

84-1250-12976

COMINCO LTD

SULLIVAN MINE

KIMBERLEY, B.C.

MAT 131 ASSESSMENT REPORT

The following report describes the results of drilling two diamond drill holes on the Mat claims about ten kilometres west of Kimberley. DDH 6451 was drilled to a depth of 168 metres on the Mat 83 claim and DDH 6452 was drilled to a depth of 199 metres on the Mat 133 claim.

The N.T.S. Location is 82 F/9.E

The UTM coordinates of the drill holes are:

DDH 6451 56322/550598

49° 42' 116 7.5

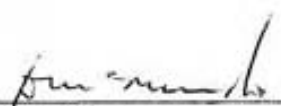
DDH 6452 56210/550602

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

P.W.Ransom is author of this report.

Date of submission: December, 1984.

Endorsed for  
release by:

  
D. McMurdo  
Chief Geologist, Kimberley

**GEOLOGICAL BRANCH  
ASSESSMENT REPORT**

**12,976**

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## INTRODUCTION

### 1. SPECIFIC LOCATION

DDHs 6451 and 6452 are located on the west fork of Matthew Creek 230 and 1300 metres respectively west of the bridge at the confluence of the north and west forks.

### 2. PROPERTY DEFINITION

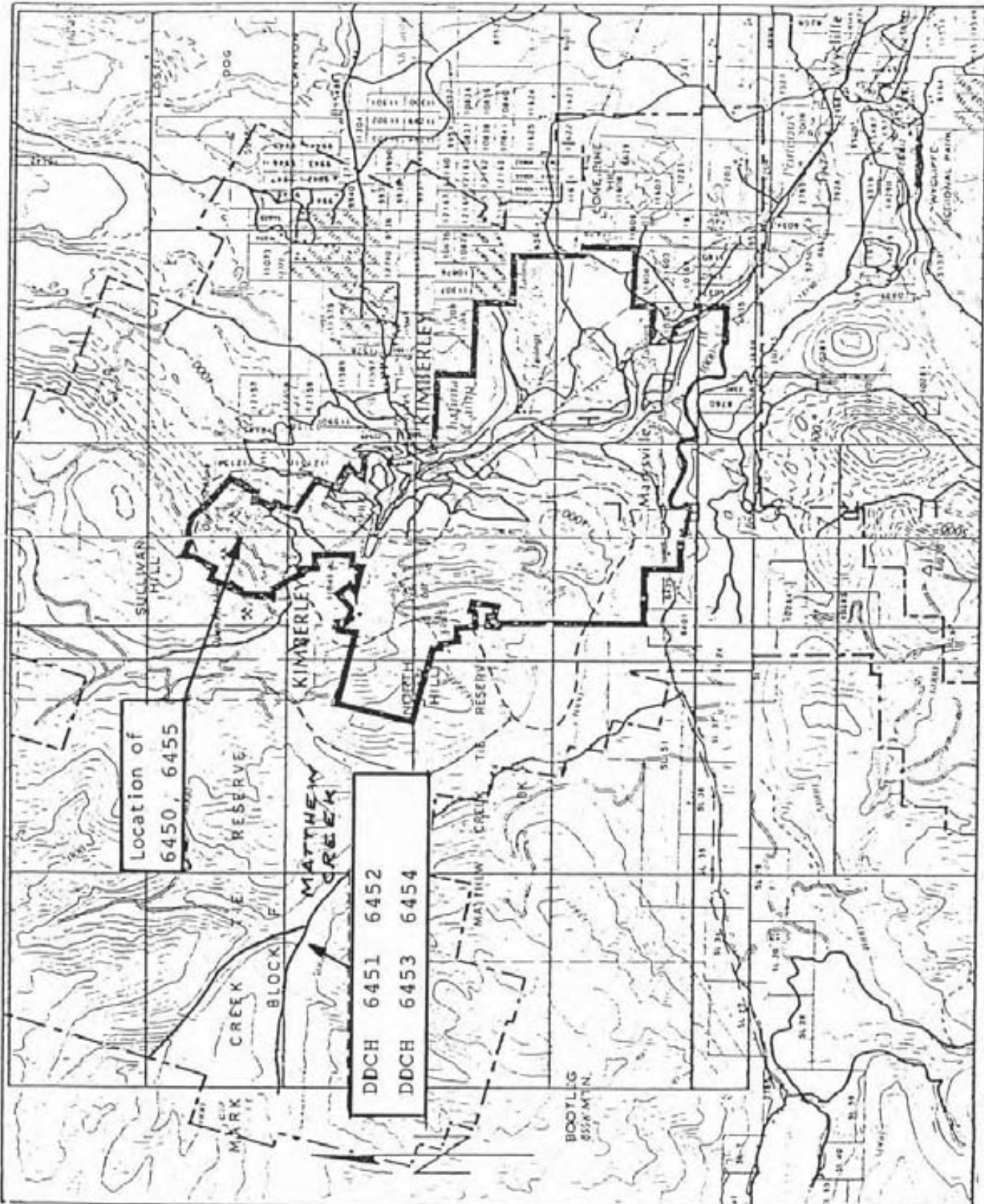
The property being investigated forms part of the Sullivan Mine claim group, owned by Cominco Ltd. Cominco has operated the mine for about 75 years. The Sullivan stratiform Ag-Pb-Zn-Fe sulphide deposit is one of the most important of its type worldwide and has contributed significantly to the mineral wealth generated in the province of British Columbia.

### 3. DRILLING

Two holes are being reported on. Both were drilled using N wireline tools, 7.6 cm in diameter. DDH 6451 was drilled with a dip of -65 degrees on azimuth 118 degrees to a depth of 168 metres and DDH 6452 was drilled with a dip of - 59 degrees on azimuth 116 degrees to a depth of 199 metres.

### 4. CLAIMS EXPLORED

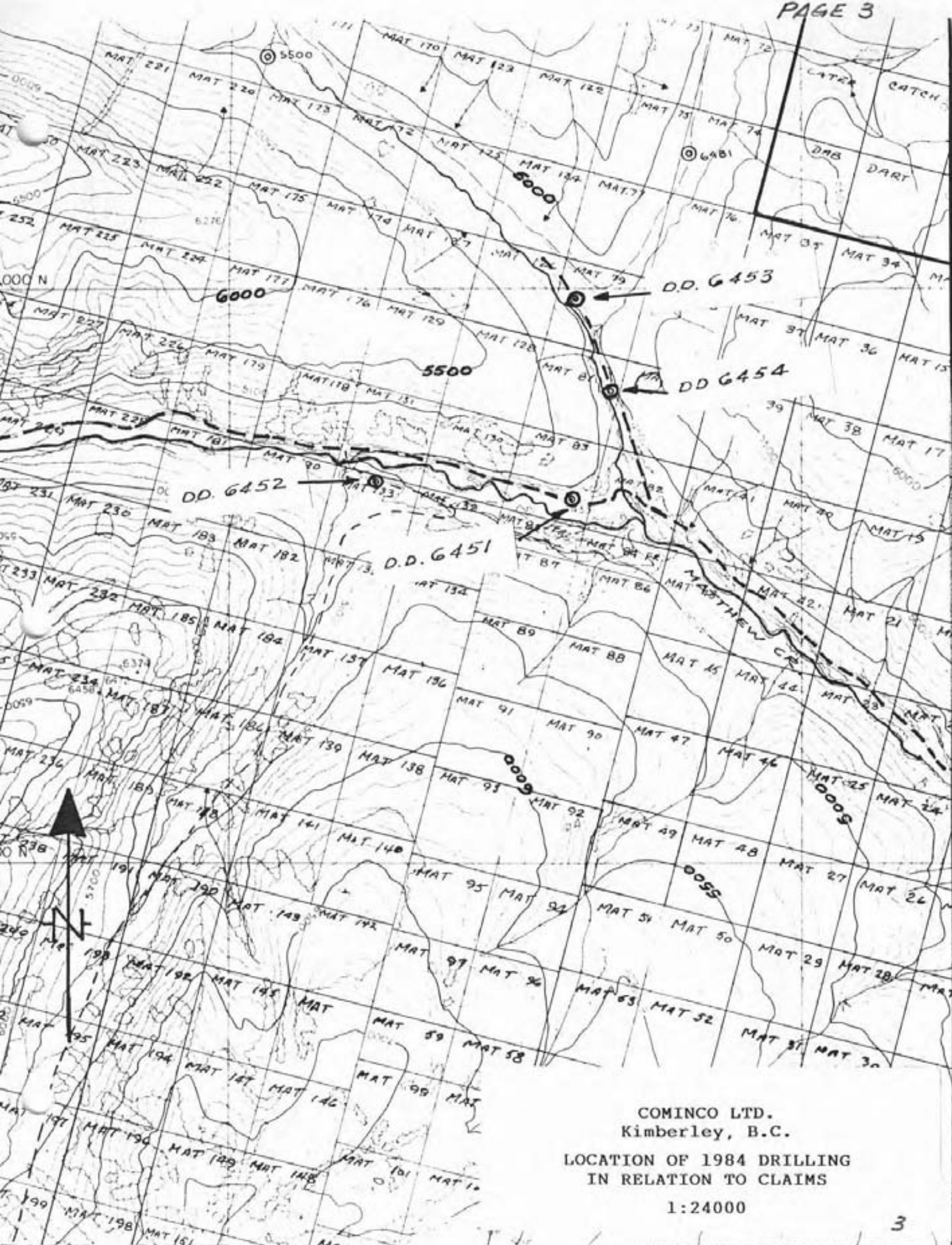
DDH 6451 was drilled on the Mat 83 Mineral Claim. DDH 6452 was drilled on the Mat 133 Mineral Claim.



