

GAHCHO KUÉ PROJECT ENVIRONMENTAL IMPACT STATEMENT
INFORMATION REQUEST RESPONSES

Appendix NRCan 1-12-B

**Details of Existing Geotechnical Investigations (Table 1 – Updated EIS Case),
Borehole Logs (2004 Site Investigation), Grain Size Analysis Test Results on
Borrow Material, Grain Size Analysis Test Results on Till Samples, Soft Lake
Bottom Sediments Testing**

Table 1 Site Condition Information at Dyke/Berm Locations

Location	Information from 2004 Geotechnical/Geophysical Investigations (AMEC 2005)	Information from Terrain (Surficial Geology) Mapping (AMEC 2005)	Information from 2010 Winter Geophysical Surveys (EBA 2010)
Dyke A	2 boreholes in each of the two abutments and 1 borehole in the channel; overburden thickness: 0.5 to 2.4 m on land and 5.3 m in channel	Moraine blanket over abutments	Up to 1.5 m deep water beneath the lake ice bottom; typical overburden thickness: 2 to 5 m; maximum depth from ice surface to top of bedrock in the channel: 8 m
Dyke B	New dyke centreline is about 100 m northwest on the southwest abutment compared to the original location for Dyke B in AMEC (2005); 7 boreholes in channel and 2 in each of two abutments; overburden thickness: 0.1 to 1.8 m on land and 1.2 to 5.0 m in the lakebed along the old dyke centreline	Moraine veneer or blanket over abutments	Up to 10 m deep water beneath of the lake ice bottom; typical overburden thickness beneath the lake bottom: 3 to 6 m with a maximum of up to 10 m (including up to 2 m thick soft lakebed sediments); 2 to 3 m of overburden on land
Dyke A1	No information	Predominantly moraine blanket over abutments	No information
Dyke D	No information	Moraine blanket and organic veneer over glaciofluvial deposits	Frozen ground; typical overburden thickness of 2 to 5 m with a deeper pocket of 9 m on the east abutment
Dyke E	No information	Peat bogs over glaciolacustrine deposits; moraine veneer or blanket over abutments	Frozen ground with warmer ground temperatures in the low lying area; typical overburden thickness of 3 to 5 m with 8 to 11 m thick deeper pockets over three areas
Dyke F	No information	Predominantly peat bogs over glaciofluvial deposits; moraine veneer or blanket over abutments	Frozen ground with warmer ground temperatures in the low lying area; typical overburden thickness of 2 to 4 m with a maximum of 5 to 7 m over the central area and north abutment; 1 to 2 m thick overburden over the south abutment
Dyke G	No information	Predominantly peat bogs over glaciofluvial deposits; moraine veneer over abutments	Frozen ground; typical overburden thickness of 2 to 5 m with a maximum of up to 7 to 10 m over two areas
Dyke H	Dyke centreline is about 75 m to 160 m away from a total of 7 boreholes drilled in the area; 3 boreholes in channel and 4 on land; overburden thickness: 1.1 to 2.4 m	Moraine blanket over abutments	Unfrozen zone identified beneath the lake ice; typical overburden thickness of 2 to 6 m; a maximum of up to 10 m

Table 1 Site Condition Information at Dyke/Berm Locations

Location	Information from 2004 Geotechnical/Geophysical Investigations (AMEC 2005)	Information from Terrain (Surficial Geology) Mapping (AMEC 2005)	Information from 2010 Winter Geophysical Surveys (EBA 2010)
	on land and 3.4 to 6.3 m in channel		overburden over the east abutment
Dyke I	5 boreholes in channel and 2 boreholes in each of two abutments; overburden thickness: 2.2 to 5.5 m on land and 1.1 to 6.4 m in channel	Moraine blanket over abutments	Up to 1.5 m deep water beneath the lake ice bottom; typical overburden thickness of 3 to 6 m with a deep pocket of 9 m over the water channel area
Dyke J	2 boreholes in channel and 3 on land; overburden thickness: 6.6 to 10.2 m on land and 6.0 to 7.1 m in channel	Moraine blanket or veneer over abutments	Up to 2 m deep water beneath the lake ice bottom; typical overburden thickness of 6 to 8 m with a deep pocket of up to 15 m over the east abutment
Dyke K	Dyke centre line is about 170 m to 210 m away from a total of 8 boreholes drilled in the area; 4 boreholes in channel and 4 on land; overburden thickness: 2.5 to 3.1 m on land and 2.0 to 8.9 m in channel	Moraine veneer over abutments	Typical overburden thickness of 2 to 4 m with a maximum thickness of up to 8 m over the areas close to dyke abutments
Dyke L	No information	Moraine blanket over abutments	Up to 7 m deep water beneath the lake ice; typical overburden thickness of 3 to 7 m with a maximum of 10 m (including 0 to 2 m thick lake bed sediments over till)
Dyke M	No information	Predominantly organic veneer over glaciofluvial deposits and moraine blanket over abutments	Warmer frozen ground; 3 to 8 m thick overburden over bedrock
Dyke N	No information	Moraine veneer or blanket over abutments	Up to 8 m ice/water; 2 to 7 m thick overburden (including 0 to 2 m thick lake bed sediments over till)
Area 1 Till Berm	No information	Moraine blanket or veneer	No information
Area 2 Waste Rock Berms	No information	Moraine blanket or veneer	No information
Water Collection Pond Berms	No information	No information	No information



HOLE NO:	MPV_04_123C
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	2/02/2004 1700hrs
DATE AND TIME FINISHED:	05/02/2004 0700
HOLE DIAMETER:	101.6 (HQ3) & 47.6 mm (NQ)
DRILLING METHOD:	Geobore and diamond core

OVERALL HOLE DRILL RATE (m/hr)	0.31
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	0.79

DRILLHOLE ID:	MPV 04 123C

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

[illegible]

DRILLHOLE ID:	MPV_04_123C

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

[illegible]

SRK Photo Log Sheet

Drillhole ID:

MPV_04_123C

[illegible]

Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV_04_123c	1	8.40	12.78
MPV_04_123c	2	12.78	17.12
MPV_04_123c	3	17.12	21.42
MPV_04_123c	4	21.42	25.50
MPV_04_123c	5	25.50	26.64
	6		
	7		
	8		
	9		
	10		
	11		
	12		
	13		
	14		
	15		
	16		
	17		
	18		
	19		
	20		

FIELD GEOLOGICAL LOG

HOLE ID

MPV_04_123c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	2.85	Ice/water	n/a	1.1m ice, to 2.85m water	RB/JS
2.85	6.1	Overburden	n/a	Overburden	RB/JS
6.10	26.64	Granite	n/a	Granite	RB/JS
EOH					

DRILL HOLE ID: **MPV-04-123C**

[illegible]

UCS SAMPLES

HOLE ID: MPV-04-123C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-123C	5	26.13	Granite	04-UCS-123-001

Geobore S Tube Tracking Sheet

Drillhole ID	Geobore S tube	From	To
MPV_04_123c	1	2.85	5.00
MPV_04_123c	2	5.00	5.80
MPV_04_123c	3	5.80	6.10
MPV_04_123c	4	N/A	N/A
MPV_04_123c	5	6.10	6.89
MPV_04_123c	6	6.89	7.65
MPV_04_123c	7	7.65	8.10
MPV_04_123c	8	8.10	8.40

SRK Consulting Packer Test Field Data

Project Name:	Gahcho Kue Geotech		Drillhole No:	MPV 04 123C		
Project No:	2CD002.11		Test Numbers	1 to 6		
Date:	05-Feb-04		Drillhole depth:	26.64		
Personnel:	R. Bowden/J.P. Siddorn		Inclination from horizontal	89		
Init. WL:	0		Test Interval:	From		To
Ref. Pt.	drill shack floor					

Test 1 25.1 26.64

Step No.	Elapsed time (min)	Meter reading (gal)	Flow rate (gpm)	Gauge pressure (psi)	Comments
1	0	72.00		10.0	no leaks
	1	76.50	4.50	10.0	THIS DATA HAS BEEN CORRECTED
	2	80.80	4.30	10.0	
	3	85.30	4.50	10.0	
	4	89.50	4.20	9.5	
	5	94.00	4.50	10.0	
2	0	110.00		17.5	
	1	116.80	6.80	17.5	
	2	123.50	6.70	17.0	
	3	130.00	6.50	17.0	
	4	136.60	6.60	17.0	
	5	143.40	6.80	17.0	
3	0	210.00		25.0	
	1	218.50	8.50	25.0	
	2	226.80	8.30	25.0	
	3	235.20	8.40	24.0	
	4	243.60	8.40	24.5	
	5	251.80	8.20	24.5	
4	0	266.00		17.0	
	1	273.00	7.00	17.0	
	2	279.80	6.80	17.5	
	3	286.80	7.00	17.5	
	4	293.80	7.00	18.0	
	5	300.80	7.00	17.5	
5	0	308.00			
	1	313.10	5.10	9.0	
	2	317.90	4.80	9.0	
	3	323.20	5.30	9.0	
	4	327.80	4.60	9.0	
	5	332.80	5.00	9.0	
	6	337.60	4.80	9.0	
	7	342.50	4.90	9.0	

Test 2 22.1 25.1

Step No.	Elapsed time (min)	Meter reading (gal)	Flow rate (gpm)	Gauge pressure (psi)	Comments
1	0	531.50		15.0	no leaks
	1	537.80	6.30	15.0	
	2	543.30	5.50	15.0	
	3	545.00	1.70	15.0	
	4	546.00	1.00	15.0	
	5	547.00	1.00	15.0	
2	0	548.40		20.0	
	1	549.60	1.20	20.0	
	2	550.80	1.20	20.0	
	3	552.20	1.40	20.0	
	4	553.60	1.40	20.0	
	5	554.90	1.30	20.0	
3	0	557.70		25.0	
	1	559.10	1.40	25.0	
	2	560.60	1.50	25.0	
	3	562.10	1.50	25.0	
	4	563.70	1.60	25.0	
	5	565.20	1.50	25.0	
4	0	565.80		20.0	
	1	567.10	1.30	20.0	
	2	568.50	1.40	20.0	
	3	569.60	1.10	20.0	
	4	570.90	1.30	20.0	
	5	572.10	1.20	20.0	
5	0	573.30		15.0	
	1	574.20	0.90	15.0	
	2	575.10	0.90	15.0	
	3	576.10	1.00	15.0	
	4	577.10	1.00	15.0	
	5	578.00	0.90	15.0	

Test 3

19.1

22.1

Step No.	Elapsed time (min)	Meter reading (gal)	Flow rate (gpm)	Gauge pressure (psi)	Comments
1	0	644.00		10.0	no leaks
	1	649.10	5.10	10.0	
	2	654.70	5.60	10.0	
	3	660.00	5.30	10.0	
	4	664.90	4.90	10.0	
	5	668.70	3.80	10.0	
	6	672.10	3.40	10.0	
	7	674.90	2.80	10.0	
2	0	680.00		15.0	
	1	683.40	3.40	15.0	
	2	686.50	3.10	15.0	
	3	689.50	3.00	15.0	
	4	692.40	2.90	15.0	
	5	695.50	3.10	15.0	
3	0	700.00		20.0	
	1	704.40	4.40	20.0	
	2	708.20	3.80	20.0	
	3	711.80	3.60	20.0	
	4	715.60	3.80	20.0	
	5	719.40	3.80	20.0	
4	0	722.70		15.0	
	1	725.30	2.60	15.0	
	2	727.60	2.30	15.0	
	3	729.30	1.70	15.0	
	4	730.90	1.60	15.0	
	5	732.70	1.80	15.0	
5	0	733.80		10.0	
	1	734.40	0.60	10.0	
	2	734.90	0.50	10.0	
	3	735.30	0.40	10.0	
	4	735.60	0.30	10.0	
	5	736.10	0.50	10.0	

Test 4

16.1

19.1

Step No.	Elapsed time (min)	Meter reading (gal)	Flow rate (gpm)	Gauge pressure (psi)	Comments
1	0	894.00		5.0	no leaks
	1	897.10	3.10	5.0	
	2	899.10	2.00	5.0	
	3	900.20	1.10	5.0	
	4	900.90	0.70	5.0	
	5	901.70	0.80	5.0	
	6	902.40	0.70	5.0	
	7	903.40	1.00	5.0	
2	0	905.60		10.0	
	1	907.00	1.40	10.0	
	2	908.60	1.60	10.0	
	3	909.90	1.30	10.0	
	4	911.40	1.50	10.0	
	5	912.90	1.50	10.0	
3	0	915.40		15.0	
	1	917.20	1.80	15.0	
	2	919.00	1.80	15.0	
	3	920.80	1.80	15.0	
	4	922.80	2.00	15.0	
	5	924.70	1.90	15.0	
4	0	926.00		10.0	
	1	927.30	1.30	10.0	
	2	928.50	1.20	10.0	
	3	929.90	1.40	10.0	
	4	931.30	1.40	10.0	
	5	932.40	1.10	10.0	
5	0	933.10		5.0	
	1	933.90	0.80	5.0	
	2	934.70	0.80	5.0	
	3	935.30	0.60	5.0	
	4	936.00	0.70	5.0	
	5	936.80	0.80	5.0	

Test 5

13.1

16.1

Step No.	Elapsed time (min)		Flow rate (gpm)	Gauge pressure (psi)	Comments
1	0	1144.00		4.0	no leaks
	1	1147.50	3.50	4.0	
	2	1151.50	4.00	4.0	
	3	1155.60	4.10	4.0	
	4	1159.60	4.00	4.0	
	5	1163.20	3.60	4.0	
	6	1166.40	3.20		
	7	1169.30	2.90		
2	0	1172.00		8.0	
	1	1176.20	4.20	8.0	
	2	1180.00	3.80	8.0	
	3	1184.10	4.10	8.0	
	4	1187.60	3.50	8.0	
	5	1191.30	3.70	8.0	
3	0	1202.00		12.0	
	1	1206.90	4.90	12.0	
	2	1211.60	4.70	12.0	
	3	1216.30	4.70	12.0	
	4	1221.00	4.70	12.0	
	5	1225.80	4.80	12.0	
4	0	1230.00		8.0	
	1	1233.60	3.60	8.0	
	2	1236.70	3.10	8.0	
	3	1240.10	3.40	8.0	
	4	1243.80	3.70	8.0	
	5	1247.20	3.40	8.0	
5	0	1249.00		4.0	
	1	1251.20	2.20	4.0	
	2	1253.60	2.40	4.0	
	3	1255.80	2.20	4.0	
	4	1258.30	2.50	4.0	
	5	1260.10	1.80	4.0	

Permeability Summary

MPV-04-123C

from	to		Step 1	Step 2	Step 3	Step 4	Step 5	Avg K
13.1	16.1	gauge (psi)	4	8	12	8	4	
		Qavg (igpm)	3.2	3.9	4.75	3.5	2.2	
		K cm/sec	2.1E-03	1.3E-03	1.0E-03	1.2E-03	1.5E-03	1.4E-03
16.1	19.1	gauge (psi)	5	10	15	10	5	
		Qavg (igpm)	0.8	1.4	1.9	1.3	0.7	
		K cm/sec	4.2E-04	3.7E-04	3.4E-04	3.4E-04	3.7E-04	3.7E-04
19.1	22.1	gauge (psi)	10	15	20	15	10	
		Qavg (igpm)	0.33	3	3.7	1.7	0.4	
		K cm/sec	8.7E-05	5.3E-04	4.9E-04	3.0E-04	1.1E-04	3.0E-04
22.1	25.1	gauge (psi)	15	20	25	20	15	
		Qavg (igpm)	1	1.4	1.55	1.2	0.97	
		K cm/sec	1.8E-04	1.9E-04	1.6E-04	1.6E-04	1.7E-04	1.7E-04
25.1	26.64	gauge (psi)	9.8	17	24.3	17.8	9	
		Qavg (igpm)	4.4	6.7	8.3	7	4.9	
		K cm/sec	2.3E-03	2.0E-03	1.8E-03	2.0E-03	2.8E-03	2.2E-03
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	

Equations: $H_f = 8.65 \times 10^{-15} (Q^2 * L_p / r_p^5)$
 $H_{nit} = (Dw' + H_g - H_f) + P_g / 1.42$
 $K = (Q * \ln(R/r_b)) / (2 * \pi * H_{nit} * L)$

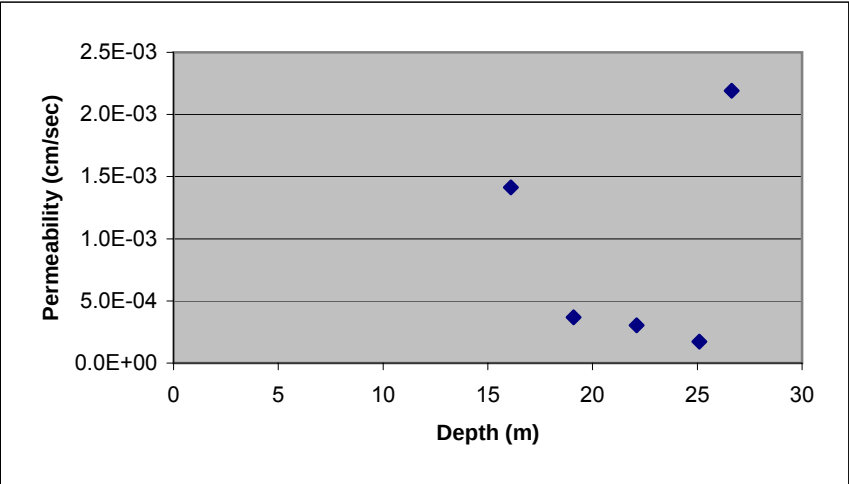
Overall 8.9E-04

assume

- vertical drillhole
- water at ground surface
- height of gauge is at rig flr
- negligible friction losses

Dw	Measured depth of static water (1)	0	m
Dp	Measured depth to packer		m
Dt	Depth to midpoint of test		m
Inc	Inclination from horizontal	90	m
Dw'	Vertical depth to static water level		°
Dp'	Vertical depth to packer		m
Dt'	Vertical depth to midpoint of test		m
Hg	Gauge height	0	m
Lp	Length of discharge pipe		m
rp	Radius of discharge pipe (1" = 0.0127m)		m
R	Radius of influence (10m is standard)	10	m
rb	Drillhole radius (HQ=0.048m, NQ=0.038m)	0.038	m
L	Length of test section		m
Hf			0 m

cm/sec



Reflex Readings

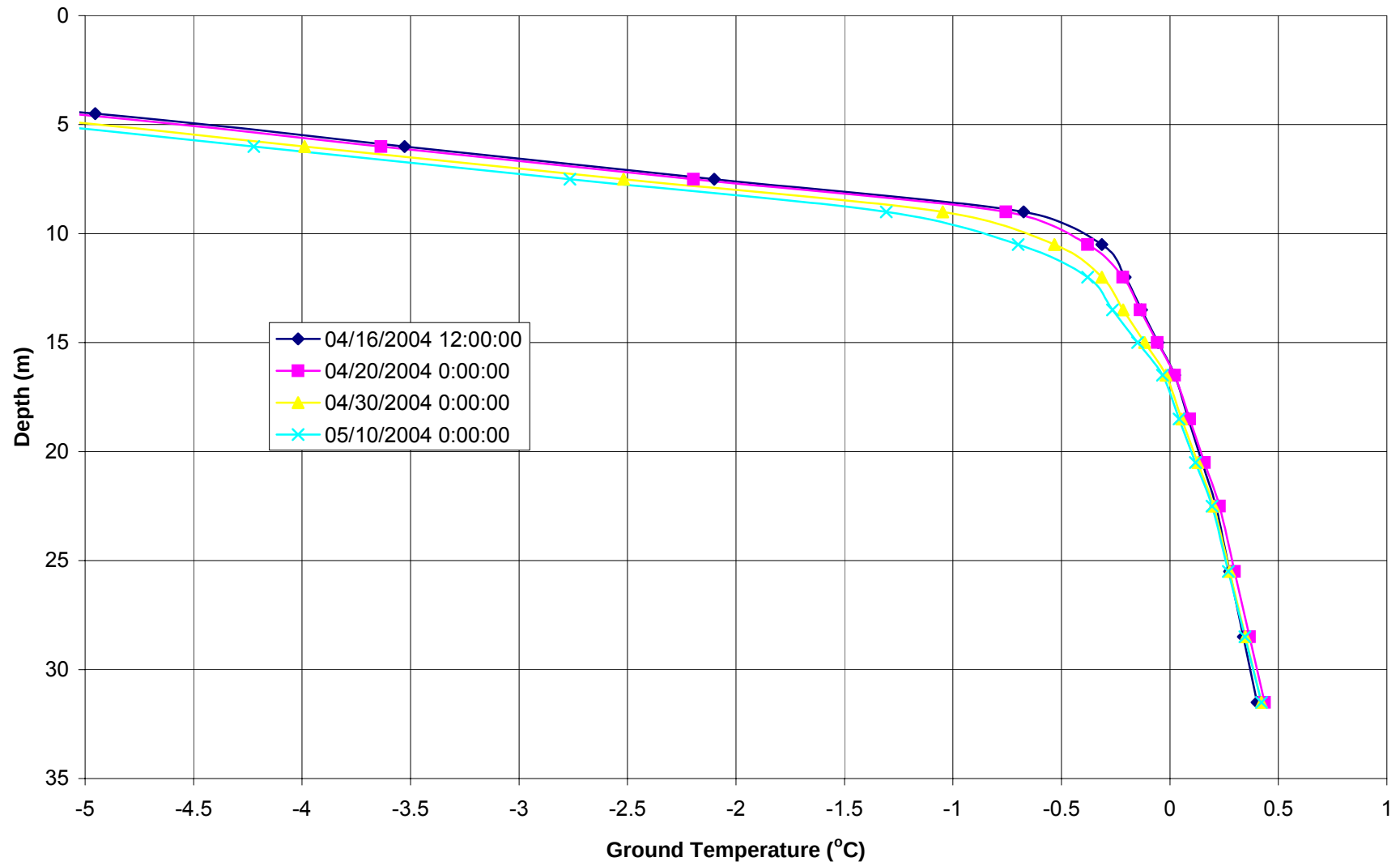
MPV-04-123C

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp °C
Feb 5 2004	26.64	213.7	-88.8	75.2	5811	11

MPV_04_123C



MPV-04-128C
Estimate



MPV_04_128C



MPV_04_128C



Prep			
	All lengths measured along drillhole		
	rig floor = 0.0m; target length is 30.5m below ground surface		
	bedrock at 3.9m		
07/02/2004	Dayshift		
0700hrs	setting up		
0930hrs	set up complete		
1100hrs	ground surface at 1.4m		
	bedrock at 3.90m		
	casing set at 4.75m		
1230hrs	rods at 5.4m		
1330hrs	sanding between rods and casing; pulled rods at 6.2		
	drove additional casing to 6.3m (top at -1.1m below rig floor)		
1630hrs	stopped to get new pot valve		
1730hrs	restarted drilling		
1900hrs	finished shift at 14m		
07/02/2004	Nightshift		
1900hrs	Continued drilling HQ		
	Refreshed bit		
2030hrs	engine cut out. No battery power to engine		
	Battery charger found to jump start engine		
2200hrs	back to drilling		
0700hrs	finished shift at 24.0		
08/02/2004	Dayshift		
0700hrs	drilling merrily		
0830hrs	29.5m		
1030hrs	31.5m, end of hole, reflex test		
	<i>Thermistor Installation</i>		
	confirmed depth below ground surface, flushed rods		
	installed PVC tremie and circulated hot water		
	zero'ed' thermistor string in ice bath		
	threaded thermistor thru segmented thermistor PVC on ground		
	manhandled segmented string down thru drillshack roof		
	pulled rods, pulled casing, inserted protective steel sleeve		
	took thermistor readings - all thermistors active		
1330hrs	moved off hole		
	installed 5.1 lengths 1.25" dia PVC thermistor pipe (5.975m/length)		
	CAPPED BOTH PIPES and pulled rods		



HOLE NO:	MPV-04-128C
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	0930 07/02/04
DATE AND TIME FINISHED:	1330 Feb 8 2004
HOLE DIAMETER:	63.5 (HQ3)
DRILLING METHOD:	Diamond core
KIMBERLITE PIPE:	

OVERALL HOLE DRILL RATE (m/hr)	0.88
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.54

(GENERAL GEOTECH LOG)

MPV-04-128C

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

[illegible]

DRILLHOLE ID:	MPV-04-128C

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating old indicate artificial
Note any weak foliation, bedding, brecciation in comments

[illegible]

[illegible]

Validation data: (Do not alter)										
IRS:	IRS:	Joint amounts:	Joint Fill Strength:	Microdefect Intensity:	Microdefect strength:	No of joint sets:	Joint type:	Joint Roughness:	Joint Wall Alteration:	Joint Infill:
%:	Categories:	0	0	0	0	1	J1	1	0	1
0	R0	1	1	1	1	1+1	J2	2	1	2
5	R1	2	2	2	2	2	J3	3	2	3
10	R2	3		3		2+1		4		4
15	R3	4				3		5		5
20	R4	5				3+1		6		6
25	R5	6						7		7
30	R6	7						8		8
35		8						9		9
40		9								
45		10								
50		11								
55		12								
60		13								
65		14								
70		15								
75		16								
80		17								
85		18								
90		19								
95		20								
100		21								
		22								
		23								
		24								
		25								
		26								
		27								
		28								
		29								
		30								

SRK Photo Log Sheet

Drillhole ID:

MPV-04-128C

[illegible]

Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-128C	1	3.90	6.85
MPV-04-128C	2	6.85	9.76
MPV-04-128C	3	9.76	12.65
MPV-04-128C	4	12.65	15.42
MPV-04-128C	5	15.42	18.30
MPV-04-128C	6	18.30	21.00
MPV-04-128C	7	21.00	23.84
MPV-04-128C	8	23.84	26.66
MPV-04-128C	9	26.66	29.50
MPV-04-128C	10	29.50	31.50
	11	31.50	EOH
	12		
	13		
	14		
	15		
	16		
	17		
	18		
	19		
	20		
	21		
	22		
	23		
	24		
	25		
	26		
	27		
	28		
	29		
	30		

MPV-04-128c

Ice Bath Readings

1	16.40
2	16.36
3	16.35
4	16.39
5	16.32
6	16.31
7	16.34
8	16.32
9	16.39
10	16.40
11	16.34
12	16.31
13	16.30
14	16.30
15	16.27
16	16.32

FIELD GEOLOGICAL LOG

HOLE ID

MPV-04-128c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	1.40	Ice/water	n/a	Ice/water	RB/JS
1.40	3.90	Overburden	n/a	Till	RB/JS
3.90	31.50	Granite	n/a	Granite; 15.0-24.0m: foliated granite, gneissic	RB/JS
EOH					

Reflex Readings

MPV-04-128C

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
Feb 8 2004	31.5	187.9	69	234.8	5884	10.7

UCS SAMPLES

HOLE ID: MPV-04-128C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-128C	10	30.12	Granite	04-UCS-128-001

POINT LOAD TEST - INPUT

DRILL HOLE ID:

[illegible]

MPV_04_129C



MPV_04_129C



Date/Time	Event
DS 08/02/2004	
1730hrs	completed set-up on hole ground surface is 2.0m below rig floor
NS 08/02/04-09/02/04	
2000hrs	set casing to 4.7m (just below rig floor)
2200hrs	began to drill
2200-2300hrs	adjust return funnel and build frame for it Till from 2m - 4.3m Bedrock (granite) intersected at 4.3m
0015-0030 hrs	water line break in seacan
0630hrs	17.00m depth reached by end of shift
DS 09/02/04	
0800hrs	at 20.5m
1000hrs	26.5m
1100hrs	29.5m
1130hrs	31.0m
1200hrs	32.5m
1430hrs	thermistor installed, started packing to move



HOLE NO:	MPV-04-129C
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	08/02/04 1900hrs
DATE AND TIME FINISHED:	1400 Feb 9 2004
HOLE DIAMETER:	101.6 (HQ3) & 47.6 mm (NQ)
DRILLING METHOD:	Geobore and diamond core
KIMBERLITE PIPE:	Dyke 2 abutment

OVERALL HOLE DRILL RATE (m/hr)	0.90
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	2.41

(GENERAL GEOTECH LOG)

MPV-04-129C

NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

[illegible]

DRILLHOLE ID: **MPV-04-129C**

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

[illegible]

SRK Photo Log Sheet

Drillhole ID:

MPV-04-129C

[illegible]

Core Box Tracking Sheet

[illegible]

FIELD GEOLOGICAL LOG**HOLE ID**

MPV-04-129c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	2.00	Ice/water	n/a	Ice/water	RB/JS
2.00	4.20	Overburden	n/a	Till	RB/JS
4.20	32.50	Granite	n/a	Granite	RB/JS
EOH					

Reflex Readings**MPV-04-129C**

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp °C
Feb 9 2004	32.5	185.6	69.3	202.5	5909	8.1

DRILL HOLE ID: [illegible]

UCS SAMPLES

HOLE ID: MPV-04-129C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-129C	6	18.32	Granite	04-UCS-129-001

Ice Bath Readings		
Thermistor String ID		ID 32/16-3
Thermistor	Ohm Reading	
1	15.91	
2	15.45	
3	15.82	
4	15.68	
5	15.52	
6	15.86	
7	15.96	
8	15.54	
9	16.06	
10	16.05	
11	15.96	
12	15.60	
13	15.57	
14	16.12	
15	15.93	
16	16.12	

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5 - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	DESCRIPTION
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	CATEGORY
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE		
CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THICKNESS < IRREGULARITIES	
8	GOUGE THICKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher Jr JRC

ROUGH		1	4	20
SMOOTH		2	3	14
SLICKEN-SIDED		3	2	11
STEPPED				
ROUGH		4	3	14
SMOOTH		5	2	11
SLICKEN-SIDED		6	1.5	7
UNDULATING				
ROUGH		7	1.5	2.5
SMOOTH		8	2	1.5
SLICKEN-SIDED		9	0.5	0.5
PLANAR				



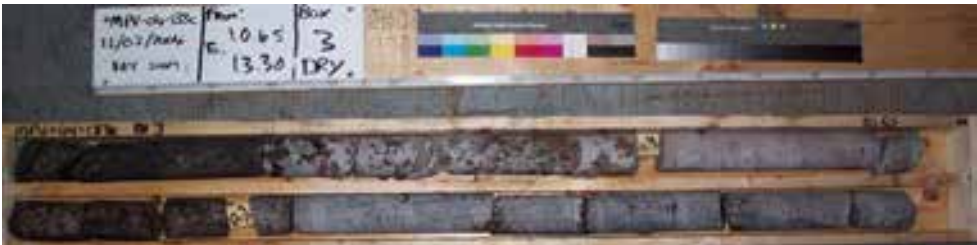
MPV_04_131C



MPV_04_131C



MPV_04_133C



MPV_04_133C



MPV-04-133c			
NS 11/02/2004			
1900hrs	Setup on hole		
2200hrs	Ream casing		
0100hrs	Casing down to 5.3m		
????	Began drilling		
???	end of shift at XXXm		
DS 11/02/2004			
0700hrs	drilling		
0830hrs	17.6m		
0950hrs	20.6m		
1030hrs	23.6m		
1110hrs	26.6m		
1140hrs	29.6m		
1230hrs	31.0m	End of Hole	
	waited for reflex		
1500hrs	thermistor installed		
	began packing to move		

FIELD DRILL PERFORMANCE LOG

PROJECT:	Gahcho Kue Geotech
PROJECT NO:	2CD002.11
NORTHING:	7035350.3
EASTING:	588816
SURFACE ELEVATION:	404.71
AZIMUTH:	24
DIP:	70

HOLE NO:	MPV-04-133c
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	1700hrs 10/2/2004
DATE AND TIME FINISHED:	1500hrs 12/2/2004
HOLE DIAMETER:	63.5 (HQ)
DRILLING METHOD:	Diamond core

[illegible]

OVERALL HOLE DRILL RATE (m/hr)	1.29
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	2.70

(GENERAL GEOTECH LOG)

DRILLHOLE ID: **MPV-04-133c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

[illegible]

DRILLHOLE ID:	

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

[illegible]

SRK Photo Log Sheet

Drillhole ID:

MPV-04-133c

[illegible]

Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-133c	1	5.45	7.70
MPV-04-133c	2	7.70	10.65
MPV-04-133c	3	10.65	13.30
MPV-04-133c	4	13.30	16.25
MPV-04-133c	5	16.25	19.10
MPV-04-133c	6	19.10	21.80
MPV-04-133c	7	21.80	24.70
MPV-04-133c	8	24.70	27.50
MPV-04-133c	9	27.50	30.15
MPV-04-133c	10	30.15	31.10
MPV-04-133c	11	31.10	End of Hole
	12		
	13		
	14		
	15		
	16		
	17		
	18		
	19		
	20		
	21		
	22		
	23		
	24		
	25		
	26		
	27		
	28		
	29		
	30		

Borehole ID

MPV-04-133c

Thermistor String ID

16/32 - 2

Ice Bath Readings

Thermistor	Reading (kOhms)	Comments

1	16.40	
2	16.31	
3	16.31	
4	16.28	
5	16.35	
6	16.28	
7	16.36	
8	16.31	
9	16.29	
10	16.31	
11	16.36	
12	16.37	
13	16.35	
14	16.34	
15	16.40	
16	16.31	

Reflex Readings

MPV-04-133C

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N	Magnetic Fielc	Temp ©
Feb 12 2004	31	18.1	68.5	73.4	5895	9.1

FIELD GEOLOGICAL LOG**HOLE ID**

MPV-04-133c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	5.45	Overburden	n/a	Overburden	RB/Clee
5.45	20.60	Granite	n/a	Granite	RB/Clee
20.60	31.00	Granite and Amphibolite	n/a	Granite and Amphibolite	RB/Clee
EOH					

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5 - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	DESCRIPTION
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	CATEGORY
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

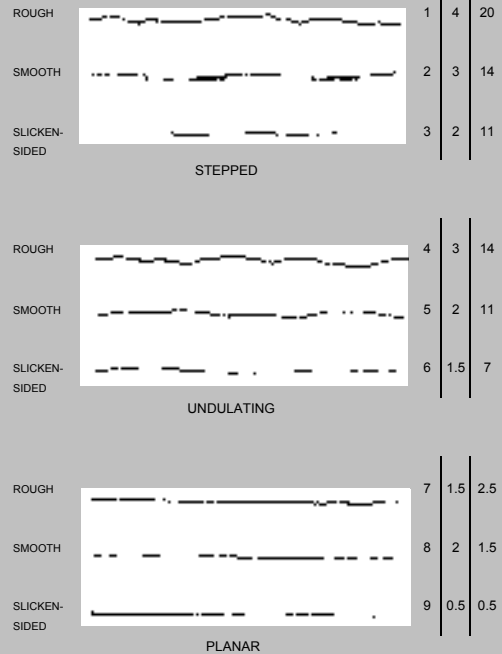
JOINT CONDITION - SMALL SCALE		
CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THICKNESS < IRREGULARITIES	
8	GOUGE THICKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher Jr JRC



POINT LOAD TEST - INPUT

DRILL HOLE ID: **MPV-04-133C**

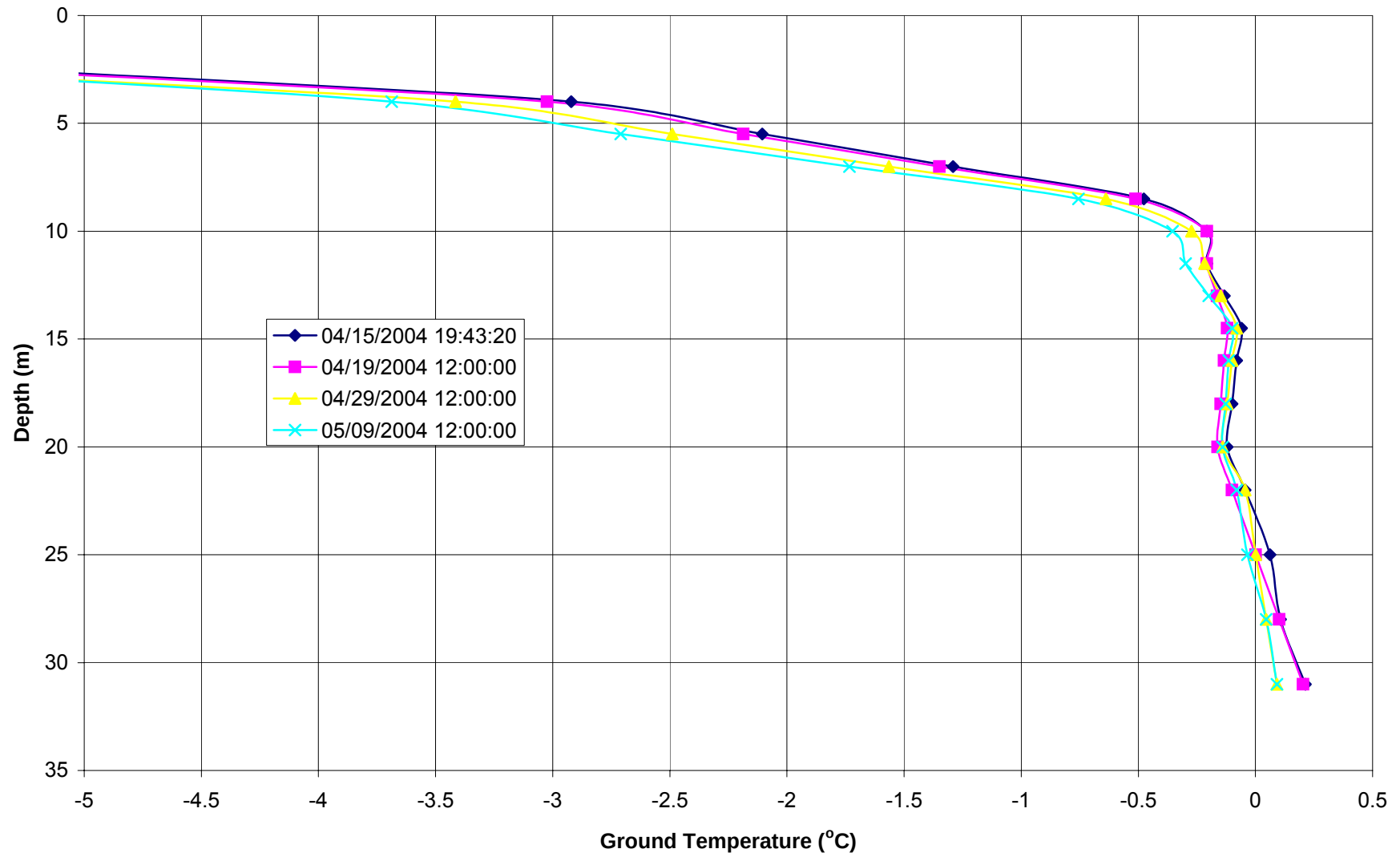
[illegible]

UCS SAMPLES

HOLE ID: MPV-04-133C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-133C	9	27.76	Grante	04-UCS-133-001

MPV-04-133C
Estimate



MPV_04_134C



MPV_04_134C



NS 12/02/2004

1900 - 2230 hrs move, setup shacks
2230 - 0000 hrs drill azimuth: used stakes for D4-A-3T, -4T and GB-1 (JAN 27 survey) for average line of site (holes poorly aligned)
0000 - 0200 hrs pack in shacks, auger hole for pump shack (2 tries before hitting water), set in pump shack
0200 - 0430 hrs laying and burying hose, fix leaky pump, setup/organize drill shack
0530 - setting casing, fixing stove

DS 13/02/2004

0700hrs
1100hrs installed funnel on casing to catch cuttings
1230hrs rods and casing bound by sand
set casing to 7.8m
1430hrs ground at 1.6m below rig floor
bedrock at 8.2
1600hrs 8.6m
1700hrs changed bit to 02 type (harder). No more 01 type bits in camp
1815hrs 9.5m

NS 13/02/2004

1900 - 0700 hrs Drillers told to use 1.5m distance from drill floor to top of head
slow drilling due to hard bit (#2 as opposed to #10 bit)

DS 13/02/2004

0730hrs 27.9m partial run to remove blocked bit/ high water pressures
0830hrs changed bit (after only 19.1m of drilling). Dead.
1000hrs 29.6m
1040hrs 31.6m **END OF HOLE**
reflex, thermistor, packed and moved to D4-A-2T
protective pipe installed over thermistor

