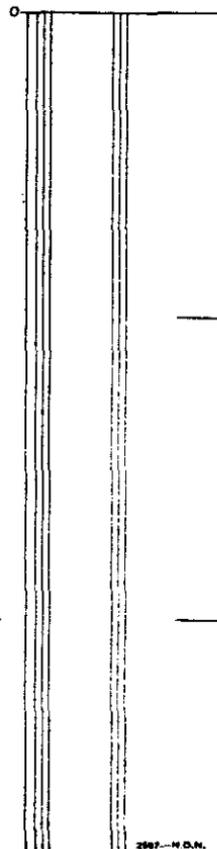
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40 Scale

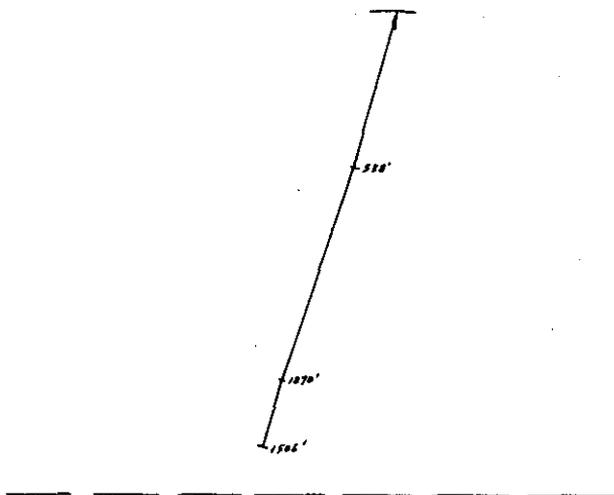
Color Plot & Dips Ore Classes & Aver.



<u>RDG.</u> <u>SEQUENCE</u>	<u>FOOTAGE</u>	<u>DIP</u>	<u>AZIMUTH</u>
1	0'	-75°	277° 58' 16"
2	1,076'	-71.5°	282° T
3	1,463	-72°	284° T

EXTRAPOLATION

<u>FOOTAGE</u>	<u>DIP</u>	<u>AZIMUTH</u>	<u>H.C.</u>	<u>V.C.</u>
0-538'	-75°	277° 58' 16"	139.23'	519.65'
538-1270'	-71.5°	282°	232.26'	694.16'
1270'-1506'	-72°	284°	69.01'	225.69'
<u>TOTALS</u>			<u>440.5</u>	<u>1439.5'</u>



Drawn by: <i>AS Hagan</i>		Traced by:	
Revised by	Date	Revised by	Date

SPERRY SUN SINGLE SHOT SURVEY  
DD 6420

Scale: 1" = 400'      Date: March / 78      Plate:

SULLIVAN MINE

COMINCO LTD.

KIMBERLEY, B.C.

COST SUMMARY

DDCH #6420 - CANTON FR. GROUP

Footage:

0 - 615'	Invoice 4145C	\$11,166.00	
614 - 1506'	Invoice 4149C	\$17,463.00	\$28,629.00

Hourly Charges:

Invoice 4145C	\$ 1,050.00	
Invoice 4149C	535.00	\$ 1,585.00

Materials:

Invoice 4145C	353.10	
Invoice 4160C	242.94	\$ 596.02

Core Boxes:

76 Boxes @ \$3.10 + 7% tax + 10% O/H + freight	\$ 328.41
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Drilling Mud Supplies:

Pro-rated from attached invoices	\$ 1,960.21
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Water Haul:

Sunrise Exc. Ltd.	\$ 1,544.00
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Cominco Charges:

Equipment rental for access, site preparation, water sump construction, set-up and tear-down.	=	\$ 3,093.00
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Geology supervision, core logging and truck rental (\$1.50/ft.)	=	\$ 2,259.00
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Core storage facility @ \$0.15/ft. of core x (1506'-12')	=	\$ 224.00
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<u>Original Mob/Demob.:</u> @ \$.308/ft. drilled	=	\$ 463.85
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TOTAL COST		<u>\$40,682.49</u>
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