Drawn by:		Traced by:	
Drawn by	Date	Traced by	Date

SULLIVAN MINE - KIMBERLEY, B.C.  
 INDEX MAP  
 LOCATION OF D.D.H. 6450-6455 inclusive  
 NTS 82 F/NE

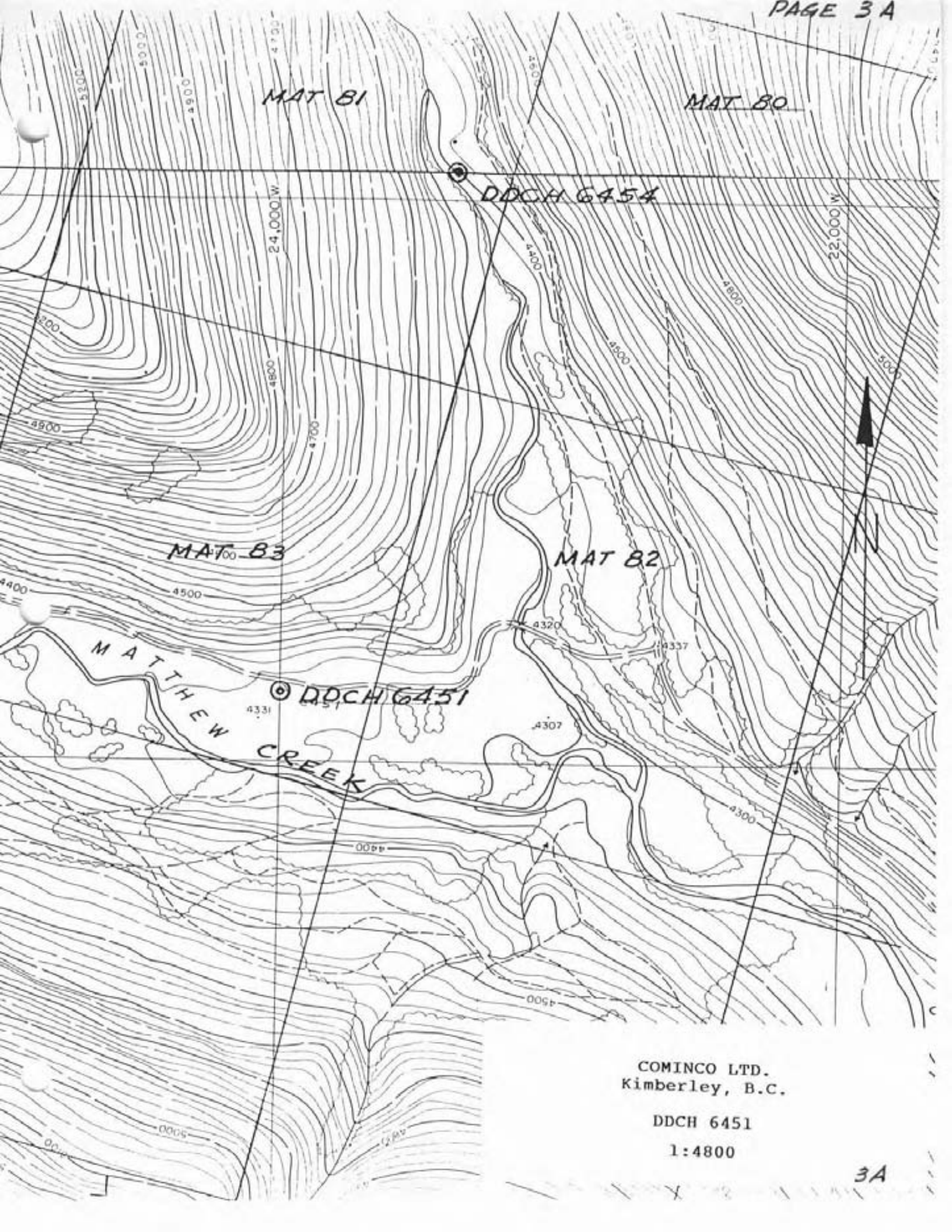
Scale: 1:125,000      Date: December 1984      Plate: 2



COMINCO LTD.  
 Kimberley, B.C.  
 LOCATION OF 1984 DRILLING  
 IN RELATION TO CLAIMS

1:24000





MAT 81

MAT 80

DDCH 6454

MAT 83

MAT 82

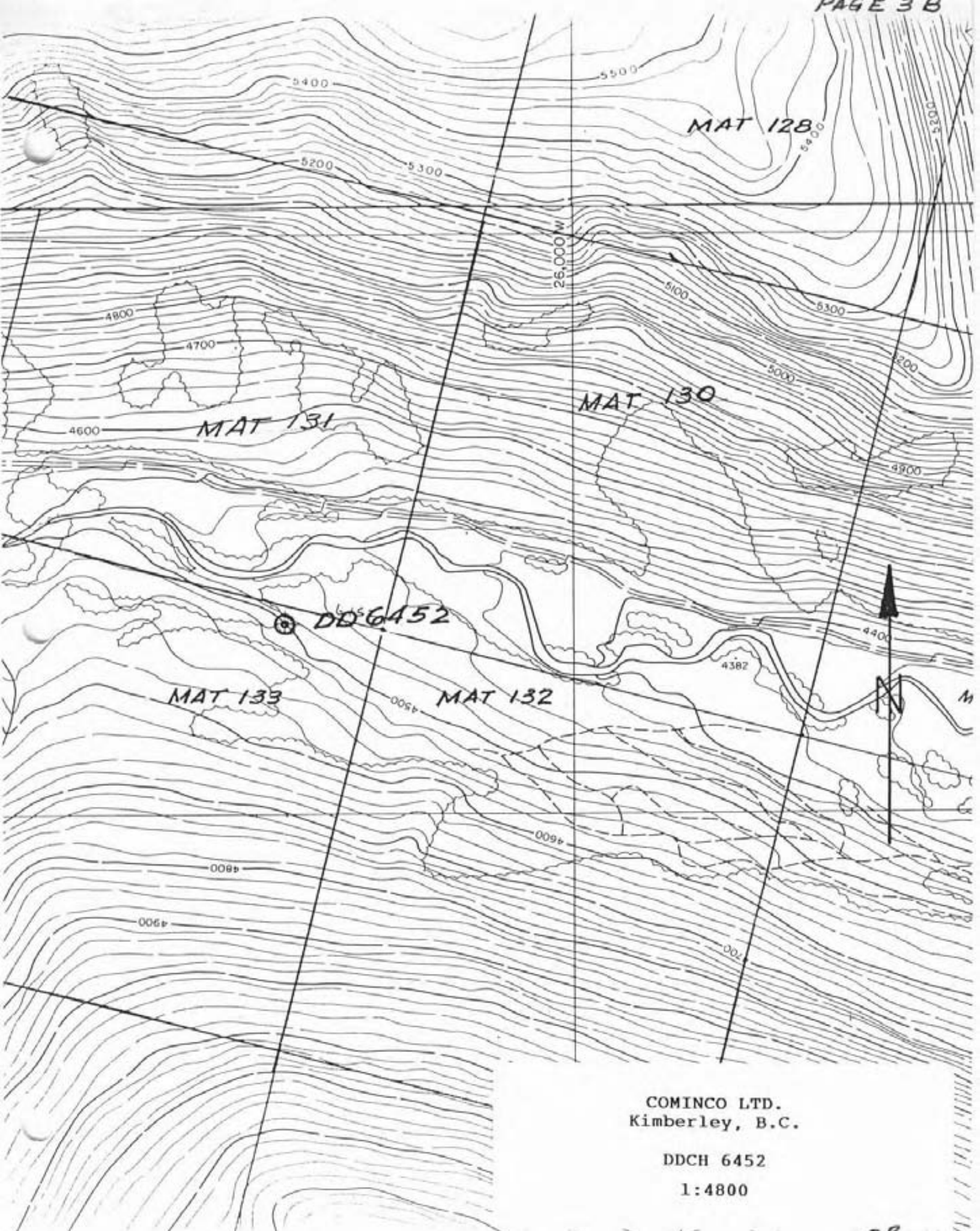
DDCH 6451

MATTHEW CREEK

COMINCO LTD.  
Kimberley, B.C.

DDCH 6451

1:4800



COMINCO LTD.  
 Kimberley, B.C.

DDCH 6452

1:4800

## DETAILED TECHNICAL DATA AND INTERPRETATION

### 1. DDH 6451

#### A. PURPOSE

The purpose of DDH 6451 was to test inferred Sullivan Horizon in the Matthew Creek area.

#### B. RESULTS

The Sullivan Horizon was not intersected.

#### C. INTERPRETATION

0 - 14m	Overburden
14 - 168m	Lower Aldridge Formation sediments. Predominantly wacke and subwacke, thin bedded to laminated, medium to light grey, and very fine grained. Some quartzitic wacke, medium to thin bedded and laminated, medium to light grey, fine and very fine grained. Numerous minor faults with gouge and slickensides. Sulphides are present as weak disseminations and in veinlets, however no concentrations of economic interest were observed. Pyrrhotite is predominant; pyrite, arsenopyrite and sphalerite were observed. Alteration includes bleaching and silicification in the lower portion of the hole and scattered calcite veinlets throughout. Chlorite is associated with cleavage and shear zones.

#### D. CONCLUSION

DDH 6451 was drilled in bedded sediments of the Lower Aldridge Formation. No mineralization of economic value was intersected.



## DETAILED TECHNICAL DATA AND INTERPRETATION (CONT'D)

### 2. DDH 6452

#### A. PURPOSE

The purpose of DDH 6452 was to test inferred Sullivan Horizon in the Matthew Creek area.

#### B. RESULTS

A laminated wacke interpreted to be Sullivan Horizon was intersected. No significant quantities of sulphide minerals were found.

#### C. INTERPRETATION

0 - 13 m	Overburden
13 - 146 m	Middle Aldridge sediments, generally either quartzitic wacke with minor wacke and subwacke, thick, medium and thin bedded with minor laminations in units about 10 metres thick, or wacke, subwacke and argillite, thin bedded and laminated in units up to two metres thick. Minor faulting indicated by broken or sheared core.
146 - 162m	Sullivan Horizon (?). Wacke, calcitic, laminated to medium bedded, very fine grained, with disseminated pyrrhotite.
162 - 199 m	Lower Aldridge sediments, wacke with either minor subwacke or minor quartzitic wacke, thin bedded to laminated with minor medium bedded intervals. Intervals of laminated wacke similar to that interpreted to be Sullivan occur in this zone. Minor faulting indicated by broken or sheared core. The most abundant sulphide is minor disseminated pyrrhotite found throughout the interval. Quartz calcite veinlets occur containing minor pyrrhotite and lesser chalcopyrite.

#### D. CONCLUSION

DDH 6452 intersected Sullivan Horizon, however no indications of significant sulphide mineralization were found.

## ITEMIZED COST STATEMENT

D.D.H. 6451

Start: May 28, 1984  
Finish: June 1, 1984

Contractor: Longyear Canada Inc.  
Location: Kimberley, B.C.