FIELD DRILL PERFORMANCE LOG

PROJECT:	Gahcho Kue Geotech
PROJECT NO:	2CD002.11
NORTHING:	7035626.06
EASTING:	589329.64
SURFACE ELEVATION:	405.57
AZIMUTH:	310
DIP:	70

HOLE NO:	MPV-04-134c
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	1200 13/2/2004
DATE AND TIME FINISHED:	1600 Feb 14 2004
HOLE DIAMETER:	63.5 (HQ)
DRILLING METHOD:	Diamond core

[illegible]

OVERALL HOLE DRILL RATE (m/hr)	0.66
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.71

GEOTECH LOGGING 1 - INPUT
(GENERAL GEOTECH LOG)

 DRILLHOLE ID: **MPV-04-134c**

Total Core Recovery = Total length of core recovered
 Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
 Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
 NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
0.00	1.60	1.60	Ice							
1.60	8.20	6.60	OB							sand (inferred), gravel, cobble and boulders fragments; many mineralogies
8.20	8.60	0.40	PGN	0.40	100.0	0.40	100.0	0.36	90.0	PGN = gneissic granite/foliated paragneiss
8.60	11.60	3.00	PGN	3.00	100.0	3.00	100.0	2.30	76.7	DRILLING PARALLEL TO FOLIATION: core splits on foln during drilling, promotes additional mechanical breakage; fudged RQD
11.60	14.60	3.00	PGN/GR	3.00	100.0	2.90	96.7	2.30	76.7	2 rubblely zones attributed to breakage associated with core parallel joints; fudged RQD
14.60	17.60	3.00	GR	2.97	99.0	2.89	96.3	2.76	92.0	disseminated sulphides ~3% @ 17.3m
17.60	20.60	3.00	PGN	2.94	98.0	2.89	96.3	2.89	96.3	
20.60	23.60	3.00	PGN	3.00	100.0	2.87	95.7	2.79	93.0	
23.60	26.60	3.00	PGN	3.00	100.0	2.95	98.3	2.95	98.3	
26.60	27.90	1.30	PGN	1.30	100.0	1.17	90.0	1.09	83.8	
27.90	29.60	1.70	PGN	1.70	100.0	1.70	100.0	1.70	100.0	
29.60	31.60	2.00	PGN	2.00	100.0	1.93	96.5	1.93	96.5	END OF HOLE

DRILLHOLE ID:

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

[illegible]

FIELD GEOLOGICAL LOG

HOLE ID

MPV-04-134c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	1.60	Ice/Snow	n/a	Ice/snow	RB/CLee
1.60	8.20	Overburden	n/a	Overburden: sand (inferred), gravel, cobble and boulders fragments; many mineralogies	RB/CLee
8.20	16.00	Gneissic granite	n/a	gneissic granite/foliated paragneiss	RB/CLee
16.00	17.60	Granite	n/a	Granite; disseminated sulphides ~3% @ 17.3m	RB/CLee
17.60	31.60	Gneissic granite	n/a	gneissic granite/foliated paragneiss	RB/CLee
EOH					

SRK Photo Log Sheet

Drillhole ID:

MPV-04-134c

Shift	Camera Photo Number	Filename	Depth	Description
DS 0700-1900		MPV-04-134c-1.6m-Box1-DRY	1.6 - 8.2m	sample of overburden materials
NS 1900-0700		MPV-04-134c-8.2m-Box2-DRY	8.2 - 10.77m	splitting on foliation, 49 fractures, but only 3 real joints
NS 1900-0700		MPV-04-134c-10.77m-Box3-DRY	10.77 - 13.20 m	
NS 1900-0700		MPV-04-134c-13.20m-Box4-DRY	13.20 - 15.77 m	contact between PGN and GR
NS 1900-0700		MPV-04-134c-15.77m-Box5-DRY	15.77 - 18.49 m	disseminated sulphides: ~3% @ 17.3
NS 1900-0700		MPV-04-134c-18.49m-Box6-DRY	18.49 - 20.94 m	
NS 1900-0700		MPV-04-134c-20.94m-Box7-DRY	20.94 - 23.60 m	
DS 0700-1900		MPV-04-134c-23.6m-Box8-DRY	23.6 - 26.6m	
DS 0700-1900		MPV-04-134c-26.6m-Box9-DRY	26.6 - 29.0m	
DS 0700-1900		MPV-04-134c-29.0m-Box10-DRY	29.0 - 31.6m	END OF HOLE

Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-134c	1	1.60	8.20
MPV-04-134c	2	8.20	10.77
MPV-04-134c	3	10.77	13.20
MPV-04-134c	4	13.20	15.77
MPV-04-134c	5	15.77	18.49
MPV-04-134c	6	18.49	20.94
MPV-04-134c	7	20.94	23.60
MPV-04-134c	8	23.60	26.60
MPV-04-134c	9	26.60	29.00
MPV-04-134c	10	29.00	31.60
		31.60	END OF HOLE

Borehole ID		MPV-04-134c
Thermistor String ID		16/32 - 8
Ice Bath Readings		
Thermistor	Reading	
	(kOhms)	Comments
1	16.25	
2	16.32	
3	16.28	
4	16.37	
5	16.35	
6	16.34	
7	16.36	
8	16.32	
9	16.37	
10	16.31	
11	16.29	
12	16.32	
13	16.31	
14	16.31	
15	16.37	
16	16.37	

Reflex Readings

MPV-04-134C

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp °C
14-Feb-04	31.6	292.5	67.9	254	5945	11.6

POINT LOAD TEST - INPUT

DRILL HOLE ID: MPV-04-134C

DRILL HOLE ID: **MPV-04-134C**

[illegible]

UCS SAMPLES

HOLE ID: MPV-04-134C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-134C	10	30.07	Granite	04-UCS-134-001

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5 - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	DESCRIPTION
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	CATEGORY
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

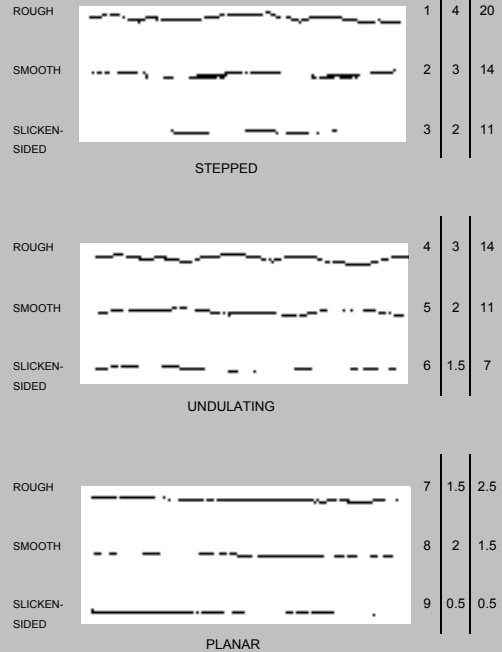
JOINT CONDITION - SMALL SCALE		
CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THICKNESS < IRREGULARITIES	
8	GOUGE THICKNESS > IRREGULARITIES	
9	NO INFILL	

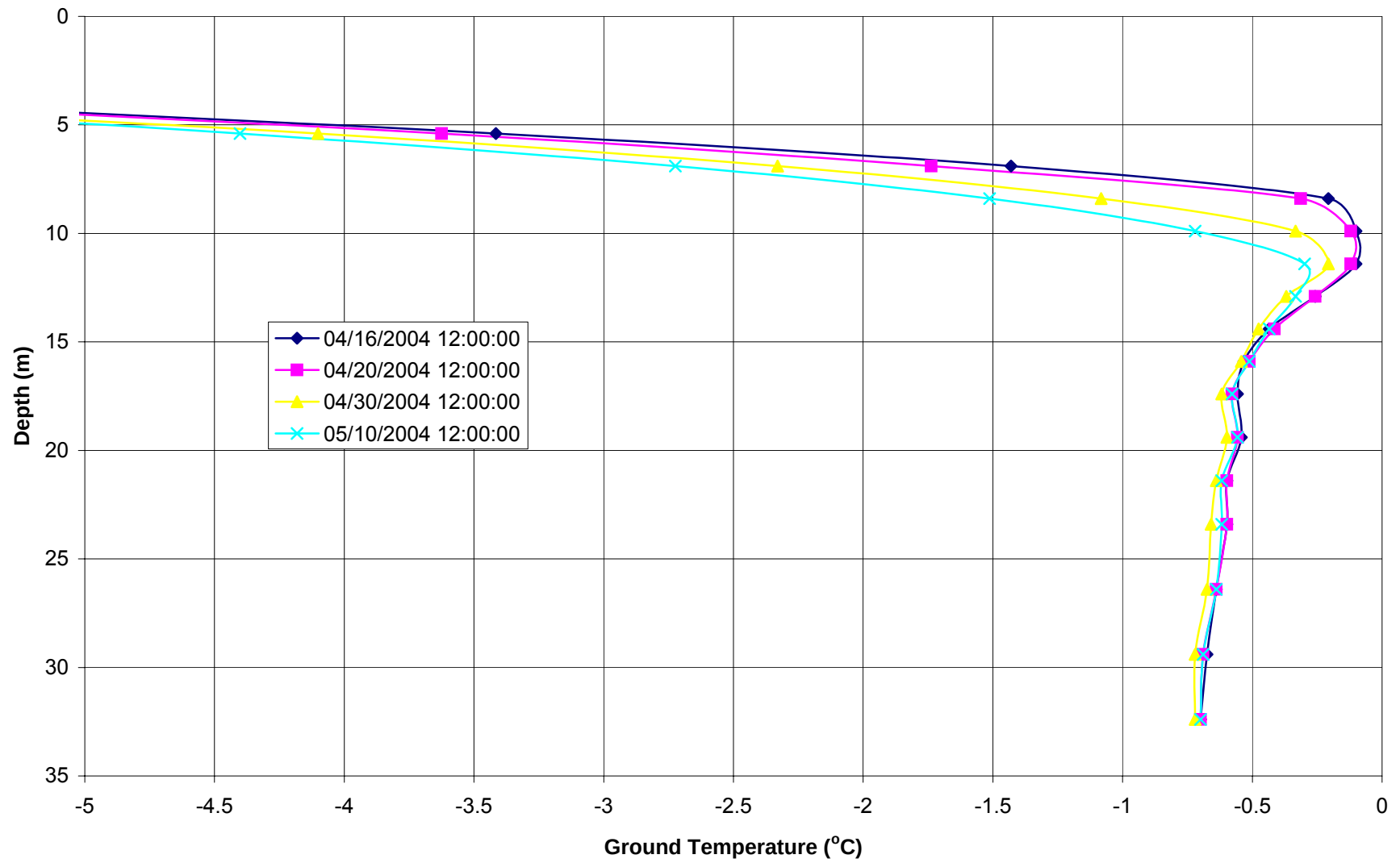
JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher Jr JRC



MPV-04-136C
Estimate



MPV_04_136C



MPV_04_136C



DS 13/02/2004

1400hrs re-established location by measuring 20.5m from D4-A-1T, along axis of dyke

NS 14/02/2004

1900hrs Fix drill floor, lay and bury hose, set casing at 5.3m (reamed in, stopped drill)
0130hrs Begin drilling
Pulled out pebbles from core barrel at 8.5m; not yet in bedrock
0230hrs Decision to re-set casing; pull rods, no core barrel clamp
Casing not sinking, decide pull all sections to replace shoe, use rods to keep hole open
Rods stuck inside casing, pull out rods
Ended shift with three 1.5m sections of casing left to pull
N.B. Bedrock not encountered at 8.5m!

DS 15/02/2004

0700hrs pulled remaining casing; changed shoe; old shoe had been seriously burned
re-set casing to 12.1m, in bedrock
1100hrs maintenance on rig engine and core shack generator
1300hrs started drilling
1400hrs 14.6m
1600hrs 19.9m
1730hrs 23.6m
1930hrs 26.6m

NS 15/02/2004

1900hrs continued drilling
2230hrs finished hole at 32.4m
0030hrs reflex, thermistor calibration and installation, pull rods
0130hrs fished sub out of mud; pull casing
set thermistor protective casing
Mobilize to D4-A-3T (Drill pad for D4-A-4T too small, requires expansion)

(GENERAL GEOTECH LOG)

MPV-04-136C

NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

[illegible]

(DETAILED LOG)

MPV-04-136C

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

[illegible]

SRK Photo Log Sheet

MPV-04-136C

Shift	Filename	Depth	Description
DS 0700-1900	MPV-04-136c_1.4m_Box1_Dry	1.4 - 12.6m	
DS 0700-1900	MPV-04-136c-12.6m-Box2-dry	12.6 - 15.6m	
DS 0700-1900	MPV-04-136c-15.6m-Box3-dry	15.6 - 18.1m	
DS 0700-1900	MPV-04-136c-18.1m-Box4-dry	18.1 - 20.6m	
DS 0700-1900	MPV-04-136c-20.m-Box5-dry	20.6 - 23.0m	
DS 0700-1900	MPV-04-136c-23.m-Box6-dry	23.0 - 26.0m	
NS 1900-0700	MPV-04-136c-26.0m-Box7-dry	26.0 - 28.02m	
NS 1900-0700	MPV-04-136c-28.02m-Box8-dry	28.02 - 29.73m	
NS 1900-0700	MPV-04-136c-29.73m-Box9-dry	29.73 - 32.40m	END OF HOLE

Cores Box Record

MPV-04-136C

Box	From	To
1	1.40	12.60
2	12.60	15.60
3	15.60	18.10
4	18.10	20.60
5	20.60	23.00
6	23.00	26.00
7	26.00	28.02
8	28.02	29.73
9	29.73	32.40
10		
11		
12		

EOH

Reflex Readings

MPV-04-136C

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N	Magnetic Fielc	Temp ©
Feb 15 2004	32.4	284.3	67.4	40.4	5942	15.3

FIELD GEOLOGICAL LOG**HOLE ID**

MPV-04-136c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	1.40	Ice/Snow	n/a	Ice/snow	RB/Clee
1.40	11.60	Overburden	n/a	Overburden: Cobbles and boulders of various lithologies	RB/CLee
11.60	26.60	Gneissic granite	n/a	Gneissic granite	RB/CLee
26.60	32.40	Mafic gneiss	n/a	Mafic gneiss	RB/Clee
EOH					

UCS SAMPLES

HOLE ID: MPV-04-136C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-136C	3	20.66	Amphibole	04-UCS-136-001

POINT LOAD TEST - INPUT

DRILL HOLE ID: MPV-04-136C

No. #	TESTED BY	DATE	HOLE/ FACE ID	DIST. (m)	ROCK TYPE	TEST TYPE	ORINT	DAYS	W (mm)	D (mm)	P (PSI)	COMMENT

[illegible]

Thermistor Readings

MPV-04-136C

Thermistor String ID

32/16-11

Ice Bath Readings		
Thermistor	Reading	
	(kOhms)	Comments
1	14.53	
2	14.16	
3	13.75	
4	14.50	
5	14.21	
6	14.27	
7	14.59	
8	14.49	
9	14.28	
10	14.98	
11	14.37	
12	14.06	
13	14.20	
14	14.05	
15	14.26	
16	15.13	

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5 - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	DESCRIPTION
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	CATEGORY
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

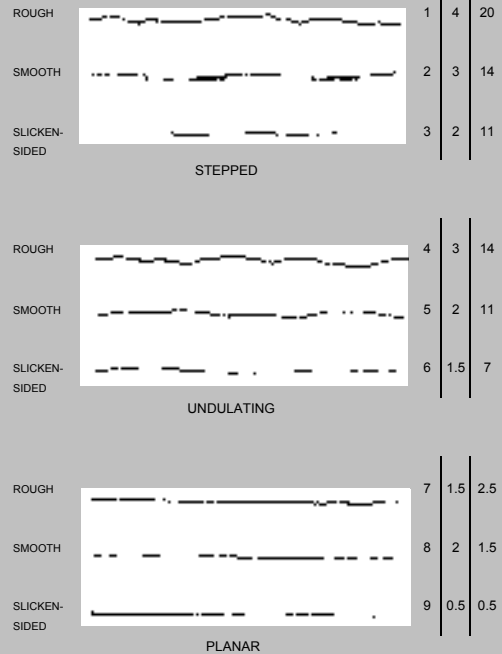
JOINT CONDITION - SMALL SCALE		
CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THICKNESS < IRREGULARITIES	
8	GOUGE THICKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher Jr JRC



MPV_04_138C



Diary

MPV-04-138c

DS 16/02/2004

0700hrs laying hoses etc.
1030hrs began to sink casing
1400hrs casing set to 7.3m depth
ground surface at 1.5m (est.) below rig floor
started to drill
1430hrs calibrated 32/16-10
1500hrs 8.6m - granite - hard drilling
1630hrs 11.6m
1730hrs 14.6m
1830hrs 17.6m

NS 16/02/2004

2130hrs 20.6m
change bit at 20.6m depth as bit #2 is not adequate for very hard granite and wore down fast
2230hrs continue drilling
23.6m
0030hrs problems with moving casing
0200hrs casing started to move, drilled to 25.8m, started to pull rods to ream the hole
0320hrs add some more casing to original depth of casing
0400hrs finished putting casing back into hole, start lowering rods
0530hrs start coring till end of shift

DS 17/02/2004

0840hrs 29.6m
0900hrs 31.6m
waited for reflex
thermistor installed
protective pipe installed
staked
1200hrs pulling casing

FIELD DRILL PERFORMANCE LOG

PROJECT	Gahcho Kue Geotech
PROJECT NO	2CD002.11
NORTHING	7035684.68
EASTING	589250.83
SURFACE ELEVATION	404.47
AZIMUTH	130
DIP	-70

HOLE NO:	MPV-04-138c
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	1200 16/02/2004
FINISH DATE AND TIME	1000 17/02/2004
HOLE DIAMETER	63.5 (HQ)
DRILLING METHOD	Diamond core

[illegible]

OVERALL HOLE DRILL RATE (m/hr)	1.37
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	3.28

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-138c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
0.00	1.50	1.50	Snow/Ice							
1.50	6.80	5.30	OB							sands and gravels (inferred). Cobbles and boulders of various mineralogies
6.80	8.60	1.80	GR	1.80	100.0	1.80	100.0	1.80	100.0	
8.60	11.60	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	very solid
11.60	14.60	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
14.60	17.60	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
17.60	20.60	3.00	GR	2.95	98.3	2.95	98.3	2.95	98.3	
20.60	23.60	3.00	GR	2.98	99.3	2.88	96.0	2.81	93.7	
23.60	25.80	2.20	GR	2.23	101.4	2.21	100.5	2.21	100.5	
25.80	26.60	0.80	GR	0.80	100.0	0.80	100.0	0.80	100.0	
26.60	29.60	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
29.60	31.60	2.00	GR	2.00	100.0	2.00	100.0	2.00	100.0	END OF HOLE
		0.00								

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID:

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM (m)	TO (m)	ROCK TYPE	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of Sets	Type	Totals	JOINT CONDITIONS				COMMENT					
			STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH				ANGLE	ROUGH	ALT	FILL						
6.8	8.6	GR	R6		100	10	0	0	0	0	0	0	1		0					interpret all fractures to be machine break					
8.6	11.6	GR	R6		100	7	0	3	0	0	0	0	3	J1	1	60	7	0	9						
														J2	1	40	4	0	9						
														J3	1	50	4	0	9						
11.6	14.6	GR	R6		100	6	0	4	0	0	0	0	1	J1	4	65	4	0	9						
14.6	17.6	GR	R6		100	6	0	0	0	0	0	0	1							interpret all fractures to be machine break					
17.6	20.6	GR	R6		100	15	0	4	0	0	0	0	2	J1	2	35	2	0	9						
														J2	2	57	4	0	9						
20.6	23.6	GR	R6		100	13	0	7	0	0	0	0	3	J1	2	63	7	0	3						
														J2	1	90	7	0	3						
														J3	4	53	5	0	9						
														J1	4	45	5	0	2						
23.6	25.8	GR	R6		100	4	0	4	0	0	0	0	1							some pyrite coating on some joint					
25.8	26.6	GR	R6		100	1	0	0	0	0	0	1													
26.6	29.6	GR	R6		100	7	0	1	0	0	0	0	1	J1	1	45	1	0	9	no natural breaks in this short run in					
29.6	31.6	GR	R6		100	3	0	1	0	0	1	0													
END OF HOLE																									

Photo Record

MPV-04-138c

Date	Shift	Filename	Depth	Description
16/02/2004	DS 0700-1900	MPV-04-138c-1.4m-Box1-dry	1.4 - 8.90m	OB and granite
16/02/2004	DS 0700-1900	MPV-04-138c-8.9m-Box2-wet	8.90 - 11.80m	GR
16/02/2004	DS 0700-1900	MPV-04-138c-11.8m-Box3-dry	11.80 - 14.60m	GR
16/02/2004	DS 0700-1900	MPV-04-138c-14.6m-Box4-dry	14.60 - 17.60m	GR
16/02/2005	NS 1900-0700	MPV-04-138c-17.6m-Box5-dry	17.60 - 20.60m	GR
16/02/2006	NS 1900-0700	MPV-04-138c-20.6m-Box6-dry	20.60 - 23.60m	GR
16/02/2007	NS 1900-0700	MPV-04-138c-23.6m-Box7-dry	23.60 - 26.40m	GR biotite rich, gneissic
17/02/2004	DS 0700-1900	MPV-04-138c-26.4m-Box8-dry	26.40 - 29.2m	GR
17/02/2004	DS 0700-1900	MPV-04-138c-26.4m-Box9-dry	29.2 - 31.6M	END OF HOLE

Core Box Record

MPV-04-138c

Box	From	To	Comments
1	1.40	8.90	OVb and granite
2	8.90	11.80	granite
3	11.80	14.60	granite
4	14.60	17.60	granite
5	17.60	20.60	granite
6	20.60	23.60	granite
7	23.60	26.40	granite
8	26.40	29.20	granite
9	29.20	31.60	END OF HOLE

Reflex Readings

MPV-04-138C

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N	Magnetic Field	Temp ©
17-Feb-04	31.6	117.1	69.1	344.3	5906	11.1

Thermistor Readings

Tested in ice water bath

Thermistor String ID

MPV-04-138c

32/16-10

Thermis Node	Reading (kOhms)	Comments
1	16.33	
2	16.31	
3	16.31	
4	16.32	
5	16.32	
6	16.31	
7	16.34	
8	16.30	
9	16.29	
10	16.32	
11	16.30	
12	16.30	
13	16.28	
14	16.32	
15	16.33	
16	16.29	

FIELD GEOLOGICAL LOG**HOLE ID**

MPV-04-138c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	1.50	Ice/Snow	n/a	Ice/snow	RB/BR
1.50	8.60	Overburden	n/a	sands and gravels (inferred). Cobbles and boulders of various lithologies	RB/BR
8.60	31.60	Granite	n/a	Granite, fresh compact granite, pink, dark-grey, coarse grained	RB/BR
EOH					

DRILL HOLE ID: MPV-04-138C

[illegible]

UCS SAMPLES

HOLE ID: MPV-04-138C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-138C	9	29.80	GRANITE	04-UCS-138-001

MPV_04_140C



MPV_04_140C



Diary

MPV-04-140c

DS 17/02/2004

1500hrs moved onto hole

NS 17/02/2004

1900hrs start casing
0000hrs start coring, HQ3 bit is used as no more HQ bits in camp
0200hrs first run in bedrock to 8.6m finished
0300hrs core to 11.6m
0400hrs problems with a bolt to pull out core barrel (0.5hrs)
0430hrs core to 14.6m
0510hrs core to 17.6m
0610hrs core to 20.6m

DS 18/02/2004

0800hrs at 23.6m
0845hrs at 26.6m
0945hrs at 29.6m
1010hrs at 31.6m END OF HOLE
flex
1130hrs thermistor installed
protective pipe installed
staked

**FIELD DRILL
PERFORMANCE LOG**

PROJECT	Gahcho Kue Geotech
PROJECT NO	2CD002.11
NORTHING	7035694.9
EASTING	589235.1
SURFACE ELEVATION	406.21
AZIMUTH	310
DIP	70

HOLE NO:	MPV-04-140c
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	1900hrs 17/02/2004
FINISH DATE AND TIME	1130hrs 18/02/2004
HOLE DIAMETER	63.5 (HQ3) - see diary
DRILLING METHOD	Diamond core

Period	Logged by	Date	Time	Period Totals				Cumulative			
				Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]
DS 0700-1900	R Bowden	17/02/2004					end MPV-04-138C, move, set-up	0	0	0.00	0
NS 1900-0700	B Rameseder	17/02/2004	1900	12	0.5	20.60	started casing, clean hole when putting in	20.6	11.5	1.79	12
DS 0700-1900	R Bowden	18/02/2004	0700	12	8.5	31.60	finished drilling at 1030; reflex and thermis	11	3.5	3.14	24

OVERALL HOLE DRILL RATE (m/hr) 1.32

OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr) 2.11

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-140c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
0.00	1.40	1.40	Snow/Ice							depth to ground surface 1.5m (estimated). OVB=overburden; pieces of granite
1.40	8.60	7.20	OVB	2.85	39.6	2.83	39.3	2.83	39.3	granite, fresh compact granite, pink, dark-grey, coarse grained
5.60	8.60	3.00	GRN	2.85	95.0	2.83	94.3	2.83	94.3	granite, fresh compact granite, pink, dark-grey, coarse grained
8.60	11.60	3.00	GRN	2.95	98.3	2.95	98.3	2.95	98.3	
11.60	14.60	3.00	GRN	2.88	96.0	2.85	95.0	2.85	95.0	mica in granite seems sometimes orientated; at 14.3m 2cm wide stringer of mica
14.60	17.60	3.00	GRN	3.02	100.7	2.96	98.7	2.80	93.3	
17.60	20.60	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
20.60	23.60	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
23.60	26.60	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
26.60	29.60	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
29.60	31.60	2.00	GRN	2.00	100.0	2.00	100.0	2.00	100.0	END OF HOLE
		0.00								

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID:	MPV 04 140c

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

[illegible]

Photo Record**MPV-04-140c**

Date	Shift	Filename	Depth	Description
17/02/04	NS 1900-0700	MPV-04-140c-0m-Box1-dry	0.0-7.14m	OVB, granite
17/02/04	NS 1900-0700	MPV-04-140c-7.14m-Box2-dry	7.14-10.13	granite
17/02/04	NS 1900-0700	MPV-04-140c-10.13m-Box3-dry	10.13-13.07	granite
17/02/04	NS 1900-0700	MPV-04-140c-13.07m-Box4-dry	13.07-16.07	granite
17/02/04	NS 1900-0700	MPV-04-140c-16.07m-Box5-dry	16.07-19.00	granite
18/02/2004	DS 0700-1900	MPV-04-140c-19.00m-Box6-dry	19.00 - 21.65m	granite
18/02/2004	DS 0700-1900	MPV-04-140c-21.65m-Box7-dry	21.65 - 24.45	granite
18/02/2004	DS 0700-1900	MPV-04-140c-24.45m-Box8-dry	24.45 - 27.30	granite
18/02/2004	DS 0700-1900	MPV-04-140c-27.3m-Box9-dry	27.3 - 30.2	granite
18/02/2004	DS 0700-1900	MPV-04-140c-30.2m-Box10-dry	30.2 - 31.6	END OF HOLE

Core Box Record**MPV-04-140c**

Box	From	To	Comments
1	0.00	7.14	OVB, granite, fresh compact granite, pink, dark-grey, coarse grained
2	7.14	10.13	granite, short pegmatitic parts
3	10.13	13.07	granite, with intervals with more mafic minerals
4	13.07	16.07	mica in granite seems sometimes orientated; at 14.3m 2cm wide stringer of mafic intrusive igneous rock (dark grey, fine grained) about 55° to core axis
5	16.07	19.00	granite
6	19.00	21.65	granite
7	21.65	24.45	granite
8	24.45	27.30	granite
9	27.30	30.20	granite
10	30.20	31.60	END OF HOLE
12			

Reflex Readings

MPV-04-140C

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp °C
18-Feb-04	31.6	113.7	68.7	89.1	5938	10.3

Thermistor Readings

MPV-04-140c

Thermistor String ID

32/26 - 9

Thermis Node	Reading (kOhms)	Comments
1	16.38	
2	16.36	
3	16.39	
4	16.39	
5	16.35	
6	16.35	
7	16.35	
8	16.35	
9	16.37	
10	16.38	
11	16.33	
12	16.36	
13	16.36	
14	16.36	
15	16.36	
16	16.41	

FIELD GEOLOGICAL LOG**HOLE ID**

MPV-04-140c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	1.40	Ice/Snow	n/a	Ice/snw	RB/BR
1.40	8.60	Overburden	n/a	Overburden; pieces of granite and granodiorite up to 40cm long	RB/BR
8.60	31.60	Granite	n/a	Granite, fresh compact granite, pink, dark-grey, coarse grained	RB/BR
EOH					

POINT LOAD TEST DATA MPV-04-140c

MPV-04-140c

[illegible]

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5 - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	DESCRIPTION
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	CATEGORY
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

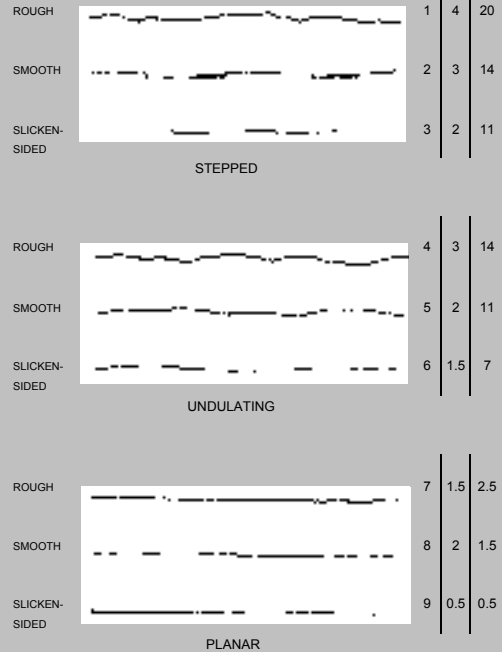
JOINT CONDITION - SMALL SCALE		
CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THICKNESS < IRREGULARITIES	
8	GOUGE THICKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher Jr JRC



Diary

MPV-04-141c

DS 18/02/2004	
1800hrs	bottom of ice at 1.7m
	lake depth sounded, 3.5m
NS 18/02/2004	
2300hrs	about 5m deep of casing and coring (in turns)
2345hrs	7.8m deep "cored"
0230hrs	followed with casing to coring depth; technical problems after oil change; drill won't start, has to be boosted and fan belt of drill motor (diesel engine) broke and has to be changed
0330hrs	repairs completed and drill started up again
0400hrs	10.8m casing, coring sed
DS 19/02/2004	
0800hrs	at 11.3m; note depth is not usual 11.6 because run is impeded by 0.3m because of cuttings catcher
0910	at 14.3m; first packer test
1125	completed first packer test
1230	at 17.3m
1417	finished 2nd packer test
1700	finished 3rd packer test
1800	at 23.3m
NS 19/02/2004	
2000hrs	standby till about 20.00 because of phone conference in the office with Marty Podolsky
2015hrs	start packer installation, some problems to bring packer down hole as the packer is slightly bended
2059hrs	start 4th packer readings
2134hrs	packer test is completed and start to deflate packer
2155hrs	putting rods back down hole and start drilling
2245hrs	stand-by technical pb; part at the top of core barrel has to be changed (lifter case)
2300hrs	continue coring
2315hrs	pull rods as bit seems to be worn down
2315hrs	drilling again
0015hrs	drilled to 26.3m
0045hrs	start 5th packer test
0145hrs	packer test finished and packer out of hole
0230hrs	drilled to 29.3m= EOH; BR and CBL spot hole MPV-04-143 on dyke 2
0250hrs	put packer in hole and start 6 th packer test
0330hrs	packer test ended
0400hrs	packer removed
0415hrs	look for reflex and start reflex
0445hrs	reflex ended, start pulling rods, pulling casing
	grouted



HOLE NO:	MPV-04-141c
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	1700hrs 18/02/2004
FINISH DATE AND TIME	20/02/2004 0700hrs
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

OVERALL HOLE DRILL RATE (m/hr)	0.81
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.75

DRILLHOLE ID:	MPV-04-141c

NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

[illegible]

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID: MPV-04-141c

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating did indicate artificial
Note any weak foliation, bedding, brecciation in comments

[illegible]

Photo Record

MPV-04-141c

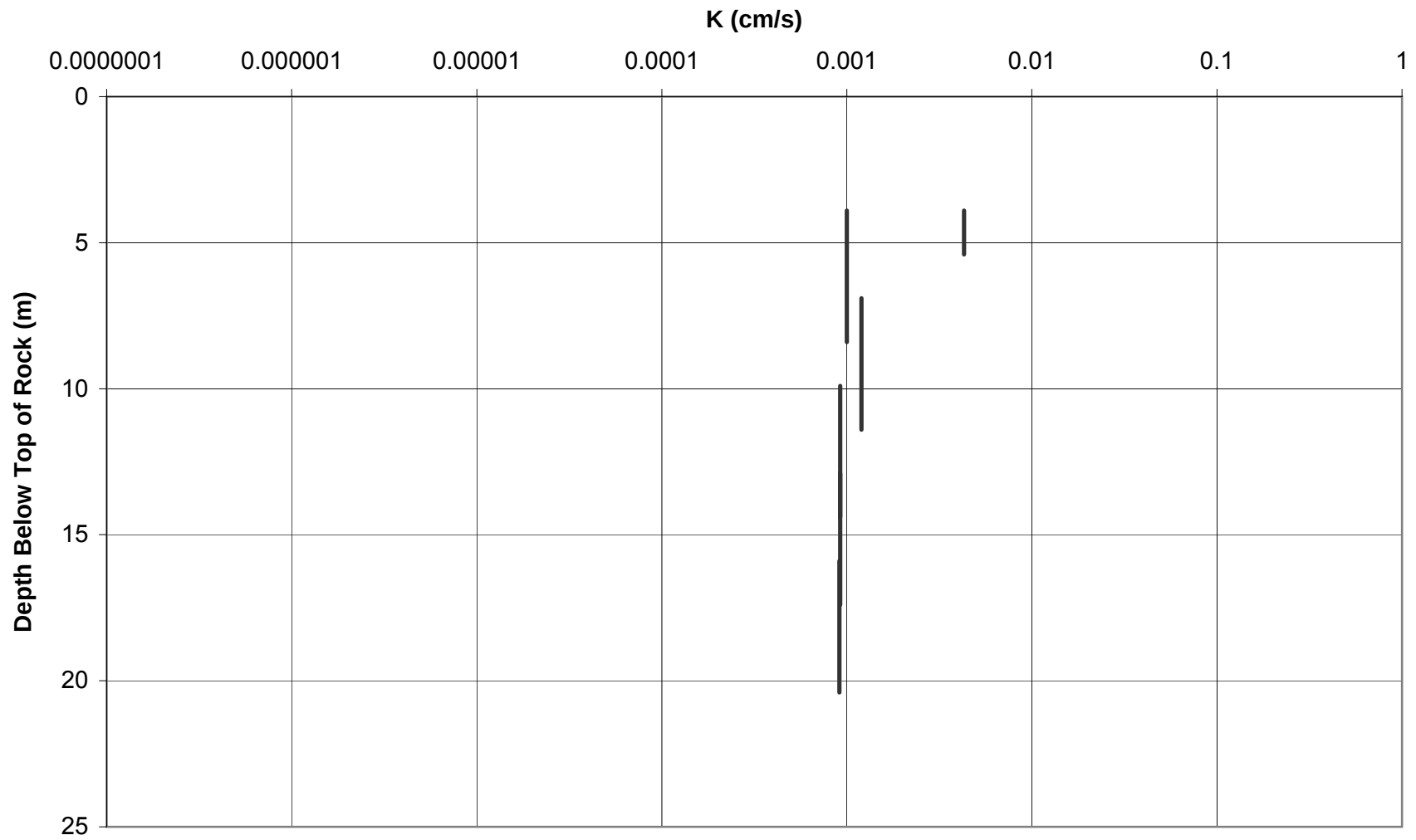
Date	Shift	Filename	Depth	Description
18/02/2004	NS 1900-0700	MPV-04-141c-4.77m-Box1-seds1	4.77-4.97m	sediments in overburden
18/02/2004	NS 1900-0700	MPV-04-141c-4.77m-Box1-seds2	4.77-4.97m	sediments in overburden
18/02/2004	NS 1900-0700	MPV-04-141c-4.97m-Box1-seds	4.97-5.11m	sediments in overburden
18/02/2004	NS 1900-0700	MPV-04-141c-3.5m-Box1-dry	3.5-9.5m	overburden with sediments and granite
19/02/2004	DS 0700-1900	MPV-04-141c-9.5m-Box2-dry	9.5 - 14.3m	GRN
19/02/2004	DS 0700-1900	MPV-04-141c-14.3m-Box3-dry	14.3 - 18.6m	GRN
19/02/2004	DS 0700-1900	MPV-04-141c-18.6m-Box4-dry	18.6 - 22.90m	GRN
19/02/2004	NS 1900-0700	MPV-04-141c-22.9.6m-Box5-dry	22.9-27.25m	GRN
19/02/2004	NS 1900-0700	MPV-04-141c-27.25m-Box6-dry	27.25-29.3m	GRN; EOH

Core Box Record

MPV-04-141c

Box	From	To	Comments
1	3.50	9.50	overburden, sediments and granite
2	9.50	14.30	granite
3	14.30	18.60	granite
4	18.60	22.90	granite
5	22.90	27.25	granite
6	27.25	29.30	granite, EOH

Permeability vs Depth
MPV_04_141C



Packer Test Data

Date	19-Feb-04
Staff	R. Bowden, B. Ramesede
Init. WL:	0
Ref. Pt.	drill shack floor
Dip	90

MPV-04-141c

Test 1 12.8 14.3

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments
1	0	12.00		4.5	no leaks
	1	15.90	3.90		
	2	19.60	3.70		
	3	23.50	3.90		
	4	27.30	3.80		
	5	31.00	3.70		
2	0			8.5	
	1	42.00	42.00		
	2	48.85	6.85		
	3	55.60	6.75		
	4	62.30	6.70		
	5	69.00	6.70		
	5	75.80	6.80		
3	0	86.00		11.5	
	1	93.90	7.90		
	2	101.70	7.80		
	3	109.70	8.00		
	4	117.50	7.80		
	5	125.40	7.90		
4	0	32.00		7.0	
	1	37.80	5.80		
	2	43.70	5.90		
	3	49.30	5.60		
	4	55.10	5.80		
	5	60.70	5.60		
	6	66.50	5.80		
5	0	72.00		4.5	
	1	76.00	4.00		
	2	79.90	3.90		
	3	83.90	4.00		
	4	87.80	3.90		
	5	91.80	4.00		

Summary 12.8 - 14.3m

Flow rate (gpm)	Pressure (psi)
3.80	4.5
6.70	8.5
7.80	11.5
5.80	7.0
4.00	4.5

Test 2 12.8 17.3

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments
1	0	1.50		4.5	no leaks
	1	3.50	3.50		
	2	5.00	1.50		
	3	6.50	1.50		
	4	8.30	1.80		
	5	9.65	1.35		
	6	11.20	1.55		
	7	13.10	1.90		
	8	14.70	1.60		
	9	16.25	1.55		
	10	17.95	1.70		
	11	19.35	1.40		
	12	21.00	1.65		
	13	22.70	1.70		
2	0	49.00		8.0	
	1	54.20	5.20		
	2	59.20	5.00		
	3	64.40	5.20		
	4	69.40	5.00		
	5	74.60	5.20		
3	0	76.00		11.8	
	1	83.10	7.10		
	2	89.60	6.50		
	3	96.60	7.00		
	4	103.65	7.05		
	5	110.20	6.55		
	1	117.20	7.00		
	2	124.20	7.00		
4	0	32.00		8.0	
	1	37.40	5.40		
	2	42.20	4.80		
	3	47.80	5.60		
	4	53.00	5.20		
	5	58.10	5.10		
	1	63.30	5.20		
5	0	78.00		5.0	
	1	81.20	3.20		
	2	84.90	3.70		
	3	88.50	3.60		
	4	91.70	3.20		
	5	95.40	3.70		
	6	98.90	3.50		
	7	102.30	3.40		