### Drilling Costs:

0 to 461 feet	Invoice 5799	\$ 8,302.50
( 0 to 141 metres.)		
461 to 549 feet	Invoice 5794	\$ 1,584.10
( 141 to 168 metres.)		
Hourly charges	Invoice 5794	\$ 282.00
	Invoice 5799	\$ 94.00
Casing	Invoice 5794	\$ 758.69
Bits/shells	Invoice 5794	\$ 797.15
Bits/shells Cr.	Invoice 6024	\$ (684.21)
Surveys	Invoice 5794	\$ 94.00
Moves	Invoice 5799	\$ 3,397.00
Cominco and other Charges		
Haul drill		\$ 1,197.00
Site preparation		\$ 1,505.00
Core boxes		\$ 134.25
Drill mud etc.		\$ 380.23
Vehicle rental		\$ 125.00
Supervision, log, report		\$ 2,290.00
TOTAL		<u>\$ 20,256.71</u>

# ITEMIZED COST STATEMENT

D.D.H. 6452

Start: June 2, 1984  
Finish: June 5, 1984

Contractor: Longyear Canada Inc.  
Location: Kimberley, B.C.

## Drilling Costs:

0 to 321 feet ( 0 to 98 metres.)	Invoice 5794	\$ 5,827.50
321 to 654 feet ( 98 to 199 metres.)	Invoice 5795	\$ 5,966.10
Hourly charges	Invoice 5795	\$ 141.00
Casing	Invoice 5795	\$ 720.70
Casing Cr.	Invoice 6024	\$ (72.28)
Surveys	Invoice 5795	\$ 141.00
Moves	Invoice 5794	\$ 2,054.00
Moves Cr.	Invoice 5795	\$ (79.00)
Cominco and other Charges		
Site preparation		\$ 1,946.00
Core boxes		\$ 187.95
Drill mud etc.		\$ 1051.70
Vehicle rental		\$ 125.00
Supervision, log, report		\$ 1,140.00
TOTAL		\$ 19,148.97

## AUTHOR'S QUALIFICATIONS

As co-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 eighteen years.

I am a member of the Geological Association of Canada.

I supervised Cominco Ltd's Sullivan mine area exploration drilling program in 1984.

A handwritten signature in cursive script that reads "P.W. Ransom".

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



## AUTHOR'S QUALIFICATIONS

As co-author of this report, I, Gary D. Delaney certify that:

I am employed by Cominco Ltd. as a Research Geologist active in minerals exploration.

I am a graduate of Carleton University with a degree of Bachelor of Science and a graduate of Brock University, St. Catharines, with a degree of Master of Science. I am currently a candidate for the degree of Doctorate of Philosophy at the University of Western Ontario, London.

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



G. D. Delaney

APPENDIX:

INVOICES AND DIAMOND DRILL LOGS

6014/0202

# Longyear

## Longyear Canada Inc.

CONTRACT DRILLING DIVISION

721 Aldford Avenue

Annacis Island, New Westminster, B.C. V3M 5P5

Telephone: 604-524-2511

Telex: 43-51280

Cominco Ltd.  
P.O. Box 2000  
Kimberley, B.C.  
V1A 2G3

Invoice No. 5799  
Cust. No. 6348  
Job No. 6345  
Dest. 062

Attention: Mr. John Hamilton

Invoice Date: June 5, 1984  
For May 1984

To: Invoice for diamond drilling performed on mining properties located near the Sullivan Mine, Kimberley, B.C. during period May 28-31, 1984 per agreement dated April 1984.

Hole No.	Size	From	To	Total	Rate	Amount
DDH-6451	Overburden	0	47	47	\$22.50	\$1,057.50
DDH-6451	NQ Wireline	47	461	414	\$17.50	\$7,245.00
				461		\$8,302.50

### Condition Hole & Ream Cave

Hole No. DDH-6450

Prorated Credit (See Later Invoice)

(--)

Hole No. DDH-6451

2 Man Hours @ \$32.00

\$64.00

1 Hour Drill Rental

\$30.00

94.00

### Moves Between Holes

Move From Hole # DDH-6450 To DDH-6451

86 Man Hours @ \$39.50

3,397.00

### Surveys

Hole # DDH-6450

1 Man Hour

47.00

### Recover Casing

Hole # DDH-6450

1 Man Hour

\$32.00

1/4 Hour Drill Rental @ \$30.00

\$15.00

47.00

....2

5799

Casing Left In Hole

Hole # DDH-6450

3 Pcs. HW - 2 Ft. Casing @ \$ 54.41	\$ 163.23
2 Pcs. HW - 5 Ft. Casing @ \$101.92	\$ 203.84
37 Pcs. HW - 10 Ft. Casing @ \$176.92	\$6,546.04
1 HW Econo Shoe # E2756	\$ 262.15

\$ 7,175.26

\$19,062.76



COPY/GEOL.

# Longyear

## Longyear Canada Inc.

CONTRACT DRILLING DIVISION

721 Aldford Avenue

Annacis Island, New Westminster, B.C. V3M 5P5

Telephone: 604-594-9511

Telex: 43-51280

Cominco Ltd.  
P.O. Box 2000  
Kimberley, B.C.  
V1A 2G3

Invoice No. 5794  
Cust. No. 6348  
Job No. 6345  
Dest. 062

Attention: Mr. John Hamilton

Invoice Date: June 6, 1984  
For June 1984.

TO: Invoice for diamond drilling performed on mining properties located near the Sullivan Mine, Kimberley, B.C. during period June 1-3, 1984 per agreement dated April 1984.

Hole No.	Size	From	To	Total	Rate	Amount
DDH-6451	NQ Wireline	461	500	39	\$17.50	\$ 682.50
DDH-6451	NQ Wireline	500	549	49	\$18.40	\$ 901.60
DDH-6452	Overburden	0	42	42	\$22.50	\$ 945.00
DDH-6452	NQ Wireline	42	321	279	\$17.50	\$4,882.50
				409		\$7,411.60

### Condition Hole & Ream Cave

#### Hole # DDH-6450

Prorated Credit (See Later Invoice) (—)

#### Hole # DDH-6451

6 Man Hours @ \$32.00	\$192.00	
3 Hours Drill Rental @ \$30.00	\$ 90.00	
1 NQ IMP Green Bit #16820	\$797.15	
Prorated Credit (See Later Invoice)	(—)	
		\$1,079.15

### Moves Between Holes

#### Move From Hole # DDH-6451 To DDH-6452

52 Man Hours @ \$39.50 \$2,054.00

### Surveys

#### Hole # DDH-6451

2 Man Hours @ \$47.00 \$ 94.00

.....2

Casing Left In Hole

Hole # DDH-6451

1 Pc. NW 2 Ft. Casing	\$ 38.15
1 Pc. NW 5 Ft. Casing	\$ 72.12
4 Pcs. NW 10 Ft. Casing @ \$121.09	\$487.92
1 NW Econo Shoe # E2314	\$160.50

\$ 758.69

\$11,397.44

# Longyear

Longyear Canada Inc.

CONTRACT DRILLING DIVISION

721 Aldford Avenue

Annacis Island, New Westminster, B.C. V3M 5P5

Telephone: 604-524-2511

Telex: 43-51280

Cominco Ltd.  
P.O. Box 2000  
Kimberley, B.C.  
V1A 2G3

Invoice No. 6024  
Cust. No. 6348  
Job No. 6345  
Dest. 062

Attention: Mr. John Hamilton

Invoice Date: July 18, 1984  
For July 1984

To: Credit your account in connection with diamond drilling performed on mining properties located near the Sullivan Mines, Kimberley, B.C. per agreement dated April, 1984. P.O. # 1-22807.

Condition Hole, Ream Cave

Hole # DDH-6450

1 - HQ IMP Green Bit # 16210 (Prorated Credit) (\$797.15)

Hole DDH-6450

Invoice Reads 1 - NQ IMP Green Bit #16820	(\$797.15)	
Should Read 1 - NQ IMP Green Bit #16820	\$508.25	
Prorated Credit	(\$395.31)	
		<u>(\$684.21)</u>

Hole # DDH-6455

1 - HQ IMP Green Bit #16209	\$797.15	
Prorated Credit	(\$524.95)	
1 - HQ Reaming Shell # T-07983	N/C	
		<u>\$272.20</u>

(\$1,209.16)

Howie:

I've asked Francis to

credit	6112.50	\$ 797.15
credit	6112.51	\$ 648.21
charge	6112.55	\$ 272.20

COPY / 1100L

# Longyear

## Longyear Canada Inc.

CONTRACT DRILLING DIVISION

721 Aldford Avenue

Annacis Island, New Westminster, B.C. V3M 5P5

Telephone: 604-524-2511

Telex: 43-51280

Cominco Ltd.  
P.O. Box 2000  
Kimberley, B.C.  
V1A 2G3

Invoice No. 5794  
Cust. No. 6348  
Job No. 6345  
Dest. 062

Attention: Mr. John Hamilton

Invoice Date: June 6, 1984  
For June 1984.

TO: Invoice for diamond drilling performed on mining properties located near the Sullivan Mine, Kimberley, B.C. during period June 1-3, 1984 per agreement dated April 1984.

Hole No.	Size	From	To	Total	Rate	Amount
DDH-6451	NQ Wireline	461	500	39	\$17.50	\$ 682.50
DDH-6451	NQ Wireline	500	549	49	\$18.40	\$ 901.60
DDH-6452	Overburden	0	42	42	\$22.50	\$ 945.00
DDH-6452	NQ Wireline	42	321	279	\$17.50	\$4,882.50
				409		\$7,411.60

### Condition Hole & Ream Cave

Hole # DDH-6450

Prorated Credit (See Later Invoice) (—)

Hole # DDH-6451

6 Man Hours @ \$32.00	\$192.00	
3 Hours Drill Rental @ \$30.00	\$ 90.00	
1 NQ IMP Green Bit #16820	\$797.15	
Prorated Credit (See Later Invoice)	(—)	
		\$1,079.15

### Moves Between Holes

Move From Hole # DDH-6451 To DDH-6452

52 Man Hours @ \$39.50 \$2,054.00

### Surveys

Hole # DDH-6451

2 Man Hours @ \$47.00 \$ 94.00

.....2



# Longyear

## Longyear Canada Inc.

CONTRACT DRILLING DIVISION

721 Aldford Avenue

Annacis Island, New Westminster, B.C. V3M 5P5

Telephone: 604-524-2511

Telex: 43-51280

Cominco Ltd.  
P.O. Box 2000  
Kimberley, B.C.  
V1A 2G3

Invoice No. 5795  
Cust. No. 6348  
Job No. 6345  
Dest. 062

*P.O. # 1-22807*

Attention: Mr. John Hamilton

Invoice Date: June 21, 1984  
For June 1984.

To: Invoice for diamond drilling performed on mining properties located near the Sullivan Mine, Kimberley, B.C. during period June 4-13, 1984, per agreement dated April 1984.

Hole No.	Size	From	To	Total	Rate	Amount
DDH-6452	NQ Wireline	321	500	179	\$17.50	\$ 3,132.50
DDH-6452	NQ Wireline	500	654	154	\$18.40	\$ 2,833.60
DDH-6453	Overburden	0	32	32	\$22.50	\$ 720.00
DDH-6453	NQ Wireline	32	500	468	\$17.50	\$ 8,190.00
DDH-6453	NQ Wireline	500	845	345	\$18.40	\$ 6,348.00
DDH-6454	Overburden	0	89	89	\$22.50	\$ 2,002.50
DDH-6454	NQ Wireline	89	400	311	\$17.50	\$ 5,442.50
				<u>1578</u>		<u>\$28,669.10</u>

### Condition Hole, Ream Cave & Casing

#### Hole # DDH-6450

Prorated Credit (See Later Invoice)

(--)  
cr

#### Hole # DDH-6452

3 Man Hours @ \$32.00	\$ 96.00
1 1/2 Hours Drill Rental @ \$30.00	\$ 45.00
2 NQ IMP Green Bits # 16417	N/C
# 12638	N/C

\$141.00

#### Hole # DDH-6453

8 Man Hours @ \$32.00	\$256.00
4 Hours Drill Rental @ \$30.00	\$120.00
3 NQ IMP Green Bits # 16821	N/C
# 16422	N/C
# 16424	N/C

\$376.00

#### Hole # DDH-6451

Prorated Credit (See Later Invoice)

(--)  
cr

....2

Hole # DDH-6454

8 Man Hours @ \$32.00	\$256.00	
4 Hours Drill Rental @ \$30.00	\$120.00	
	<hr/>	\$376.00
		\$ 893.00

Moves Between Holes

Move From Hole # DDH-6451 To # DDH-6452 (See Invoice #5794)

(2)cr Man Hours @ \$39.50 (\$79.00)cr

Move From Hole # DDH-6452 To # DDH-6453

43 Man Hours @ \$39.50 \$1,698.50

Move From Hole # DDH-6453 To # DDH-6454

18 Man Hours @ \$39.50 \$ 711.00

Move From Hole # DDH-6454

30 Man Hours @ \$39.50	\$1,185.00	
	<hr/>	\$ 3,515.50

Surveys

Hole # DDH-6452

3 Man Hours @ \$47.00 \$ 141.00

Hole # DDH-6453

2 Man Hours @ \$47.00 \$ 94.00

Hole # DDH-6454

2 Man Hours @ \$47.00	\$ 94.00	
	<hr/>	\$ 329.00

Casing Left In Hole

Hole # DDH-6452

4 Pcs. NW 10 Ft. Casing @ \$121.98	\$487.92	
1 NW To HQ Sub	\$ 72.28	
1 NW Econo Shoe # E3751	\$160.50	
	<hr/>	\$ 720.70

Hole # DDH-6453

3 Pcs. HQ 10 Ft. Rod @ \$145.41	\$436.23	
1 NW To HQ Sub	\$ 72.28	
1 NW Econo Shoe # E4888	\$160.50	
	<hr/>	\$ 669.01

# Longyear

Longyear Canada Inc.

CONTRACT DRILLING DIVISION

721 Alderford Avenue

Annacis Island, New Westminster, B.C. V3M 5P5

Telephone: 604-594-9511

Telex: 43-51280

Cominco Ltd.  
P.O. Box 2000  
Kimberley, B.C.  
V1A 2G3

Invoice No. 5905  
Cust. No. 6348  
Job No. 6345  
Dest. 062

Attention: Mr, John Hamilton

Invoice Date: July 6, 1984  
For June, 1984.

To: Invoice for diamond drilling performed on mining properties located near the Sullivan Mine, Kimberley, B.C. during period June 22-28, 1984 per agreement dated April, 1984. "Shaft Hole". P.O. #1-22807

Hole No.	Size	From	To	Total	Rate	Amount
DDH-6455	HQ Wireline	Ø	500	500	\$21.25	\$10,625.00
DDH-6455	HQ Wireline	500	1,000	500	\$22.50	\$11,250.00
DDH-6455	HQ Wireline	1,000	1,223	223	\$24.00	\$ 5,352.00
				1,223		\$27,227.00

Condition Hole, Ream Cave and Casing

Hole #DDH-6455

17 Man Hours @ \$32.00	\$ 544.00
8½ Hours Drill Rental @ \$30.00	\$ 255.00
1 HQ Imp. Green Bit #16209 (See later invoice)	-----
1 HQ Reaming Shell #T07983 ( " " " )	-----
	\$ 799.00

Hole #DDH-6450

Prorated Credit (See later invoice) -----

Hole #DDH-6451

Prorated Credit (See later invoice) -----

\$ 799.00

Moves Between Holes

Move from Hole #DDH-6452 to #DDH-6453

(2) CR Man Hours @ \$39.50 \$ (79.00) CR

.....2

# 5905

Move from Hole #DDH-6454

(4) CR Man Hours @ \$39.50 (\$158.00) CR

Move to Hole #DDH-6455

44 Man Hours @ \$39.50 \$1,738.00

Move from Hole #DDH-6455

7 Man Hours @ \$39.50 \$276.50

\$ 1,777.50

Surveys

Hole #DDH-6455

34 Man Hours @ \$47.00 \$ 1,598.00

Cementing

Hole #DDH-6455

2 Man Hours @ \$32.00 \$64.00  
1 Hour Machine Rental \$30.00

\$ 94.00

Casing Left in Hole

Hole #DDH-6455

3 Pcs. HW 5 Ft. Casing @ \$101.92 \$305.76  
1 HW Pin to 4 1/2" Pin Sub \$121.60  
1 HW Econo Shoe #E1526 \$262.15

\$689.51

Hole #DDH-6452 (Did Read)

(1) CR NW to HQ Sub (\$72.28) CR

Hole #DDH-6452 (Should Read)

1 NW to HQ Sub N/C

Hole #DDH-6453 (Did Read)

(3) CR Pcs. HQ 10 Ft. Rod @ \$145.41	(\$436.23) CR	
(1) CR NW to HQ Sub	(\$72.28) CR	
		----- (\$508.51) CR

Hole #DDH-6453 (Should Read)

3 Pcs. HQ 10 Ft. Rod @ \$121.98 *	\$365.94	
1 NW to HQ Sub	N/C	
		----- \$365.94

Hole #DDH-6454 (Did Read)

(10) CR Pcs. HQ 10 Ft. Rod @ \$145.51	(\$1,454.10) CR	
1 NW to HQ Sub	(\$72.28) CR	
1 HQ to NW Sub	(\$72.28) CR	
		----- (\$1,598.66) CR

Hole #DDH-6454 (Should Read)

10 Pcs. HQ 10 Ft. Rod @ \$121.98 *	\$1,219.80	
1 NW to HQ Sub	N/C	
1 HQ to NW Sub	N/C	
		----- \$1,219.80

95.80

## \* Casing Price

Mud and Additives (attached)

Westcoast Drilling Supplies Ltd.	\$214.00	
Plus 12%	25.68	
		----- \$239.68

Moves

Henderson Heavy Hauling (1973) Ltd. Inv. #22279		
Longyear Portion 9 Hrs. @ (\$60.00) CR		(\$540.00) CR

---

\$ 31,290.98

## Diamond Drill Geological Log For D.D.H.

6451



CAT. 6250 N	DEP. 24000 W	ELEV. 4330
DIP: -65	AZIM.: 118°	LENGTH: 549.5
HORIZ. COMP.		VERT. COMP.
DATE COLLARED: May 30/84		DATE COMPLETED: June 2/84
CORE STORAGE: Sullivan Mine - Old Warehouse		
DRILLED ON CLAIM(S):		
OBJECTIVE: To test weak UTEM conductor at 400-450' (inferred Sullivan Horizon).		
PLANNED LENGTH: 550'		
TERMINATION COMMENTS: Artesian flow of water issuing from hole. Grout plug (mechanical) installed below casing slowed but did not stop the flow.		
DRILLED BY: Longyear		
TYPE DRILL: 38		
CORE SIZE: NQ		
PERFORMANCE COMMENTS: Sand seam at 115 created blockage in hole. Otherwise good drilling.		
CASING REMAINING IN HOLE (LENGTH & SIZE): 50'		
TYPE CAP & SEALING METHOD: HQ cap.		
OTHER MATERIAL REMAINING IN HOLE:		
SURVEY INSTRUMENT USED: Sperry Sun singleshot		
ADDITIONAL DOWN HOLE TESTS: 80' - 62.5° Azm 114		
545' - 58.1° Azm 115		

GENERAL COMMENTS:

## LOG LEGEND

## BED THICKNESS CLASSIFICATION

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

## LITHOLOGY ABBREVIATIONS

OQ - Orthoquartzite  
 QA - Quartz Arenite  
 QW - Quartz Wacke  
 QCW - Quartzitic Wacke  
 W - Wacke  
 SW - Sub Wacke  
 AG - Argillite