Summary 12.8 17.3m

Flow rate (gpm)	Pressure (psi)
1.70	4.5
5.10	8.0
7.00	11.8
5.20	8.0
3.50	5.0

Test 3 15.8 20.3

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments
1	0	2.55		4.4	no leaks
	1	5.20	2.65		
	2	7.65	2.45		
	3	10.10	2.45		
	4	12.70	2.60		
	5	15.30	2.60		
2	0	35.50		10.0	
	1	41.60	6.10		
	2	48.20	6.60		
	3	54.30	6.10		
	3	60.10	5.80		
	4	66.20	6.10		
	5	72.30	6.10		
3	0	85.00		14.0	
	1	92.70	7.70		
	2	100.40	7.70		
	3	108.10	7.70		
	4	115.90	7.80		
	5	123.60	7.70		
4	0	34.00		9.0	
	1	39.90	5.90		
	2	45.90	6.00		
	3	51.90	6.00		
	4	57.80	5.90		
	5	63.80	6.00		
5	0	69.00		4.5	
	1	73.10	4.10		
	2	77.00	3.90		
	3	80.90	3.90		
	4	85.00	4.10		
	5	89.00	4.00		

Summary 15.8 - 20.3

Flow rate (gpm)	Pressure (psi)
2.60	4.4
6.00	10.0
7.70	14.0
6.00	9.0
4.00	4.5

Test 4 18.8m 23.30m

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments
1	0	2035.70		6.0	no leaks
	1	2039.00	3.30		
	2	2042.00	3.00		
	3	2045.30	3.30		
	4	2048.70	3.40		
	5	2051.70	3.00		
	6	2055.00	3.30		
2	0	2066.00		12.0	no leaks
	1	2071.90	5.90		
	2	2077.70	5.80		
	3	2083.70	6.00		
	4	2089.40	5.70		
	5	2095.40	6.00		
	6	2101.20	5.80		
	7	2107.00	5.80		
3	0	2121.20		18.0	no leaks
	1	2129.00	7.80		
	2	2136.70	7.70		
	3	2144.60	7.90		
	4	2152.10	7.50		
	5	2159.9	7.80		
4	0	2167.00		12.0	no leaks
	1	2173.70	6.70		
	2	2180.00	6.30		
	3	2186.50	6.50		
	4	2193.00	6.50		
	5	2199.40	6.40		
	6	2205.90	6.50		
5	0	2210.50		6.0	no leaks
	1	2214.40	3.90		
	2	2218.10	3.70		
	3	2221.80	3.70		
	4	2225.50	3.70		
	5	2229.30	3.80		

Summary 18.8 - 23.3

Flow rate (gpm)	Pressure (psi)
3.20	6.0
5.80	12.0
7.70	18.0
6.50	12.0
3.70	6.0

Test 5 21.8 26.3

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments
1	0	2263.70		7.5	no leaks
	1	2268.40	4.70		
	2	2272.90	4.50		
	3	2277.50	4.60		
	4	2282.00	4.50		
	5	2286.70	4.70		
	6	2291.5	4.80		
	7	2296.30	4.80		
2	0	2309.00		15.0	no leaks
	1	2316.00	7.00		
	2	2323.00	7.00		
	3	2329.80	6.80		
	4	2336.70	6.90		
	5	2343.70	7.00		
3	0	2359.80		23.0	no leaks
	1	2368.50	8.70		
	2	2377.50	9.00		
	3	2386.50	9.00		
	4	2395.40	8.90		
	5	2404.4	9.00		
4	0	2411.70		15.0	no leaks
	1	2419.00	7.30		
	2	2426.10	7.10		
	3	2433.40	7.30		
	4	2440.50	7.10		
	5	2447.80	7.30		
	6	2455.00	7.20		
5	0	2460.50		7.5	no leaks
	1	2465.20	4.70		
	2	2469.80	4.60		
	3	2474.60	4.80		
	4	2479.20	4.60		
	5	2484.00	4.80		
	6	2488.80	4.80		
	7	2493.50	4.70		

Summary 21.8 - 26.3

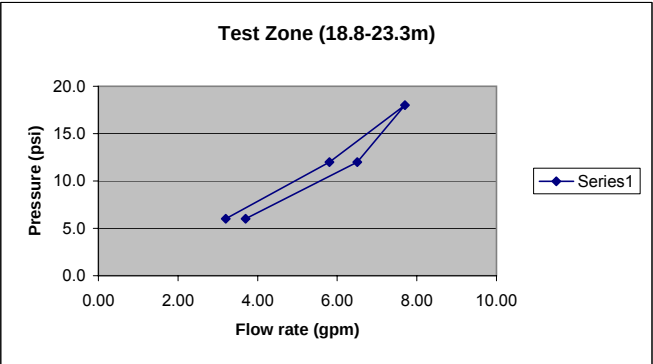
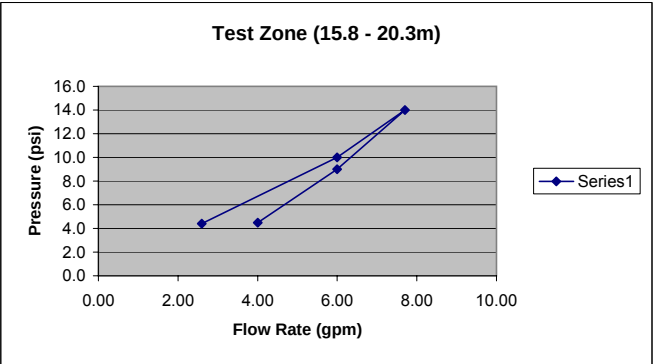
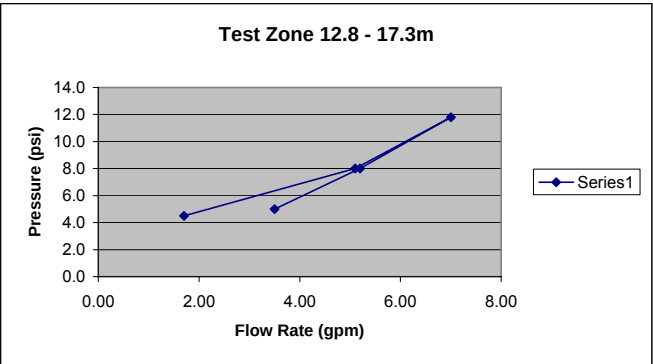
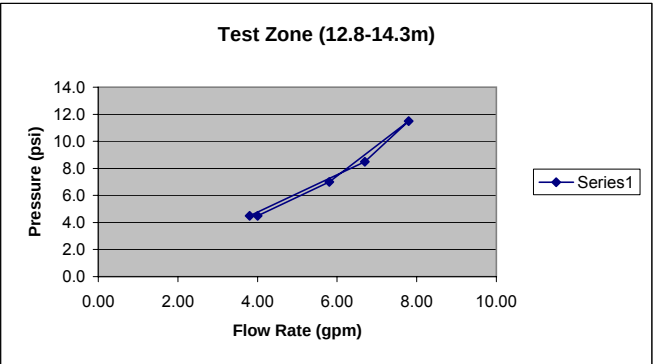
Flow rate (gpm)	Pressure (psi)
4.80	7.5
6.90	15.0
9.00	23.0
7.20	15.0
4.80	7.5

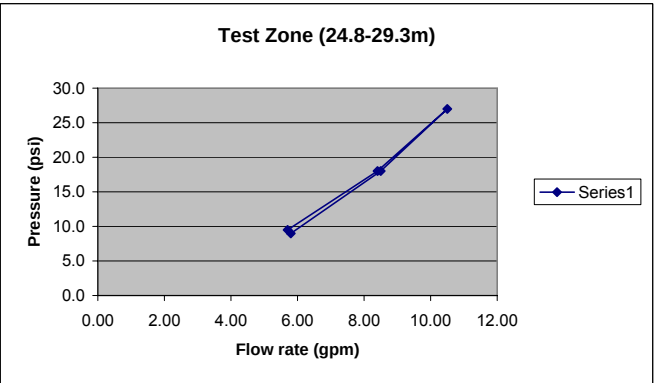
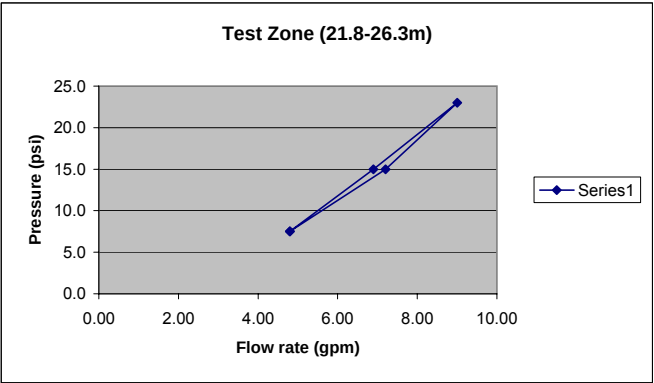
Test 5 24.8 29.3

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments
1	0	2520.50		9.5	no leaks
	1	2526.30	5.80		
	2	2532.20	5.90		
	3	2538.00	5.80		
	4	2543.90	5.90		
	5	2549.60	5.70		
	6	2555.30	5.70		
	7	2561.00	5.70		
2	0	2569.00		18.0	no leaks
	1	2577.50	8.50		
	2	2586.00	8.50		
	3	2594.30	8.30		
	4	2602.80	8.50		
	5	2611.20	8.40		
3	0	2629.80		27.0	no leaks
	1	2640.10	10.30		
	2	2650.70	10.60		
	3	2661.10	10.40		
	4	2671.50	10.40		
	5	2682	10.50		
4	0	2691.00		18.0	no leaks
	1	2699.40	8.40		
	2	2707.80	8.40		
	3	2716.30	8.50		
	4	2724.80	8.50		
	5	2733.40	8.60		
5	0	2739.70		9.0	no leaks
	1	2745.70	6.00		
	2	2751.30	5.60		
	3	2757.40	6.10		
	4	2763.40	6.00		
	5	2769.30	5.90		
	6	2775.10	5.80		
	7	2780.90	5.80		

Summary 24.8 - 29.3

Flow rate (gpm)	Pressure (psi)
5.70	9.5
8.40	18.0
10.50	27.0
8.50	18.0
5.80	9.0





Permeability Summary

MPV-04-141c

from	to		Step 1	Step 2	Step 3	Step 4	Step 5	Avg K
12.8	14.3	gauge (psi)	4.5	8.5	11.5	7	4.5	
		Qavg (igpm)	3.8	6.7	7.8	5.8	4	
		K cm/sec	4.5E-03	4.2E-03	3.6E-03	4.4E-03	4.7E-03	4.3E-03
12.8	17.3	gauge (psi)	4.5	8	11.8	8	5	
		Qavg (igpm)	1.7	5.1	7	5.2	3.5	
		K cm/sec	6.7E-04	1.1E-03	1.0E-03	1.1E-03	1.2E-03	1.0E-03
15.8	20.3	gauge (psi)	4.4	10	14	9	4.5	
		Qavg (igpm)	2.6	6	7.7	6	4	
		K cm/sec	1.0E-03	1.1E-03	9.7E-04	1.2E-03	1.6E-03	1.2E-03
18.8	23.3	gauge (psi)	6	12	18	12	6	
		Qavg (igpm)	3.2	5.8	7.7	6.5	3.7	
		K cm/sec	9.4E-04	8.5E-04	7.6E-04	9.6E-04	1.1E-03	9.2E-04
21.8	26.3	gauge (psi)	7.5	15	23	15	7.5	
		Qavg (igpm)	4.8	6.9	9	7.2	4.8	
		K cm/sec	1.1E-03	8.1E-04	6.9E-04	8.5E-04	1.1E-03	9.2E-04
24.8	29.3	gauge (psi)	9.5	18	27	18	9	
		Qavg (igpm)	5.7	8.4	10.5	8.5	5.8	
		K cm/sec	1.1E-03	8.2E-04	6.9E-04	8.3E-04	1.1E-03	9.1E-04

Equations: $H_f = 8.65 \times 10^{-15} (Q^2 * L_p / r_p^5)$
 $H_{nit} = (Dw' + H_g - H_f) + P_g / 1.42$
 $K = (Q * \ln(R/r_b)) / (2 * \pi * H_{nit} * L)$

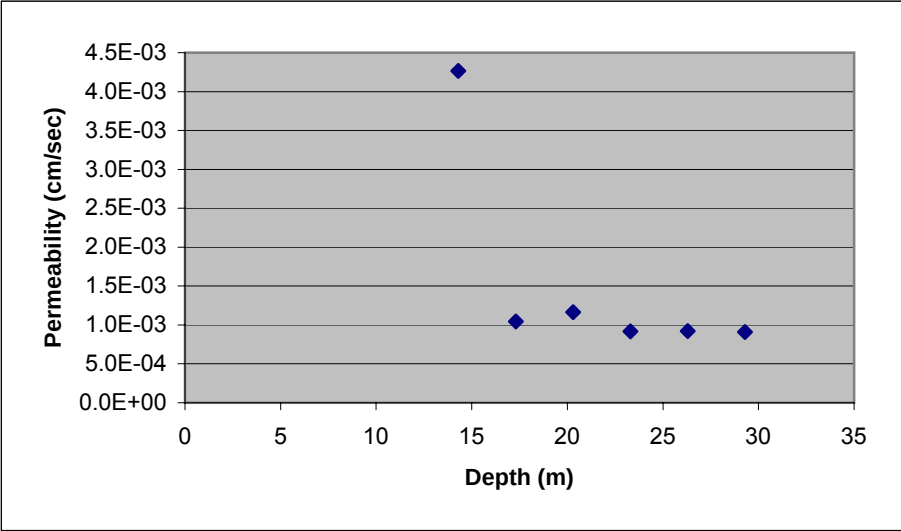
Overall 1.5E-03

assume

- vertical drillhole
- water at ground surface
- height of gauge is at rig flr
- negligible friction losses

Dw	Measured depth of static water (1)	0	m
Dp	Measured depth to packer		m
Dt	Depth to midpoint of test		m
Inc	Inclination from horizontal		m
Dw'	Vertical depth to static water level	90	°
Dp'	Vertical depth to packer		m
Dt'	Vertical depth to midpoint of test		m
Hg	Gauge height	0	m
Lp	Length of discharge pipe		m
rp	Radius of discharge pipe (1" = 0.0127m)		m
R	Radius of influence (10m is standard)	10	m
rb	Drillhole radius (HQ=0.048m, NQ=0.038m)	0.038	m
L	Length of test section		m
Hf		0	m

cm/sec



Reflex Readings**MPV-04-141C**

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp °C
20-Feb-04	29.3	131.8	89.2	44.8	5907	8.5

FIELD GEOLOGICAL LOG

HOLE ID

MPV-04-141c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	3.50	Ice/Water	n/a	1.7m ice, to 3.5m water	RB/BR
3.50	8.90	Overburden	n/a	Overburden; 3 countryrock boulders (29, 21, 14cm long), granite (reddish and mafic); 33cm of soil sample recovered (4.77-5.1m): grey-brown, clay and silt some sand, trace gravel; loose-very loose density, wet (was frozen solid when receiving in shack), subangular-angular gravel consisting of pieces of countryrock eg granite, various mineralogies (quartz, feldspar, mica, amphibole, garnet?), no stratification or organics visible	RB/BR
8.90	29.30	Granite	n/a	Granite reddish-grey-white, biotite rich, compact, slightly weathered as the rock is not as fresh and compact as the other granite (pink one); hematite inclusions?	RB/BR
EOH					

DRILL HOLE ID: [illegible]

UCS SAMPLES

HOLE ID: MPV-04-141C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-141C	6	27.55	GRANITE	04-UCS-141-001

MPV_04_141C



Diary

MPV-04-143c

NS 19/02/2004

drillhole location re-established; measured from MPV-04-133c (D2-A-7T)

DS 20/02/2004

moved from MPV-04-141c, Dyke 4

1500' of sludge lines laid to disposal site N of MPV-04-126c

NS 20/02/2004

1900hrs prepare ice-cutter and drill
2145hrs start first run to closest boulder, as rods shake, casing is set into first boulder
0015hrs start coring
0315hrs return lost (maybe sand, gravel underneath, drilled faster), pull tube
0330hrs pull tube 1 in order to put empty plastic tube in
0340hrs tube 1 pulled
0345hrs tube 2 removed as end of run, soft material, for new run one of the modified finger traps will be used (as soft material); no recovery for tube 2
0415hrs rod added and drilled to 5.2m,
0450hrs no recovery; changed seal ring on inner tube

0530hrs add rod; hit hard material again
0630hrs 5.2-5.5m, no recovery;

DS 21/02/2004

0700 rig floor at 0.0m
top of ice at 0.6m
bottom of ice at 2.3m
lake bed at 2.8m
casing set on lake bottom at 2.8m (3m of pipe and 0.2m stickup above rig floor)
730 hard drilling for .5m then soft
0810 at 6.8m (from rig floor); lifter case crimped at lower end; core barrel broken at approx 1m from bit; speculate that barrel was damaged by deflecting off of boulders
1010 attempted to recover remaining barrel; failed
1020 changed plastic wear ring in chuck
1050 reamed HW casing to approx 6.8m; 1.3m stick up too much; no HW-NW adaptor on site

1245 pulled HW and reamed NW to 7.0m (6m+2ft + 2ft = 7.2m casing minus 0.2m stickup); that is 0.2m below lost S core barrel tip
drilled NQ to 9.7m (4m+3m+3m rods, minus 0.3m stickup)
1445 still in sand and boulders (inferred from drill response); pulled rods and reamed casing deeper to 8.7m (3+3+3 - 0.3m stickup).
1700 rods and casing binding; casing self-separated just below rig floor; rods significantly out of alignment because of drillhole crookedness
pulled rods and casing in tandem because they were bound together.
1830 casing at 8.7m again (3+3+3 - 0.3 stickup)

NS 21/02/2004

2000hrs bolts on hydraulique cylinder behind the head lifter are loose
2030hrs hydraulique cylinder is broken
2300hrs start drilling, cylinder was welded

0015hrs	clean hole, rod finished (to 11.7m), start to add casing as material above caved in, stabilize hole in bedrock
0045hrs	part at hydraulic cylinder broke again
0200hrs	part welded and additional casing is put down
0250hrs	finished casing
0330hrs	finished run to 14.4m, getting packer ready
0450hrs	packer installed (had to be brought from container, warmed up; the same for nitrogen gage)
0455hrs	start packer test (12.9-14.4m)
0530hrs	packer test finished
0545hrs	rod added

DS 22/02/2004

0930	packer test (12.9 - 17.4m) completed
1100	re-welded piston on drill head
1410	packer test (15.9 - 20.4m) completed pulled rods at 22.2 because of high pump pressure; removed rock in bit
1710	packer test (18.9 - 23.4m) completed
1800	at 26.4m
1840	at 29.4m

NS 22/02/2004

	pull rods, first attempt to put packer down did not work as water flow up hole; had to be put deeper (too much tape around ball to let packer down)
2050hrs	start packer test
2125hrs	packer test ended
2150hrs	packer pulled; prepare for reflex
2300hrs	reflex completed cement hole, spot new hole, get ready to move

**FIELD DRILL
PERFORMANCE LOG**

PROJECT	Gahcho Kue Geotech
PROJECT NO	2CD002.11
NORTHING	7035 409.9
EASTING	588 840.2
SURFACE ELEVATION	404
AZIMUTH	0
DIP	90

HOLE NO:	MPV-04-143c
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	20-Feb-04 7:00am
FINISH DATE AND TIME	23-Feb-04 0:00am
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

Period	Logged by	Date	Time	Period Totals				Standby Reason	Cumulative			
				Total drill time [hr]	Standby time [hr]	Depth [m]	Metreage drilled [m]		Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
DS 0700-1900	R Bowden	20/02/2004		12	12		0	moved	0	0	0	0.00
NS 1900-0700	B Rameseder	20/02/2004		12	5.8	5.50	5.5	made ice-cutter, 3m casing (SQ), drilling SQ to 5.5m, not much recovery	12	5.8	6.2	0.89
DS 0700-1900	R Bowden	21/02/2004		12	6	9.70	4.2	broke S core barrel; changed to HW casing, changed to NW casing	24	11.8	12.2	0.80
NS 1900-0700	B Rameseder	21/02/2004		12	8	17.40	7.7	hydraulic cylinder had to be welded twice, added casing, 1 packer test	36	19.8	16.2	1.07
DS 0700-1900	R Bowden	22/02/2004		12	5	29.40	12	welded hydraulic cylinder again; 3 packer tests	48	24.8	23.2	1.27
NS 1900-0700	B Rameseder	22/02/2004		12	12	29.40	0	1 packer test, reflex, cement hole, pull down, move	60	36.8	23.2	1.27

OVERALL HOLE DRILL RATE (m/hr) 0.41

OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr) 1.27

GENERAL GEOTECH LOG	DRILLHOLE ID: MPV-04-143c

DRILLHOLE ID: MPV-04-143c

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB. IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

[illegible]

DETAILED GEOTECHNICAL LOG

 DRILLHOLE ID: **MPV-04-143c**

NB: 3 sources of open joints and fractures found in drillcore
 Artificial breaks induced by drilling process
 Artificial breaks induced by core handling
 Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
 Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating did indicate artificial
 Note any weak foliation, bedding, brecciation in comments

FROM (m)	TO (m)	ROCK TYPE	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of Sets	Type	Totals	JOINT CONDITIONS				COMMENT
			STRONG R	WEAK R	% WEAK	ALL	OPEN REDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH				ANGLE	ROUGH	ALT	FILL	
9.2	9.7	MD	R5		0	5	0	2	0	0	0	0	1	J1	2	55	5	0	9	MD: Mafic dyke
9.8	11.4	MD	R5		0	12	0	6	3	1	1	0	3	J1	4	65	7	0	3	Cemented joints broken open with chlorite filling: angle 25, rough 7, alt 0, fill 4
														J2	1	80	4	0	9	
														J3	1	55	2	0	3	
11.4	14.4	MD	R5		0	28	0	20	0	0	1	1	3	J1	5	65	7	0	9	Joint set 4: 5 joints, angle 20, rough 5, alt 0, fill 5; Joint set 5: 1 joint, angle 10, rough 3, alt 0, fill 3; joint set 6: 1 joint, angle 15, rough 1, alt 0, fill 9; broken zone at 13.80-13.90m (between joints but probably due to machine breaks)
														J2	3	80	4	0	3	
														J3	5	80	3	0	3	
14.4	17.4	MD	R5		0	19	0	5	0	0	0	0	3	J1	1	40	5	0	8	J1 has 2mm weathered silty/clay gouge; J2 has thin partial thin silt coating
														J2	1	50	7	0	9	
														J3	3	70	4	0	9	
17.4	20.4	MD	R5		0	15	0	7	2	1	0	0	3	J1	2	25	4	0	8	
														J2	2		4	0	8	
														J3	2	65	4	0	6	
20.4	22.2	MD	R5		0	15	0	1	0	0	0	0	1	J1	1	20	1	0	9	
22.2	23.4	MD	R5		0	5	0	4	0	0	1	1	2	J1	1	48	5	0	9	J2 has joints at 20, 30 and 40 degrees + similar to microfractures which are random; 20 degree joint has hematite staining
														J2	3		4	0	9	
23.4	26.4	MD	R5		0	10	0	4	2	2	0	0	2	J1	3	65	5	0	9	J1 has planar and rough joint conditions
														J2	1	30	4	0	9	
26.4	29.4	MD	R5		0	27	0	18	3	1	1	1	3	J1	7	35	4	0	3	Joint set 4: 3 joints, angle 15, rough 5, alt 0, fill 6, 27.8-28.2m: broken at joints due to drilling
														J2	2	25	5	0	3	
														J3	6	85	4	0	9	

Photo Record

MPV-04-143c

Date	Shift	Filename	Depth	Description
21/02/2004	NS 1900-0700	MPV-04-140c-0m-Box1-dry	6.7-11.78	overburden, mafic dyke
22/02/2004	DS 0700-1900	MPV-04-143c-11.78m-Box2-dry	11.78 - 16.10	mafic dyke
22/02/2004	DS 0700-1900	MPV-04-143c-16.1m-Box3-dry	16.1 - 20.2	mafic dyke
22/02/2004	DS 0700-1900	MPV-04-143c-20.2m-Box4-dry	20.2 - 24.3	mafic dyke
22/02/2004	NS 1900-0700	MPV-04-143c-24.3m-Box5-dry	24.3-28.45	mafic dyke
22/02/2004	NS 1900-0700	MPV-04-143c-28.45m-Box6-dry	28.45-29.4	mafic dyke, EOH

Core Box Record

MPV-04-143c

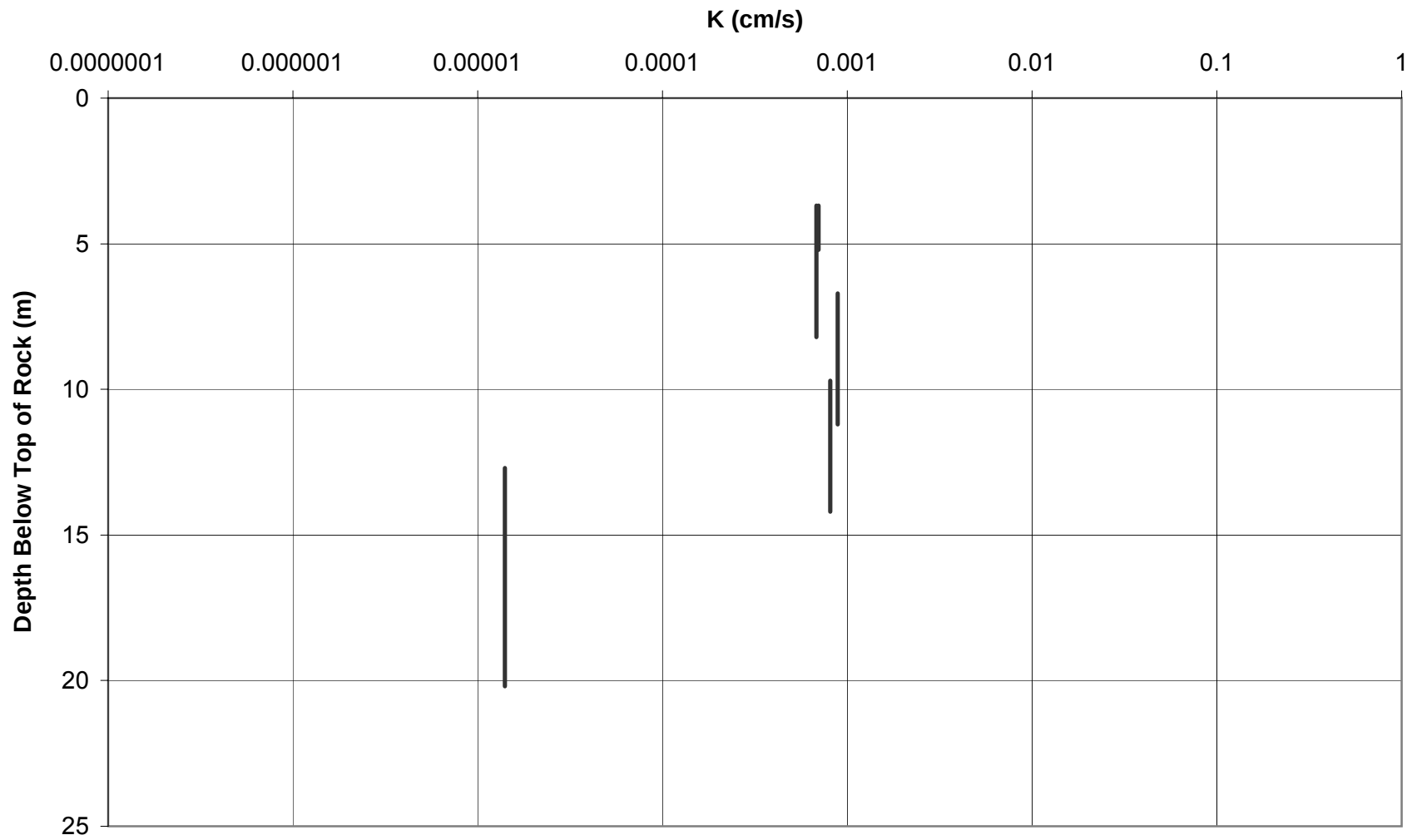
Box	From	To	Comments
Tube 1	2.80	3.70	big boulder granite/gneiss at bottom (min 25cm long)
Box 1	6.70	11.78	overburden, mafic dyke
Box 2	11.78	16.10	mafic dyke
Box 3	16.10	20.20	mafic dyke
Box 4	20.20	24.30	mafic dyke
Box 5	24.30	28.45	mafic dyke
Box 6	28.45	29.40	mafic dyke; EOH

FIELD GEOLOGICAL LOG

HOLE ID: MPV-04-143C

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	2.80	Ice/Water	n/a	2.3m ice to 2.8m water	RB/BR
2.80	9.20	Overburden	n/a	Overburden (partially no recovery with Geobor S), boulders in the tube	RB/BR
9.20	29.40	Mafic Dyke	n/a	Mafic dyke; chlorte rich, compact, dark green black, medium to fine grained; 9.70-9.80m; caved material (cobbles and boulders, partially redrilled material; first 78cm of the run; put depth according to the end of the run and according to the solid core at the end.	RB/BR
E.O.H.					

Permeability vs Depth
MPV_04_143C



Packer Test Data

Date	22-Feb-04
Staff	R. Bowden, B. Ramesede
Init. WL:	0
Ref. Pt.	drill shack floor
Dip	90

MPV-04-143c

Test 1 12.9 14.4

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments
1	0	2794.40		3.0	no leaks
	1	2794.40	0.00		
	2	2794.40	0.00		
	3	2794.40	0.00		
	4	2794.40	0.00		
2	0	2794.50		5.5	no leaks
	1	2795.80	1.30		
	2	2797.10	1.30		
	3	2798.40	1.30		
	4	2799.70	1.30		
3	0	2801.40		7.0	no leaks
	1	2803.30	1.90		
	2	2804.90	1.60		
	3	2806.50	1.60		
	4	2808.10	1.60		
	5	2809.8	1.70		
4	0	2810.50		5.0	no leaks
	1	2811.45	0.95		
	2	2812.20	0.75		
	3	2813.15	0.95		
	4	2813.95	0.80		
	5	2814.75	0.80		
	6	2815.50	0.75		
5	0	2816.00		3.0	no leaks
	1	2816.10	0.10		

Summary 1

Flow rate
(gpm)
0.00
1.30
1.60
0.80
0.10

	2	2816.20	0.10		
	3	2816.25	0.05		
	4	2816.35	0.10		
	5	2816.45	0.10		
	6	2816.50	0.05		
	7	2816.60	0.10		
	8	2816.70	0.10		

Test 2 12.9 17.4

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments
1	0	22.50		5.2	
	1	23.40	23.40		
	2	24.05	0.65		
	3	24.70	0.65		
	4	25.20	0.50		
	5	25.75	0.55		
	6	26.25	0.50		
2	0	33.00		8.7	
	1	37.60	4.60		
	2	42.20	4.60		
	3	46.90	4.70		
	4	51.50	4.60		
3	0	72.00		11.0	
	1	78.00	6.00		
	2	84.10	6.10		
	3	90.00	5.90		
	4	96.00	6.00		
4	0	0.00		8.2	
	1	4.50	4.50		
	2	8.90	4.40		
	3	13.40	4.50		
	4	17.80	4.40		
5	0	20.00		5.7	
	1	21.25	1.25		
	2	22.40	1.15		
	3	23.65	1.25		

Summary

Flow rate
(gpm)

0.5

4.7

6.0

4.5

1.1

	4	24.80	1.15		
	5	25.80	1.00		
	6	26.90	1.10		
	7	28.00	1.10		

Test 3

15.9

20.4

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments	
1	0	36.30		5.7		Summary
	1	38.40	2.10			Flow rate
	2	40.50	2.10			(gpm)
	3	42.70	2.20			2.10
	4	44.80	2.10	2.1	avg last 3 readings	4.00

2	0	50.00		8.2	6.00
	1	54.20	4.20		4.50
	2	58.20	4.00		2.80
	3	62.30	4.10		
	3	66.30	4.00		
	4	70.30	4.00	4.0	avg last 3 readings
3	0	78.00		12.5	
	1	84.00	6.00		
	2	89.90	5.90		
	3	95.90	6.00		
	4	101.90	6.00	6.0	avg last 3 readings
4	0	7.00		8.2	
	1	11.40	4.40		
	2	16.00	4.60		
	3	20.40	4.40		
	4	24.90	4.50		
	5	29.40	4.50	4.5	avg last 3 readings
5	0	32.00		4.4	
	1	34.70	2.70		
	2	37.40	2.70		
	3	40.10	2.70		
	4	42.90	2.80		
	5	45.65	2.75	2.8	avg last 3 readings

Test 4

18.9

23.4

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments	
1	0	65.00		7.0		Summary
	1	67.90	2.90			Flow rate (gpm)
	2	70.90	3.00			
	3	73.95	3.05			3.00
	4	76.85	2.90			5.30
	5	79.80	2.95	3.0	avg last 3 readings	7.40
2	0	85.00		12.0		6.00
	1	90.30	5.30			4.00
	2	95.70	5.40			

	3	101.00	5.30		
	4	106.30	5.30	5.3	avg last 3 readings
3	0	15.00		18.2	
	1	22.30	7.30		
	2	29.70	7.40		
	3	37.00	7.30		
	4	44.40	7.40	7.4	avg last 3 readings
4	0	52.00		13.0	
	1	58.00	6.00		
	2	64.20	6.20		
	3	70.10	5.90		
	4	76.20	6.10		
	5	82.20	6.00	6.0	avg last 3 readings
5	0	86.50		7.3	
	1	90.50	4.00		
	2	94.50	4.00		
	3	98.50	4.00		
	4	102.50	4.00	4.0	avg last 3 readings

Test 5 21.9 29.4

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments
1	0	3386.30		8.0	
	1	3386.35	0.05		
	2	3386.43	0.08		
	3	3386.50	0.07		
	4	3386.60	0.10		
	5	3386.70	0.10		
2	0	3387.80		16.5	
	1	3388.20	0.40		
	2	3388.45	0.25		
	3	3388.70	0.25		
	4	3388.90	0.20		
	5	3389.10	0.20		
3	0	3390.00		25.0	
	1	3390.45	0.45		

Summary

Flow rate
(gpm)

0.10

0.20

0.30

0.25

0.12

	2	3390.70	0.25		
	3	3391.03	0.33		
	4	3391.33	0.30		
	5	3391.625	0.30		
4	0	3391.70		16.5	
	1	3392.00	0.30		
	2	3392.25	0.25		
	3	3392.50	0.25		
	4	3392.75	0.25		
	5	3393.00	0.25		
5	0	3393.15		8.0	
	1	3393.20	0.05		
	2	3393.30	0.10		
	3	3393.45	0.15		
	4	3393.55	0.10		
	5	3393.65	0.10		
	6	3393.80	0.15		avg last 3 readings

2.9 - 14.4m

Pressure
(psi)

3.0
5.5
7.0
5.0
3.0

12.9

17.4

Pressure
(psi)

5.2
8.7
11.0
8.2
5.7

15.9 20.4

Pressure
(psi)

5.7
8.2

12.5
8.2
4.4

18.9	23.4

Pressure
(psi)

7.0
12.0
18.2
13.0
7.3

21.9 29.4

Pressure
(psi)

8.0
16.5
25.0
16.5
8.0

Permeability Summary

MPV-04-143c

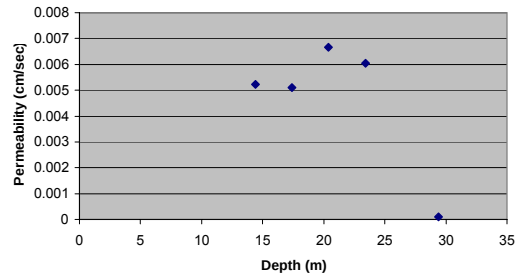
from	to		Step 1	Step 2	Step 3	Step 4	Step 5	Avg K
12.9	14.4	gauge (psi)	3	5.5	7	5	3	
		Qavg (igpm)	0	1.3	1.6	0.8	0.1	
		K cm/sec	0.0E+00	1.3E-03	1.2E-03	8.5E-04	1.8E-04	7.0E-04
12.9	17.4	gauge (psi)	5.2	8.7	11	8.2	5.7	
		Qavg (igpm)	0.5	4.7	6	4.5	1.1	
		K cm/sec	1.7E-04	9.5E-04	9.6E-04	9.7E-04	3.4E-04	6.8E-04
15.9	20.4	gauge (psi)	5.7	8.2	12.5	8.2	4.4	
		Qavg (igpm)	2.1	4	6	4.5	2.8	
		K cm/sec	6.5E-04	8.6E-04	8.5E-04	9.7E-04	1.1E-03	8.9E-04
18.9	23.4	gauge (psi)	7	12	18.2	13	7.3	
		Qavg (igpm)	3	5.3	7.4	6	4	
		K cm/sec	7.6E-04	7.8E-04	7.2E-04	8.1E-04	9.7E-04	8.1E-04
21.9	29.4	gauge (psi)	8	16.5	25	16.5	8	
		Qavg (igpm)	0.1	0.2	0.3	0.25	0.12	
		K cm/sec	1.3E-05	1.3E-05	1.3E-05	1.6E-05	1.6E-05	1.4E-05
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	

Equations: $Hf = 8.65 \times 10^{-15} (Q^2 * Lp / rp^5)$
 $H_{nit} = (Dw' + Hg - Hf) + Pg / 1.42$
 $K = (Q * Ln(R/r_b)) / (2 * \pi * H_{nit} * L)$

Overall 6.2E-04

assume
- vertical drillhole
- water at ground surface
- height of gauge is at rig flr
- negligible friction losses

Dw	Measured depth of static water (1)	0	m
Dp	Measured depth to packer		m
Dt	Depth to midpoint of test		m
Inc	Inclination from horizontal	90	m
Dw'	Vertical depth to static water level		°
Dp'	Vertical depth to packer		m
Dt'	Vertical depth to midpoint of test		m
Hg	Gauge height	0	m
Lp	Length of discharge pipe		m
rp	Radius of discharge pipe (1" = 0.0127m)		m
R	Radius of influence (10m is standard)	10	m
rb	Drillhole radius (HQ=0.048m, NQ=0.038m)	0.038	m
L	Length of test section		m
Hf			0 m



Reflex Readings**MPV-04-143C**

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
22-Feb-04	29.4	344	86.7	268.1	5875	6.6

Thermistor Readings

MPV-04-143c

Thermistor String ID

?????

Thermis Node	Reading (kOhms)	Comments
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		

DRILL HOLE ID: [illegible]

UCS SAMPLES

HOLE ID: MPV-04-143C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-143C	5	24.58	Granite	04-UCS-143-001

MPV_04_143C



Diary

MPV-04-146c

NS 22/02/2004

drillhole location established; 2m from original picket to avoid original set up; ice thickness tested with ice auger (more than 42 inches)

DS 23/02/2004

NQ Drilling
1400 completed move; removed/ unburied excess hoses;
rig floor at 0.0m (reference)
top of ice at 0.6m
bottom of ice at >1.7m
lake bottom at 3.3m
1420 casing drilled butter to 4.2m; barely a crunch
drilled about 0.6m beyond casing, during which casing sank under own weight to below rig floor; pulled rods
1630 casing encountered rock at 5.7m (bedrock)
1700 advanced casing to 6.1m, adjusted casing lengths to install cuttings catcher below rig floor
1900 at 8.7m

NS 23/02/2004

1920hrs problems with oil pump/cooler on motor? No oil pressure; drain hoses to avoid freezing; motor of drill had to be started with battery
2040hrs put hoses back, still not working: one oil line to cooler was leaking therefore not enough oil (absorbed in mats, no spill); snow inside of enviro tank, so line might be frozen; try to change tank; fuel filter with primer to be changed
0045hrs start drilling
0145hrs at 11.7m
0300hrs packer test 1 completed, packer out of hole
0400hrs at 14.7m
0515hrs packer test 2 completed, packer out of hole
0615hrs add oil to motor, get ready for packer test 3
0630hrs packer test 3 started
0705hrs packer finished

DS 24/02/2004

0830 at 20.7m
0930 packer test 4 complete
1030 at 23.7m
1120 END OF HOLE AT 26.2m; bit worn out
1220 final packer complete
reflex
grouted
staked

Checklist (delete after file is complete, before printing)

summary updated?
point load test samples selected?