D.D.H. 6451

# Diamond Drill Geological Log



Objective: TO TEST UTEM ANOMALY		Sampled:		40 Scale	
Logged By: G. DELANEY		Date: JUNE 1984		Color Plot & Dips	
Block:		Sect.:		Ore Classes & Aver.	
Place:		App. Bear:		App. Dip:	
				Length: 549.5	
From	To	Discard:	Reason:		
47	58.5		Wacke (30%) with interbedded subwacke (20%) and wacke-to-quartzitic wacke wacke (50%). Wacke, grey, thin-bedded, massive to even, parallel laminated. Subwacke, light greenish grey, laminae and thin beds, massive. Quartzitic wacke-to-wacke, coarse silt-to-very fine sand, thin-to-medium-bedded; massive; locally minor disseminated pyrrhotite. Note: Much of this interval is scored core which tends to mask relationships, 50.4 - 4 mm thick zone of wispy sphalerite laminations; 57.0 - 57.1 light greenish grey bleached interval with fine-to-medium grained clots of pyrrhotite and sphalerite; long axes of clots parallel bedding.		
58.5	93		Wacke (60%) with interbedded quartzitic wacke (25-30%) and subwacke (10-15%). Wacke, grey, thin-to-locally medium-bedded; massive-to-even, parallel laminated, generally with sharp, planar contacts; a few of these beds contain granule- and small pebble-size fragments, the long axis of which parallel bedding. Quartzitic wacke, grey; thin and some medium beds; generally massive although some are even, parallel laminated. Subwacke, light grey; as laminae and very thin beds with generally parallel, planar contacts. These light grey subwacke beds and laminae, which occur singly or in packets of three-to-four impart a distinctive striped appearance to the interval. 60.3-60.7 light-greenish grey, bleached looking zone containing fine- and medium-grained clots of pyrrhotite and sphalerite. Cut by a thin calcite, pyrrhotite and sphalerite vein. Bedding to core: 88° at 58.5'; 85° at 65'; 85° at 75.5'; 84° at 80'; 83° at 90'; 85° at 93'.		
93	101		Wacke (80%) with minor interbedded subwacke (20%). Wacke, grey, generally thin-bedded; massive, even, parallel laminated -locally graded. Subwacke, light grey-to-grey, laminae and very thin beds (generally these laminae are not as distinctive as in the preceding interval). Very thin fractures at various angles to core throughout this interval. Bedding to core: 84° at 96'; cleavage to core: 87° at 100'. Po. coatings on many of the fractures in this interval.		
			Core Size		
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			Plate No.	Page	
			6451	1	



# Diamond Drill Geological Log



Objective:		Sampled:		40 Scale	
Logged By:		Date:		Color Plot & Dips	
Block:		Sect.:		Ore Classes & Avar.	
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Length:		Composites:			
From	To	Discard:	Reason:		
101	104.4		Quartz vein, pyrrhotitic, white; contains a few irregular, wispy terminated, dark grey rock fragments cut by an irregular network of pyrrhotite, pyrite and arsenopyrite veins.		
104	105		Gouge zone.		
105	108.5		Wacke (50%) and interbedded subwacke. Wacke, grey, very thin-bedded, even, parallel laminated. Subwacke, grey laminae-to-very thin bedded; interval is fractured and cut by numerous mm-thick calcite pyrrhotite veins. Bedding to core 70° at 107.5'.		
108.5	111.5		Broken zone.		
111.5	112.8		Wacke and subwacke in a disrupted zone. Bedding is contorted and the interval is cut by quartz-calcite veins.		
112.8	114.15		Broken core gravelly-looking interval.		
114.5	156		Wacke (75%) with intercalated subwacke and quartzitic wacke. Wacke, grey, laminae-to-thin beds; generally even, parallel laminated; some beds are massive, most beds are characterized by sharp, planar contacts, although for some the basal contact is undulatory. Subwacke, light grey, laminae and very thin beds. Quartzitic wacke, grey, coarse silt, massive, thin bedded. Very thin, irregular fractures of various orientations are common throughout this interval. Many of these are coated with calcite. Toward the top of this interval there is a tendency for pieces to break along fractures parallel to bedding; bedding to core: 79° at 120'; 76° at 126'; 85° at 134'; 82° at 140'; 74° at 148'; 62° at 152'; 63° at 155'.		
			Core Size	NQ	
			Hole No.	6451	
			Page	2	

# Diamond Drill Geological Log



Objective:		Sampled:		40 Scale	
Logged By:		Date:		Color Plot & Dips	
Block:		Place:		Ore Classes & Aver.	
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App. Dip.:		Length:			
From	To	Discard:	Reason:		
156	156.5		Fault zone characterized by a close-spaced cleavage, calcitic veins and chloritic areas. Cleavage to bedding 50°.		
156.5	159		Broken core, includes some fragments of grey wacke and subwacke, some of these cleave along bedding parallel cleavage planes. Most detail is masked.		
159	184.1		Wacke (80%) with interbedded subwacke (20%). Wacke, grey, predominantly silt and clay size material; very thin-to-thin-bedded; varies from massive to even, parallel laminated; most contacts are sharp and planar; a few are undulatory (scour contacts). Subwacke, light grey, laminae and very thin beds, generally massive. 159-162 - the core in this interval breaks along slickensided fractures parallel to bedding (-62°) 173-176 - broken core, 167.8 pyrrhotite laminae, a few mm wide-parallel bedding. 170.7-171 - numerous close-spaced fractures - chlorite, quartz, calcite and pyrrhotite common; represents a small fault zone. Orientation of fractures varies from 55°-65°. 179.5-181 broken core, fractured into pieces up to a few cm long. Bedding to core: 62° at 161'; 68° at 164'; 73° at 176' and 74° at 182.5'.		
184.1	185		Broken core.		
185	189		Wacke (70%) with interbedded subwacke (20%) and quartzitic wacke (10%). Much of this interval is fractured and broken core and thus features are masked (most intensely fractured is 187-188); bedding to core 76.5 ° at 185'.		
189	198.2		Wacke (70%) with interbedded quartzitic wacke (20%) and subwacke (10%). Wacke, grey, very thin-to-thin bedded; generally massive - some beds are even, parallel laminated. Quartzitic wacke grey, thin-bedded; generally massive. Subwacke-laminae and very thin beds. Most of the core over this interval is fractured and locally broken. Many of these fractures are coated with pyrrhotite. 192.5 - QcW with numerous blebs of pyrrhotite - cut by an irregular net-	Core Size	NO
				Note No.	Page
				6451	3



# Diamond Drill Geological Log



Objective:		Sampled:	
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From	To	Discard:	Reason:
213.4	215.5		Wacke, grey, laminae and thin beds characterized by even, parallel laminae and locally cross-laminae. 215.3 - 215.5 silicified chloritized zone. Bedding to core: 76° at 214.8'.
215.5	217.65		Wacke, greenish-grey, chloritized, massive, cut by irregular calcite-lined fractures.
217.65	218.05		Wacke, grey, massive.
218.05	218.35		Chloritic shear zone.
218.35	263.6		Wacke (55%) with interbedded quartzitic wacke-to-wacke and subwacke. Wacke, grey, thin-to-medium bedded, even, parallel laminated or locally massive; Quartzitic wacke-to-wacke, hard, grey, coarse silt-size to very fine sand size, generally medium bedded; some beds are massive others are even, parallel laminated; in a few large scale cross beds are present (ie at 221); basal contacts of these beds vary from sharp and planar to sharp and undulatory (scoured); these beds appear to be fairly uniformly distributed throughout the interval. Subwacke, grey, laminae and very thin beds occur singly or in a sequence of three or four. Locally within this interval (ie 228-237) there are greenish bleached zones developed along irregular fractures. 237-2 - .6 irregular nodular zone around which bedding is broken (nodular area = pyrrhotite, calcite and biotite). 243.5 - pyrrhotite-calcite-quartz vein at 45° to bedding 0.5 cm. Bedding to core: 75° at 222'; 68° at 234'; 72° at 239'; 74° at 248'; 77° at 249'; 82° at 258'; broken core 260.5' - 261.1'.
263.6	277.9		Wacke (75%) with interbedded quartzitic wacke (15%) and subwacke (10%). Wacke, grey, thin-to-medium-bedded; massive or even, parallel laminated; characterized by sharp, planar contacts. Quartzitic wacke, grey, coarse silt, thin-bedded, massive or even, parallel laminated. Subwacke, light grey, laminae and thin beds, massive. Some

40 Scale	
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200'	

Core Size	NQ
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# Diamond Drill Geological Log



Objective:		Sampled:		40 Scale	
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Length:		Composites:			
From	To	Discard:	Reason:		
263.6	277.9	continued:			
		intervals such as 275.6 - 276 are very distinctive. 269 - pyrrhotite-calcite vein - irregular thickness which averages about 1 cm - orientation of vein more or less parallels bedding. Bedding to core 77° at 264'; 80° at 275'.			
277.9	279.2	Wacke, chloritic, green, massive, fine grained; chloritic veins at base and top of this interval.			
279.2	315.2	Wacke (80%) with interbedded subwacke (15%) and quartzitic wacke (5%). Wacke, grey, thin-to-medium-bedded, generally massive or even, parallel laminated, locally cross-laminated; contacts are generally sharp and planar; a few are undulatory. Subwacke, light-grey-to-light greenish grey, laminae and very thin beds; massive. Quartzitic wacke, grey, coarse silt, even, parallel laminated-probably gradational in composition to wacke beds. Bedding to core: 83° at 281'; 80° at 288'; 81° at 292'; 78° at 303'; 80° at 309'.			
315.2	316	Fracture and shear zone in wacke and subwacke; at both the top and bottom of this interval there are narrow shear zones (ie, close-spaced cleavage, micaceous). Between these two zones there are numerous irregular fractures.			
316	330.3	Wacke (85%) with intercalated laminae and beds of subwacke (15%). Wacke, grey, thin and a few medium beds; massive or even, parallel laminated. Subwacke, grey or light grey, massive; sharp planar contacts. 318-319 narrow shear zone at the top of this interval which is characterized by contorted and broken bedding. 327.5-330.6 contorted bedding and few narrow, irregular chloritic shear zones. 327.5 calcite-pyrrhotite vein at 46° to core; bedding to core: 68° at 318'; 70° at 321'; 71° at 323'.			
				Cure Size	
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				6451	6

# Diamond Drill Geological Log



Objective:		Sampled:				40 Scale	
Logged By:		Date:		Composites:		Color Plot & Dip	Ore Classes & Avar.
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From	To	Discard:	Reason:				
330.3	338.6		Predominantly broken core with several shear and gouge zones as noted below. Those intervals which are not broken consist of wacke and subwacke similar to the preceding interval. 330.3-330.8 gouge zone; 331.6-331.9 - contorted bedding; 334 narrow gouge zone; 336.8-337.2 shear and gouge zone, 338.3-338.6 gouge zone.				
338.6	354		Wacke (80%) with minor interbedded subwacke 10-15% and quartzitic wacke (5%). Wacke, grey, generally, thin-bedded, a few medium beds; massive or more typically even, parallel laminated; contacts sharp and planar; a few are undulatory. Subwacke, light grey, laminae and very thin beds. Quartzitic wacke, grey, thin beds, even, parallel laminated or cross-laminated 345.8-346.2 subwacke beds are contorted-wispy elongate-shear zone, 346.7-347 contorted bedding, 350 cleavage to bedding = 20°. Bedding to core: 77° at 339.5'; 77° at 346'; 76° at 351'.				
354	355.8		Broken core of wacke and subwacke similar to preceding interval.				
355.8	358.85		Wacke (80%) with interbedded quartzitic wacke (20%). Wacke grey, thin-bedded, massive even, parallel laminated. Bedding to core: 76° at 351'.				
358.85	361		Broken core of wacke and subwacke including at least one gouge zone.				
361	361.9		Wacke, grey, thin-bedded, even, parallel laminated or massive includes a silicified zone at 361.7 - 361.9.				
361.9	362		Gouge zone.		Core Size		
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# Diamond Drill Geological Log



Objective:		Sampled:		40 Scale			
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Block:		Sect.:		Ore Classes & Aver.			
Place:		App. Bear:		App. Dip.:			
Length:		Composites:		Discard:			
From	To	Reason:					
362	415	Wacke with interbedded subwacke and quartzitic wacke? Much of this interval is bleached to various shades of grey and greenish grey. Silicification and locally chloritization is common in these bleached zones. Wacke, commonly silicified; grey or various mottled greenish grey colours; generally thin-bedded; even, parallel laminated or massive. Subwacke, grey or greenish grey laminae and very thin beds which are typically altered. Note: Throughout this interval there are several mm-to-cm thick, light grey, siliceous laminae. Bleached, chloritized and silicified intervals include: 367.2-368.1-greenish grey; 368.8-373.8 most of this interval is light greenish-grey although for the basal .2 feet a dark green colour is more common; at the top there are numerous, close-spaced, calcite-lined fractures at 20° to core; 374.6-377.6-light grey silicified interval; 384-386 light greenish grey; 388-392 several narrow shear zones in this interval which is also characterized by irregular, splotchy bleaching; 397-415 several distinct light greenish grey zones some of which are spotty and some of which parallel bedding (ie, appear to have replaced beds of a distinctive composition). Bedding to core: 69° at 364'; 72° at 372'; 79° at 376'; 77° at 385'; 77° at 393'; 75° at 402'; 78° at 414'.					
415	420.7	Fragmented and sheared zone. Much of this interval appears to consist of variably fragmented, chloritized wacke. Irregular fractures and splotchy masses quartz, chlorite calcite and pyrrhotite are common. 416.8 splotchy chloritic-calcite zone. 417.8 3 cm dark green, chloritic shear zone which parallels bedding. 420.7 gouge zone.					
420.7	429.9	Wacke grey, greenish grey, thin-to-medium-bedded local splotchy discoloration. A quartz, calcite, pyrrhotite vein of variable thickness parallels much of the length of this interval. Bedding to core: 70° at 421'.					
429.9	431	Gouge zone.		Core Size			
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# Diamond Drill Geological Log



Objective:		Sampled:				40 Scale	
Logged By:		Date:		Composites:		Color Plot & Dips	Ore Classes & Aver.
Block:		Sect.:	Place:	App. Bear:	App. Dip.:	0	
From	To	Discard:	Reason:				
431	445		<p>Wacke, with interbedded subwacke; alteration in this interval makes it hard to estimate proportions. Wacke, grey-to-various shades of green-grey, very thin-to-thin-bedded, massive to commonly even; parallel laminated; greenish-grey centered locally on irregular fractures masks features. Subwacke, grey-to-greenish grey laminae and very thin beds. Intervals characterized by a close-spaced, paper-thin, foliation (shear zone) which are typically a light brownish grey colour; 435.8-436 (includes a quartz-calcite vein); 436.3-436.6 (includes a quartz-calcite vein). 438.1-438.2; 438.85-440; 440.25-440.4; 441.6-441.8. (Note most of these parallel bedding and appear to be developed in subwacke.) Quartz veins: 433.6 1 cm quartz vein at 65° to core, 434 quartz vein 1 cm at 70° to core. Bedding to core: 80° at 436'; 83° at 441'; 84° at 442'.</p>				
445	459.6		<p>Shear zone most of which is characterized by a close-spaced, paper thin foliation - mostly a light brownish grey colour; boudinaged beds of wacke and subwacke occur in parts of this interval. Mottled, bleached, in part silicified zones, occur at the top and bottom of this interval; much of this interval is weakly calcareous; 446.4-446 a quartz, pyrrhotite, and calcite vein containing a few wispy rock fragments; 456.3-456.4 quartz, biotite-pyrrhotite vein; 456.6-456.9 quartz, calcite-pyrrhotite vein, irregular morphology; 457.1-457.15 - irregular pyrrhotite, pyrite-calcite vein which contains granule- and pebble-size rock fragments. 450 foliation to core 85°; varies locally.</p>				
459.6	482		<p>Wacke (70%?) with interbedded subwacke. Much of this interval is silicified and this results in patchy light grey bleached looking zones. Wacke, grey-greenish grey, very thin-to-thin bedded, appears to be even, parallel or massive although alteration commonly masks these features. Subwacke, light grey, laminae and very thin beds - again alteration masks features. Near the top of this interval there are some narrow zones characterized by a close-spaced foliation - similar to preceding interval. These shear zones occur at 460.5; 462.5-462.6; 464.8; silicified zones occur at 464.2-464.7; 466.25-466.35; 472-475.7 - patchy zones over this interval, 481-482 - irregular quartz-calcite vein at</p>				
		Core Size		NQ			
		Hole No.		6451			
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# Diamond Drill Geological Log



Objective:		Sampled:		40 Scale	
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Block:		Sect.:		Ore Classes & Avar.	
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Length:		Composites:			
From	To	Discard:	Reason:		
459.6	482		continued:		
			472-473.4; 474.8 - 0.5 cm quartz, calcite and pyrrhotite vein, irregular thickness, 50° to core. Bedding to core: 85° at 461'; 85° at 463'; 86° at 467'.		
482	514.5		Wacke (80%) with interbedded subwacke. This interval is characterized by a distinctive stripped appearance defined by the light greenish grey subwacke laminations and grey wacke beds. Again in this interval there are a few splotchy silicified zones. Wacke, grey, thin-to-medium bedded, generally massive although a few may be weakly bedded. Minor fine-grained pyrrhotite disseminated throughout. Subwacke, light grey, laminae and very thin beds which occur singly or in clusters of 3 or 4; a massive or even, parallel laminated. Some of these subwacke intervals appear similar to the NU markers. Altered zones include: 484.1-484.5 mottled silicified zone; 488.75-489.8 mottled silicified zone; 490-490.4 silicified zone; 491.4-491.6 silicified zone; 492.0-492.3 silicified zone; 494-495 bleached looking zone cut by quartz-calcite veins; 495.6-496.6 silicified zone (patchy); 501.3-501.5 silicified zone; 509-514.5 alteration is generally pervasive throughout this interval-mottled appearance caused by fine-grained porphyroblasts of biotite - also bleached look. Bedding to core: 84° at 484'; 85° at 487'; 86° at 498'; 86° at 501'; 86° at 512'.		
514.5	521.2		Varicoloured, silicified bleached zone with some intervals characterized by a close-spaced foliation (shear zone). Attitude of foliation varies from 50 to 70° to core. Original bedding not preserved in this interval.		
521.2	542		Interval of silicified, varicoloured wacke and subwacke. Includes some intervals which are characterized by a paper-thin close-spaced foliation (shear zone). Silicified zones: 523.5-524; 525.2-526.9; 533.4-533.9; 534-534.4; 536.7-537.3. Shear zones 537.4; 537.5-538.3.		
			Core Size		
			NQ		
			Note No.	Page	
			6451	10	

# Diamond Drill Geological Log



Objective:		Sampled:				40 Scale	
Logged By:		Date:		Composites:		Color Plot & Dips	Ore Classes & Aver.
Block:		Sect.:	Place:	App. Bear:	App. Dip.:	0	
From	To	Discard:	Reason:				
542	543		Shear zone characterized by a close-spaced cleavage at 65° 68° to core. Rock easily cleaves along this foliation.				
543	549.5		Bleached looking silicified interval which includes some narrow shear zones 60° to core.				
			At the end of the hole is a gouge zone characterized by a close-spaced cleavage.				
				Core Size			
				NQ			
				Hole No.	Page		
				6451	11		



# Diamond Drill Geological Log



Objective: TO TEST INFERRED SULLIVAN HORIZON  
 Logged By: G. DELANEY Date: JUNE 1984  
 Block: Sect.: Place: App. Bear: App. Dip.: Length:

From To Discard: Reason:

41.3	56.2	Quartzitic wacke (90%) with interbedded subwacke (10%). Quartzitic wacke light grey, fine sand, medium and a few thick beds (some of the thicker beds are amalgamated). Locally there are fine-to-medium grained porphyroblasts of garnet in these beds (i.e. at 49 and 53). Also at 49 there are elliptical-shaped concentrations of fine-grained biotite in a calcitic matrix. Subwacke, - minor wacke, grey-light grey; as laminae and very thin beds (usually in an interval of several laminations and beds); massive or even, parallel laminated; some intervals are characterized by numerous, wispy, elongate granule and small pebble-size fragments in a wacke matrix; another deformed bed of subwacke appears to be cut by several pieces of quartzitic wacke (i.e. 56); some of the subwacke beds are cut by rust-stained fractures. Bedding to core: 83° at 44'.
56.2	79.5	Quartzitic wacke (65-70%) with interbedded subwacke and wacke (30-35%). Thinning-fining upward interval. Quartzitic wacke, grey-locally greenish grey; fine sand; generally thin-to-medium bedded; generally massive a few are weakly graded near the top; locally there are light greenish grey, splotchy, bleached looking zones which commonly contain pink garnets - some of these zones of discolouration appear to be related to fractures at 20° to core. Within some of the QcW beds there are scattered clasts of subwacke and wacke. Scoured bases occur at the bases of some of these QcW beds. Subwacke and minor wacke, grey, laminae and thin beds; even, parallel laminated-to-massive; flame structures at the top of some beds. At 67 there is a few mm wide quartz, pyrrhotite-chlorite vein. Bedding to core: 79° at 58'; 83° at 59'; 79° at 67'; 88° at 75'. There are some variably inclined, scoured contacts over this interval.
79.5	84.5	Subwacke and wacke (65%) with interbedded quartzitic wacke (35%). Forms the top of a fining, thinning upward interval. Subwacke, grey, laminae and very thin beds, massive-to-locally even, parallel laminated, some of these beds form the graded tops of wacke or quartzitic wacke beds. At the bases of some of the subwacke beds there is a fragmented interval of wacke/subwacke. Quartzitic wacke, grey, thin-bedded, massive-to-graded particularly at the tops. Contain a few scattered granule and small pebble-size clasts. Locally (i.e. 83') there are light greenish grey discoloured zones containing pink garnets. Bedding to core: 82° at 84'.