FIELD DRILL PERFORMANCE LOG

PROJECT	Gahcho Kue Geotech
PROJECT NO	2CD002.11
NORTHING	7035468.6
EASTING	588865
SURFACE ELEVATION	404
AZIMUTH	0
DIP	90

HOLE NO:	MPV-04-146c
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	02/23/2004 1:00
FINISH DATE AND TIME	02/24/2004 13:00
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

[illegible]

OVERALL HOLE DRILL RATE (m/hr)	0.73
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.87

GENERAL GEOTECH LOG

DRILLHOLE ID:

MPV-04-146c

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

[illegible]

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID:	MPV-04-146c

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

[illegible]

Photo Record

MPV-04-146c

[illegible]

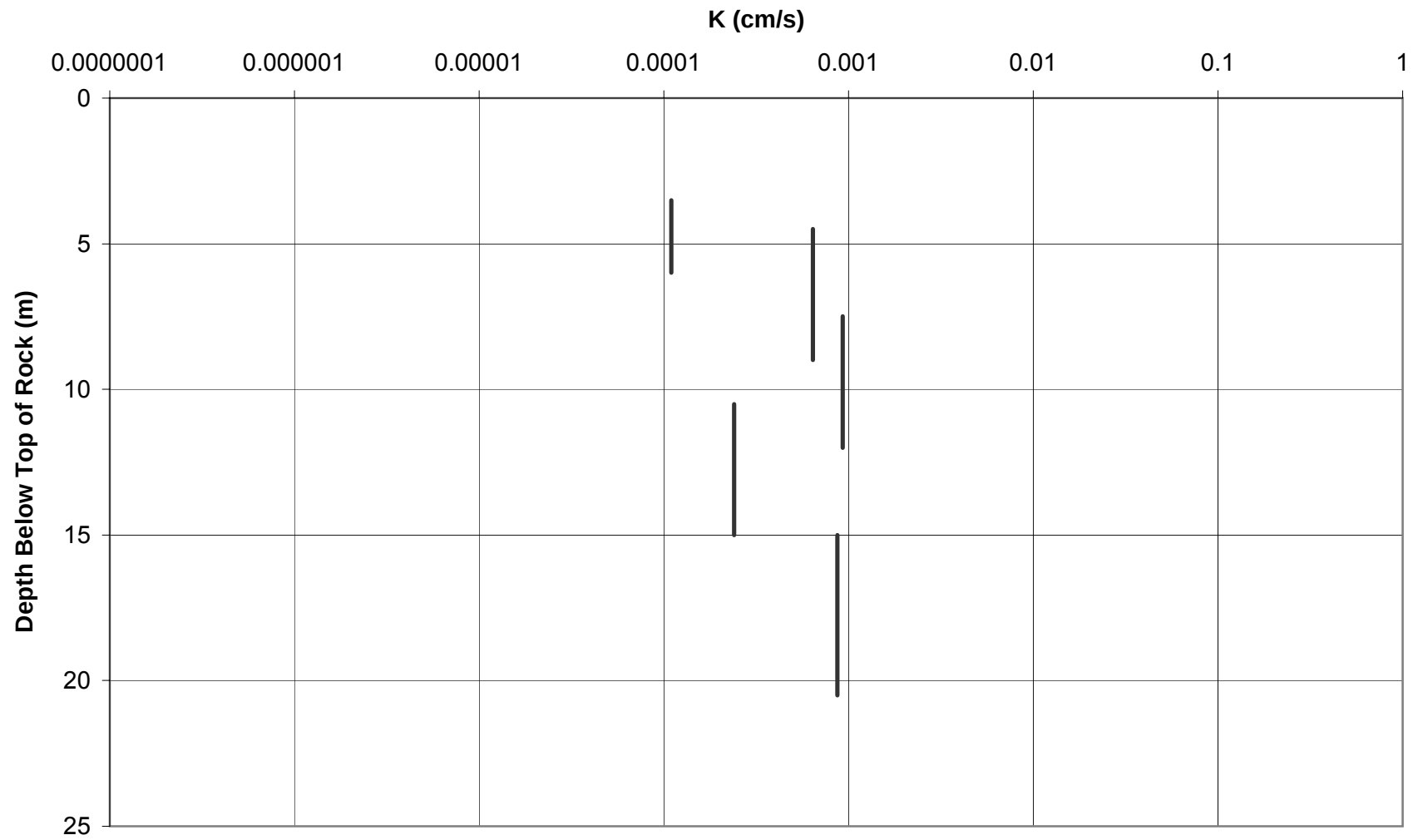
Core Box Record

MPV-04-146c

Box	From	To	Comments
1	5.70	10.10	biotite rich granite, pegmatitic
2	10.10	14.32	biotite rich granite, pegmatitic
3	14.32	18.60	biotite rich granite, pegmatitic
4	18.60	22.90	biotite rich granite, pegmatitic
5	22.90	26.20	biotite rich granite, pegmatitic
	26.20		END OF HOLE

Permeability vs Depth

MPV_04_146C



Packer Test Data

Date	23-02-2004
Staff	B. Rameseder, R. Bowder
Init. WL:	
Ref. Pt.	rig floor
Dip	90

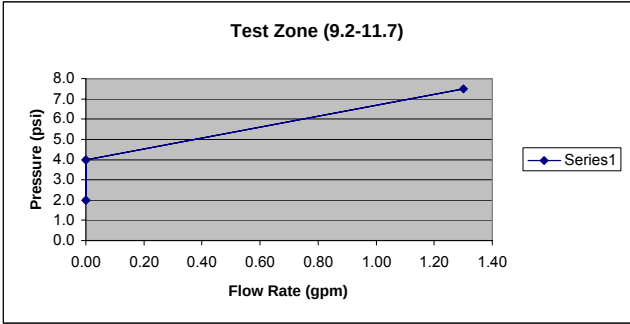
MPV-04-146c

Test 1 9.2 11.7

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	3404.50		2.0	no leaks
	1	3404.50	0.00		
	2	3404.50	0.00		
	3	3404.50	0.00		
	4	3404.50	0.00		
2	0	3404.20		4.0	no leaks
	1	3404.50	0.30		knocked on gage
	2	3404.50	0.00		
	3	3404.50	0.00		
	4	3404.50	0.00		
3	0	3405.80		7.5	no leaks
	1	3407.10	1.30		
	2	3408.30	1.20		
	3	3409.60	1.30		
	4	3410.80	1.20		
	5	3412.10	1.30		
	6	3413.50	1.40		
4	0	3415.00		4.0	no leaks
	1	3415.00	0.00		
	2	3415.00	0.00		
	3	3415.00	0.00		
	4	3415.00	0.00		
5	0	3415.00		2.0	no leaks
	1	3415.00	0.00		
	2	3415.00	0.00		
	3	3415.00	0.00		
	4	3415.00	0.00		

Summary

Flow rate (gpm)
0.00
0.00
1.30
0.00
0.00



Test 2 10.2 14.7

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments

Summary

Permeability Summary

MPV-04-146C

from	to		Step 1	Step 2	Step 3	Step 4	Step 5	Avg K
9.2	11.7	gauge (psi)	2	4	7.5	4	2	
		Qavg (igpm)	0	0	1.3	0	0	
		K cm/sec	0.0E+00	0.0E+00	5.5E-04	0.0E+00	0.0E+00	1.1E-04
10.2	14.7	gauge (psi)	3	7.5	10	7	3.5	
		Qavg (igpm)	0	3.6	4.6	3.4	1.4	
		K cm/sec	0.0E+00	8.5E-04	8.1E-04	8.6E-04	7.1E-04	6.4E-04
13.2	17.7	gauge (psi)	5.5	10.5	15	10.5	5	
		Qavg (igpm)	3	5.1	6.6	5.5	3.2	
		K cm/sec	9.6E-04	8.6E-04	7.8E-04	9.2E-04	1.1E-03	9.3E-04
16.2	20.7	gauge (psi)	9.5	16	20.5	13.5	8	
		Qavg (igpm)	1.3	2.1	2.6	1.8	1.1	
		K cm/sec	2.4E-04	2.3E-04	2.2E-04	2.4E-04	2.4E-04	2.4E-04
20.7	26.2	gauge (psi)	10.5	17	21.5	15	8.5	
		Qavg (igpm)	6.7	9.1	10.1	8.6	6.7	
		K cm/sec	9.2E-04	7.7E-04	6.8E-04	8.3E-04	1.1E-03	8.7E-04
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	

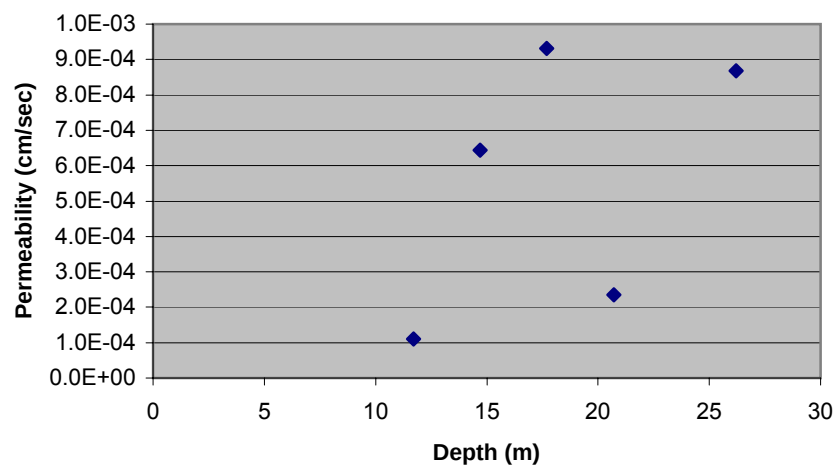
Equations: $H_f = 8.65 \times 10^{-15} (Q^2 * L_p / r_p^5)$
 $H_{nit} = (Dw' + H_g - H_f) + P_g / 1.42$
 $K = (Q * \ln(R/r_b)) / (2 * \pi * H_{nit} * L)$

Overall 5.6E-04 cm/sec

assume

- vertical drillhole
- water at ground surface
- height of gauge is at rig flr
- negligible friction losses

Dw	Measured depth of static water (1)	0	m
Dp	Measured depth to packer		m
Dt	Depth to midpoint of test		m
Inc	Inclination from horizontal	90	m
Dw'	Vertical depth to static water level		°
Dp'	Vertical depth to packer		m
Dt'	Vertical depth to midpoint of test		m
Hg	Gauge height	0	m
Lp	Length of discharge pipe		m
rp	Radius of discharge pipe (1" = 0.0127m)		m
R	Radius of influence (10m is standard)	10	m
rb	Drillhole radius (HQ=0.048m, NQ=0.038m)	0.038	m
L	Length of test section		m
Hf		0	m



Reflex Readings**MPV-04-146C**

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
24-Feb-04	26.2	159.6	88.7	31.3	5899	11.2

FIELD GEOLOGICAL LOG

HOLE ID

MPV-04-146c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	3.30	Ice/Water	n/a	>1.7m ice, to 3.3m water	RB/BR
3.30	5.70	Overburden	n/a	Overburden	RB/BR
5.70	26.20	Granite	n/a	Biotite rich granite with pegmatitic sections	RB/BR
EOH					

POINT LOAD TEST - INPUT

DRILL HOLE ID: MPV-04-146C

[illegible]

UCS SAMPLES

HOLE ID: MPV-04-146C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-146C	5	24.22-24.53	Granite	04-UCS-146-001

MPV_04_146C



MPV_04_147C



MPV_04_147C



Diary

MPV-04-147c

DS 2/02/2004

1500hrs start move from MPV-04-16 to MPV-04-147C

NS 25/02/2004

0030hrs finished set-up; repair roof of drill

0415hrs casing finished, very hard ground (boulders); 3m of casing are 2.4m in ground
rig floor st 0.0m (reference point)
[snow at 0.7m](#)
[ground surface at 1.7m](#)
[casing set at 3.2m](#)

0500hrs fuel person drives with fuel sled on leg of drill, leg is displaced; check leg and tower

0530hrs continue drilling to 5.6m
Note: rock seems to have large fractures: no water return, problems when drilling ("empty spaces")

DS 25/02/2004

0700 at 5.6m, no return

0810 at 8.6m
changed bit at 9.4m

0940 at 11.6m

1120 at 17.6m
Hydraulic fluid leak. Drill shut down for repairs.

11:30 Hydraulic leak repaired. Drill restarted.

12:30 at 22.5 m

14:20

15:09 at 30.7 EOH
reflex test

1635 thermistor installed
protective pipe impeded by cave and pvc stick-up; pvc shortened and protective pipe installed in the evening

1710

FIELD DRILL PERFORMANCE LOG

PROJECT	Gahcho Kue Geotech
PROJECT NO	2CD002.11
NORTHING	7035235
EASTING	588408
SURFACE ELEVATION	404.37
AZIMUTH	267
DIP	-70

HOLE NO:	MPV-04-147c
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	24/02/2004 13:00:00 PM
FINISH DATE AND TIME	25/02/2004 16:00:00 PM
HOLE DIAMETER	63.5 (HQ)
DRILLING METHOD	Diamond core

[illegible]

OVERALL HOLE DRILL RATE (m/hr)	1.02
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	2.39

GENERAL GEOTECH LOG

DRILLHOLE ID: MPV-04-147c

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

[illegible]

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID:	MPV-04-147c

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

[illegible]

Photo Record

MPV-04-147c

[illegible]

Core Box Record

MPV-04-147c

Box	From	To	Comments
1	0.70	5.10	overburden and granite
2	5.10	8.10	granite
3	8.10	10.93	granite
4	10.93	13.80	granite
5	13.80	16.70	granite
6	16.70	19.60	granite
7	19.60	22.50	granite
8	22.50	25.50	granite
9	25.50	28.50	granite
10	28.50	30.70	granite
11	EOH		
12			

Thermistor Readings

MPV-04-147c

Thermistor String ID

32/16- 5

Thermis Node	Reading (kOhms)	Comments
1	16.20	
2	16.15	
3	15.73	
4	15.64	
5	16.23	
6	15.95	
7	15.74	
8	16.10	
9	15.81	
10	16.14	
11	15.59	
12	15.73	
13	16.13	
14	16.06	
15	15.66	
16	16.24	

Reflex Readings**MPV-04-147C**

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
25-Feb-04	30.7	248.6	69.3	244.3	5943	8.7

FIELD GEOLOGICAL LOG

HOLE ID

MPV-04-147c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	1.70	ice/snow	n/a	ice/snow	MS
1.7	2.8	Overburden	n/a	Overburden	MS
2.80	30.70	Granite	n/a	Granite, compact, some fractures, reddish as hematite stained, coarse grained, biotite rich	MS
EOH					MS

UCS SAMPLES

HOLE ID: MPV-04-147C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-147C	10	29.13-29.41	Granite	04-UCS-147-001

POINT LOAD TEST - INPUT

DRILL HOLE ID: **MPV-04-147C**[illegible]

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5 - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	DESCRIPTION
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	CATEGORY
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

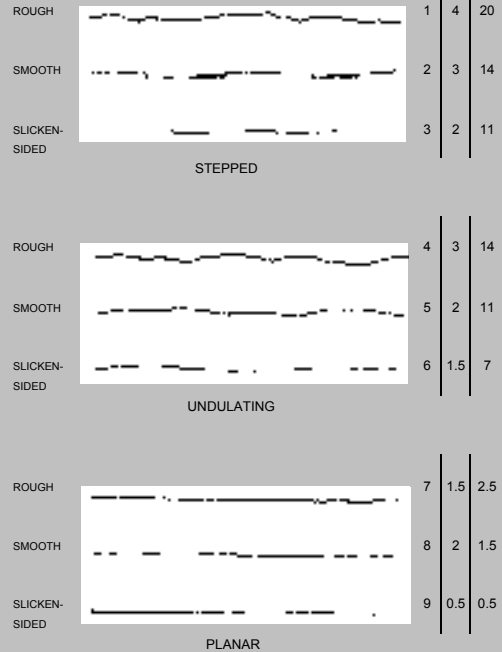
JOINT CONDITION - SMALL SCALE		
CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THICKNESS < IRREGULARITIES	
8	GOUGE THICKNESS > IRREGULARITIES	
9	NO INFILL	

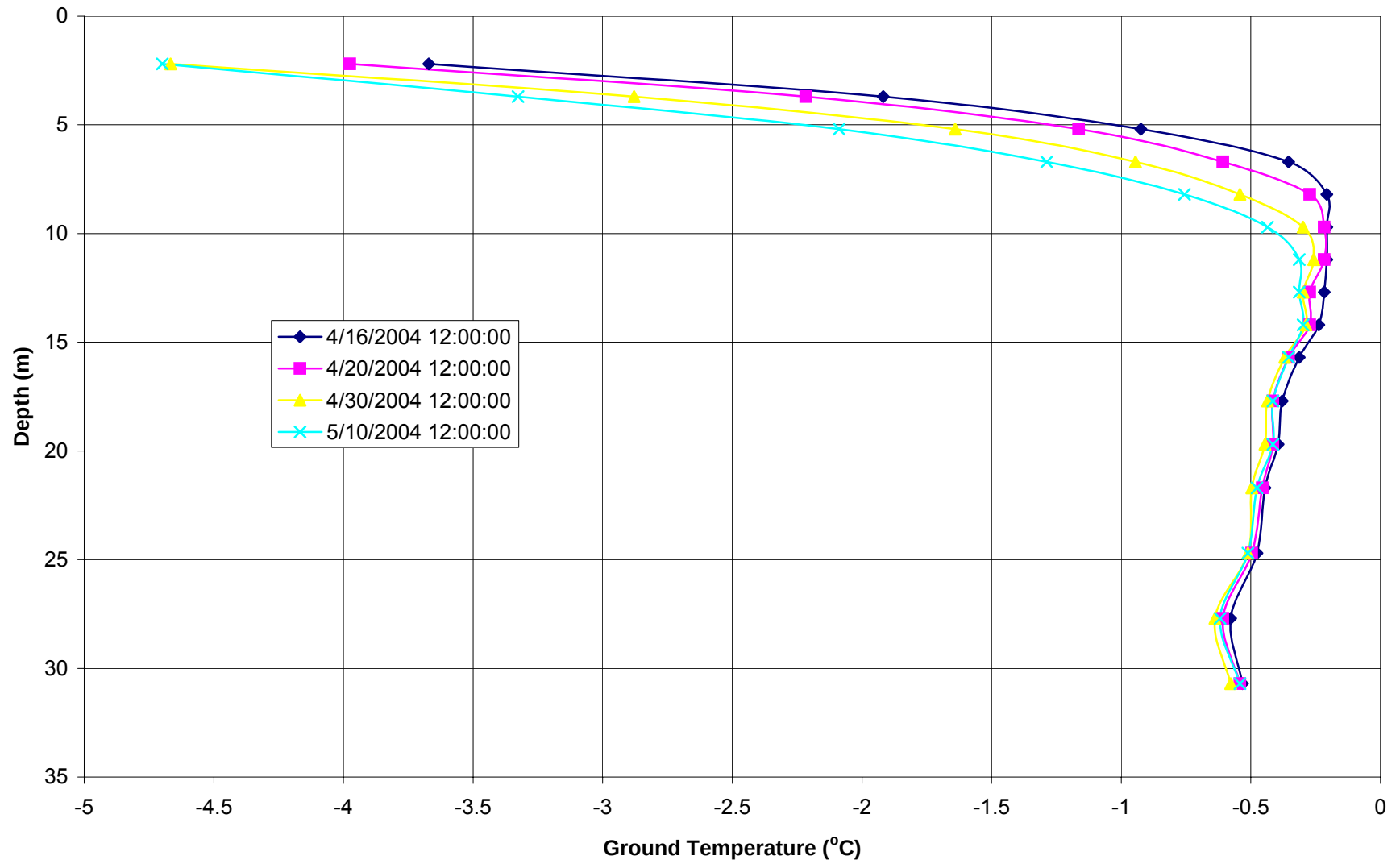
JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher Jr JRC



MPV-04-147C



MPV_04_148C



MPV_04_148C



Diary

MPV-04-148c

NS 25/02/2004

set-up finished, started casing; helper is
2300hrs sick, driller is working with foreman
0100hrs foreman has to leave; stop casing
0130hrs continue casing
at 5.6m (to 4.5m casing), problem with lock
0300hrs at core barrel
0330hrs continue drilling
rig floor as reference point (0.0m)
snow at 0.7m
ground surface at 1.5m
casing set to 4.5m
pump below rig floor plugged up with sand
0430hrs at 8.6m
0545hrs at 11.6m
check oil at pumps and drill

DS 26/02/2004

0830hrs at 14.6 m
0100hrs change drill bit
1015hrs recommence drilling
1030hrs at 19 m
1300hrs at 26.6m
1450hr at 31.5 m . EOH
1510hr Thermister installed in hole.

**FIELD DRILL
PERFORMANCE LOG**

PROJECT	Gahcho Kue Geotech
PROJECT NO	2CD002.11
NORTHING	7035232
EASTING	588387
SURFACE ELEVATION	404
AZIMUTH	267
DIP	-70

HOLE NO:	MPV-04-148c
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	25/02/2004 19:00
FINISH DATE AND TIME	26/02/2004 15:00
HOLE DIAMETER	63.5 (HQ)
DRILLING METHOD	Diamond core

				Period Totals						Cumulative				
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	B Rameseder	25/02/2004		12	7.15	11.6	set-up at hole, foreman has to replace helper (sick), some short delays due to work on other drills; casing to 4.5m	11.6	4.85	2.39	12	7.15	4.85	2.39
DS 0700-1900	M Story	25/02/2004		12	4.1	31.50	15 minutes down time to change drill bit. EOH; install thermistor; start move	19.9	7.90	2.52	24.00	11.25	12.75	2.47

OVERALL HOLE DRILL RATE (m/hr) 1.31

OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr) 2.47

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-148c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB.... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
4.50	4.85	0.35	OVB							OVB: overburden consisting of boulders and cobbles of different lithologies eg
4.85	5.60	0.75	GRN	0.74	98.7	0.74	98.7	0.74	98.7	GRN: granite
5.60	8.60	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
8.60	11.60	3.00	GRN	3.01	100.3	3.01	100.3	3.01	100.3	
11.60	14.60	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
14.60	17.60	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
17.60	19.00	1.40	GRN	1.40	100.0	1.40	100.0	1.40	100.0	Drill bit changed between 17.6 and 19.0
19.00	20.60	1.60	GRN	1.60	100.0	1.60	100.0	1.60	100.0	
20.60	23.60	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
23.60	26.60	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
26.60	29.60	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	No return water between 26.60 and 29.60 m depth.
29.60	31.50	1.90	GRN	1.90	100.0	1.90	100.0	1.90	100.0	greater Quartz content; EOH
		0.00								

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID: MPV-04-148c

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

[illegible]

Photo Record**MPV-04-148c**

Date	Shift	Filename	Depth	Description
25/02/2004	NS 1900-0700	MPV-04-148c-4.5m-Box1-dry	4.5-7.25	Overburden/ granite
25/02/2004	NS 1900-0700	MPV-04-148c-7.25m-Box2-dry	7.25-10.0	Granite
25/02/2004	DS 0700-1900	MPV-04-148c-10.0m-Box3-dry	10.0 - 12.7	Granite
25/02/2004	DS 0700-1900	MPV-04-148c-12.7m-Box4-dry	12.7-15.59	Granite
25/02/2004	DS 0700-1900	MPV-04-148c-15.59m-Box5-dry	15.99 - 18.55	Granite
25/02/2004	DS 0700-1900	MPV-04-148c-18.55m-Box6-dry	18.55 - 21.30	Granite
25/02/2004	DS 0700-1900	MPV-04-148c-21.30m-Box7-dry	21.30 - 24.3	Granite
25/02/2004	DS 0700-1900	MPV-04-148c-24.30m-Box8-dry	24.3 - 26.95	Granite
25/02/2004	DS 0700-1900	MPV-04-148c-26.95m-Box9-dry	26.95 - 29.6	Granite
25/02/2004	DS 0700-1900	MPV-04-148c-29.5m-Box10-dry	26.95 - 29.6	Granite

Core Box Record

MPV-04-148c

Box	From	To	Comments
1	4.50	7.25	
2	7.25	10.00	
3	10.00	12.70	
4	12.70	15.59	
5	15.59	18.55	
6	18.55	21.30	
7	21.30	24.30	
8	24.30	26.95	
9	26.95	29.60	
10	29.60	31.50	End of Hole
11			
12			

Thermistor Readings

MPV-04-148c

Thermistor String ID

32/16-4

Thermis Node	Reading (kOhms)	Comments
1	12.40	
2	12.76	
3	13.30	
4	14.44	
5	15.22	
6	14.56	
7	13.65	
8	12.77	
9	14.95	
10	15.68	
11	14.42	
12	13.17	
13	15.44	
14	13.75	
15	15.20	
16	12.95	

Reflex Readings

MPV-04-148C

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N	Magnetic Field	Temp ©
26-Feb-04	31.5	251.1	67.5	22.2	5948	13.9

FIELD GEOLOGICAL LOG

HOLE ID

MPV-04-148c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	1.50	snow/ice		snow/ice	BR
1.5	4.85	Overburden		Overburden consisting of boulders and cobbles of different lithologies eg different types of granite (pink, red or grey), gneiss, schist and ultramafics	BR
4.85	31.50	Granite		Very compact granite; coarse grained, reddish-black colour, biotite rich	BR

UCS SAMPLES

HOLE ID: MPV-04-148C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-148C	6	19.91-20.17	Granite	04-UCS-148-001

POINT LOAD TEST - INPUT

DRILL HOLE ID: **MPV-04-148C**

[illegible]

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5 - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	DESCRIPTION
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	CATEGORY
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

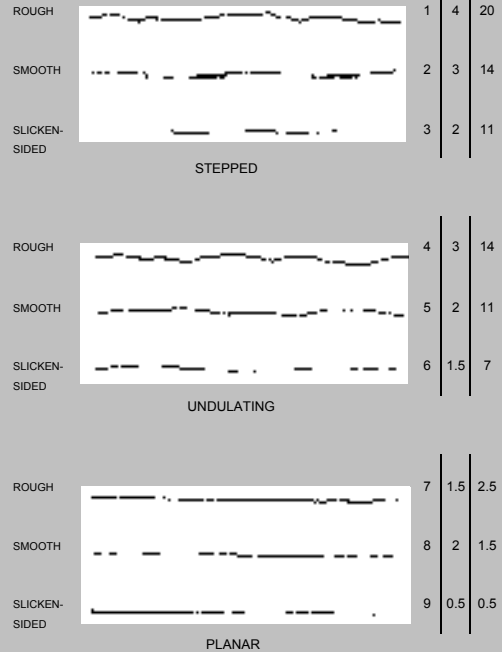
JOINT CONDITION - SMALL SCALE		
CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THICKNESS < IRREGULARITIES	
8	GOUGE THICKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

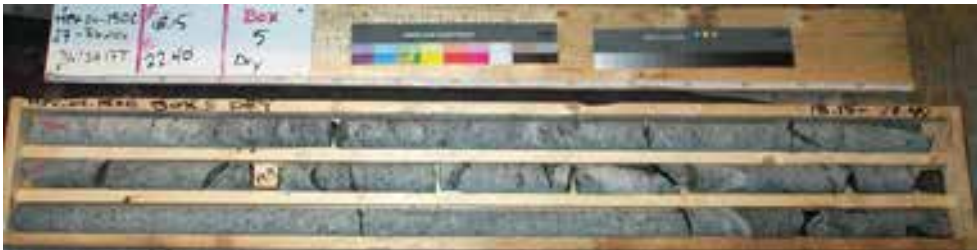
Laubscher Jr JRC



MPV_04_150C



MPV_04_150C



Diary

MPV-04-150c

NS26/02/2004

move and set-up on hole MPV-04-150C
set-up finished, hoses buried (long sludge
0130hrs line)
0200hrs start to put casing in
0630hrs 13.2m
casing to 7.5m; more casing had to be
added and length of casing rods changed,
therefore the rods were pulled. When going
back into this hole it might be possible that
current hole will be intersected partially or
that a new hole will be started as casing
kicked off some boulders when it was set
initially.

DS27/02/2004

0700 - 1030 Take out casing.
Casing reinstalled (to 7.5 m). Bedrock at
1030hrs 6.9m depth.
1400hrs Packer test at 12.4 to 16.9m
1550hrs Packer test at 15.4 to 19.9m
1720hrs Packer test at 18.4 to 22.9m
1840hrs Finished drilling (25.9m). Set up packer test

NS27/02/2004

2045hrs Packer test completed (21.4-25.9m)
take reflex reading, cement hole, prepare for
move

**FIELD DRILL
PERFORMANCE LOG**

PROJECT	Gahcho Kue Geotech
PROJECT NO	2CD002.11
NORTHING	7035216
EASTING	588256
SURFACE ELEVATION	404
AZIMUTH	0
DIP	-90

HOLE NO:	MPV-04-150c
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	26-02-2004 19:00
FINISH DATE AND TIME	27-02-2004 21:00
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals				Cumulative			
Period	Logged by	Date	Time	Total drill time (hr)	Standby time (hr)	Depth (m)	Standby Reason	Metreage drilled (m)	Actual drill time (hr)	Drill rate (m/hr)	Total drill time (hr)
NS 1900-0700	B Rameseder	26/02/2004		12	7	13.2	move, set-up, casing/ drilling in sediment	13.2	5	2.64	12
DS 0700-1900	M Story	27/02/2004		12	3.5	25.90	Reinstall casing; 3 packer tests	12.7	8.5	1.49	24
NS 1900-0700	B Rameseder	27/02/2004		3	3	25.90	1 packer test, reflex, cementing, move	0	0	0.00	27

OVERALL HOLE DRILL RATE (m/hr) 0.96

OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr) 1.92

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-150c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

[illegible]

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-150c**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling BUT excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM (m)	TO (m)	ROCK TYPE	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of Sets	Type	Totals	JOINT CONDITIONS				COMMENT	
			STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH				ANGLE	ROUGH	ALT	FILL		
10.8	13.2	BGRN	R5		0	10	0	1	1	1			1	J1	1	75	5	1	9	Joint shows hematite stained alteration, up to 2mm from joint	
7.1	7.9	BGRN	R5		0	8	0	0	0												
7.9	10.9	BGRN	R4		0	22	0	4	0		1	0	2	J1	1	30	9	0		Thin coating on J1, J2 1 joint at 70 deg, 2 joints at 65 deg.	
														J2	3	65	5				
10.9	13.9	BGRN	R4		0	19	0	3	0		0		2	J1	1	30	4			silt film at J1.	
														J2	2	55	4				
13.9	16.9	AMP	R5		0	19	0	6	0		1	0	3	J1	3	30	5			J2 one joint at 50 deg.	
														J2	2	45	4				
														J3	1	70	4				
16.9	19.9	AMP	R3		0	10	0	2	0		0		1	J1	2	30	4	0	3	J1 has calcite coating.	
19.9	22.9	AMP	R4		0	15	0	4	0		2	0	2	J1	1	70	4	0	2		
														J2	3	40	1				
22.9	25.9	AMP	R5	R3	10	20	0	11	3	1	2	0		J1	2	70	2	0	3	Joint set 4: 4 joints at 80 angle, 4 rough, alt 0, fill 2; breaks at contacts	
														J2	1	40	5	0	2		
														J3	4	45	8	1	2		

Photo Record**MPV-04-150c**

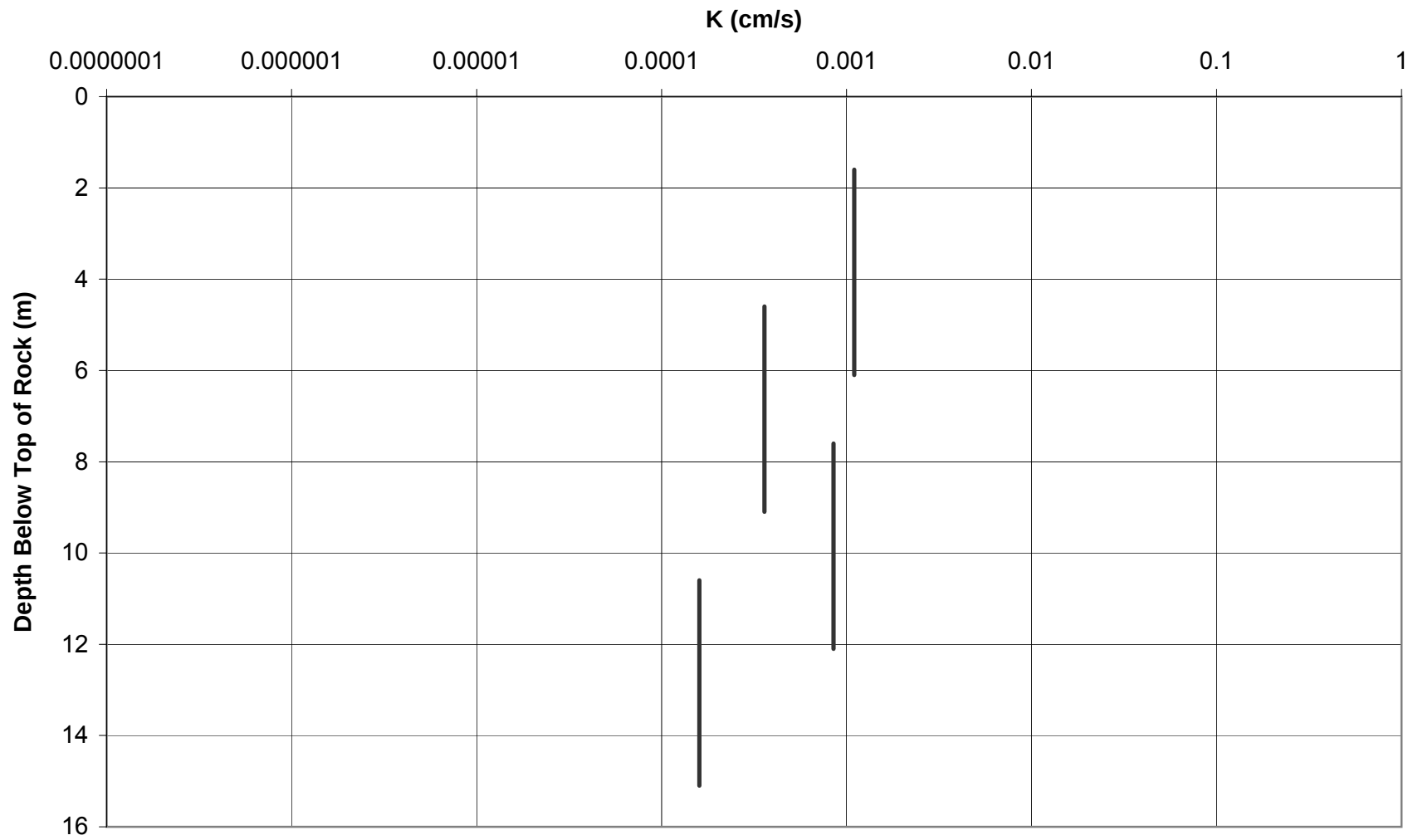
Date	Shift	Filename	Depth	Description
26-Feb-04	NS 1900-0700	MPV-04-150C_4.5_10.78m_box1	sediments	
26-Feb-04	NS 1900-0700	MPV-04-150C_4.5_10.78m_box1_2	sediments	
27-Feb-04	DS 0700-1900	MPV-04-150C_6.8m_box2	6.8 - 10.75	
27-Feb-04	DS 0700-1900	MPV-04-150C_10.75m_box3	10.75 - 13.9	
27-Feb-04	DS 0700-1900	MPV-04-150C_13.9m_box4	13.9 - 18.15	
27-Feb-04	DS 0700-1900	MPV-04-150C_18.15m_box5	18.15 - 22.40	
27-Feb-04	DS 0700-1900	MPV-04-150C_22.40m_box6	22.40-25.90	
			EOH	

Core Box Record

MPV-04-150c

Box	From	To	Comments
1	4.50		sediment sample at top of box
2	6.80	10.75	
3	10.75	13.90	
4	13.90	18.15	
5	18.15	22.40	
6	22.40	25.90	
7	EOH		
8			
9			
10			
11			
12			

Permeability vs Depth
MPV_04_150C



Packer Test Data

Date	27-Feb-04
Staff	M. Story, B. Rameseder
Init. WL:	0
Ref. Pt.	drill shack floor
Dip	90

MPV-04-150c

Test 1 12.4 16.9

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments	
1	0	4028.80		3.7	no leaks	
	1	4030.50	1.70			
	2	4031.50	1.00			
	3	4033.00	1.50			
	4	4034.80	1.80			
	5	4036.50	1.70			
	5	4038.20	1.70			
2	0	4042.50		7.5	no leaks	
	1	4048.40	5.90			
	2	4054.40	6.00			
	3	4060.00	5.60			
	4	4066.20	6.20			
3	0	4073.00		11.0	no leaks	
	1	4079.80	6.80			
	2	4086.80	7.00			
	3	4093.50	6.70			
	4	4100.40	6.90			
4	0	4105.30		7.5	no leaks	
	1	4111.00	5.70			
	2	4117.00	6.00			
	3	4122.70	5.70			
	4	4128.50	5.80			
	5	4134.20	5.70			
5	0	4137.00		3.5	no leaks	
	1	4138.80	1.80			
	2	4140.20	1.40			
	3	4142.10	1.90			
	4	4144.10	2.00			
	5	4146.00	1.90			

Summary

Flow rate

(gpm)

1.70

5.80

6.90

5.80

1.90

Test 2 15.4 19.9

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments	Summary
1	0	4155.50		4.0		
	1	4156.10	0.60			
	2	4156.40	0.30			
	3	4156.70	0.30			
	4	4157.10	0.40			
	5	4157.40	0.30			

Flow rate

(gpm)

0.3

3.5

0.4

2	0	4160.50		8.0	max pressure would have been 12 psi but was not properly set at drill
	1	4163.20	2.70		
	2	4166.80	3.60		
	3	4170.00	3.20		
	4	4173.60	3.60		
	5	4177.00	3.40		
3	0	4178.20		4.0	
	1	4179.60	1.40		
	2	4180.00	0.40		
	3	4180.40	0.40		
	4	4180.80	0.40		
	4	4181.20	0.40		
4	0				
	1		0.00		
	2		0.00		
	3		0.00		
	4		0.00		
5	0				
	1		0.00		
	2		0.00		
	3		0.00		
	4		0.00		
	5		0.00		
	6		0.00		
	7		0.00		

Test 3

18.4

22.9

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	4197.00		7.0	
	1	4200.00	3.00		

	2	4204.30	4.30			
	3	4208.30	4.00			
	4	4212.20	3.90			
	5	4216.20	4.00			
2	0	4222.00		14.0		
	1	4228.10	6.10			
	2	4234.00	5.90			
	3	4240.00	6.00			
	3	4246.00	6.00			
	4	4251.80	5.80			
3	0	4259.00		21.0		
	1	4267.10	8.10			
	2	4275.00	7.90			
	3	4283.00	8.00			
	4	4291.00	8.00			
	5	4299	8.00			
4	0	4305.10		14.0		
	1	4311.50	6.40			
	2	4317.60	6.10			
	3	4323.70	6.10			
	4	4329.90	6.20			
	5	4335.90	6.00			
5	0	4340.20		7.0		
	1	4344.80	4.60			
	2	4349.60	4.80			
	3	4353.60	4.00			
	4	4357.80	4.20			
	5	4362.00	4.20			

Summary

Flow rate
(gpm)

4.00
6.00
8.00
6.10
4.20

Test 4

21.4

25.9

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments	
1	0	4380.80		8.0	no leaks	
	1	4381.60	0.80			
	2	4382.70	1.10			
	3	4383.60	0.90			
	4	4384.40	0.80			
	5	4385.20	0.80			
	6	4386.00	0.80			
2	0	4389.80		16.0	no leaks	
	1	4391.30	1.50			
	2	4393.00	1.70			
	3	4394.50	1.50			
	4	4396.00	1.50			
	5	4397.50	1.50			
3	0	4404.30		25.5	no leaks	
	1	4406.70	2.40			
	2	4409.00	2.30			
	3	4411.10	2.10			
	4	4413.40	2.30			

Summary

Flow rate
(gpm)

0.80
1.50
2.10
1.40
0.80

	5	4415.50	2.10		
	6	4417.50	2.00		
	7	4419.6	2.10		
4	0	4420.80		16.0	no leaks
	1	4422.30	1.50		
	2	4423.80	1.50		
	3	4425.20	1.40		
	4	4426.60	1.40		
5	0	4427.00		8.0	no leaks
	1	4427.80	0.80		
	2	4428.70	0.90		
	3	4429.40	0.70		
	4	4430.20	0.80		
	5	4431.00	0.80		
	6	4431.80	0.80		