40 Scale

Color Plot & Dips Ore Classes & Aver.

Core Size  
NO

Note No. 6452 Page 1



# Diamond Drill Geological Log

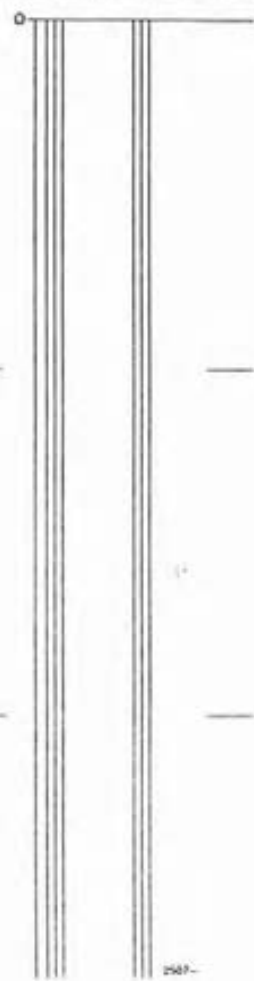


Objective:		Sampled:		60 Scale	
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Block:		Place:		Ore Classes & Avar.	
Sect.:		App. Bear:		App. Dip.:	
From		To		Length:	
Discard:		Reason:			
84.5	86.6	Broken core - wacke - subwacke?			
86.6	134.0	<p>Quartzitic wacke (80%) with interbedded subwacke and wacke (20%). This interval consists of 3 cycles characterized by medium-to-thick bedded quartzitic wacke beds at the base with an increase in the number of argillaceous beds toward the top and a decrease in the thickness of quartzitic wacke beds. Cycles: 86.6 - 103; 103 - 117.5; 117.5 - 133.4. Quartzitic wacke, grey to light greenish grey; fine sand; thin-to-thick bedded; some of the beds are graded in the upper few cm, but generally massive. A few scattered clasts; several altered zones developed in the quartzitic wacke: 88.6 - 88.8 several parallel calcite laminations, medium-grained porphyroblasts of pink garnet - mm size - elliptical-shaped clots of biotite. 93 - 94 light greenish grey bleached zone, medium-grained porphyroblasts of garnet; calcitic fractures; 95 - 95.4 light greenish grey bleached zone with fine-grained porphyroblasts of garnet. 99.8 - 100.6 light greenish grey bleached zone with medium-grained porphyroblasts of garnet-calcitic fractures. 105.1 - 105.4 silicified zone with medium grained porphyroblasts and biotite clots. 110 - 111 medium grained porphyroblasts of pink garnet in a mottled bleached zone. 114 - 115 light greenish grey bleached zone; 120.5 - 123 bleached looking zone as before. 127.5 - 128.5 same. 131.0 - 131.5 medium grained garnets in a bleached-looking zone. Subwacke and wacke, grey, laminae and very thin beds, massive or laminated - upper contacts commonly scoured; some of the wacke beds contain subwacke clasts. Bedding to core: 83° at 93'; 82° at 101.1'; 85° at 104'; 85° at 111'; 86° at 124'. Numerous paper thin calcite-lined fractures over much of the top five feet of this interval.</p>			
134.0	143.6	<p>Subwacke (50%) with interbedded quartzitic wacke. Subwacke, grey, very thin bedded and laminated, vary from massive to laminated intervals, some beds contain irregular lenses of silt-size material. Quartzitic wacke, grey, thin-bedded, includes an irregular light greenish grey bleached silicified zone from 141-142. These contain porphyroblasts of garnet and clots of biotite. Bedding to core: 86° at 139'.</p>			
		Core Size		NO	
		Hole No.		6452	
		Page		2	

# Diamond Drill Geological Log



Objective:		Sampled:		40 Scale	
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Block:		Place:		Ore Classes & Aver.	
Sect:		App. Bear:		App. Dip.:	
Length:		Composites:			
From	To	Discard:	Reason:		
143.6	146		Broken core includes a few fragments of subwacke and quartzitic wacke but much of the interval is small fragments; one of the pieces near the top of this interval is a chlorite-calcite fracture zone inclined at 65° to core.		
146	148.2		Quartzitic wacke with interbedded subwacke and wacke. Includes broken core. Quartzitic wacke, grey thin bedded. Subwacke and wacke, very thin bedded cut by some irregular, very thin calcite coated fractures. Some of the quartzitic wacke beds in this interval are silicified and contain clots of biotite. Bedding to core: 82° at 148'.		
148.2	150.2		Shear zone. Most of this interval is characterized by a close-spaced cleavage which is generally inclined to core at about 65° but in many instances is contorted. Quartz, calcite and pyrrhotite veins occur in this interval.		
150.2	170		Quartzitic wacke with some interbedded wacke, calcareous interval. Quartzitic wacke-to-wacke, (hard to distinguish between the two end members over much of this interval), calcareous, predominantly thin-bedded, massive-to-laminated, calcite in this interval occurs both as even, parallel laminae and disseminations. There are a few light-greenish grey, discoloured, bleached zones in this interval. From 164 - 166 light, greenish grey brecciated interval; 168.5 - 170.0 bleached discoloured zone. Bedding to core: 85° at 155'; 85° at 159'; 85° at 164'.		
170	195.5		Quartzitic wacke (60%) with interbedded wacke (20%) and subwacke (20%). A fining and thinning-upward interval? Quartzitic wacke, grey, thin-to-medium-bedded (medium beds more common near the base), basal contacts are sharp and vary from planar to undulatory; generally massive; some beds are weakly graded near the top; a few beds contain isolated granule- and small- pebble-size clasts including at least one of tourmalinite. Patches of light greenish grey bleaching - silicification occur throughout this interval. Wacke, grey, laminae-to-thin beds, even, parallel laminated-to-massive. Subwacke, grey, massive-to-even, parallel laminae, some occur as wispy-terminated intervals. Bedding to core:		
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# Diamond Drill Geological Log



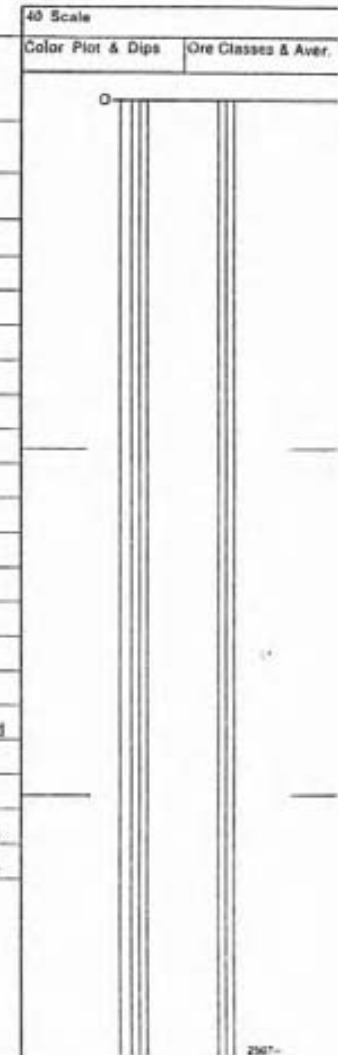
Objective:		Sampled:		40 Scale	
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170	195.5	continued:			
		85° at 174'; 84° at 188'; 85° at 191'; from 170 to about 186 core is cut by a series of subparallel, variably-spaced, very thin fractures which are coated with calcite, aligned at 25° to core.			
195.5	199	Wacke and intercalated subwacke. Distinctive striped interval. Wacke, lighter shade of grey than subwacke, variably thick laminae, vary from even, parallel to more commonly lenticular; massive or graded or cross-laminated. Subwacke, darker shade of grey than adjacent wacke laminae; even, parallel-to-wavy; massive-to-graded. Bedding to core: 87° at 198'.			
199	233	Wacke (35%) with interbedded subwacke (30%) and quartzitic wacke (35%). Most of the core from this interval was scored by drilling and this tends to mask most features. Wacke, grey, laminae and very thin beds, massive or even, parallel laminated; some very thin beds contain numerous, wispy-terminated subwacke fragments, most of the wacke in the interval from 217-220 appears to have been fragmented. Subwacke, grey, mostly as laminae, scoring masks nearly all features. Quartzitic wacke, grey, massive thin or medium-bedded, an interval consisting mostly of medium-bedded quartzitic wacke occurs from 199-212. Within this zone are light greenish grey alteration patches of calcite, quartz and pink garnets. There are also a few thin quartzitic wacke beds near the base of this interval. Bedding to core: 85° at 225'.			
233	265	Quartzitic wacke (80%) with interbedded wacke and subwacke (20%). Quartzitic wacke, grey, fine sand, predominantly thin and medium-bedded; most beds are massive; a few are weakly graded; this lithotype commonly occurs in packets of several beds, some of which are amalgamated with others separated by laminae and thin beds of wacke and subwacke. Some beds of quartzitic wacke contain light grey-to-light greenish grey altered zones. Particularly intense zones of alteration occur at 248.3 and 248.9-249.0. In the latter interval porphyroblasts of garnet and biotite are common. Another wide zone of alteration occurs over the interval 260.5 - 262.4. This light greenish-grey, bleached zone is			
		Core Size		NQ	
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# Diamond Drill Geological Log