12.4 16.9

Pressure

(psi)

3.7
7.5
11.0
7.5
3.5

15.4 19.9

Pressure

(psi)

4.0
8.0
4.0

18.4 22.9

Pressure
(psi)

7.0
14.0
21.0
14.0
7.0

21.4 25.9

Pressure
(psi)

8.0
16.0
25.5
16.0
8.0

Packer Injection Test

input fields toned green

Drillhole No	MPV-04-150c			
Test interval	From	21.4	To	25.9
Date	27/02/2004			
Start time				
Finish time				

Measurement	Q (gpm)				
	Pg (psi) Step 1	Pg (psi) Step 2	Pg (psi) Step 3	Pg (psi) Step 4	Pg (psi) Step 5
1	3.7	7.5	11	7.5	3.5
2	4	8	4		
3	7	14	21	14	7
4	8	16	24	16	8
5					
6					
Qavg (gpm)					
Gavg (m ³ /day)					
Hf (m)					
Hnit (m)					
K (m/day)					
K (cm/sec)					
Lugeons					

Notes: 1: If hole is dry enter Dw=drilling depth
2: Enter values from packer manufacturer
3: Pgmax (psi) = 1.5 x vertical depth (m) in rock to top of test section

Equations:
 $P_{infmin} = (1.42 \cdot Dp' + Ps + Pgmax) \cdot 1.1$
 $P_{infmax} = P_{wmax} + 1.42 \cdot (Dp' - Dw')$
 $Hf = 8.65 \times 10^{-15} (Q^2 \cdot Lp / rp^5)$
 $H_{nit} = (Dw' + Hg - Hf) + Pg / 1.42$
 $K = (Q^2 \cdot Ln(R/r_b)) / (2 \cdot \pi \cdot H_{nit} \cdot L)$

Conversion factors: 10m of water = 0.9807 bar = 1kg/cm² = 14.2 psi
1cm/sec = 864m/day
1 Lugeon = 1ltr/mi per metre at 10 bars
which is approximately 1.4 x 10⁻⁵ cm/sec
1 US gpm = 3.785 ltr/min = 5.45m³/day

Dw	Measured depth of static water 1)	0	m
Dp	Measured depth to packer	21.4	m
Dr	Measured depth to top of rock	6.90	m
Dt	Depth to midpoint of test	23.65	m
Inc	Inclination from horizontal	90	°
Dw'	Vertical depth to static water level	0	m
Dp'	Vertical depth to packer	21.40	m
Dt'	Vertical depth to midpoint of test	23.65	m
Ps	Packer stretch pressure 2)	60	psi
Pwmax	Max packer working pressure 2)	400	psi
Pgmax	Max injection gauge pressure 3)	25	psi
Pinfmin	Min packer inflation pressure	127	psi
Pinfmax	Max packer inflation pressure	430	psi
Hg	Gauge height	0	m
Lp	Length of discharge pipe		m
rp	Radius of discharge pipe (1" = 0.0127m)		m
R	Radius of influence (10m is standard)		m
rb	Drillhole radius (HQ=0.048m, NQ=0.038m)	0.038	m
L	Length of test section	4.5	m
Hf	Friction loss	?	m
Hnit	Net injection at midpoint of test	?	m
K	Hydraulic conductivity	?	m

Permeability Summary

MPV-04-150c

from	to		Step 1	Step 2	Step 3	Step 4	Step 5	Avg K
12.4	16.9	gauge (psi)	3.7	7.5	11	7.5	3.5	
		Qavg (igpm)	1.73	6	6.9	5.75	1.95	
		K cm/sec	8.3E-04	1.4E-03	1.1E-03	1.4E-03	9.8E-04	1.1E-03
15.4	19.9	gauge (psi)	4	8	4			
		Qavg (igpm)	0.33	3.4	0.4			
		K cm/sec	1.5E-04	7.5E-04	1.8E-04			3.6E-04
18.4	22.9	gauge (psi)	7	14	21	14	7	
		Qavg (igpm)	3.97	5.93	8	6.1	4.13	
		K cm/sec	1.0E-03	7.5E-04	6.7E-04	7.7E-04	1.0E-03	8.5E-04
21.4	25.9	gauge (psi)	8	16	25.5	16	8	
		Qavg (igpm)	0.8	1.5	2.1	1.4	0.8	
		K cm/sec	1.8E-04	1.7E-04	1.5E-04	1.5E-04	1.8E-04	1.6E-04
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

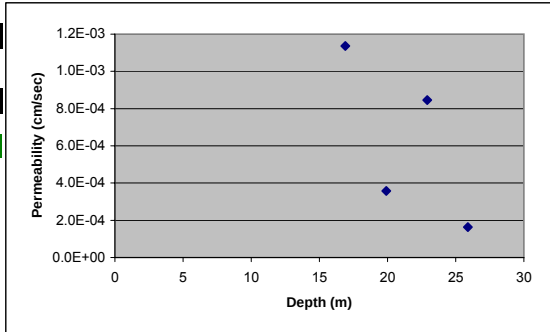
Equations: $H_f = 8.65 \times 10^{-15} (Q^2 \cdot L / r_p^5)$
 $H_{nit} = (Dw' + Hg - Hf) + Pg / 1.42$
 $K = (Q \cdot L \cdot n(R / r_b)) / (2 \cdot \pi \cdot H_{nit} \cdot L)$

Overall 6.3E-04

assume
- vertical drillhole
- water at ground surface
- height of gauge is at rig flr
- negligible friction losses

Dw Measured depth of static water (L)
Dp Measured depth to packer
Dt Depth to midpoint of test
Inc Inclination from horizontal
Dw' Vertical depth to static water level
Dp' Vertical depth to packer
Dt' Vertical depth to midpoint of test
Hg Gauge height
Lp Length of discharge pipe
rp Radius of discharge pipe (1" = 0.0127m)
R Radius of influence (10m is standard)
rb Drillhole radius (HQ=0.048m, NQ=0.038m)
L Length of test section
Hf

0 m
m
m
m
°
m
m
m
0 m
m
m
10 m
0.038 m
m
0 m



Reflex Readings**MPV-04-150C**

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp °C
27-Feb-04	25.9	193.7	88	181.2	5934	10.3

FIELD GEOLOGICAL LOG

HOLE ID

MPV-04-150c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	4.50	Ice/water		1.5m ice; to 4.5m water	BR
4.5	10.78	Overburden		silty clay	BR
10.78		BGRN		grey biotite granite; digested mafic xenolith at top 7cm	BR

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	4.50	Ice/water		1.5m ice; to 4.5m water	BR
4.5	7.1	Overburden		silty clay	BR
7.10	13.90	BGRN		grey biotite granite	BR
13.90	25.90	AMP		Amphibolite (hb) with digested granite xenoliths and granitic dyklets and irregular granitic stringers; amphibolite : dark green, coarse to medium grained; local biotite rich zones associate with granitic xenoliths	BR/Clee
EOH					

DRILL HOLE ID:

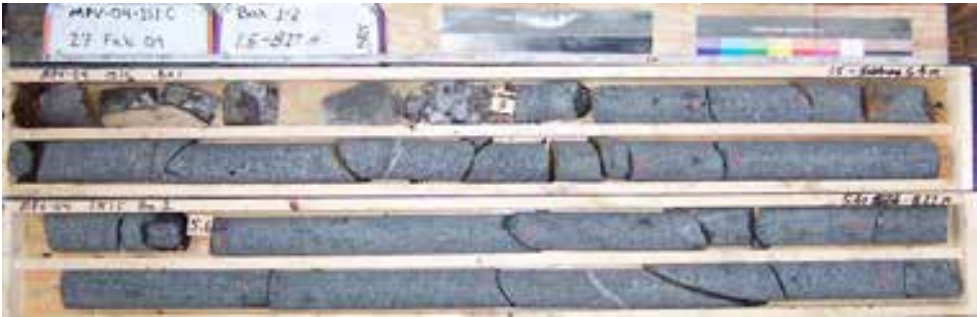
[illegible]

UCS SAMPLES

HOLE ID: MPV-04-150C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-150C	3	12.84-13.11	Granite	04-UCS-150-001
MPV-04-150C	6	25.25-25.55	Granite/Diorite	04-UCS-150-002

MPV_04_151C



MPV_04_151C





PROJECT:	Gahcho Kue Dike Hydrology
PROJECT NO:	HCI-1759 Hole MPV_04 151C
NORTHING:	7,035,208
EASTING:	588,182
SURFACE ELEVATION:	407
AZIMUTH:	87
DIP:	70

HOLE NO:	MPV-04-151C
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	02/26/2004 8:00
DATE AND TIME FINISHED:	02/26/2004 17:20
HOLE DIAMETER:	75.7 mm
DRILLING METHOD:	NQ Diamond core
DIKE	1

[illegible]

OVERALL HOLE DRILL RATE (m/hr)	1.32
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	2.63

GEOTECH LOGGING 1 - INPUT
(GENERAL GEOTECH LOG)

 DRILLHOLE ID: **MPV-04-144C**

Total Core Recovery = Total length of core recovered
 Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
 Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
 NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
1.50	3.00	1.50	till	0.80	53.3	0.27	18.0	0.20	13.3	broken quartz & diorite
3.00	5.60	2.60	diorite	2.34	90.0	0.77	29.6	1.60	61.5	
5.60	8.60	3.00	diorite	3.00	100.0	2.67	89.0	2.40	80.0	
8.60	11.60	3.00	diorite	3.00	100.0	2.81	93.7	2.81	93.7	
11.60	14.60	3.00	diorite	2.86	95.3	2.53	84.3	2.53	84.3	
14.60	17.60	3.00	diorite	3.00	100.0	2.38	79.3	2.92	97.3	
17.60	20.60	3.00	diorite	2.99	99.7	2.84	94.7	2.84	94.7	
20.60	23.60	3.00	diorite	3.00	100.0	3.00	100.0	3.00	100.0	
23.60	26.60	3.00	diorite	3.00	100.0	2.80	93.3	2.80	93.3	Pyrite noted at 26.5 m
26.60	29.60	3.00	diorite	2.96	98.7	2.96	98.7	2.96	98.7	
29.60	31.60	2.00	diorite	1.97	98.5	2.83	141.5	1.81	90.5	

DRILLHOLE ID:	MPV-04-144C

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

[illegible]

[illegible]

Validation data: (Do not alter)										
IRS:	IRS:	Joint amounts:	Joint Fill Strength:	Microdefect Intensity:	Microdefect strength:	No of joint sets:	Joint type:	Joint Roughness:	Joint Wall Alteration:	Joint Infill:
%:	Categories:	0	0	0	0	1	J1	1	0	1
0	R0	1	1	1	1	1+1	J2	2	1	2
5	R1	2	2	2	2	2	J3	3	2	3
10	R2	3		3		2+1		4		4
15	R3	4				3		5		5
20	R4	5				3+1		6		6
25	R5	6						7		7
30	R6	7						8		8
35		8						9		9
40		9								
45		10								
50		11								
55		12								
60		13								
65		14								
70		15								
75		16								
80		17								
85		18								
90		19								
95		20								
100		21								
		22								
		23								
		24								
		25								
		26								
		27								
		28								
		29								
		30								

SRK Photo Log Sheet

Drillhole ID:

MPV-04-151C

[illegible]

Core Box Tracking Sheet

[illegible]

ORIENTATION INPUT SHEET

Drill hole Information

ID:	MPV-04-151C
Dip:	70
Azimuth:	87

Drilling Contractor:	Boart Longyear
Orientation Method Used:	Easy Mark

[illegible]

Validation Data (Do Not Alter)		
Orientation:	Discontinui C/O:	JC
Top	Joint Close	
Bottom	Open Bed Open	

Reflex Readings

MPV-04-151C

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
27-Feb-04	31.6	65.5	70	292.3	5854	14.4

FIELD GEOLOGICAL LOG
HOLE I.D.: MPV-04-151C

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	1.50	Ice/Water	0		KB/SA
1.50	3.00	Overburden	0	Glacial till and broken quartz and diorite.	KB/SA
3.00	31.60	Diorite	0	Mild chlorinization noted. Black clay gouge also noted. Pyrite at 26.50m	KB/SA

[illegible]

MPV-04-151C

[illegible]

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH		
CODE	CATEGORY	DESCRIPTION
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER

MICRODEFECTS - QUANTITY		DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	DESCRIPTION	CODE	CATEGORY
0	NONE	0	STRONG (NEVER BREAKS)
1	MINOR	1	MODERATE (SOMETIMES BREAKS)
2	MODERATE	3	WEAK (ALWAYS BREAKS)
3	HEAVY		

JOINT CONDITION - SMALL SCALE			JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY	CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH	1	NON	COARSE
2		SMOOTH	2	SOFTENING	MEDIUM
3		SLICKENSIDED	3		FINE
4	UNDULATING	ROUGH	4	SOFT	COARSE
5		SMOOTH	5	SHEARED	MEDIUM
6		SLICKENSIDED	6		FINE
7	PLANAR	ROUGH	7	GOUGE THICKNESS < IRREGULARITIES	
8		SMOOTH	8	GOUGE THICKNESS > IRREGULARITIES	
9		SLICKENSIDED	9	NO INFILL	

JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

		Laubscher	Jr	JRC
ROUGH		1	4	20
SMOOTH		2	3	14
SLICKEN-SIDED		3	2	11
STEPPED				
ROUGH		4	3	14
SMOOTH		5	2	11
SLICKEN-SIDED		6	1.5	7
UNDULATING				
ROUGH		7	1.5	2.5
SMOOTH		8	2	1.5
SLICKEN-SIDED		9	0.5	0.5
PLANAR				

Thermistor Readings

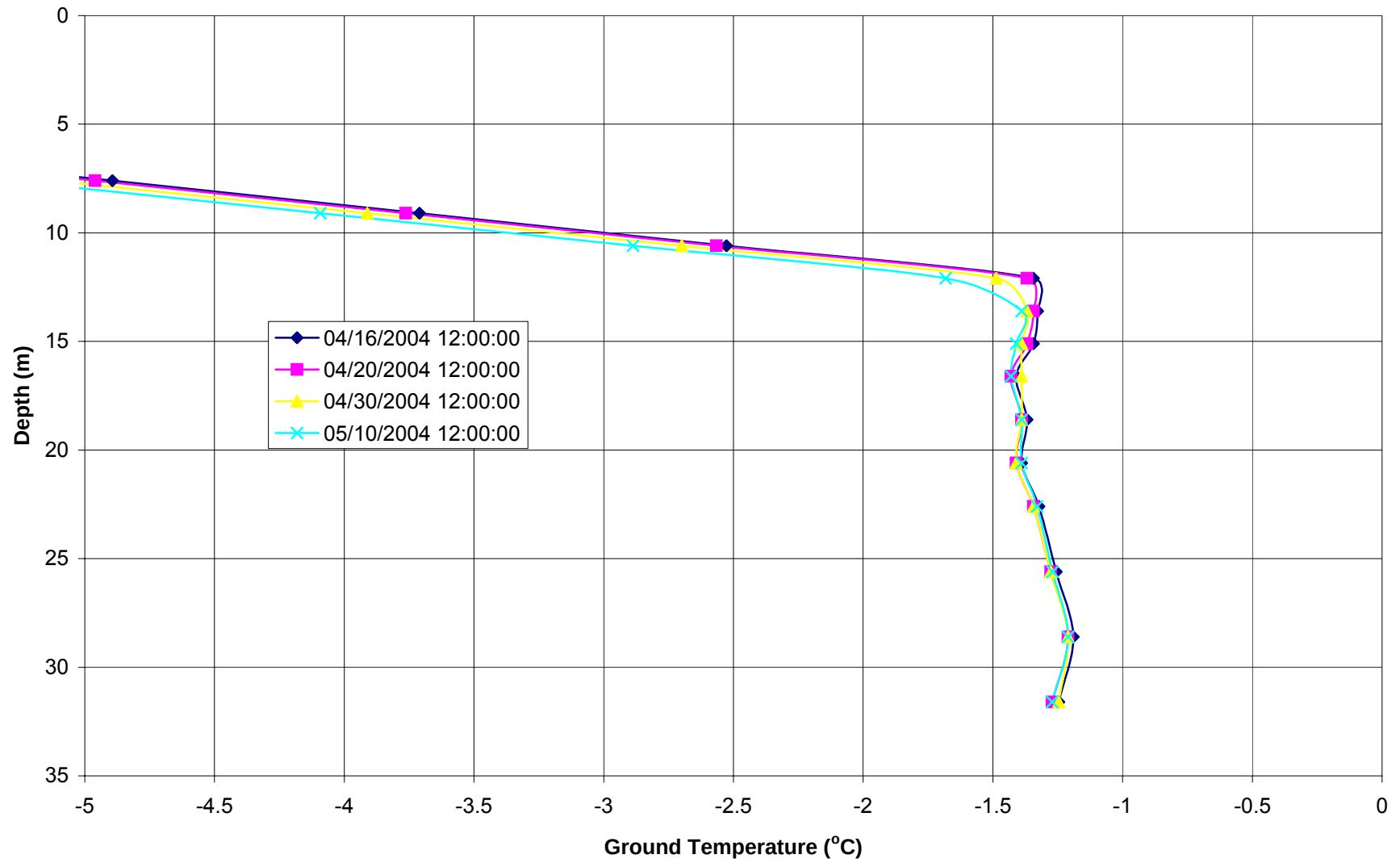
MPV-04-188c

Thermistor String ID

32/16 -12

Thermis Node	Reading (kOhms)	Comments
1	14.30	
2	14.01	
3	13.75	
4	12.77	
5	12.82	
6	12.99	
7	12.61	
8	12.58	
9	12.85	
10	12.82	
11	12.42	
12	13.61	
13	12.85	
14	12.96	
15	12.96	
16	14.72	

MPV-04-151C
Estimate



Diary

MPV-04-154c

NS 27/02/2004

moved from MPV-04-150C
move and set-up took till end of shift; water
line was frozen into ice; casing set to 3.3m
(at bottom of lake not in rock yet)
[2.6m ice/water](#)

DS 28/02/2004

0730hrs Driller attempting to retrieve sediment
overburden.

0800hrs At 7.0 m very little recovery of overburden.
(Small cobbles, less than 1% recovery see
picture (MPV-04-154C_poor recovery of
sediments)). Overburden washed away.

0930hrs Casing taken out of hole. Drill bit destroyed.
Driller went back to camp for parts.

1145hrs Casing installation completed. Bottom of
casing at 9.1 m below floor. Casing
advanced .3 m into bedrock. Bedrock at
8.8m. Overburden at 3.3m below floor level.
Ice at 0.7m below floor level. Drilling into
bedrock.

1500hrs at 20.8m. Set up for Packer test.

1545hr Packer test completed.

1700hr at 23.8m. Set up for packer test.

1745hr Packer test completed.

NS 28/02/2004

1945hrs set for packer test

2030hrs packer test 3 completed (22.3-26.8m)

2130hrs drilled to 29.8m

2240hrs packer test 4 completed (25.3-29.8m)

2400hrs reflex completed
pull casing, move



PROJECT	Gahcho Kue Geotech
PROJECT NO	2CD002.11
NORTHING	7035225
EASTING	588319
SURFACE ELEVATION	404.4
AZIMUTH	0
DIP	-90

HOLE NO:	MPV-04-154c
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	27/02/2004 22:00
FINISH DATE AND TIME	01/29/2004 0:00
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

[illegible]

OVERALL HOLE DRILL RATE (m/hr)	1.15
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	3.14

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-154c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

[illegible]

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID: MPV-04-154c

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

[illegible]

FIELD GEOLOGICAL LOG

HOLE ID

MPV-04-154c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	2.60	Ice/water		Ice/water	BR
2.6	8.1	Overburden		Unable to collect representative sample.	MS
8.10	29.80	GRN		Granite: pink compact granite with hematite stains; medium-coarse grained	MS
EOH					

Photo Record

MPV-04-154c

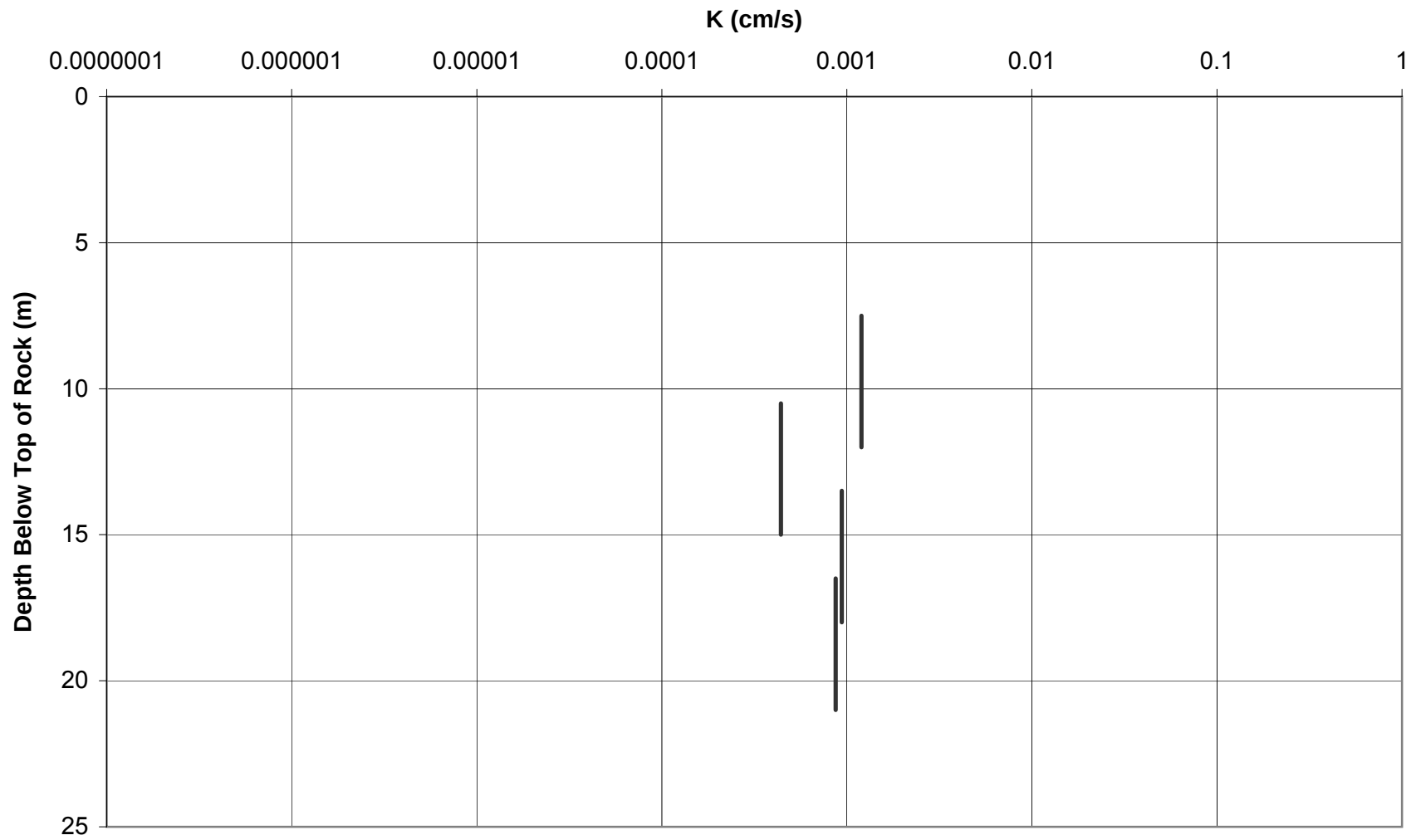
[illegible]

Core Box Record

MPV-04-154c

Box	From	To	Comments
1	8.70	13.00	
2	13.00	17.20	
3	17.20	21.50	
4	21.50	25.80	
5	25.80	29.80	
6	EOH		
7			
8			
9			
10			
11			
12			

Permeability vs Depth
MPV_04_154C



Packer Test Data

Date	28-Feb-04
Staff	M. Story, B. Rameseder
Init. WL:	0
Ref. Pt.	drill shack floor
Dip	90

MPV-04-154c

Test 1 16.3 20.8

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres. (psi)	Comments
1	0	4442.00			no leaks
	1	4443.90	1.90	5.0	
	2	4445.80	1.90	5.0	
	3	4447.60	1.80	5.0	
	4	4449.60	2.00	5.0	
	5	4451.60	2.00	5.0	
	6	4453.80	2.20	5.0	
	7	4455.70	1.90	5.0	
	8	4457.60	1.90	5.0	
	9	4459.50	1.90	5.0	
2	0	4468.00		10.0	no leaks
	1	4474.80	6.80	10.0	
	2	4481.20	6.40	10.0	
	3	4487.80	6.60	10.0	
	4	4494.60	6.80	10.0	
	5	4501.20	6.60	10.0	
	6	4507.80	6.60	10.0	
3	0	4514.00		15.0	no leaks
	1	4522.40	8.40	15.0	
	2	4530.60	8.20	15.0	
	3	4539.00	8.40	15.0	
	4	4547.40	8.40	15.0	
	5	4555.7	8.30	15.0	
4	0	4562.00		10.0	no leaks
	1	4569.40	7.40	10.0	
	2	4576.60	7.20	10.0	
	3	4584.00	7.40	10.0	
	4	4591.30	7.30	10.0	
	5	4598.50	7.20	10.0	
5	0	4606.00			no leaks
	1	4610.90	4.90		
	2	4615.80	4.90		
	3	4620.80	5.00		
	4	4625.80	5.00		

Summary 16.3 20.8

(gpm) (psi)

1.90 5.0
6.67 10.0
8.36 15.0
7.30 10.0
4.97 5.0

Test 2 19.3 23.8

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres. (psi)	Comments
1	0	4638.50		6.0	
	1	4639.60	1.10	6.0	
	2	4641.10	1.50	6.0	
	3	4642.40	1.30	6.0	
	4	4643.90	1.50	6.0	
	5	4645.30	1.40	6.0	
	6	4646.70	1.40	6.0	
2	0	4649.50		12.0	
	1	4652.50	3.00	12.0	
	2	4655.50	3.00	12.0	
	3	4658.50	3.00	12.0	
	4	4661.40	2.90	12.0	
	5	4664.40	3.00	12.0	
3	0	4668.00		19.0	
	1	4672.20	4.20	19.0	
	2	4676.40	4.20	19.0	
	3	4680.50	4.10	19.0	
	4	4684.40	3.90	19.0	
	5	4689.00	4.60	19.0	
	6	4693.10	4.10	19.0	
	7	4697.20	4.10	19.0	
	8	4701.40	4.20	19.0	
4	0	4705.10		12.0	
	1	4708.20	3.10	12.0	
	2	4711.30	3.10	12.0	
	3	4714.60	3.30	12.0	
	4	4717.70	3.10	12.0	
	5	4720.90	3.20	12.0	
5	0	4724.00			
	1	4725.80	1.80	6.0	
	2	4727.50	1.70	6.0	
	3	4729.30	1.80	6.0	

Summary 19.3 23.8

Flow rate Pressure
(gpm) (psi)

1.4 6.0
3.0 12.0
4.1 19.0
3.1 12.0
1.8 6.0

	4	4731.10	1.80	6.0
	5	4732.90	1.80	6.0

Test 3 22.3 26.8

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres. (psi)	Comments	Summary	22.3	26.8
1	0	4749.90		8.0	no leaks	Flow rate (gpm)	Pressure (psi)	
	1	4754.50	4.60			4.55	8.0	
	2	4759.00	4.50			7.70	16.0	
	3	4763.60	4.60			10.00	24.5	
	4	4768.10	4.50			8.20	16.0	
	5	4772.70	4.60			5.60	8.0	
	6	4777.20	4.50					
2	0	4784.40		16.0	no leaks			
	1	4792.00	7.20					
	2	4799.70	7.60					
	3	4807.40	7.70					
	4	4815.10	7.70					
	5	4822.80	7.70					
3	0	4831.80		24.5	no leaks			
	1	4841.80	10.00					
	2	4851.80	10.00					
	3	4861.80	10.00					
	4	4871.90	10.10					
4	0	4880.20		16.0	no leaks			
	1	4888.50	8.30					
	2	4896.70	8.20					
	3	4905.00	8.30					
	4	4913.10	8.10					
	5	4921.10	8.00					
	6	4929.40	8.30					
	7	4937.50	8.10					
	8	4945.60	8.10					
	9	4954.00	8.40					
	10	4962.10	8.10					
	11	4970.30	8.20					
5	0	4976.70		8.0	no leaks			
	1	4982.30	5.60					
	2	4988.00	5.70					
	3	4993.60	5.60					
	4	4999.20	5.60					
	5	5004.80	5.60					

Test 4 25.3 29.8

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres. (psi)	Comments	Summary	25.3	29.8
1	0	5047.50		9.0	no leaks	Flow rate (gpm)	Pressure (psi)	
	1	5052.50	5.00			5.00	9.0	
	2	5057.90	5.40			8.00	18.0	
	3	5062.20	4.30			10.17	27.5	
	4	5067.20	5.00			8.13	18.0	
	5	5072.20	5.00			5.77	9.0	
	6	5077.20	5.00					
	7	5082.10	4.90					
2	0	5089.50		18.0	no leaks			
	1	5097.50	8.00					
	2	5105.50	8.00					
	3	5113.50	8.00					
	4	5121.40	7.90					
3	0	5130.70		27.5	no leaks			
	1	5140.70	10.00					
	2	5150.90	10.20					
	3	5161.00	10.10					
	4	5171.20	10.20					
	5	5181.4	10.20					
4	0	5189.90		18.0	no leaks			
	1	5198.10	8.20					
	2	5206.10	8.00					
	3	5214.30	8.20					
	4	5222.50	8.20					
	5	5230.60	8.10					
	6	5238.70	8.10					
5	0	5245.30		9.0	no leaks			
	1	5251.00	5.70					
	2	5256.80	5.80					
	3	5262.60	5.80					
	4	5268.30	5.70					
	5	5274.10	5.80					

Permeability Summary

MPV-04-154c

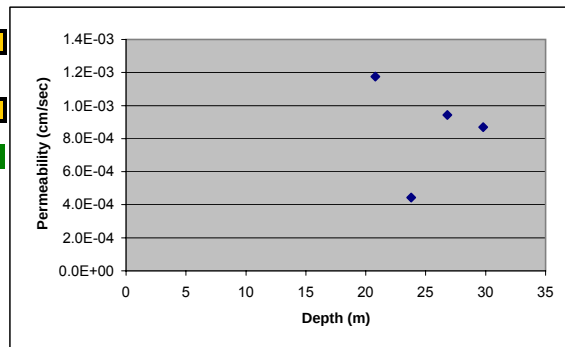
from	to		Step 1	Step 2	Step 3	Step 4	Step 5	Avg K
16.3	20.8	gauge (psi)	5	10	15	10	5	
		Qavg (igpm)	1.9	6.67	8.36	7.3	4.97	
		K cm/sec	6.7E-04	1.2E-03	9.8E-04	1.3E-03	1.8E-03	1.2E-03
19.3	23.8	gauge (psi)	6	12	19	12	6	
		Qavg (igpm)	1.4	3	4.1	3.1	1.8	
		K cm/sec	4.1E-04	4.4E-04	3.8E-04	4.6E-04	5.3E-04	4.4E-04
22.3	26.8	gauge (psi)	8	16	24.5	16	8	
		Qavg (igpm)	4.55	7.7	10	8.2	5.6	
		K cm/sec	1.0E-03	8.5E-04	7.2E-04	9.0E-04	1.2E-03	9.4E-04
25.3	29.8	gauge (psi)	9	18	27.5	18	9	
		Qavg (igpm)	5	8	10.17	8.13	5.77	
		K cm/sec	9.8E-04	7.8E-04	6.5E-04	8.0E-04	1.1E-03	8.7E-04
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Equations: $Hf = 8.65 \times 10^{-15} (Q^2 * Lp / rp^5)$
 $H_{nit} = (Dw' + Hg - Hf) + Pg / 1.42$
 $K = (Q * Ln(R/rb)) / (2 * \pi * H_{nit} * L)$

Overall 8.6E-04

assume
- vertical drillhole
- water at ground surface
- height of gauge is at rig flr
- negligible friction losses

Dw	Measured depth of static water (L)	0 m
Dp	Measured depth to packer	m
Dt	Depth to midpoint of test	m
Inc	Inclination from horizontal	90 m
Dw'	Vertical depth to static water level	0 m
Dp'	Vertical depth to packer	m
Dt'	Vertical depth to midpoint of test	m
Hg	Gauge height	0 m
Lp	Length of discharge pipe	m
rp	Radius of discharge pipe (1" = 0.0127m)	m
R	Radius of influence (10m is standard)	10 m
rb	Drillhole radius (HQ=0.048m, NQ=0.038m)	0.038 m
L	Length of test section	m
Hf		0 m



Reflex Readings

MPV-04-154C

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp °C
28-Feb-04	29.8	236.8	88.5	256.4	5942	9.8

UCS SAMPLES

HOLE ID: MPV-04-154C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-154C	5	28.12-28.37	Granite	04-UCS-154-001

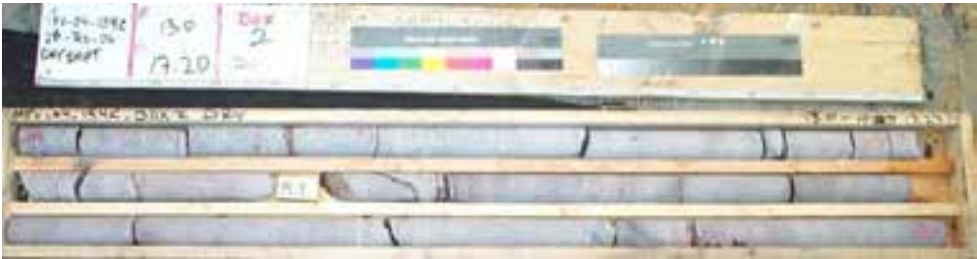
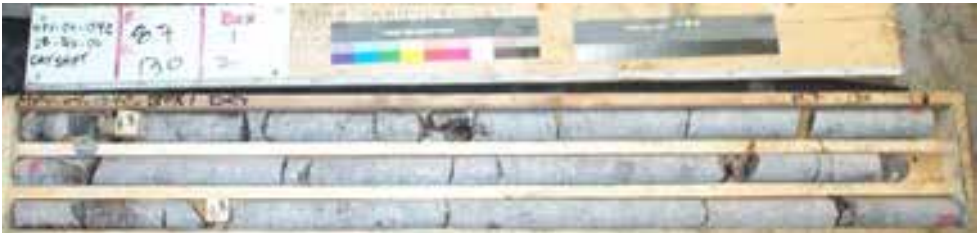
POINT LOAD TEST - INPUT

DRILL HOLE ID: **MPV-04-154C**

MPV-04-154C

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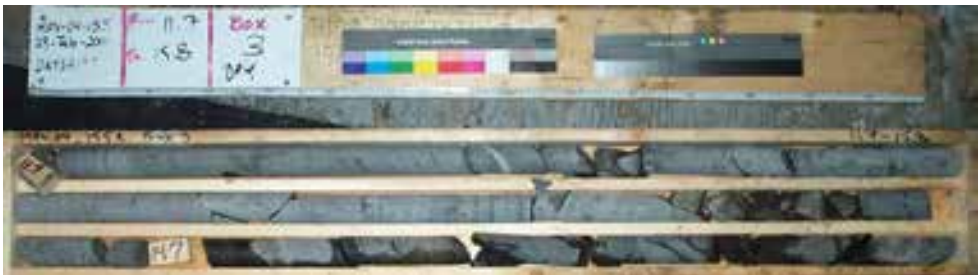
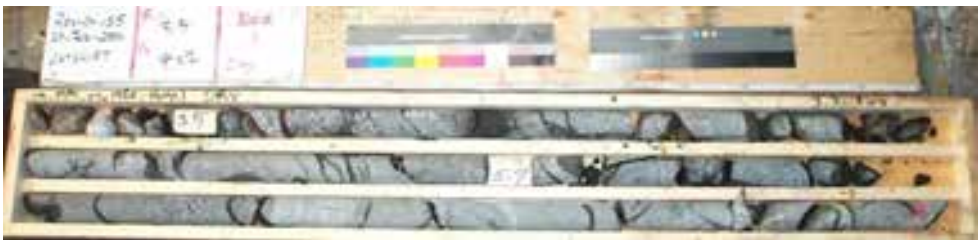
MPV_04_154C



MPV_04_154C



MPV_04_155C



MPV_04_155C



Diary

MPV-04-155c

NS 28/02/2004

2400hrs move to MPV-04-155C from MPV-04-154C,
set-up drill

DS 29/02/2004

0700hrs Continue setting up drill. Driller does not
have HQ adapter. Driller sent for HQ
adapter.
Bernie (BL) arrived after discussion with
Mike Waldegger (deBeers) and Peter Dixon
(BL). Decided to go with NQ instead of HQ.
BL only has three HQ adapters. The other
three rigs are currently drilling HQ.
Checked thermistor would fit through NQ.
1137hrs OK.
1140hrs Start to install casing.
Ground surface 1.1 m below floor level.
Bottom of casing set to 3.8m below floor
level. Bedrock at 3.5 m below floor surface.
1330hr end of shift at 29.7m

NS 29/02/2004

2030hrs drilled to 31.2m
2100hrs reflex completed
2130hrs Had to get pipes; Thermistor installed
2300hrs Rods and casing pulled; pack for move

**FIELD DRILL
PERFORMANCE LOG**

PROJECT	Gahcho Kue Geotech
PROJECT NO	2CD002.11
NORTHING	7035211
EASTING	588206
SURFACE ELEVATION	407
AZIMUTH	87
DIP	-70

HOLE NO:	MPV-04-155c
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	02/29/2004 0:00
FINISH DATE AND TIME	29/02/2004 23:00
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals						Cumulative				
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	B Rameseder	28/02/2004		7	7	0	move to new hole	0	0	0.00	0	0	0	0.00
DS 0700-1900	M Story	29/02/2004		12	6	29.70	No HQ adapter. Wait until decision to use NQ. Set casing. Start drilling	29.7	6	4.95	12	6	6	4.95
NS 1900-0700	B Rameseder	29/02/2004		4	3.5	31.20	Finish hole, install thermistor, reflex, install pipe	1.5	0.5	3.00	16	9.5	6.5	4.80

OVERALL HOLE DRILL RATE (m/hr) 1.36

OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr) 4.80

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-155c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

[illegible]

DETAILED GEOTECHNICAL LOG		DRILLHOLE ID:	MPV-04-155c

DRILLHOLE ID:	MPV-04-155c

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM (m)	TO (m)	ROCK TYPE	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of Sets	Type	Totals	JOINT CONDITIONS				COMMENT	
			STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH				ANGLE	ROUGH	ALT	FILL		
5.5	5.7	AMP	R4			13	0	6	0		1	0	3	J1	4	65	4	0	1	J1 angles 65,55(2) and 70	
														J2	1	55	1	0	1		
														J3	1	65	2	0	1		
5.7	8.7	AMP	R4			25	0	13	0		1	0		J1	2	20	8	0	1		
														J2	3	60	7	0	1		
														J3	8	65	4	0	1		
8.7	11.7	AMP	R3			15	0	7	0		1	0	3	J1	4	60	5	0	9		
														J2	2	55	2	0	9		
														J3	1	70	4	0	9		
11.7	14.7	AMP	R4			18	0	8	0		1	0	3	J1	6	50	5	0	9	(2) J1 had fill of 2	
														J2	1	65	3	0	9		
														J3	1	80	4	0	9		
14.7	17.7	AMP*	R4			11	0	4	0		1	0	3	J1	2	60	5	0	9		
														J2	1	65	5	0	1		
														J3	1	60	4	0	9		
17.7	20.7	GGRN	R4			19	0	11	0		1	0	3	J1	8	60	4	0	1	J1 angles 55 to 70.	
														J2	2	80	2	0	1		
														J3	1	40	7	0	1		
20.7	23.7	GGRN	R4			21	0	6	0	0	1	1	3	J1	2	35	5	0	1	J2 angles 30, 60,80	
														J2	3	30	4	0	1		
														J3	1	30	1	0	3		
23.7	26.7	GGRN	R4			24	0	8	1	1	1	1	3	J1	5	55	5	0	3	fills are generally calcite or hematite; joint set 2 shows about 2mm brownish alteration on the rockwall; hematite stains on the sides following join	
														J2	1	35	7	1	3		
														J3	2	45	7	0	3		
26.7	29.5	GGRN	R4			14	0	4	0	0	1	0	3	J1	1	15	5	0	3		
														J2	2	35	2	0	3		
														J3	1	55	7	0	3		
29.5	31.2	AMP	R5			6	0	3	0	0	1	0	3	J1	1	45	7	0	9	Joint set 3: calcite and chlorite coating on joint surface	
														J2	1	50	5	0	3		
														J3	1	25	2	0	3		
EOH																					

Photo Record**MPV-04-155c**

Date	Shift	Filename	Depth	Description
29-Feb-04	DS 0700-1900	MPV-04-155C-3.3mbox1	3.3m - 7.02m	
29-Feb-04	DS 0700-1900	MPV-04-155C-7.02m_box2	7.02m - 11.7m	
29-Feb-04	DS 0700-1900	MPV-04-155C-11.7m_box3	11.7 - 15.8	
29-Feb-04	DS 0700-1900	MPV-04-155C-15.8m_box4	15.8 - 19.78	
29-Feb-04	NS 1900-0700	MPV-04-155C-19.78m_box5	19.78-23.8m	
29-Feb-04	NS 1900-0700	MPV-04-155C-23.8m_box6	23.8-28.03m	
29-Feb-04	NS 1900-0700	MPV-04-155C-28.03m_box7	28.03-31.2m	EOH

Core Box Record

MPV-04-155c

Box	From	To	Comments
1	3.03	7.02	
2	7.02	11.70	
3	11.70	15.80	
4	15.80	19.78	
5	19.78	23.80	
6	23.80	28.03	
7	28.03	31.20	EOH
8			
9			
10			
11			
12			

Thermistor Readings

MPV-04-155c

Thermistor String ID

32/16-7

Thermis Node	Reading (kOhms)	Comments
1	15.65	
2	13.56	
3	14.84	
4	14.37	
5	14.53	
6	14.21	
7	13.49	
8	13.35	
9	14.74	
10	14.15	
11	14.66	
12	13.50	
13	13.79	
14	13.17	
15	14.18	
16	14.34	

Reflex Readings

MPV-04-155C

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N	Magnetic Field	Temp ©
Feb 29,2004	31.2	65.6	70	51.7	5788	12.1

FIELD GEOLOGICAL LOG

HOLE ID

MPV-04-155c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	1.10	Snow/ice		Snow/ice	MS
1.1	3.5	OVb		Overburden	MS
3.5	14.7	AMP		Amphibolite (hb) with digested granite xenoliths and granitic dykelets ; amphibolite : dark green, coarse to medium grained; local biotite rich zones associate with granitic xenoliths	MS
14.70	29.50	GGRN		Gneissic granite: biotite rich, biotite shows some regulation/foliation; dark grey; compact; joint often filled with calcite and hematite; hematite stains in granite; granite is medium grained; pegmatitic sections throughout core; towards end of hole (last 3m) amphibolitic	MS/BR
29.50	31.20	AMP		Amphibolite: See above: pyrite at 29.8m	BR
EOH					

UCS SAMPLES

HOLE ID: MPV-04-155C

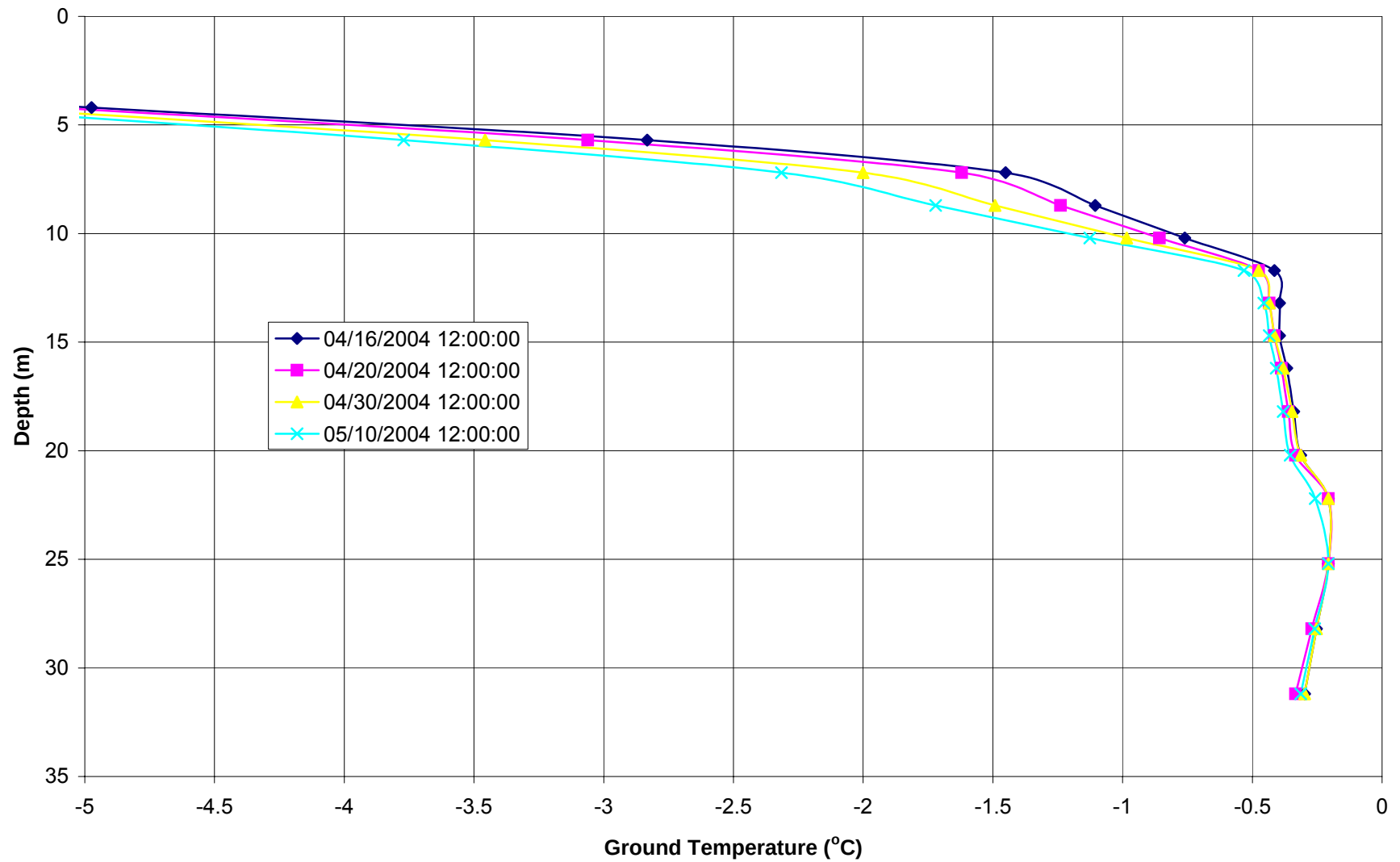
HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-155C	5	21.56-21.91	Granite/Diorite	04-UCS-155-001
MPV-04-155C	7	28.67-28.98	Granite	04-UCS-155-002

DRILL HOLE ID: **MPV-04-155C**

DRILL HOLE ID: **MPV-04-155C**

[illegible]

MPV-04-155C
Estimate



MPV_04_156C



MPV_04_156C



Diary

MPV-04-156c

NS 29/02/2004

packing at MPV-04-155c and move to new site on dyke 6

DS 1/03/2004

700hrs set up water lines. Water line to flood area for next abutment hole. Weather very cold - 36 C.
Bury waterlines. Numerous problems with freezing equipment (eg. Water swivel, gauges etc.).
Casing set to 2.1 below floor level. Bedrock at 1.5m. Ground level at 1.0m
1500hrs at 4.2m. Changed drill bit.
1700hrs lost water return at 7.5 m.
end of shift 14.7m

NS 1/03/2004

2130hrs drilled to 20.7m
2330hrs drilled to 26.7m
had to change gauge at drill as the other one was frozen
0000hrs 31.5m
0230hrs looking for reflex and all its parts (drill 4 is moving at same time)
Extreme cold weather conditions keep freezing the gauge (water pressure) at the drill
reflex reading is taken, thermistor is
0530hrs installed
pull rods and casing

Checklist - delete before finalizing and printing file

reflex??
thermistor?
protective pipe?
grouted?
staked?
summary updated?
point load test samples selected?

**FIELD DRILL
PERFORMANCE LOG**

PROJECT	Gahcho Kue Geotech
PROJECT NO	2CD002.11
NORTHING	7035377
EASTING	591530
SURFACE ELEVATION	405
AZIMUTH	327
DIP	-70

HOLE NO:	MPV-04-156c
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	03/01/2004 0:00
FINISH DATE AND TIME	02/03/2004 7:00
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

Period	Logged by	Date	Time	Period Totals				Cumulative			
				Total drill time (hr)	Standby time (hr)	Depth (m)	Standby Reason	Metreage drilled (m)	Actual drill time (hr)	Drill rate (m/hr)	Total drill time (hr)
NS 1900-0700	B Rameseder	29/2/2004		7	7	0	Pack drill and move to dyke 6	0	0	0.00	0
DS 0700-1900	M Storey	01/03/2004		12	7.5	14.70	Finish set-up; Numerous problems associated with freezing.	14.7	4.5	3.27	12
NS 1900-0700	B Rameseder	01/03/2004		12	6	31.20	finished hole, reflex, thermistor installation	16.5	6	2.75	24

OVERALL HOLE DRILL RATE (m/hr)	1.01
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	2.97

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-156c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
1.00	1.50	0.50	OVBN							
1.50	4.50	3.00	GRN	2.30	76.7	0.90	30.0	0.60	20.0	Granite, Run contains numerous fragments.
4.50	5.70	1.20	GRN	1.30	108.3	0.80	66.7	0.55	45.8	
5.70	8.70	3.00	GRN	3.06	102.0	2.30	76.7	2.10	70.0	Granite, Run contains numerous fragments.
8.70	9.60	0.90	GRN	0.95	105.6	0.78	86.7	0.74	82.2	
9.60	11.70	2.10	GRN	2.12	101.0	2.08	99.0	2.08	99.0	Granite, broken on cemented joints and microdefects along core axis
11.70	14.70	3.00	GRN	3.01	100.3	3.01	100.3	3.01	100.3	
14.70	17.70	3.00	GRN	2.98	99.3	2.95	98.3	2.95	98.3	
17.70	20.70	3.00	GRN	3.00	100.0	2.95	98.3	2.95	98.3	magnetite? in granite
20.70	23.70	3.00	GRN	3.02	100.7	2.93	97.7	2.83	94.3	
23.70	26.70	3.00	GRN	3.01	100.3	2.95	98.3	2.95	98.3	in core barrel
26.70	27.56	0.86	GRN	0.86	100.0	0.86	100.0	0.76	88.4	Handling broke many microdefects
27.56	27.95	0.39	GRN	0.50	128.2	0.25	64.1	0.25	64.1	Handling broke many microdefects, defects parallel to core axis
27.95	29.70	1.75	GRN	1.79	102.3	1.79	102.3	1.70	97.1	Handling broke many microdefects, cemented joints, weathered zone at 28.51-28.61; feldspars change to kaolinit; granite changes to pegmatite
29.70	31.20	1.50	GRN	1.52	101.3	1.52	101.3	1.52	101.3	Handling broke many microdefects
EOH										
		0.00								

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-156c**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

[illegible]

Photo Record**MPV-04-156c**

Date	Shift	Filename	Depth	Description
1-Mar-04	DS 0700-1900	MPV-04-156C-1mbox1	1m - 5.5m	
1-Mar-04	DS 0700-1900	MPV-04-156C-5.5mbox2	5.5 - 8.7	
1-Mar-04	NS 1900-0700	MPV-04-156C-8.7mbox3	8.7-12.7m	
1-Mar-04	NS 1900-0700	MPV-04-156C-12.7mbox4	12.7-17.11m	
1-Mar-04	NS 1900-0700	MPV-04-156C-17.11mbox5	17.11-21.2m	
1-Mar-04	NS 1900-0700	MPV-04-156C-21.2mbox6	21.2-25.58m	
1-Mar-04	NS 1900-0700	MPV-04-156C-25.58mbox7	25.58-29.6m	
1-Mar-04	NS 1900-0700	MPV-04-156C-29.6mbox8	29.6-31.2m	EOH

Core Box Record**MPV-04-156c**

Box	From	To	Comments
1	1.00	5.50	
2	5.50	8.70	
3	8.70	12.70	
4	12.70	17.11	
5	17.11	21.20	
6	21.20	25.58	
7	25.58	29.60	
8	29.60	31.20	EOH

Thermistor Readings

MPV-04-156c

Thermistor String ID

32/16-14

Thermis Node	Reading (kOhms)	Comments
1	14.24	
2	13.51	
3	12.64	
4	13.00	
5	12.55	
6	13.58	
7	13.08	
8	13.53	
9	12.86	
10	12.70	
11	13.05	
12	12.99	
13	13.03	
14	12.83	
15	13.20	
16	13.78	

Reflex Readings

MPV-04-156C

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp °C
02-Mar-04	31.2	315.1	69.5	350.1	5968	7.8

FIELD GEOLOGICAL LOG

HOLE ID

MPV-04-156c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	1.00	Snow, ice			MS
1.00	1.50	Overburden		tundra, small boulders cobbles.	MS
1.5	31.2	Granite		Granite: light coloured, (pink) medium grained, compact, hematite stained, chlorite in microdefects and cemented joints - coarse grained pegmatite present; at about 20m depth: magnetite? (crystals about 0.5-2cm large); at 28.51-28.61: granit weathered- feldspars change to kaolinite; pegmatitic section at 29-29.3m (large quantity of quartz)	MS/BR
EOH					

UCS SAMPLES

HOLE ID: MPV-04-156C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-156C	6	23.04-23.34	Granite	04-UCS-156-001

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5 - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	DESCRIPTION
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	CATEGORY
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

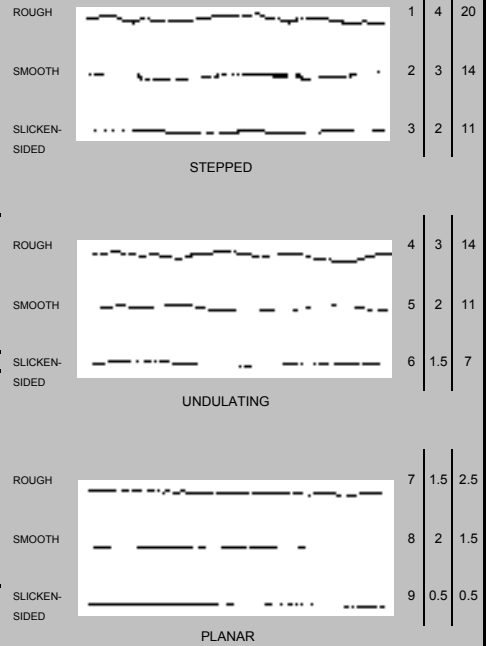
JOINT CONDITION - SMALL SCALE		
CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THICKNESS < IRREGULARITIES	
8	GOUGE THICKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher Jr JRC



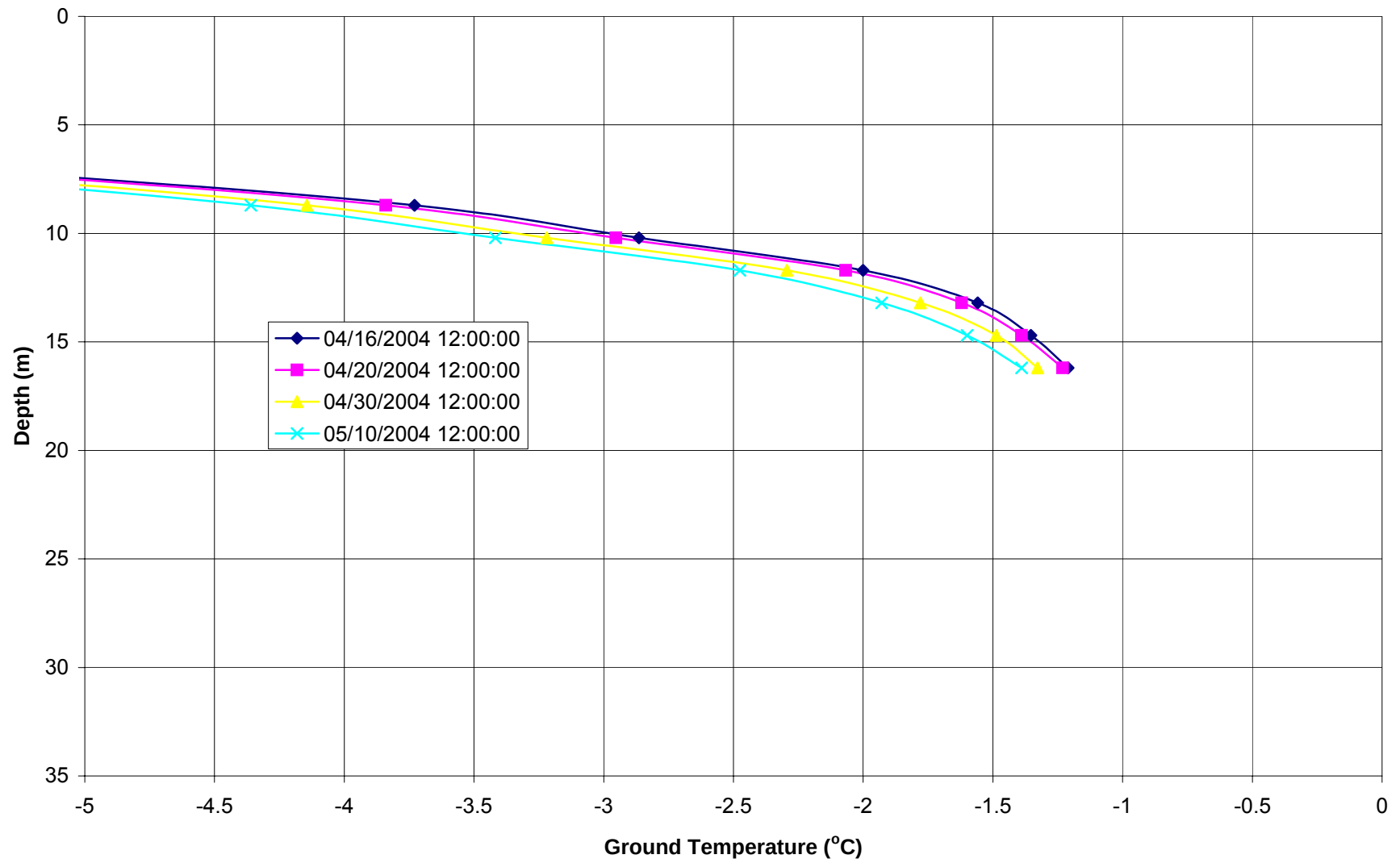
MPV_04_158C



MPV_04_158C



MPV-04-158C
Estimate



Diary

MPV-04-158c

NS 1/03/2004

ready to move

DS 2/03/2004

0700hrs Move rig, reconnect water lines, bury water
lines set up rig.
1430hrs Start installing casing.
Casing at 2.3m below floor level. Ground
surface at 0.9 m below floor. Bedrock at 2.0
m below floor.
1730hrs drilled to 8.7m
1900hrs

NS 2/03/2004

2100hrs coil stove is not working properly
11.7m
water lines and sludge are frozen
sucking lines frozen; pump shack had to be
moved and new hole in ice drilled with ice
auger; water swivel and rods frozen

DS 3/03/2004

0700hrs Rods frozen in hole. Cannot take them out.
Peter Dixon foreman of BL came out to
0930hrs assist drillers.
Rods still frozen in hole. Peter Dixon decided
to unscrew rods and take casing down to
11.7m to break up ice around rod. Peter
went back to camp to get new shoe.
1030hrs Water line froze. Drillers replaced it. End of
1130hrs shift: drill worked but rods still frozen

NS 3/03/2004

0000hrs rods and casing thawed out; 11.1 m of total
casing (drilled over rods)
0100hrs drilled to 14.7m
0145hrs drilled to 17.7m
0400hrs drilled to 23.7m
0415hrs pull rods to change bit
bit changed; cave-in; ream hole to get back
to bottom; hole froze when changing the bit
0500hrs
0630hrs ready to continue

DS 4/03/2004

0700hr continue drilling
0930hr EOH at 31.2m below floor level.
1000hr take reflex
1120hr Thermistor installed.
Unable to put casing over thermistor. Placed
1210hr stake next to Thermistor.

**FIELD DRILL
PERFORMANCE LOG**

PROJECT	Gahcho Kue Geotech
PROJECT NO	2CD002.11
NORTHING	7035359
EASTING	591539
SURFACE ELEVATION	405
AZIMUTH	327
DIP	-70

HOLE NO:	MPV-04-158c
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	03/02/2004 7:00
FINISH DATE AND TIME	03/04/2004 11:30
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
DS 0700-1900	M Storey	02/03/2004		12	7.5	8.7	Move rig, set-up, casing, start drilling	8.7	4.5	1.93	12	7.5	4.5	1.93
NS 1900-0700	B Rameseder	02/03/2004		12	10.5	11.70		3	1.5	2.00	24	18	6	1.95
DS 0700-1900	M Storey	03/03/2004		12	12	11.70	Rods frozen in hole.	0	0	#DIV/0!	36	30	6	1.95
							rods and casing thawed after freezing the previous day, hole started partially to freeze after bit change, drilled to 23.7m							
NS 1900-0700	B Rameseder	03/03/2004		12	8	23.70		12	4	3.00	48	38	10	2.37
DS 0700-1900	M Storey	04/03/2004		4.5	0.5	31.20	Install thermistor	7.5	4	1.88	52.5	38.5	14	2.23

OVERALL HOLE DRILL RATE (m/hr)	0.59
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	2.23

GENERAL GEOTECH LOG

DRILLHOLE ID: MPV-04-158c

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB.... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
0.90	2.00	1.10	OVb							OVb - overburden - small cobbles coarse gravel.
2.00	4.00	2.00	GRN	1.84	92.0	1.68	84.0	1.40	70.0	GRN - pink granite, medium grained, some large grained pegmatite.
4.00	5.70	1.70	GRN	1.75	102.9	1.75	102.9	1.75	102.9	
5.70	6.75	1.05	GRN	1.07	101.9	1.05	100.0	0.95	90.5	
6.75	6.87	0.12	GRN	0.12	100.0					broken up rock
6.87	8.70	1.83	GRN	1.92	104.9	1.92	104.9	1.92	104.9	
8.70	11.70	3.00	GRN	2.99	99.7	2.99	99.7	2.99	99.7	
11.70	14.70	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
14.70	17.70	3.00	GRN	2.96	98.7	2.96	98.7	2.92	97.3	compact pegmatite
17.70	20.70	3.00	GRN	2.98	99.3	2.98	99.3	2.98	99.3	
20.70	22.85	2.15	GRN	2.15	100.0	2.15	100.0	2.10	97.7	
22.85	23.37	0.52	GRN	0.52	100.0					broken into pieces due to mechanical breaks and cemented fractures, microdefects parallel to core axis
23.37	23.70	0.33	GRN	0.38	115.2	0.38	115.2	0.38	115.2	
23.70	26.70	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	Mechanical breaks only. Some mechanical breaks along axis.
26.70	29.70	3.00	GRN	3.02		3.02		3.02		
29.70	30.03	0.33	GRN							Rock fragments due to mechanical breakage.
30.03	31.20	1.17	GRN	1.20	102.6	1.20	102.6	1.20	102.6	EOH

DETAILED GEOTECHNICAL LOG

 DRILLHOLE ID: **MPV-04-158c**

NB: 3 sources of open joints and fractures found in drillcore
 Artificial breaks induced by drilling process
 Artificial breaks induced by core handling
 Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
 Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating did indicate artificial
 Note any weak foliation, bedding, brecciation in comments

FROM (m)	TO (m)	ROCK TYPE	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of		JOINT CONDITIONS					COMMENT
			STRONG R	WEAK R	% WEAK	ALL	OPEN REDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH	Sets	Type	Totals	ANGLE	ROUGH	ALT	FILL	
2.0	4.0	GRN	R4			18	0	7	0		1	0	3	J1	5	70	4	0	1	J1 angles: 55, 70, 75
														J2	1	50	2	0	6	
														J3	1	75	2	0	1	
4.0	5.7	GRN	R6			7	0	4	1	0	1	0	3	J1	1	80	3	0	9	J1 angles: 60 and 65
														J2	2	60	4	0	1	
														J3	1	65	2	0	6	
5.7	6.8	GRN	R5			15	0	6	0		2	1	3	J1	1	30	2	0	9	Joint set 4: angle 30, rough 5, alt 0, fill
														J2	3	25	2	0	3	
														J3	1	50	5	0	3	
6.8	6.9	GRN	R4				0													broken material due to handling and quantity of microdefects and joint
6.9	8.7	GRN	R5			13	0	2	0		1	1	2	J1	1	10	3	0	3	
														J2	1	30	1	0	3	
8.7	11.7	GRN	R5			13	0	2	0		1	0	1	J1	2	25	4	0	9	
11.7	14.7	GRN	R5	R4	20	29	0	4	0		1	0	3	J1	1	20	4	0	3	Joint set 4: 1 joint, angle 30, rough 7, alt 0, fill 3; gneissic parts; mechanically used part
														J2	1	25	4	0	3	
														J3	1	10	5	0	9	
14.7	17.7	GRN	R5			13	0	1	2	0	1	0	1	J1	1	10	5	0	3	compact pegmatitic section
17.7	20.7	GRN	R5			19	0	2	1	1	0	0	2	J1	1	25	7	0	3	cemented joint in 50 degree angle; fill about 0.2-0.4mm of dark green material, compact, no alteration, chlorite
														J2	1	30	5	0	2	
20.7	22.9	GRN	R5			17	0	6	4	1	1	1	3	J1	2	10	7	0	9	Joint set 4: 2 joints, angle 45, rough 5, alt 0, fill
														J2	1	40	2	0	3	
														J3	1	60	4	0	3	
22.9	23.4	GRN	R5																	broken material due to handling and quantity of microdefects and joint along core axis
23.4	23.7	GRN	R5			6	0	2	2	1	1	1	3	J1	1	50	2	0	3	
														J2	1	15	3	0	3	
23.7	26.7	GRN	R4			20	0	1	3	1	1	1	1							Mechanical breaks only.
26.8	29.7	GRN	R4			18	0	3	0	0	1	0	1	J1	3	65	9	0	6	One joint has no joint fill.
29.7	31.2	GRN	R6			6	0	2	0	0	1	0	2	J1	1	70	3	0	9	EOH
														J2	1	30	5		3	

Photo Record**MPV-04-158c**

Date	Shift	Filename	Depth	Description
3-Mar-04	DS 0700-1900	MPV-04-158C-.9mbox1	0.9m - 5.3m	
3-Mar-04	NS 1900-0700	MPV-04-158C-5.3mbox2	5.3m - 9.37m	
3-Mar-04	NS 1900-0700	MPV-04-158C-9.37mbox3	9.37-13.59m	
3-Mar-04	NS 1900-0700	MPV-04-158C-13.59mbox4	13.59-17.8m	
3-Mar-04	NS 1900-0700	MPV-04-158C-17.8mbox5	17.8-22.08m	
3-Mar-04	NS 1900-0700	MPV-04-158C-22.08mbox6	22.08m- 23.7m	
4-Mar-04	DS 0700-1900	MPV-04-158C-23.7mbox7	23.7m - 27.72m	
4-Mar-04	DS 0700-1900	MPV-04-158C-27.72mbox8	27.72m - 31.2m EOH	

Core Box Record

MPV-04-158c

Box	From	To	Comments
1	0.9m	5.3m	
2	5.3m	9.37m	
3	9.37m	13.59m	
4	13.59m	17.8m	
5	17.8m	22.08m	
6	22.08m	23.7m	
7	23.7m	27.72m	
8	27.72m	31.2m	EOH
9			
10			
11			
12			

Thermistor Readings

MPV-04-158c

Thermistor String ID

32/16-16

Thermis Node	Reading (kOhms)	Comments
1	16.65	
2	14.63	
3	14.60	
4	14.89	
5	14.84	
6	14.80	
7	15.00	
8	15.18	
9	14.47	
10	15.21	
11	14.46	
12	14.80	
13	15.32	
14	14.86	
15	14.89	
16	14.76	

Reflex Readings**MPV-04-158C**

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp °C
04-Mar-04	31.2	317.3	69.4	134.6	6001	10.4

FIELD GEOLOGICAL LOG

HOLE ID

MPV-04-158c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	0.90	Ice/snow		Ice/snow	MS
0.9	2.00	Overburden		Overburden: small cobbles coarse gravel	MS
2.00	31.2 (EOH)	Granite		Granite: pink granite, hematite stains, broken due to fractures; medium grained, some large grained pegmatite; at 8.5m: magnetite crystals up to 0.5cm; at 12- 13m gneissic sections; at 15.5-17.5m pegmatitic; at 22.0- 23.7 mafic mineral content higher	MS/BR

UCS SAMPLES

HOLE ID: MPV-04-158C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-158C	7	24.57	GRANITE	04-UCS-158-001

POINT LOAD TEST - INPUT

DRILL HOLE ID: MPV-04-158C

[illegible]

MPV_04_160C



Diary

MPV-04-160c

DS 04/03/2004

1230hrs Prepare rig for move from previous location.
Wait for loader to arrive.

1730hrs Rig, shack etc. in new location at D1-GB-1.

NS 04/03/2004

2130hrs 1.6m ice

casing to 3.8m lake bottom start drilling
ahead in order to get sediments no recovery

hole depth 9m, casing 6.5m; advance

2300hrs additional casing to bedrock

0015hrs casing added to 9m

0300hrs drilled to 11.9m

0445hrs drilled to 17.9m

pull rods, prepare packer

pressure gauge at flow meter was not
working, had to get replacement

0620hrs start packer

finish 1st packer test; no water flow due to
frozen ground/permafrost?

0645hrs

DS 05/03/2004

700hrs Continue drilling.

0930hrs Set up for packer testing at 16.4 - 20.9m.

1030hrs packer testing completed.

1215hr Set up for packer testing at 19.4 - 23.9m.

1315hr packer testing completed.

1445hr Set up for packer testing at 22.4 - 26.9m.

1545hr packer testing completed.

finish drilling to 29.9m and packer test at last
interval

NS 05/03/2004

1945hrs reflex test finished

cemented hole

2200hrs start packing

**FIELD DRILL
PERFORMANCE LOG**

PROJECT	Gahcho Kue Geotech
PROJECT NO	2CD002.11
NORTHING	7035413
EASTING	591509
SURFACE ELEVATION	404
AZIMUTH	0
DIP	-90

HOLE NO:	MPV-04-160c
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	04-Mar-2004 1230hrs
FINISH DATE AND TIME	05-Mar-2004 2200hrs
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

Period	Logged by	Date	Time	Period Totals				Cumulative			
				Total drill time (hr)	Standby time (hr)	Depth (m)	Standby Reason	Metreage drilled (m)	Actual drill time (hr)	Drill rate (m/hr)	Total drill time (hr)
DS 0700-1900	M Story	4-Mar-04		7	7	0	Move rig from previous location.	0	0	0.00	0
							advance drilling slowly in order to get sediments, pressure gauge was broken on packer set-up	17.9	9.75	1.84	12
NS 1900-0700	B Rameseder	4-Mar-04		12	2.25	17.90					2.25
DS 0700-1900	M Story	5-Mar-04		12	4	29.90	5 times packer testing.	12	8	1.50	24
NS 1900-0700	B Rameseder	5-Mar-04		3	3	29.90	reflex, cement hole, pull down for move	0	0	0.00	27

OVERALL HOLE DRILL RATE (m/hr) 0.88

OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr) 1.68

GENERAL GEOTECH LOG

DRILLHOLE ID: MPV-04-160c

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

[illegible]

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID: MPV-04-160c

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM (m)	TO (m)	ROCK TYPE	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of Sets	Type	Totals	JOINT CONDITIONS				COMMENT
			STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH				ANGLE	ROUGH	ALT	FILL	
3.8	8.5	OVB				0	0	0	0	0	0	0								
8.5	10.5	AGRN	R2			0	0	0	0	0	0	0								AGRN: altered granite: broken up grinded pieces due to alteration of feldspars in granite to clay, large quartz filled fractures parallel to core axis and drilling; clay seam at 9.65-9.7m
10.5	11.9	AGRN	R2			18	0	5	4	2	1	1	3	J1	3	35	5	0	3	0.5cm quartz fill in cemented joints; fill is harder than granite; medium sized fill; broken cemented joints stepped to smoothly stepped; sometimes alteration (weaker than wallrock)
11.9	12.6	AGRN	R2			6	0	1	3	1	1	1	1	J3	1	15	7	0	3	
12.6	13.5	AGRN	R2			0	0	0	0	0	0	0	1	J1	1	20	2	0	3	
13.5	14.9	AGRN	R3			14	0	5	3	1	1	1	3	J1	1	55	7	0	3	AGRN: altered granite: broken up grinded pieces due to alteration of feldspars in granite to clay, large quartz filled fractures parallel to core axis and drilling
14.9	17.9	AGRN	R4			30	0	13	2	1	1	1	3	J2	3	40	7	2	3	
17.9	20.4	AGRN	R4			11	0	6	0		1	1	3	J3	1	40	4	0	3	point set 3: quartz filling, on top of filling rock is weathered to coarse grains and some clay; joint set 4 angle 60, rough 7, alt 0, fill 3, joint set 5 2 joints, angle 85, rough 7, alt 0, fill 3
20.9	23.9	AGRN	R5			19	0	7	0		1	1	3	J1	2	65	5	1	9	J2 set: angles 25,30, 35.
23.9	26.7	AGRN	R4			18	0	5	2	0	1	0	3	J2	3	35	4	0	3	
26.7	26.9	AGRN	R4											J3	1	45	2	0	2	
26.9	29.9	GRN	R4			22	0	6	2	1	1	1	3	J1	1	75	8	0	9	2/J4 -50 deg, roughness -5, alt - 0, fill-3 (1) J5-75, roughness - 2, alt
EOH														J2	2	40	4	0	3	
														J3	2	60	5	0	3	
														J2	1	45	2	0	3	
														J3	2	80	2	0	2	
														J1	1	65	7	0	3	
														J2	2	75	7	0	3	
														J3	1	10	7	0	3	joint set 4: 2 joints, angle 45, rough 5, alt 0, fill 9

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	3.80	Ice/water		to 1.6m ice, 2.2m water	BR
3.8	8.45	OVB		OVB: overburden consisting of several cobbles and boulders (granite, gneiss, pegmatite) up to 30 cm long	BR
8.45	29.90	Altered Granite		Altered Granite: greenish -grey colour with pinkish specks; rock has waxy appearance, plagioclase seems to alter to caolinite (clay), K-feldspars still visible as pink megacrysts, clay seam at 9.65-9.7m depth; rock contains many quartz veins (up to 0.5cm thickness of fill); green=chlorite?, traces of sulphides observed at 11.6-11.9m; at 11.9-12.2 large quartz veins (up to 2cm thick) starting at 13.5m granite starts to become more compact, feldspar and mafic minerals seem fresher, more pink in colour; hematite stained, higher mafic mineral content (more mica), sometimes vuggy appearance	BR
EOH					

Photo Record

MPV-04-160c

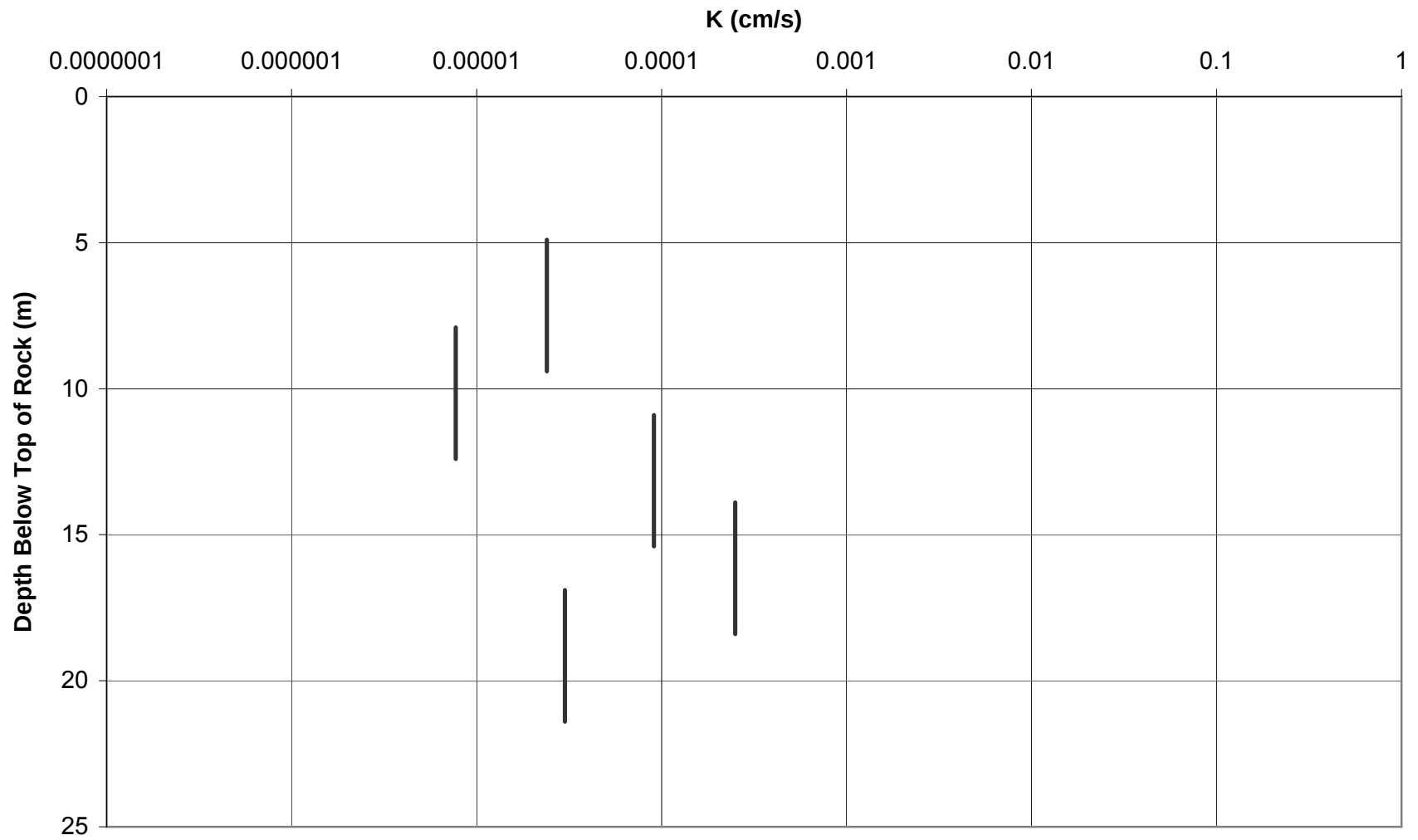
Date	Shift	Filename	Depth	Description
04/03/2004	NS 1900-0700	MPV-04-160C-3.8mbox1	3.8-10.85m	overburden, altered granite
04/03/2004	NS 1900-0700	MPV-04-160C-10.85mbox2	10.85-14.9m	altered granite
05/03/2004	DS 0700-1900	MPV-04-160C-14.9mbox3	14.9 - 19.27m	
05/03/2004	DS 0700-1900	MPV-04-160C-19.27mbox4	19.27 - 23.62	
05/03/2004	NS 1900-0700	MPV-04-160C-23.62mbox5	23.62-27.8m	
05/03/2004	NS 1900-0700	MPV-04-160C-27.8mbox6	27.8-29.9m	EOH

Core Box Record

MPV-04-160c

Box	From	To	Comments
1	3.80	10.85	OVB, altered granite
2	10.85	14.90	altered granite
3	14.90	19.27	
4	19.27	23.62	
5	23.62	27.80	
6	27.80	29.90	EOH

Permeability vs Depth
MPV_04_160C



Packer Test Data

Date	3/4/2004, 3/5/2004
Staff	M Story, B. Rameseder
Init. WL:	0
Ref. Pt.	drill shack floor
Dip	90