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From	To	Discard:	Reason:		
302	311	Broken core - includes a few fragments which are silicified, variably chloritic and cut by irregular calcitic fractures - approaching a fault zone.			
311	312	Fragmented, silicified interval cut by numerous, irregular calcitic veins.			
312	318	Minette dyke, extensively fractured, dark greenish grey fine-to-medium-grained equigranular, weakly calcitic.			
318	329	Predominantly broken core but includes a few recognizable, larger fragments of quartzitic wacke.			
97	329	Quartzitic wacke (75-80%), calcitic with interbedded subwacke and wacke which occurs mostly toward the base of the interval. Quartzitic wacke, calcareous, grey, (scoring masks many of the features) massive-to-laminated; calcite is disseminated throughout this rock type and also occurs in laminations. Pyrrhotite coatings occur on fractures. Near the top of the interval is a bed containing numerous, wispy terminated, pebble-size wacke fragments.			
1003	1034				
339	340	Sheared subwacke cut by several quartz chlorite, calcite and pyrrhotite veins, one of which is 2 cm wide, veins are oriented at about 60° core.			
340	349	Subwacke and wacke (70-75%) with intercalated quartzitic wacke. Much of the core over this interval is scored which tends to mask most features. Locally within the wacke beds (i.e. 345-346) there is a fairly well developed, close-spaced cleavage system. Cleavage surfaces are coated with pyrrhotite. Attitude of cleavage is variable; averages about 65° to core.			
107	1064				



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Objective:		Sampled:		40 Scale	
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From	To	Discard:	Reason:		
349 <i>106.4</i>	355 <i>126.3</i>				
Quartzitic wacke, calcareous, grey, thin-to-medium-bedded, massive to laminated, calcite (5-25%?) occurs both in a disseminated state and in calcite rich laminations. Bedding to core 87° at 352'.					
355 <i>108.3</i>	356.3 <i>108.7</i>				
Subwacke (with minor interbedded wacke), grey, massive-to more commonly laminated.					
356.3 <i>108.7</i>	362.3 <i>110.5</i>				
Quartzitic wacke (80%) with intercalated subwacke (20%). Quartzitic wacke, light grey, dissected by numerous calcite-lined fractures and is probably silicified, (these features tend to mask most primary structures). Subwacke, grey, massive, some segments (i.e. such as at 357) are cut by mm-thick quartz-calcite-chlorite-pyrrhotite veins.					
362.3	366				
Broken core - mostly quartzitic wacke.					
366 <i>111.6</i>	402.5 <i>122.8</i>				
Quartzitic wacke (80-85%) with minor intercalated wacke and subwacke (15-20%). Quartzitic wacke, variably calcareous, light grey to grey, massive, thin-to-thick bedded (most commonly medium bedded). The zone from 366-370 is silicified and cut by numerous fractures and a few quartz, pyrrhotite and calcite veins. The content of disseminated calcite is also variable throughout this interval but more common in the upper part. Also throughout this interval there are light greenish grey bleached zones which contain medium-grained, porphyroblasts of pink garnet. One of the more extensive altered zones occurs from 390.4-392 which also contains a variably thick, quartz-pyrrhotite vein, inclined at 10° to core. Wacke and subwacke, grey, massive-to-laminated, more common toward the base of the interval. Note: Zone of broken core 377-378.2. Bedding to core: 88° at 368'; 85° at 381'; 86° at 399'.					
402.5 <i>122.8</i>	404.5 <i>122.4</i>				
Subwacke (70%) with interbedded wacke (30%). Subwacke grey, massive-to-even, parallel-to-lenticular laminated. Wacke, grey very thin bedded, massive, contains a few scattered granule size fragments of subwacke.					

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From	To	Discard:	Reason:		
404.5	405		Sheared subwacke.		
405	420		Quartzitic wacke (80-85%) with interbedded subwacke and minor wacke. Quartzitic wacke, grey, fine sand, thin-to-medium bedded; generally massive; a few of the beds contain tabular, wispy-terminated, pebble-size clasts of subwacke (i.e. see 415); amalgamated contacts separate some beds; in some of the quartzitic wacke beds in this interval there are light grey, bleached silicified zones which contain medium-grained porphyroblasts of pink garnet. Subwacke, grey, as laminae and thin beds; massive-to-even, parallel laminated. Bedding to core: 88° at 416'.		
420	441.6		Quartzitic wacke (50%) with interbedded wacke (25%) and subwacke. This is a thinning and fining upward interval.		
128.1	134.7		Quartzitic wacke, grey, thin-to-medium bedded, massive to graded (grading is more common in thin beds near the top of this interval); a few of the beds of quartzitic wacke contain numerous, tabular, wispy terminated, contorted, fragments of subwacke and wacke (i.e. 424-425; 435-436); the thickness and proportion of quartzitic wacke beds increase toward the base of this interval; again within some of these beds are light greenish grey, silicified zones which contain porphyroblasts of pink garnet and in some porphyroblasts of biotite. Wacke, grey, very thin beds, massive or even, parallel laminated or in a few cases graded; some of the latter, coarser varieties locally contain small pebble-size clasts of wacke and subwacke. Subwacke, grey, very thin bedded, massive-to-even, parallel laminated. Locally within this interval there are distinctive banded zones characterized by alternating very thin beds of even, parallel laminated wacke and massive subwacke. 427.7-427.8 quartz, vein with disseminated medium-grained biotite. Bedding to core: 83° at 432'.		
441.6	455		Quartzitic wacke (60%) with interbedded wacke (30%) and subwacke (10%), much of the core in this interval is scored and this tends to mask features. As a whole this interval appears to be a thinning, fining upward interval similar to the preceding interval. Bedding to core: 88° at 449'.		
134.7	138.8			Core Size	
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Objective:						Sampled:		40 Scale	
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455	464		Subwacke with minor interbedded wacke and quartzitic wacke. Subwacke grey, laminae and very thin beds, variable textures						
142.8	141.5		laminated or massive or locally as graded laminae and very thin beds. Some of the subwacke beds in this interval are cut by irregular lenses of wacke which pinch and sell in thickness (dyklets?). The basal 2 feet of this interval is particularly disrupted. Bedding to core: 85° at 456'; 84° at 461'.						
464	467		Quartzitic wacke containing a few wispy terminated beds and fragments of wacke and subwacke. Quartzitic wacke, grey-to-						
142.5	142.4		light grey, thin bedded, massive, light greenish grey, bleached, silicified zones containing medium-grained porphyroblasts of garnet.						
467	470.8		Broken core primarily fragments of wacke and subwacke, but also includes one fragment of gabbro? (misplaced?)						
142.4	143.6								
470.8	479		Quartzitic wacke (60-70%) with interbedded wacke and subwacke. Parts of this interval are extensively scored and this tends to mask structures. Quartzitic wacke, grey, predominantly thin-to-medium bedded; massive; near the top of this interval are lenticular laminae of quartzitic wacke in dark grey wacke and subwacke, locally these quartzitic wacke beds are calcareous and one at 477.7 there is a calcareous nodule.						
143.6									
479	479.9		Scored wacke to subwacke containing very thin, wispy concentrations of pyrrhotite.						
146.4									
479.9	507.3		Wacke, variably calcitic, grey, predominantly silt-size, laminae-to-medium beds; most of this interval is characterized by very thin, even, parallel laminations; fine-grained, disseminated pyrrhotite, in various concentrations, occurs throughout this interval; calcite occurs as both blebs and in laminations. This interval is characterized by an abundance of silt-size quartz or has been silicified. Note hardness! "Sullivan Horizon." Bedding to core: 83° at 484'; 82° at 494'						
146.4	154.7								

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507.3	513.5	16-6	Wacke, sandy (50%) with interbedded wacke (40%) and subwacke. Wacke, sandy, grey, massive, thin-bedded. Wacke, weakly calcareous, grey, even, parallel laminated, minor disseminated pyrrhotite throughout this interval.		
513.5	515		Lamprophyre, calcareous, grey, medium grained; a shear zone is developed at the base of this interval.		
515	524		Predominantly broken core with intervals of intact core. This interval appears to consist mostly of wacke with some quartzitic wacke and subwacke. 519.8-520.8 contorted shear zone cut by an irregular network of quartz-calcite-pyrrhotite veins - minor chalcopryite.		
524	530	16-65	Wacke, grey, thin-bedded, although parts of this interval is even, parallel laminated, in other parts the wacke is contorted or disrupted; (Basal part of Sullivan Horizon?), variably pyrrhotitic.		
530	534		Light greenish grey silicified interval. - equals to limestone slate?		
534	560.5		Wacke (70%) with interbedded subwacke (10-15%) and quartzitic wacke (15-20%). Wacke, grey, laminae-to-medium beds, varies from massive-to-even, parallel laminated (the even parallel laminated zone is similar to the preceding Sullivan Horizon; the proportion of even, parallel wacke decreases toward the base of the interval). Fine-grained disseminated pyrrhotite, of variable concentrations, is common in the wacke intervals. Subwacke, grey, laminae and very thin beds, massive. Quartzitic wacke, grey, fine sand-to-coarse silt; thin-to-a few medium beds; weakly graded; minor fine-grained disseminated pyrrhotite and medium-grained clots of pyrrhotite; within some beds of quartzitic wacke there are light greenish grey zones which contain porphyroblasts of pink garnet and in some cases clots of biotite; many of these altered zones are calcareous. Bedding to core: 80° at 539'; 75° at 543'; 80° at 547'; 80° at 552'; 78° at 559'.		
				Core Size	
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560.5	567.5	Broken core, mostly quartzitic wacke and wacke.						
567.5	581	Wacke with minor interbedded quartzitic wacke and subwacke. Much of this interval is calcareous and there are light grey bleached zones containing medium-grained porphyroblasts of pink garnet and clots of biotite.						
581	654	Wacke with minor interbedded subwacke (5%) and quartzitic wacke (5%). Wacke, 2 distinct types: wacke var.1; generally thin-bedded-to-medium bedded, massive-to-even parallel laminated, contains abundant silt-size quartz (rock is equivalent to a quartzitic wacke); some beds contain blebs of calcite; pyrrhotite disseminated throughout; within some of the beds there are light greenish grey discoloured zones containing medium-grained porphyroblasts of pink garnet. Wacke var.2; more argillaceous than the preceding variety; massive-to-even, parallel laminated; variably calcareous including some intervals which are characterized by calcite laminations; i.e. 650-653; fine grained pyrrhotite is disseminated throughout. Within this interval are a few quartz calcite veins. Bedding to core: 77° at 597'; 79° at 602'; 72° at 615'; 74° at 622'; 73° at 632'; 76° at 640'; 74° at 650'.						

*Gay Delaney*

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