MPV-04-160c

Test 1 13.4 17.9

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	5319.60			no leaks
	1	5319.65	0.05	4.0	
	2	5319.70	0.05		
	3	5319.75	0.05		
	4	5319.80	0.05		
2	0	5320.40		7.0	no leaks
	1	5320.45	0.05		
	2	5320.50	0.05		
	3	5320.55	0.05		
	4	5320.60	0.05		
3	0	5321.30		10.5	no leaks
	1	5321.75	0.45		
	2	5322.00	0.25		
	3	5322.20	0.20		
	4	5322.45	0.25		
4	0	5322.45		7.5	no leaks
	1	5322.50	0.05		
	2	5322.65	0.15		
	3	5322.80	0.15		
	4	5322.95	0.15		
5	0	5323.10		4.0	no leaks
	1	5323.10	0.00		
	2	5323.10	0.00		
	3	5323.12	0.02		
	4	5323.14	0.02		
	5	5323.16	0.02		

Summary	13.4	17.9
Flow rate (gpm)	Pressure (psi)	
0.50	4.0	
0.50	7.0	
2.33	10.5	
0.15	7.5	
0.02	4.0	

Test 2 16.4 20.9

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments
1	0	5323.80			no leaks
	1	5323.80	0.00	5.0	
	2	5323.80	0.00		
	3	5323.80	0.00		
	4	5323.80	0.00		
	5	5323.80	0.00		
2	0	5324.30			no leaks
	1	5324.40	0.10	10.0	
	2	5324.50	0.10		
	3	5324.60	0.10		
	4	5324.70	0.10		
	5	5324.80	0.10		
3	0	5325.40		15.0	no leaks
	1	5325.50	0.10		
	2	5325.70	0.20		
	3	5325.80	0.10		
	4	5325.85	0.05		
	5	5325.95	0.10		
	6	5326.05	0.10		
	7	5326.15	0.10		
4	0	5326.20		10.0	no leaks
	1	5326.30	0.10		
	2	5326.35	0.05		
	3	5326.40	0.05		
	4	5326.45	0.05		
5	0	5326.45		5.0	no leaks
	1	5326.45	0.00		
	2	5326.45	0.00		
	3	5326.45	0.00		
	4	5326.45	0.00		

Summary	16.4	20.9
Flow rate (gpm)	Pressure (psi)	
0.0	5.0	
0.1	10.0	
0.1	15.0	
0.05	10.0	
0.0	5.0	

Test 3 19.4 23.9

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments
1	0	5334.20			no leaks
	1	5335.00	0.80	7.0	
	2	5335.30	0.30		
	3	5335.60	0.30		
	4	5336.00	0.40		
	5	5336.30	0.30		
2	6	5336.60	0.30		
	0	5338.00		14.0	no leaks
	1	5338.70	0.70		
	2	5339.30	0.60		
	3	5340.00	0.70		
	4	5340.70	0.70		
3	5	5341.40	0.70		
	0	5343.50		20.0	no leaks
	1	5344.50	1.00		
	2	5345.40	0.90		
	3	5346.30	0.90		
	4	5347.30	1.00		
5	5348.3	1.00			

Summary	19.4	23.9
Flow rate (gpm)	Pressure (psi)	
0.33	7.0	
0.70	14.0	
0.97	20.0	
0.83	14.0	
0.36	7.0	

4	0	5349.00		14.0	no leaks
	1	5349.60	0.60		
	2	5350.40	0.80		
	3	5351.20	0.80		
	4	5351.90	0.70		
	5	5352.80	0.90		
	6	5353.60	0.80		
	7	5354.40	0.80		
5	0	5354.50		7.0	no leaks
	1	5354.80	0.30		
	2	5355.10	0.30		
	3	5355.40	0.30		
	4	5355.80	0.40		
	5	5356.20	0.40		

Test 4 22.4 26.9

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	5371.00		8.0	no leaks
	1	5372.10	1.10		
	2	5373.30	1.20		
	3	5374.40	1.10		
	4	5375.00	0.60		
	5	5376.50	1.50		
	6	5377.60	1.10		
	7	5378.70	1.10		
	8	5379.80	1.10		
2	0	5382.00		16.0	no leaks
	1	5384.60	2.60		
	2	5386.90	2.30		
	3	5389.30	2.40		
	4	5391.60	2.30		
	5	5394.10	2.50		
3	0	5403.50		25.0	no leaks
	1	5406.50	3.00		
	2	5409.60	3.10		
	3	5412.80	3.20		
	4	5415.90	3.10		
	5	5418.9	3.00		
4	0	5421.00		15.0	no leaks
	1	5423.20	2.20		
	2	5425.40	2.20		
	3	5427.20	1.80		
	4	5429.20	2.00		
	5	5431.20	2.00		
	6	5433.20	2.00		
5	0	5435.00		8.0	no leaks
	1	5436.00	1.00		
	2	5437.40	1.40		
	3	5438.70	1.30		
	4	5439.90	1.20		
	5	5441.10	1.20		

Summary 22.4 26.9

Flow rate (gpm)	Pressure (psi)
1.10	8.0
2.40	16.0
3.10	25.0
2.00	15.0
1.23	8.0

Test 5 25.4 29.9

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	5460.20		10.0	no leaks
	1	5460.40	0.20		
	2	5460.55	0.15		
	3	5460.70	0.15		
	4	5460.85	0.15		
	5	5461.00	0.15		
	6	5461.15	0.15		
2	0	5461.50		20.0	no leaks
	1	5461.80	0.30		
	2	5462.10	0.30		
	3	5462.60	0.50		
	4	5462.95	0.35		
	5	5463.30	0.35		
	6	5463.70	0.40		
	7	5464.05	0.35		
3	0	5464.70		30.0	no leaks
	1	5465.10	0.40		
	2	5465.60	0.50		
	3	5466.10	0.50		
	4	5466.55	0.45		
	5	5467.05	0.50		
4	0	5467.90		20.0	no leaks
	1	5468.30	0.40		
	2	5468.60	0.30		
	3	5468.95	0.35		
	4	5469.30	0.35		
	5	5469.60	0.30		
5	0	5469.80		10.0	no leaks
	1	5470.00	0.20		
	2	5470.20	0.20		
	3	5470.25	0.05		
	4	5470.45	0.20		
	5	5470.65	0.20		
	6	5470.85	0.20		

Summary 25.4 29.9

Flow rate (gpm)	Pressure (psi)
0.15	10.0
0.37	20.0
0.48	30.0
0.33	20.0
0.20	10.0

Permeability Summary

MPV-04-160c

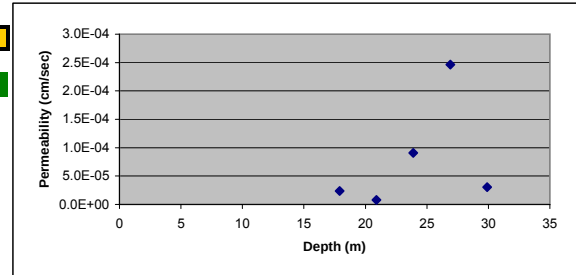
from	to		Step 1	Step 2	Step 3	Step 4	Step 5	Avg K
13.4	17.9	gauge (psi)	4	7	10.5	7.5	4	
		Qavg (igpm)	0.05	0.05	0.233	0.15	0.02	
		K cm/sec	2.2E-05	1.3E-05	3.9E-05	3.5E-05	8.8E-06	2.4E-05
16.4	20.9	gauge (psi)	5	10	15	10	5	
		Qavg (igpm)	0	0.1	0.1	0.05	0	
		K cm/sec	0.0E+00	1.8E-05	1.2E-05	8.8E-06	0.0E+00	7.7E-06
19.4	23.9	gauge (psi)	7	14	20	14	7	
		Qavg (igpm)	0.33	0.7	0.97	0.83	0.36	
		K cm/sec	8.3E-05	8.8E-05	8.6E-05	1.0E-04	9.1E-05	9.1E-05
22.4	26.9	gauge (psi)	8	16	25	15	8	
		Qavg (igpm)	1.1	2.4	3.1	2	1.23	
		K cm/sec	2.4E-04	2.6E-04	2.2E-04	2.4E-04	2.7E-04	2.5E-04
25.4	29.9	gauge (psi)	10	20	30	20	10	
		Qavg (igpm)	0.15	0.37	0.48	0.33	0.2	
		K cm/sec	2.65E-05	3.27E-05	2.82E-05	2.91E-05	3.53E-05	3.0E-05

Equations: $Hf = 8.65 \times 10^{-15} (Q^2 * Lp / rp^5)$
 $H_{nit} = (Dw' + Hg - Hf) + Pg / 1.42$
 $K = (Q * Ln(R/rb)) / (2 * \pi * H_{nit} * L)$

Overall 8.0E-05

assume
- vertical drillhole
- water at ground surface
- height of gauge is at rig flr
- negligible friction losses

Dw	Measured depth of static water (L)	0 m
Dp	Measured depth to packer	m
Dt	Depth to midpoint of test	m
Inc	Inclination from horizontal	90 m
Dw'	Vertical depth to static water level	°
Dp'	Vertical depth to packer	m
Dt'	Vertical depth to midpoint of test	m
Hg	Gauge height	0 m
Lp	Length of discharge pipe	m
rp	Radius of discharge pipe (1" = 0.0127m)	m
R	Radius of influence (10m is standard)	10 m
rb	Drillhole radius (HQ=0.048m, NQ=0.038m)	0.038 m
L	Length of test section	m
Hf		0 m



Reflex Readings

MPV-04-160C

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp °C
05-Mar-04	29.9	276.3	89.3	227.7	6020	6.8

UCS SAMPLES

HOLE ID: MPV-04-160C

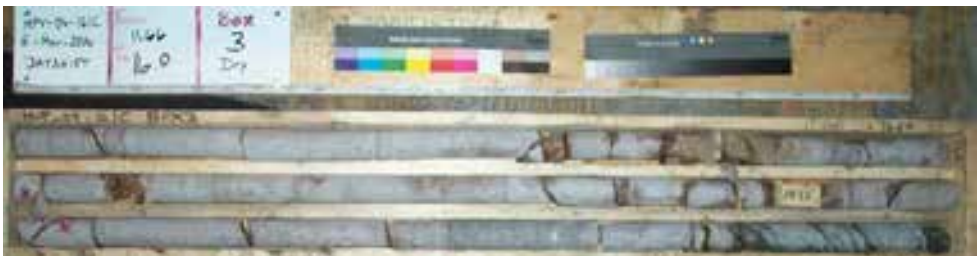
HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-160C	6	27.52-27.82	Granite	04-UCS-160-001

[illegible]

MPV-04-160C

[illegible]

MPV_04_161C



MPV_04_161C



Diary

MPV-04-161c

NS 5/03/2004

2200hrs start packing and moving from MPV-04-160c to this hole
0700hrs move completed, ready for casing

DS 6/03/2004

0700hrs Start casing. New drillers on site. BL gave new drillers orientation.
Casing at 5.55m below floor level. Bedrock at 3.25 m . 0.55m to snow/ice. 1.15m to ground level.
1200hrs
1600hrs at 14.6m
1900hrs at 23.55m

NS 6/03/2004

New helper; change bit
2100hrs start drilling
2230hrs 26.55m
2330hrs 29.55m
0100hrs 31.55m
0200hrs reflex completed
0400hrs thermistor installed, rods pulled

**FIELD DRILL
PERFORMANCE LOG**

PROJECT	Gahcho Kue Geotech
PROJECT NO	2CD002.11
NORTHING	7035467
EASTING	591477
SURFACE ELEVATION	406.2
AZIMUTH	147
DIP	-70

HOLE NO:	MPV-04-161c
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	5-Mar 2004 2200hrs
FINISH DATE AND TIME	7-Mar 2004 0400hrs
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals						Cumulative				
Period	Logged by	Date	Time	Total drill time	Standby time	Depth	Standby Reason	Metreage drilled	Actual drill time	Drill rate	Total drill time	Standby time	Actual drill time	Drill rate
				[hr]	[hr]	[m]		[m]	[hr]	[m/hr]	[hr]	[hr]	[hr]	[m/hr]
NS 1900-0700	B Rameseder	03/05/2004		9	9	0	move and set-up	0	0	0.00	0	0	0	0.00
DS 0700-1900	M Story	03/06/2004		12	0	23.55		23.55	12	1.96	12	0	12	1.96
NS 1900-0700	B Rameseder	03/06/2004		9	5	31.55	change bit, reflex, put thermistor in hole	8	4	2.00	21	5	16	1.97

OVERALL HOLE DRILL RATE (m/hr)

1.05

OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)

1.97

[illegible][illegible][illegible][illegible]

DETAILED GEOTECHNICAL LOG		DRILLHOLE ID:	MPV-04-161c

DRILLHOLE ID: **MPV-04-161c**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM (m)	TO (m)	ROCK TYPE	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of Sets	Type	Totals	JOINT CONDITIONS				COMMENT
			STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH				ANGLE	ROUGH	ALT	FILL	
3.25	5.55	GRN	R4			16	0	6	0		1	0	3	J1	2	65	2	0	9	J1: angles 65, 80; heatite staining. J2:angles 35, 40. Heatite at J2.
														J2	3	40	2	0	3	
														J3	1	70	5	0	3	
5.60	8.60	GRN	R6			19	0	8	0		1	0	3	J1	3	45	5	0	3	J1 angles 65, 45.
														J2	2	45	2	0	3	
														J3	3	80	4	0	3	
9.25	11.55	GRN	R5			11	0	2	1	0	1	0	3	J1	1	45	5	0	9	Broken rock fragments.
														J2	1	65	5	0	3	
														J3	1	75	2	0	3	
11.55	14.55	GRN	R6			16	0	6	0		1	1	3	J1	3	80	5	0	9	J1 angles 80, 80, 70. J2 angles 70, 80. J4: 75 degrees; rough:2; alt:0; fill:3.
														J2	2	70	5	0	1	
														J3	2	60	5	0	3	
14.55	17.55	GRN	R5			26	0	3	1	0	1	0	3	J1	1	65	5	0	9	
														J2	1	65	4	0	9	
														J3	1	50	4	0	9	
17.55	20.55	GRN	R4			15	0	2	0	0	1	0	2	J1	2	65	5	0	3	J1: angles 65, 70.
20.55	23.55	GRN	R5			23	0	4	2	0	1	0	2	J1	3	45	2	0	3	
														J2	1	10	5	0	3	
23.55	26.55	GRN	R5			9	0	0	0		1	0								
26.55	29.55	GRN	R5			11	0	2	1	1	1	0	2	J1	1	15	2	0	3	chlorite coating on joints
														J2	1	30	5	0	3	
29.55	31.55	GRN	R5			8	0	1	0		1	0	1	J1	1	20	3	0	3	
EOH																				

FIELD GEOLOGICAL LOG

HOLE ID

MPV-04-161c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0	1.13	Ice/snow		Ice/snow	MS
1.13	3.25	OVb		Overburden	MS
3.25	31.5	GRN		Granite: pinkish-grey, medium grained with some pegatitic sections, some quartz veins, hematite/chlorite staining observed at some joints, compact, fresh granite	MS
EOH					

Photo Record**MPV-04-161c**

Date	Shift	Filename	Depth	Description
03/06/2004	DS 0700-1900	MPV-04-160C-3.18mbox1	3.18 - 7.5m	
03/06/2004	DS 0700-1900	MPV-04-160C-7.5mbox2	7.5 - 11.66m	
03/06/2004	DS 0700-1900	MPV-04-160C-11.66mbox3	11.66 - 16.00m	
03/06/2004	DS 0700-1900	MPV-04-160C-16.00mbox4	16.00 - 20.55m	
03/06/2004	NS 1900-0700	MPV-04-160C-20.55mbox5	20.55-24.49m	
03/06/2004	NS 1900-0700	MPV-04-160C-24.49mbox6	24.49-28.8m	
03/06/2004	NS 1900-0700	MPV-04-160C-28.8mbox7	28.8-31.55m	EOH

Core Box Record

MPV-04-161c

Box	From	To	Comments
1	3.18	7.50	
2	7.50	11.66	
3	11.66	16.00	
4	16.00	20.55	
5	20.55	24.49	
6	24.49	28.80	
7	28.80	31.55	EOH

Reflex Readings

MPV-04-161C

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
07-Mar-04	31.55	135.5	68.7	349.7	6008	7.9

Thermistor Readings

MPV-04-161c

Thermistor String ID

32/16-13

Thermis Node	Reading (kOhms)	Comments
1	15.26	
2	15.18	
3	16.19	
4	14.39	
5	14.24	
6	15.38	
7	15.31	
8	15.16	
9	14.31	
10	15.19	
11	14.36	
12	15.43	
13	14.77	
14	14.83	
15	15.73	
16	16.04	

UCS SAMPLES

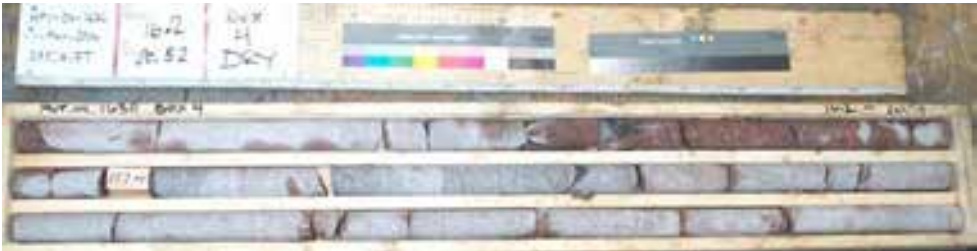
HOLE ID: MPV-04-161C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-161C	7	29.64-29.93	Granite	04-UCS-161-001

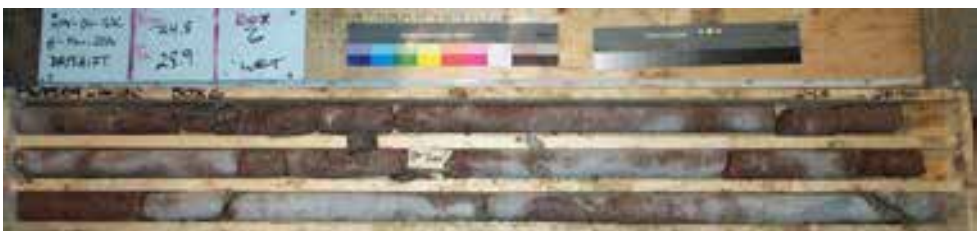
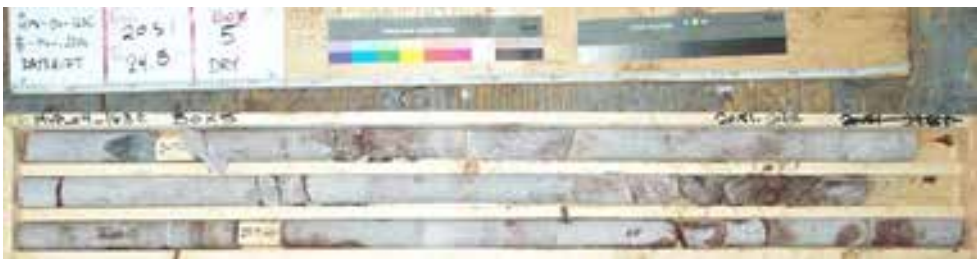
DRILL HOLE ID: **MPV-04-161C**

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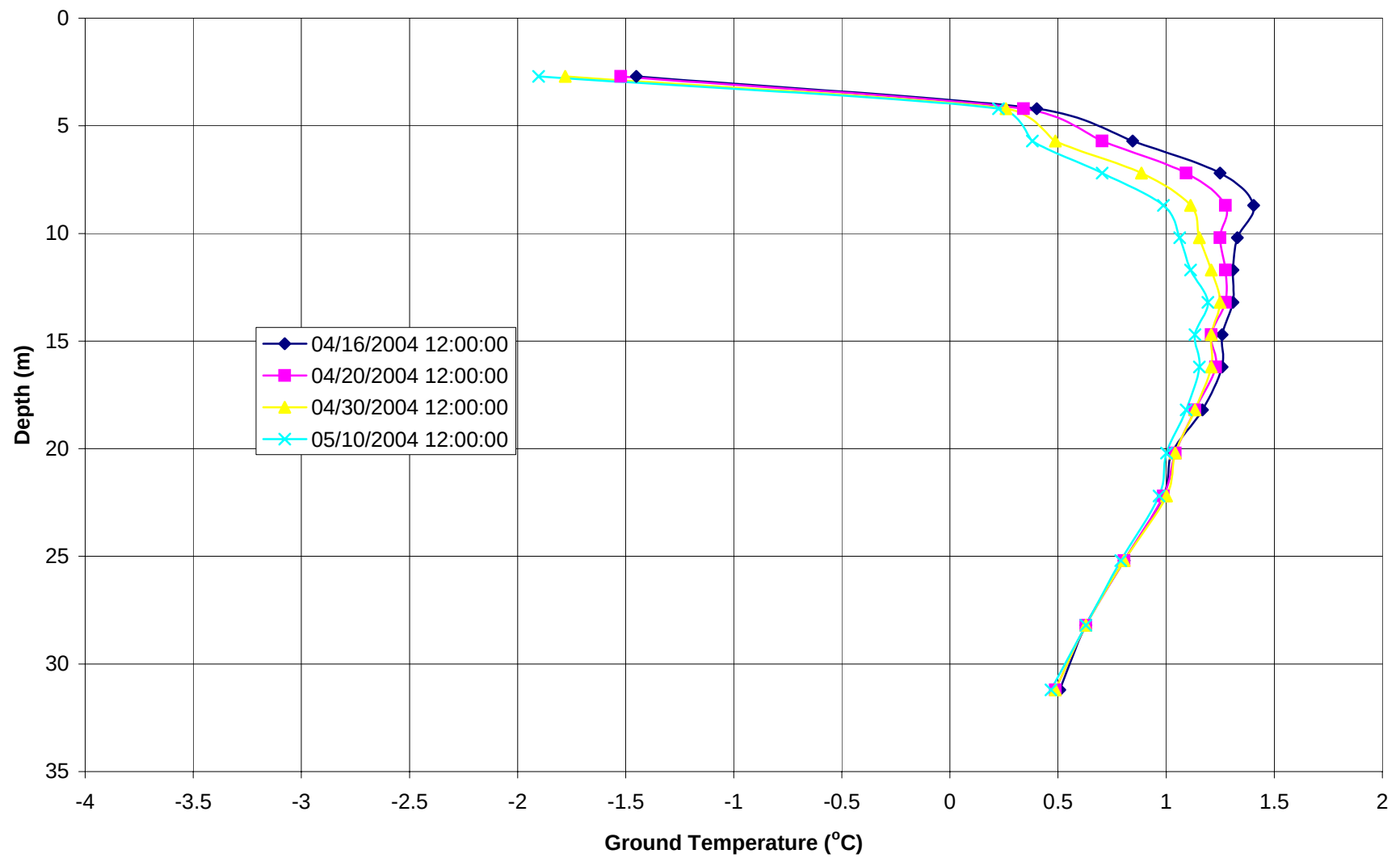
MPV_04_163C



MPV_04_163C



MPV-04-163C



Diary

MPV-04-163c

DS 07/03/2004

0700hrs Rig at new location. Drillers need to install new oil stove, bury lines et.
1000hrs Start casing
Casing at 4.2m below floor level. Bedrock at 4.2m below floor level. Ground level at 1.2m
1230hrs
1300hrs Drill down to 5.2m. Loss of return at 5m.
1315hrs Water intake pump stopped.
1350hrs Water intake pump back online.
Drill rig shut down for repairs. Water kept circulating.
1415hrs
1515hrs Rig back online.
1630hrs Drill bit finished.
1645hrs Whiteout conditions. Drillers stop work.

NS 07/03/2004

Night shift drillers showed up to maintain rig overnight during whiteout. No drilling allowed due to unsafe conditions caused by whiteout. NS Geologist stayed at camp due to unsafe conditions.
1700hrs

DS 08/03/2004

0700hrs Drillers continue to drill.
1000hrs down to 14.7m
1200hrs Driller change sludge pump.
1400hrs Generator offline.
1645hrs Generator online.
1730hrs EOH @ 31.2m
1800hrs Take reflex.

NS 08/03/2004

thermistor installation completed; new driller; ground level surface was underestimated (more than 2 m thermistor sticking out off ground)
2100hrs started to pull down for move; white-out called

**FIELD DRILL
PERFORMANCE LOG**

PROJECT	Gahcho Kue Geotech
PROJECT NO	2CD002.11
NORTHING	7035450
EASTING	591487
SURFACE ELEVATION	405.2
AZIMUTH	0
DIP	-70

HOLE NO:	MPV-04-163c
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	7/3/2004 0700hrs
FINISH DATE AND TIME	8/3/2004 2200hrs
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time	Standby time	Depth	Standby Reason	Metreage drilled	Actual drill time	Drill rate	Total drill time	Standby time	Actual drill time	Drill rate
				[hr]	[hr]	[m]		[m]	[hr]	[m/hr]	[hr]	[hr]	[hr]	[m/hr]
DS 0700-1900	M Storey	7-Mar-04		12	8	11.7	Set up rig, install new stove coil, shut down drill rig for repairs/maintenance, white out.	11.7	4	2.93	12	8	4	2.93
NS 1900-0700	B Rameseder	7-Mar-04		12	12	0.00	White out conditions. No drilling was conducted.		0		24	20	4	0.00
DS 0700-1900	M Storey	8-Mar-04		12	3	31.20	maintain generator, reflex	31.2	9	3.47	36	23	13	2.40
NS 1900-0700	B Rameseder	8-Mar-04		4	4	0.00	install thermistor, pull rods; white-out call		0		40	27	13	0.00

OVERALL HOLE DRILL RATE (m/hr) 1.07

OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr) 3.30

[illegible][illegible][illegible][illegible]

DETAILED GEOTECHNICAL LOG																DRILLHOLE ID:		MPV-04-163c					
NB: 3 sources of open joints and fractures found in drillcore Artificial breaks induced by drilling process Artificial breaks induced by core handling Natural joints that are present in the rock mass																Open Fractures = All Open Discontinuities (including those induced by drilling BUT excluding those created by core handling) Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process) Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial Note any weak foliation, bedding, brecciation in comments							
FROM (m)	TO (m)	ROCK TYPE	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of Sets	Type	Totals	JOINT CONDITIONS				COMMENT			
			STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH				ANGLE	ROUGH	ALT	FILL				
5.7	8.7	GRN	R5			30	0	13	0		1	0	2	J1	7	60	5	0	3	J1 angles range from 45 to 75. J2 angles range from 40 to 55.			
														J2	6	45	4	0	3				
8.7	11.7	GRN	R4			15	0	5	0		1	0	3	J1	1	75	7	0	1	J2 angles (2) 80, (1) 50.			
														J2	3	80	5	0	1				
														J3	1	90	4	0	1				
11.7	14.7	GRN	R5			18	0	6	0		1	0	3	J1	2	30	5	0	3	J4: 75 deg.,rough 5;alt 0; fill 1.			
														J2	2	50	2	0	1				
														J3	1	60	4	0	3				
14.7	17.7	GRN	R5			14	0	1	0		1	0	1	J1	1	25	3	0	3	Calcite coating on J1.			
17.7	20.7	GRN	R6			15	0	1	0		0		1	J1	1	45	5	0	1				
20.7	23.7	GRN	R6			13	0	8	0		0		2	J1	7	75	5	0	1	J1 angles from (1) 65, (4)/75, (1)65, (1)80.			
														J2	1	80	2	0	1				
																			1				
23.7	26.7	GRN	R4			13	0	9	0		0		3	J1	6	60	4	0	3	J2 angles: 60,65, 70.			
														J2	3	65	5	0	3				
26.7	29.7	GRN	R6			9	0	3	0		1	0	2	J1	2	70	5	0	1				
														J2	1	35	5	0	1				
29.7	31.2	GRN	R5			7	0	0	0		1	0											
EOH																							

DRILLHOLE ID: MPV-04-163c

Photo Record**MPV-04-163c**

Date	Shift	Filename	Depth	Description
7-Mar-04	DS 0700-1900	MPV-04-163C-4.2mbox1	4.2 - 8.1m	wet
7-Mar-04	DS 0700-1900	MPV-04-163C-8.1mbox2	8.1 - 11.7m	
8-Mar-04	DS 0700-1900	MPV-04-163C-11.7mbox3	11.7 - 14.7m	
8-Mar-04	DS 0700-1900	MPV-04-163C-20.51mbox4	16.2 - 20.51	
8-Mar-04	DS 0700-1900	MPV-04-160C-20.55mbox5	20.51 - 24.8m	
8-Mar-04	DS 0700-1900	MPV-04-163C-24.8mbox6	24.8 - 28.9m	
8-Mar-04	DS 0700-1900	MPV-04-163C-28.9mbox7	28.9 - 31.2m	EOH

Core Box Record

MPV-04-163c

Box	From	To	Comments
1	4.20	8.10	
2	8.10	11.70	
3	11.70	16.20	
4	16.20	20.52	
5	20.52	24.80	
6	24.80	28.90	
7	28.90	31.20	EOH
12			

Reflex Readings

MPV-04-163C

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N	Magnetic Fielc	Temp ©
08-Mar-04	31.2	123.9	68.5	247.3	6098	7.9

Thermistor Readings

MPV-04-163c

Thermistor String ID

32/16-15

Thermis Node	Reading (kOhms)	Comments
1	14.09	
2	16.03	
3	16.15	
4	15.29	
5	13.89	
6	14.90	
7	15.71	
8	16.11	
9	15.30	
10	13.91	
11	15.75	
12	14.27	
13	15.40	
14	15.40	
15	15.65	
16	14.17	

FIELD GEOLOGICAL LOG

HOLE ID

MPV-04-163c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0	1.8*	Snow/ice		Snow/ice (*corrected)	
1.8*	4.20	OVBN		OVBN	
4.2	31.2 (EOH)	GRN		Granite: pinkish-grey, medium grained, some pegmatitic sections.	MS

UCS SAMPLES

HOLE ID: MPV-04-163C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-163C	7	29.39-29.70	Granite	04-UCS-163-001

DRILL HOLE ID: MPV-04-163C

[illegible]

Diary

MPV-04-166c

NS 08/03/2004

start draining hoses and pulling down rig;
white out called at about 22.00 hrs; Peter
Dixon and drill crew at drill; crew was
brought into camp in the morning by loader

DS 09/03/2004

white-out conditions in the morning; drill was
moved to MPV-04-166c in the afternoon

NS 09/03/2004

finished set-up, tried to get everything
started; new type of rig for driller therefore
Peter Dixon helps with set-up; change drill to
SQ (from NQ)

0400hrs start drilling into ice

drilled through ice with ice cutter (about

0430hrs 1.8m); about 0.6m water

were not able to get through the ice with
casing, have to ream the ice.

DS 10/03/2004

0700hrs Ice surface at 0.6m below floor level.

Casing appears to be either broken or
threads at fittings are destroyed. Peter
Dixon left drill to find a tap to bring up

0800hrs casing.

Geobore sample taken (run 5.6-7.1m below
floor level). 14" recovered from 60" plastic
casing - 23 % recovery).

1400hrs Gepbore sample from 7.1 to 8.0m Sand
between plastic tube and inner tube

1630hrs recovered. 0% recovery.

Telephone discussion with Todd Martin
(AMEC). TM:Abandon Geobore for all lake
dyke holes. Continue D1-GB-1 with NQ drill.

1700hrs Cased to 8.6m

NS 10/03/2004

Foreman is drilling with driller (helper had to
go to Yellowknife to get hisr finger
straightened); had to ream through ice and
add some more casing to 9.6m depth; Hook-
up hydrauliques for sedimentation shack

2200hrs

2400hrs 18m depth; install packer

0230hrs	packer test completed and start to add rods
0300hrs	continue drilling
0400hrs	drilled to 21m hole in little nitrogen hose found and repaired
0620hrs	start 2nd packer test
0645hrs	packer test completed

DS 11/03/2004

1000hrs	packer testing at 24m
1115hrs	packer testing at 24m completed
1230hrs	set up for packer testing at 27m
1245hrs	Driller's helper quit job and walked of site.
1315hrs	packer testing at 27m completed
1330hrs	Driller repairs/maintains pumps.
1510hrs	Drilling resumes.
1615hrs	Set up packer test at 30m. Packer test completed. Malfunction of intake pump caused fluctuation of pressure at last set of packer testing. Driller to commence repairs of pump.
1720hrs	

NS 11/03/2004

2030hrs	fan belt and alternator was changed
2240hrs	36m drilled
0015hrs	42m drilled
0200hrs	6th packer test completed, adding rods
0400hrs	48m drilled
0500hrs	52m drilled
0545hrs	start packer 7
0640hrs	packer completed; rods back in hole

DS 12/03/2004

1000hrs	57m drilled.
1200hrs	EOH at 60m. Take packer test, reflex Packer, reflex completed. Driller maintaining tanks.
1300hrs	

Checklist - delete before finalizing and printing file

grouted?
staked?
summary updated?
point load test samples selected?

**FIELD DRILL
PERFORMANCE LOG**

PROJECT	Gahcho Kue Geotech
PROJECT NO	2CD002.11
NORTHING	7034933
EASTING	589920
SURFACE ELEVATION	404
AZIMUTH	0
DIP	-90

HOLE NO:	MPV-04-166c
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	8-Mar-04 2200hrs
FINISH DATE AND TIME	12-Mar-04 1300hrs
HOLE DIAMETER	101.6 (Geobor S)/47.6 (NQ)
DRILLING METHOD	Diamond core

Period	Logged by	Date	Time	Period Totals						Cumulative				
				Total drill time	Standby time	Depth	Metreage drilled	Actual drill time	Drill rate	Total drill time	Standby time	Actual drill time	Drill rate	
				[hr]	[hr]									[m]
NS 1900-0700	B Rameseder	08/03/2004		9	9	0	pack up at last hole, white out till morning	0	0	0.00	0	0	0	0.00
DS 0700-1900	M Storey	09/03/2004		12	12	0.00	white out in the morning; move drill to new site		0	#DIV/0!	12	12	0	#DIV/0!
NS 1900-0700	B Rameseder	09/03/2004		12	12	0.00	get drill ready to go with Geobor S (everything was shut off since last night)		0	#DIV/0!	24	24	0	#DIV/0!
DS 0700-1900	M Storey	10/03/2004		12	6	8.60	Numerous problems with Geobore drilling.	8.6	6	1.43	36	30	6	1.43
NS 1900-0700	B Rameseder	10/03/2004		12	9	21.00	Hook-up hydrauliques for sedimentation shack, 2 packer tests, hole in nitrogene hose	12.4	3	4.13	48	39	9	2.33
DS 0700-1900	M Storey	11/03/2004		12	6.5	30.00	3 packer tests, problems with pump sucking sediments	9	5.5	1.64	60	45.5	14.5	2.07
NS 1900-0700	B Rameseder	11/03/2004		12	4.75	52.00	change fan belt and alternator	22	7.25	3.03	72	50.25	21.75	2.39
DS 0700-1900	M Storey	12/03/2004		6	1	60.00	Packer testing reflex.	8	5	1.60	78	51.25	26.75	2.24

OVERALL HOLE DRILL RATE (m/hr)

0.69

OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)

2.24

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-166c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB.... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
4.10	9.30	5.20	OVBN							should be from 2.4-8.6 (32cm sediments recovered as well as some additional sand)
9.30	12.00	2.70	GRN	2.30	85.2	1.46	54.1	0.48	17.8	rock broken up core, many fractures and mechanical damage
12.00	15.00	3.00	GRN	2.80	93.3	0.63	21.0	0.24	8.0	rock broken up core, many fractures and mechanical damage
15.00	18.00	3.00	GRN	3.00	100.0	2.70	90.0	2.30	76.7	
18.00	21.00	3.00	GRN	3.00	100.0	2.92	97.3	2.17	72.3	
21.00	24.00	3.00	GGRN	3.05	101.7	2.94	98.0	2.82	94.0	Rock broken up core, many fractures due to mechanical damage
24.00	27.00	3.00	GGRN	2.90	96.7	2.20	73.3	2.05	68.3	Broken core in due 24.2 to 24.6m.
27.00	30.00	3.00	GRN	3.50	116.7	2.20	73.3	1.20	40.0	Highly fractured rock. Two 1.5 m runs (first partial run jammed with rock fragments.).
30.00	33.00	3.00	GRN	3.08	102.7	2.94	98.0	2.72	90.7	
33.00	36.00	3.00	GRN	2.98	99.3	2.78	92.7	2.36	78.7	
36.00	39.00	3.00	GRN	3.05	101.7	3.00	100.0	2.84	94.7	
39.00	40.53	1.53	GRN	1.53	100.0	1.45	94.8	1.13	73.9	
40.52	45.00	4.48	GGRN	4.46	99.6	4.47	99.8	4.47	99.8	GGRN: granitic Gneiss
45.00	48.00	3.00	GGRN	2.93	97.7	2.90	96.7	2.90	96.7	
48.00	51.00	3.00	GGRN	2.95	98.3	2.92	97.3	2.58	86.0	
51.00	54.00	3.00	GRN	2.91	97.0	2.89	96.3	2.51	83.7	
54.00	57.00	3.00	GGRN	3.00	100.0	2.91	97.0	2.91	97.0	
57.00	60.00	3.00	GGRN	3.00	100.0	3.00	100.0	3.00	100.0	

DETAILED GEOTECHNICAL LOG

 DRILLHOLE ID: **MPV-04-166c**

NB: 3 sources of open joints and fractures found in drillcore
 Artificial breaks induced by drilling process
 Artificial breaks induced by core handling
 Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling BUT excluding those created by core handling)
 Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating did indicate artificial
 Note any weak foliation, bedding, brecciation in comments

FROM (m)	TO (m)	ROCK TYPE	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of Sets	Type	Totals	JOINT CONDITIONS				COMMENT
			STRONG R	WEAK R	% WEAK	ALL	OPEN REDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH				ANGLE	ROUGH	ALT	FILL	
9.3	15.0	GRN	R4																	fairly broken up core, many joints, some joints parallel to core axis; chlorite coating on joint surface, rough 5, angle mainly 60-70
15.0	18.0	GRN	R4			34	0	17	2	1	1	1	3	J1	8	65	2	0	3	
														J2	4	75	3	0	3	joint set 4: 1 joint, angle 25, rough 4, alt 0, fill 3; joint set 5: 2 joints, angle 35, rough 5, alt 0, fill 3
														J3	2	80	2	0	3	
18.0	21.0	GRN	R4			30	0	24	1	0	1	0	3	J1	2	45	9	0	3	
														J2	3	50	7	0	3	(3) J4: 45 degree; rough 6; alt 0; fill 3. (1) J5: 35 degree; rough 8; alt 0; fill 3. Calcite fill noted on all joint sets.
														J3	15	35	5	0	3	
21.0	24.0	NGRN	R5			23	0	10	2	0	2	0	3	J1	6	40	5	0	3	
														J2	2	45	5	0	5	J1 angles (3) 40, (2) 45, (1) 65. J2 angles: 45, 70. chlorite coating on joint surfaces J1 and J3.
														J3	2	80	4	0	3	
24.0	27.0	NGRN	R4			26	0	8	2	0	2	0	3	J1	5	35	5	0	3	
														J2	2	30	2	0	3	
														J3	1	40	5	0	4	J1 angles (1) 30; (2) 35; (1) 45; (1) 65. J4: 60 deg; rough 4; alt 0; fill 3
27.0	30.0	GRN	R4			31	0	23	2	0	2	0	3	J1	5	60	6	0	3	
														J2	14	65	5	0	3	J1 angles (1) 60, (3) 65, (1) 50. J2 angles (3) 65, (5) 55, (3) 40, (2) 40, (1) 70. J4 50 degrees, rough 2; alt 0; fill 3
														J3	4	40	4	0	3	
30.0	33.0	GRN	R4			30	0	19	1	1	1	1	3	J1	1	35	3	0	3	
														J2	3	25	4	0	9	joint set 4: 4 joints, angle 40, rough 5, fill 3, alt 0, joint set 5: 3 joints, angle 20, rough 4, alt 0, fill 9
														J3	8	45	4	0	3	
33.0	36.0	GRN	R4			28	0	17	0		1	0	3	J1	8	60	2	0	3	
														J2	1	45	3	0	3	joint set 4: 3 joints, angle 30, rough 2, alt 0, fill 3, joint set 5: 4 joints, angle 80, rough 3, alt 0, fill 3
														J3	1	50	2	0	9	
36.0	39.0	GRN	R4			32	0	16	9	1	1	1	3	J1	6	75	3	0	3	
														J2	5	40	2	0	3	joint set 4: 3 joints, angle 80, rough 4, alt 1, fill 3; joint set 5, 1 joint, angle 30, rough 5, alt 0, fill 3
														J3	1	50	2	0	9	
39.0	40.5	GRN	R4			22	0	16	2	1	1	1	3	J1	10	80	3	0	3	
														J2	4	45	2	0	3	
														J3	1	30	3	0	3	joint set 4: 1 joint, angle 75, rough 5, alt 1, fill 3; chlorite and hematite
40.5	45.0	GGRN	R5			19	0	4	2	1	0		3	J1	1	40	5	0	3	
														J2	2	55	5	0	3	
														J3	1	20	2	1	3	clay seam at contact (top) at 65 degree, about 1cm large, green clay,
45.0	48.0	GGRN	R5	R4	20	8	0	2	2	1	1	0	1	J1	2	55	3	0	3	
48.0	51.0	GGRN	R4			18	0	2	1	0	0		2	J1	1	35	6	0	3	
														J2	1	45	5	0	3	
51.0	54.0	GRN	R4			16	0	10	1	0	1	0		J1	5	35	5	0	3	
														J2	2	60	5	0	6	
														J3	1	45	4	0	3	J1 angles (2) 35, (1) 30, (1) 45, (1) 60. J2 angles 70, 60. J4: 35 deg
54.0	57.0	GGRN	R6			19	0	6	2	0	1	0		J1	1	60	8	0	3	
														J2	1	35	6	0	3	
														J3	2	35	5	0	3	(1) J4: 30 degrees, rough; 5; alt 0; fill 5. (1) J5: 75 degrees; rough; 4;
57.0	60.0	GGRN	R4			14	0	4	3	0	2	0	3	J1	2	30	6	0	3	
														J2	2	65	5	0	3	
														J3	1	50	2	0	3	J1 angles: 30, 60. Calcite coating on J1, J2, J3.

Photo Record

MPV-04-166c

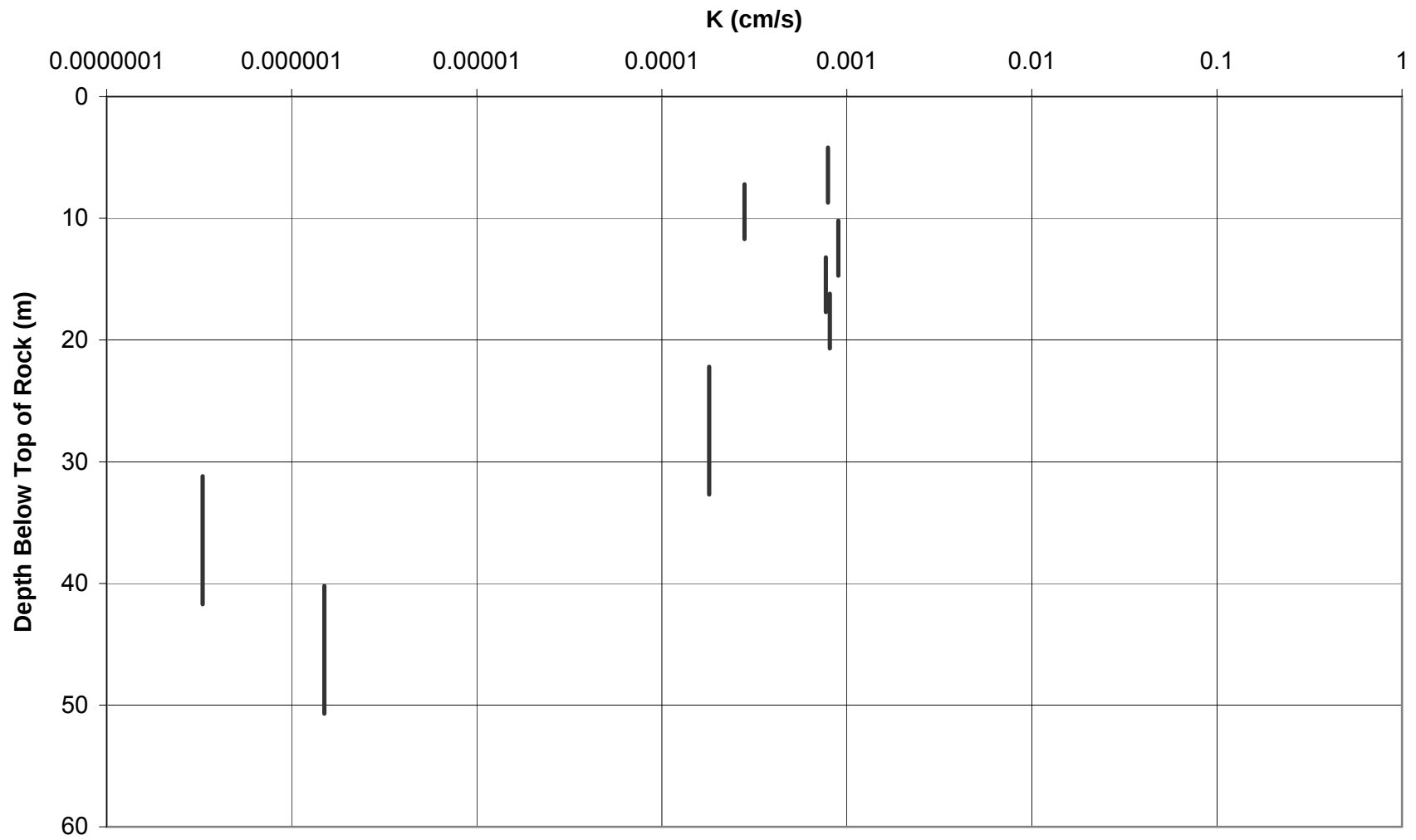
Date	Shift	Filename	Depth	Description
03/10/2004	NS 1900-0700	MPV-04-166C-9mbox1-dry	9 - 13.7m	
03/10/2004	NS 1900-0700	MPV-04-166C-13.7mbox2-dry	13.7 - 17.65m	
03/11/2004	DS 0700-1900	MPV-04-166C-17.65mbox3-dry	17.65 - 21m	
03/11/2004	DS 0700-1900	MPV-04-166C-21mbox4-dry	21 - 24m	
03/11/2004	DS 0700-1900	MPV-04-166C-24mbox5-dry	24-29.1	
03/11/2004	NS 1900-0700	MPV-04-166C-29.1mbox6-dry	29.1-32.9	
03/11/2004	NS 1900-0700	MPV-04-166C-32.9mbox7-dry	32.9-37.1	
03/11/2004	NS 1900-0700	MPV-04-166C-37.1mbox8-dry	37.1-41.25m	
03/11/2004	NS 1900-0700	MPV-04-166C-41.25mbox9-dry	41.25-45.43m	
03/12/2004	DS 0700-1900	MPV-04-166C-45.43mbox10-dry	45.43 - 49.9m	
03/12/2004	DS 0700-1900	MPV-04-166C-49.9mbox11-dry	49.9 - 54m	
03/12/2004	DS 0700-1900	MPV-04-166C-54mbox12-dry	54 - 58.2m	
03/12/2004	DS 0700-1900	MPV-04-166C-58.2mbox13-dry	58.2 - 60m	

Core Box Record

MPV-04-166c

Box	From	To	Comments
Tube 1	5.60	7.10	22% recovery (Geobore)
Bag 1	7.10	8.60	tube did not contain any sample; sand between inner tube and plastic tube sampled
1	8.60	13.70	
2	13.70	17.65	
3	17.65	21.00	
4	21.00	25.00	
5	25.00	29.10	
6	29.10	32.90	
7	32.90	37.10	
8	37.10	41.25	
9	41.25	45.43	
10	45.43	49.90	
11	49.90	54.00	
12	54.00	58.20	
13	58.20	60.00	EOH

Permeability vs Depth
MPV_04_166C



Packer Test Data

Date	10-Mar-04
Staff	M. Story, B. Rameseder
Init. WL:	0
Ref. Pt.	drill shack floor
Dip	90

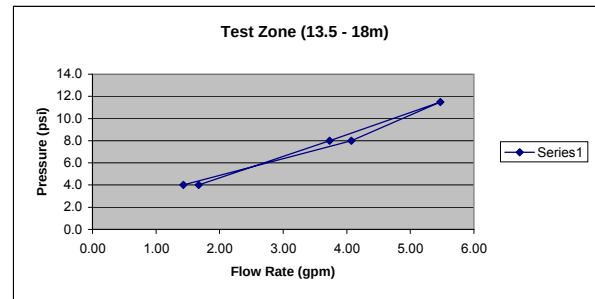
MPV-04-166c

Test 1 13.5 18

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pressure (psi)	Comments
1	0	5477.20		4.0	no leaks
	1	5479.00	1.80		
	2	5480.70	1.70		
	3	5481.70	1.00		
	4	5482.70	1.00		
	5	5484.30	1.60		
	6	5485.90	1.60		
	7	5487.60	1.70		
	8	5489.30	1.70	1.67	
2	0	5507.30		8.0	no leaks
	1	5511.00	3.70		
	2	5514.90	3.90		
	3	5518.60	3.70		
	4	5522.30	3.70		
	5	5526.10	3.80	3.73	
3	0	5531.10		11.5	no leaks
	1	5536.60	5.50		
	2	5542.10	5.50		
	3	5547.50	5.40		
	4	5553.00	5.50	5.47	
4	0	5557.2		8.0	no leaks
	1	5561.10	3.90		
	2	5565.40	4.30		
	3	5569.40	4.00		
	4	5573.60	4.20		
	5	5577.70	4.10		
	6	5581.70	4.00		
	7	5585.80	4.10	4.07	
5	0	5587.50		4.0	no leaks
	1	5588.90	1.40		
	2	5590.20	1.30		
	3	5591.50	1.30		
	4	5593.00	1.50		
	5	5594.40	1.40		
	6	5595.80	1.40	1.43	

Summary 13.5 18
Flow rate Pressure

(gpm)	(psi)
1.67	4.0
3.73	8.0
5.47	11.5
4.07	8.0
1.43	4.0

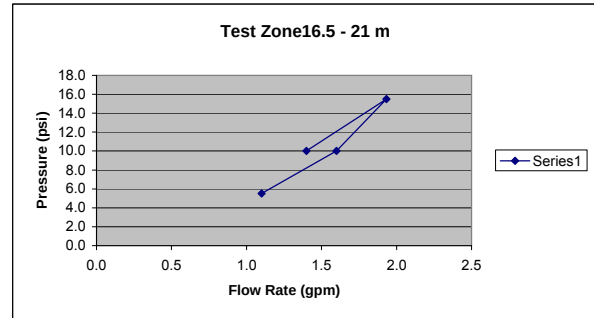


Test 2 16.5 21

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pressure (psi)	Comments
1	0	5571.80		5.5	
	1	5572.90	1.10		
	2	5574.10	1.20		
	3	5575.20	1.10		
	4	5576.30	1.10		
	5	5577.40	1.10		
2	0	5579.00		10.0	
	1	5580.60	1.60		
	2	5582.20	1.60		
	3	5583.80	1.60		
	4	5585.40	1.60		
3	0	5588.10		15.5	
	1	5590.00	1.90		
	2	5591.80	1.80		
	3	5593.80	2.00		
	4	5595.70	1.90		
	5	5597.60	1.90		
4	0	5599.00		10.0	
	1	5600.30	1.30		
	2	5601.70	1.40		
	3	5603.10	1.40		
	4	5604.50	1.40		
5	0	5605.50		5.0	
	1	5606.30	0.80		
	2	5607.20	0.90		
	3	5607.60	0.40		
	4	5608.40	0.80		
	5	5609.20	0.80		
	6	5610.10	0.90		
	7	5611.00	0.90		

Summary 16.5 21

Flow rate (gpm)	Pressure (psi)
1.1	5.5
1.6	10.0
1.9	15.5
1.4	10.0
0.9	5.0



Test 3

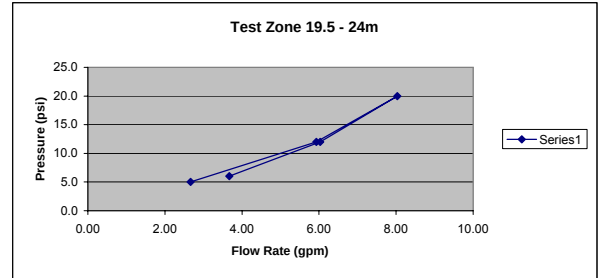
19.5

24

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pressure (psi)	Comments
1	0	5663.00			
	1	5665.70	2.70	5.0	
	2	5668.30	2.60		
	3	5670.90	2.60		
	4	5673.70	2.80		
	5	5676.30	2.60		
2	0	5682.00		12.0	
	1	5688.10	6.10		
	2	5694.10	6.00		
	3	5700.00	5.90		
	4	5706.00	6.00		
	5	5711.90	5.90		
3	0	5722.00		20.0	
	1	5730.00	8.00		
	2	5738.30	8.30		
	3	5746.40	8.10		
	4	5754.40	8.00		
	5	5762.4	8.00		
4	0	5767.00		12.0	
	1	5773.30	6.30		
	2	5779.30	6.00		
	3	5785.40	6.10		
	4	5791.40	6.00		
5	0	5877.00		5.0	
	1	5880.30	3.30		
	2	5884.20	3.90		
	3	5887.80	3.60		
	4	5891.30	3.50		

Summary 19.5 24

Flow rate (gpm)	Pressure (psi)
2.67	5.0
5.93	12.0
8.03	20.0
6.03	12.0
3.67	6.0



Test 4

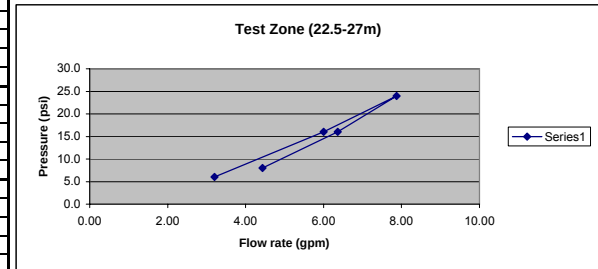
22.5

27

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pressure (psi)	Comments
1	0	5874.00		6.0	
	1	5877.10	3.10		
	2	5880.30	3.20		
	3	5883.60	3.30		
	4	5886.80	3.20		
2	0	5894.00		16.0	
	1	5900.00	6.00		
	2	5906.00	6.00		
	3	5912.00	6.00		
	4	5918.00	6.00		
3	0	5925.00		24.0	
	1	5933.00	8.00		
	2	5940.90	7.90		
	3	5948.70	7.80		
	4	5956.60	7.90		
	5	5964.5	7.90		
4	0	5975.00		16.0	
	1	5981.30	6.30		
	2	5987.70	6.40		
	3	5994.10	6.40		
	4	6000.40	6.30		
5	0	6007.00		8.0	
	1	6011.30	4.30		
	2	6015.80	4.50		
	3	6020.20	4.40		
	4	6024.60	4.40		

Summary 22.5 27

Flow rate (gpm)	Pressure (psi)
3.20	6.0
6.00	16.0
7.87	24.0
6.36	16.0
4.43	8.0



Test 5

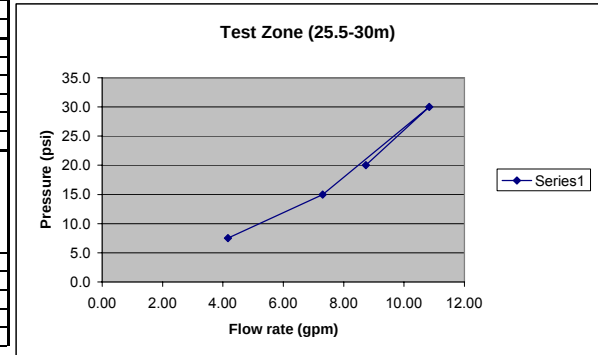
25.5

30

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pressure (psi)	Comments
1	0	6084.00		7.5	
	1	6088.00	4.00		
	2	6092.10	4.10		
	3	6096.30	4.20		
	4	6100.40	4.10		
	5	6104.60	4.20		
2	0	6112.00		15.0	
	1	6119.40	7.40		
	2	6126.70	7.30		
	3	6134.10	7.40		
	4	6141.40	7.30		
	5	6148.90	7.50		
3	0	6160.00		30.0	
	1	6170.80	10.80		
	2	6181.50	10.70		
	3	6192.50	11.00		
	4	6203.30	10.80		
	5	6214	10.70		
4	0	6222.00		20.0	
	1	6230.60	8.60		
	2	6239.30	8.70		
	3	6247.80	8.50		
	4	6256.60	8.80		
	5	6265.40	8.80		
					intake pump malfunction. Unable to maintain constant pressure. Results for this set disqualified.
5	0	6271.00		10.0	
	1	6273.60	2.60		
	2	6277.30	3.70		
	3	6284.60	7.30		
	4	6285.80	1.20		
	5	6287.00	1.20		

Summary 25.5 30

Flow rate (gpm)	Pressure (psi)
4.17	7.5
7.30	15.0
10.83	30.0
8.73	20.0



Test 6

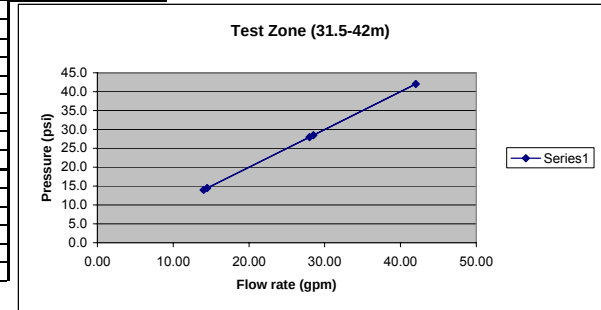
31.5

42

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pressure (psi)	Comments
1	0	6303.20		14.0	no leaks
	1	6307.70	4.50		
	2	6312.10	4.40		
	3	6316.50	4.40		
	4	6320.80	4.30		4.37
2	0	6333.30		28.5	no leaks
	1	6340.00	6.70		
	2	6346.70	6.70		
	3	6353.50	6.80		
	4	6360.10	6.60		
	5	6366.80	6.70		6.70
3	0	6374.70		42.0	no leaks
	1	6382.80	8.10		
	2	6390.70	7.90		
	3	6398.20	7.50		
	4	6405.60	7.40		
	5	6413	7.40		7.43
4	0	6419.00		28.0	no leaks
	1	6425.10	6.10		
	2	6431.20	6.10		
	3	6436.60	5.40		
	4	6442.30	5.70		
	5	6448.20	5.90		
	6	6454.00	5.80		5.80
5	0	6458.60		14.5	no leaks
	1	6462.50	3.90		
	2	6466.50	4.00		
	3	6470.50	4.00		
	4	6474.60	4.10		
	5	6478.70	4.10		4.07

Summary 31.5 42

Flow rate (gpm)	Pressure (psi)
14.00	14.0
28.50	28.5
42.00	42.0
28.00	28.0
14.50	14.5



Test 7

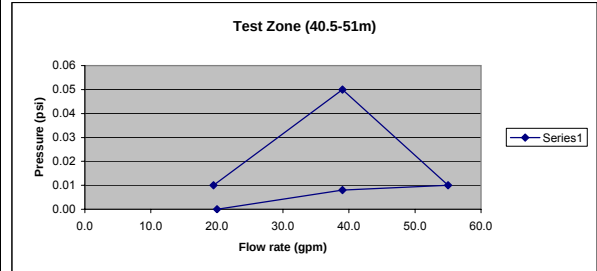
40.5

51

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pressure (psi)	Comments
1	0	6483.70		19.5	no leaks
	1	6483.71	0.01		
	2	6483.72	0.01		
	3	6483.73	0.01		0.01
2	0	6483.80		39.0	no leaks
	1	6483.85	0.05		
	2	6483.90	0.05		
	3	6483.95	0.05		0.05
3	0	6484.10		55.0	no leaks
	1	6484.12	0.02		
	2	6484.13	0.01		
	3	6484.14	0.01		
	4	6484.15	0.01		0.01
4	0	6484.15		39.0	no leaks
	1	6484.15	0.00		
	2	6484.16	0.01		
	3	6484.17	0.01		
	4	6484.18	0.01		0.008
5	0	6484.30		20.0	no leaks
	1	6484.30	0.00		
	2	6484.30	0.00		
	3	6484.30	0.00		0

Summary 40.5 51

Flow rate (gpm)	Pressure (psi)
0.01	19.5
0.05	39.0
0.01	55.0
0.01	39.0
0.00	20.0



Test 8

49.5

60.5

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pressure (psi)	Comments
1	0	6486.30		20.0	
	1	6486.40	0.10		
	2	6486.55	0.15		
	3	6486.70	0.15		
	4	6486.85	0.15		
	5				
	6		0.00		
	7		0.00		
2	0	6487.00		40.0	
	1	6487.05	0.05		
	2	6487.10	0.05		
	3	6487.20	0.10		
	4	6487.25	0.05		
	5				
3	0	6487.50		60.0	
	1	6487.55	0.05		
	2	6487.60	0.05		
	3	6487.65	0.05		
	4	6487.70	0.05		
	5				
4	0	6487.75		40.0	
	1	6487.80	0.05		
	2	6487.80	0.00		
	3	6487.80	0.00		
	4	6487.80	0.00		
	5				
5	0	6487.80		20.0	
	1	6487.80	0.00		
	2	6487.80	0.00		
	3	6487.80	0.00		
	4	6487.80	0.00		
	5				
	6		0.00		
	7		0.00		

Summary 49.5

Flow rate Pressure
(gpm) (psi)

0.15 20.0
0.07 40.0
0.05 60.0
0.00 40.0
0.00 20.0

Permeability Summary

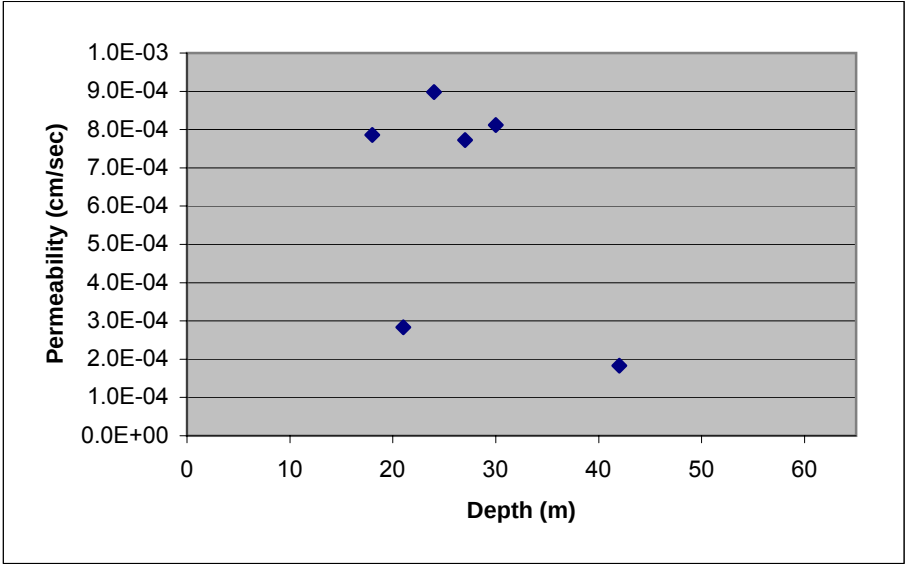
MPV-04-166c

from	to		Step 1	Step 2	Step 3	Step 4	Step 5	Avg K
13.5	18	gauge (psi)	4	8	11.5	8	4	
		Qavg (igpm)	1.67	3.73	5.47	4.07	1.43	
		K cm/sec	7.4E-04	8.2E-04	8.4E-04	9.0E-04	6.3E-04	7.9E-04
16.5	21	gauge (psi)	5.5	10	15.5	10	5	
		Qavg (igpm)	1.1	1.6	1.9	1.4	0.9	
		K cm/sec	3.5E-04	2.8E-04	2.2E-04	2.5E-04	3.2E-04	2.8E-04
19.5	24	gauge (psi)	5	12	20	12	6	
		Qavg (igpm)	2.67	5.93	8.03	6.03	3.67	
		K cm/sec	9.4E-04	8.7E-04	7.1E-04	8.9E-04	1.1E-03	9.0E-04
22.5	27	gauge (psi)	6	16	24	16	8	
		Qavg (igpm)	3.2	6	7.87	6.36	4.43	
		K cm/sec	9.4E-04	6.6E-04	5.8E-04	7.0E-04	9.8E-04	7.7E-04
25.5	30	gauge (psi)	7.5	15	30	20		
		Qavg (igpm)	4.17	7.3	10.83	8.73		
		K cm/sec	9.82E-04	8.59E-04	6.37E-04	7.71E-04		8.1E-04
31.5	42	gauge (psi)	14	28.5	42	28	14.5	
		Qavg (igpm)	4.37	6.7	7.43	5.8	4.07	
		K cm/sec	2.4E-04	1.8E-04	1.3E-04	1.6E-04	2.1E-04	1.8E-04
40.5	51	gauge (psi)	19.5	39	55	39	20	
		Qavg (igpm)	0.01	0.05	0.01	0.008	0	
		K cm/sec	3.9E-07	9.7E-07	1.4E-07	1.6E-07	0.0E+00	3.3E-07
49.5	60	gauge (psi)	20	40	60	40	20	
		Qavg (igpm)	0.15	0.07	0.05	0	0	
		K cm/sec	5.7E-06	1.3E-06	6.3E-07	0.0E+00	0.0E+00	1.5E-06
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Equations:		$H_f = 8.65 \times 10^{-15} (Q^2 * Lp / r_p^5)$ $H_{nit} = (Dw' + Hg - Hf) + Pg / 1.42$ $K = (Q * Ln(R/r_b)) / (2 * \pi * H_{nit} * L)$					Overall	6.2E-04

assume

- vertical drillhole
- water at ground surface
- height of gauge is at rig flr
- negligible friction losses

Dw	Measured depth of static water (1)	0	m
Dp	Measured depth to packer		m
Dt	Depth to midpoint of test		m
Inc	Inclination from horizontal	90	m
Dw'	Vertical depth to static water level		°
Dp'	Vertical depth to packer		m
Dt'	Vertical depth to midpoint of test		m
Hg	Gauge height	0	m
Lp	Length of discharge pipe		m
rp	Radius of discharge pipe (1" = 0.0127m)		m
R	Radius of influence (10m is standard)	10	m
rb	Drillhole radius (HQ=0.048m, NQ=0.038m)	0.038	m
L	Length of test section		m
Hf			0 m



Reflex Readings

MPV-04-166c

Date	03/122004
Hole Depth	60m
Azi/Dir	306.9
Incl/dip	89.4
Roll (Toolface re to Mag N)	175.3
Magnetic Field	
Temp ©	

FIELD GEOLOGICAL LOG

HOLE ID

MPV-04-166c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0	4.1			2.5m ice,	BR
4.10	8.60	Overburden		Gravel, sharp, angular, mixed with sandy silt (till); cobbles of different lithologies	MS
8.60	22.30	GRN		pink to reddish-white granite; medium to coarse grained, hematite stained, many microdefects and joints filled with chlorite; calcite and hematite on joint surfaces	BR
22.30	30.00	GGRN		Gneissic granite: biotite rich, dark grey; compact; joint often filled with calcite. granite is medium grained.	MS
30.00	40.53	GRN		pink to reddish-white granite; medium to coarse grained, hematite stained; many microdefects and joints filled with chlorite; calcite and hematite on joint surfaces; sulphides at end of section (coarse to fine)	BR
40.53	51.00	GGRN		Granitic gneiss: grey, fine to coarse, grained biotite and in sections mafic mineral rich; compact; contains sulphides (pyrite); at top 1cm clay seam (fine to medium grained); some pegmatitic sections (up to 30cm); mafic sections (40cm); some hematite veining and chloritisation; elongated, green minerals about 3mm long in dark fine grained mafic xenolith; pyrite also on some joint surfaces; some quartz veinlets	BR
51.00	54.00	GRN		pink to reddish-white granite; medium to coarse grained, hematite stained, some microdefects and joints filled with chlorite; calcite and hematite on joint surfaces	MS
54.00	60.00	GGRN		Gneissic granite: biotite rich, dark grey; compact; joint often filled with calcite. granite is medium grained. Some large grained pegmatic sections.	MS

UCS SAMPLES

HOLE ID: MPV-04-166C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-166C	9	44.01	Granite	04-UCS-166-001
MPV-04-166C	12	57.25	Granite	04-UCS-166-002

DRILL HOLE ID: **MPV-04-166c**[illegible]

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5 - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	DESCRIPTION
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	CATEGORY
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE		
CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THICKNESS < IRREGULARITIES	
8	GOUGE THICKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher Jr JRC

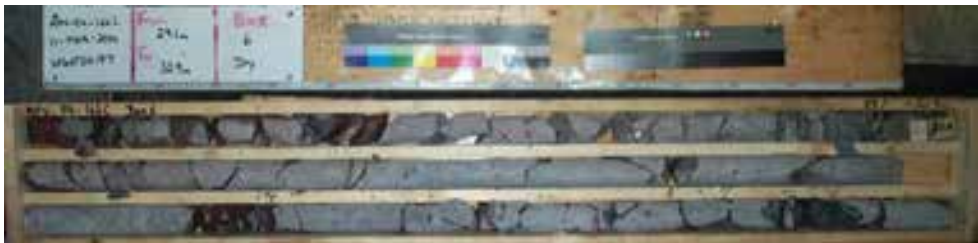
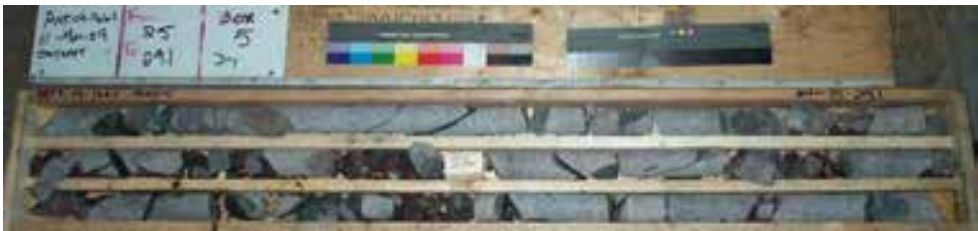
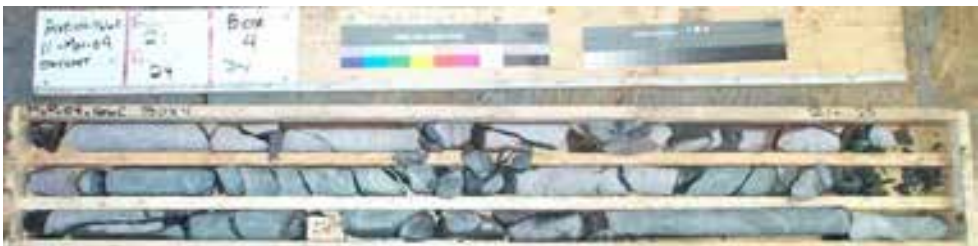
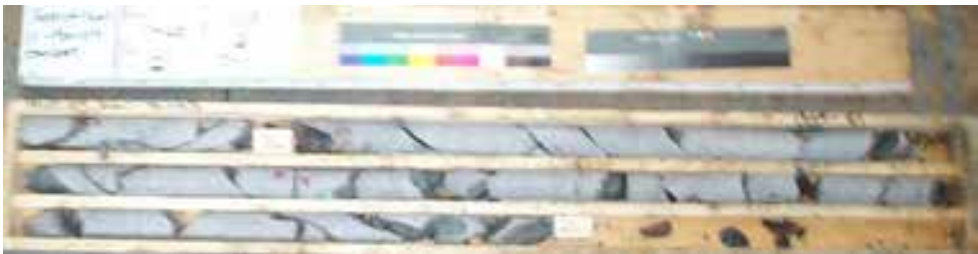
ROUGH		1	4	20
SMOOTH		2	3	14
SLICKEN-SIDED		3	2	11
STEPPED				
ROUGH		4	3	14
SMOOTH		5	2	11
SLICKEN-SIDED		6	1.5	7
UNDULATING				
ROUGH		7	1.5	2.5
SMOOTH		8	2	1.5
SLICKEN-SIDED		9	0.5	0.5
PLANAR				



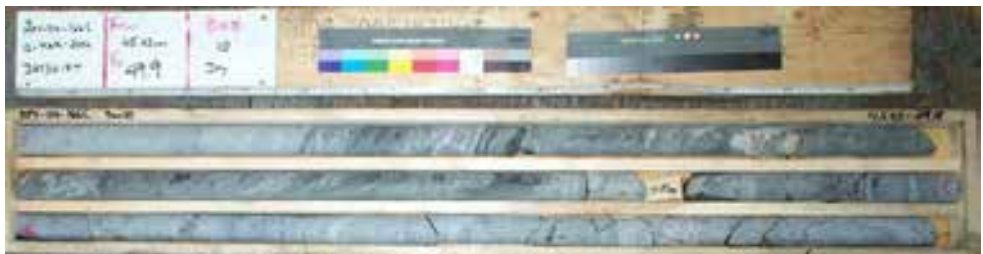
MPV_04_166C



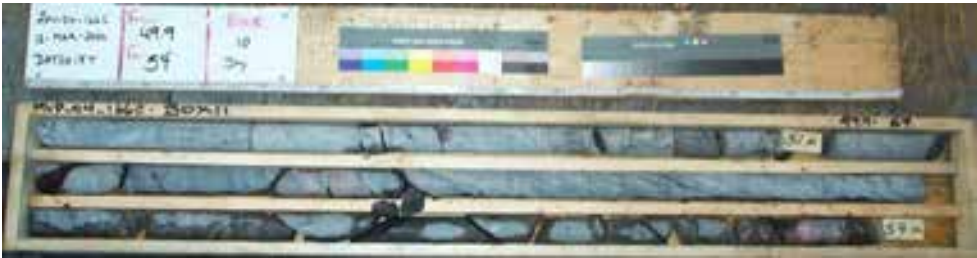
MPV_04_166C



MPV_04_166C



MPV_04_166C



Diary

MPV-04-167c

NS 12/03/2004

1930hrs M Waldegger spotted new hole location by GPS; approx 5m N of original D3-GB-04 location

1900hrs started to pack and move

2300hrs banked in and augering hole for water
Depth to ice - 0.6m
Depth to water - 2.63m
Depth to lake bed - 8.87m
Depth to bedrock 17.8m
drillers must stake hole location at previous location. Done (MS).

0030hrs Start casing
Ice at 0.6 m below floor level. Ice 2.03m thick. Top of overburden at 8.87m below floor level. Reference point is rig floor.

0130hrs Casing at 9.6 m.

0220hrs Unable to drop rods through casing. Ice formed inside of casing. Ice drilled out.

0315hrs Chuck holding rod broken.

0340hrs Freeman (BL foreman) arrives to help repair the chuck. Sleeve inside chuck needs to be replaced. Freeman left to get new sleeve.

0415hrs New sleeve installed in chuck. Hole frozen.

0430hrs Drillers run out of propane. Driller's helper left to get more propane.

0500hrs Generator for shack fueled up.

0515hrs Drilling resumes.

0630hrs NQ at 11m. Driller states that NQ is still in boulders and not yet in solid bedrock.

DS 13/03/2004

0700hrs Richard working alone until Al arrived at 0800

0800hrs changed leaking valve on lever bank

0900hrs replaced burst hydraulic line between lever bank and rig head
NQ'd through boulders to bedrock starting at 17.8m; reamed casing to 17.0m (6m + .6m + 0.4m below rig flr)

1300hrs at about 18m

1520hrs at 26.8m

1600hrs attempted packer test 22.3 to 26.5 - almost no flow even though fractured zone encountered during drilling. Confirmed flow through apparatus by increasing pressure to 55psi; still very modest flow rates

1745hrs at 29.6m

NS 13/03/2004

2130hrs At 32.6m. Ice inside rods. Unable to lower packer down hole. Add calcium to water.

1115hrs Set up packer at 32.6m

1130hrs Gauge for nitrogen tank is broken. Driller's helper gone to get a new gauge.

1300hrs Packer test at 32.6m completed.

0230hrs Set up packer at 35.6m

0400hrs Packer test at 35.6m completed. Almost no flow through 31.5 to 35.6m. Increased pressure to 40 psi to confirm flow.

DS 14/03/2004

0830rs no reflex because of miscommunication between drillers and fear of instrument freezing
doenhole
hole grouted
point load test samples selected and dropped off



PROJECT	Gahcho Kue Geotech
PROJECT NO	2CD002.11
NORTHING	589914
EASTING	7034833
SURFACE ELEVATION	404
AZIMUTH	0
DIP	90

HOLE NO:	MPV-04-167c
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	0000hrs Mar 13, 2004
FINISH DATE AND TIME	0700hrs Mar 14, 2004
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

[illegible]

OVERALL HOLE DRILL RATE (m/hr)	1.25
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	2.34

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-167c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
0.00	0.60	0.60	snow							
0.60	2.87	2.27	ice							
2.87	17.80	14.93	OVb							
17.80	20.80	3.00	GRN	3.00	100.0	2.79	93.0	2.62	87.3	biotite rich gneite
20.80	23.80	3.00	GRN	3.00	100.0	2.95	98.3	2.95	98.3	pegmatitic zones
23.80	26.50	2.70	GRN	2.40	88.9	1.31	48.5	0.89	33.0	low recovery, material washed away and fractured
26.50	29.60	3.10	NGRN	3.08	99.4	2.87	92.6	2.20	71.0	Gneissic Granite, biotite rich, some fractures
29.60	32.60	3.00	NGRN	2.90	96.7	2.80	93.3	2.65	88.3	Gneissic Granite, biotite rich.
32.60	35.60	3.00	GRN	3.00	100.0	2.85	95.0	2.50	83.3	
35.60	38.60	3.00	GRN	2.80	93.3	2.74	91.3	2.37	79.0	EOH

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID: **MPV-04-167c**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drillingBUT excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)
Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating old indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM (m)	TO (m)	ROCK TYPE	IRS			OPEN FRACTURES		CEMENTED JOINTS		MICRO DEFECTS		No of Sets	JOINT CONDITIONS						COMMENT	
			STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY		STRENGTH	Type	Totals	ANGLE	ROUGH	ALT		FILL
17.8	20.8	GRN	R5			20	0	5	0	0	0	3	J1	3	50	4	0	1	GRN=Granite with highly variable biotite enrichment and grain size; J1 has 1 joint with gouge and one with calcite; J2 has calcite coating.	
													J2	1	58	4	0	9		
													J3	1	35	6	0	9		
20.8	23.8	GRN	R5			13	0	5	1	1	0	3	J1	3	60	1	0	9	J1 has angles, 38, 60 and 68; J3 has calcite coating	
													J2	1	50	6	0	9		
													J3	1	65	1	0	9		
23.8	26.5	GRN	R5			30	0	8	0	0	2	1	3	J1	5	50	4	0	9	SOFT ZONE WASHED AWAY AT APPROX 25.8, following 0.9m highly fractured and has silty/sandy gouge; J1 has calcite coating; J3 and many of remaining joints have calcite coating.
													J2	1	50	6	0	9		
													J3	2	60	4	0	9		
26.5	29.6	NGRN	R5			30	0	20	1	0	2	1		J1	6	35	5	0	3	J1 angles (2) 35, (1)50, (2)65; J2 angles 60, 65, 50; J2 angles 38, 55, 50; J3 angles 40, (2)45, 55, 60, 65; (3) J4; angles 25, 30, 65, rough 3; alt: 0; fill: 3; (1) J5 angle: 70; rough 2; alt: 0; fill: 3; (1) J6 angle 30; rough 1; alt: 0; fill: 6.
													J2	3	50	5	0	6		
													J3	6	60	4	0	3		
29.6	32.6	NGRN	R4			18	0	8	1	0	1	0		J1	4	65	5	0	3	J4: 45 degrees; rough 2; alt: 0; fill: 3; J3 angles 35, 65.
													J2	1	65	7	0	3		
													J3	2	35	4	0	3		
32.6	35.6	GRN	R5			25	0	17	1	1	1	1	3	J1	15	45	5	0	3	J1 angles: (1) 30; (3) 38; (2) 40; (2) 45; (2) 50; (1) 55; (2) 60; (1) 60; (1) 65;
													J2	1	40	5	0	6		
													J3	1	35	2	0	3		
35.6	38.6	GRN	R6			12	0	12	1	0	1	0	2	J1	10	45	5	0	3	J1 angles: (5) 45; (2) 40; (1) 35; (1) 30. Calcite coating on joints.
													J2	2	30	4	0	3		

Photo Record**MPV-04-167c**

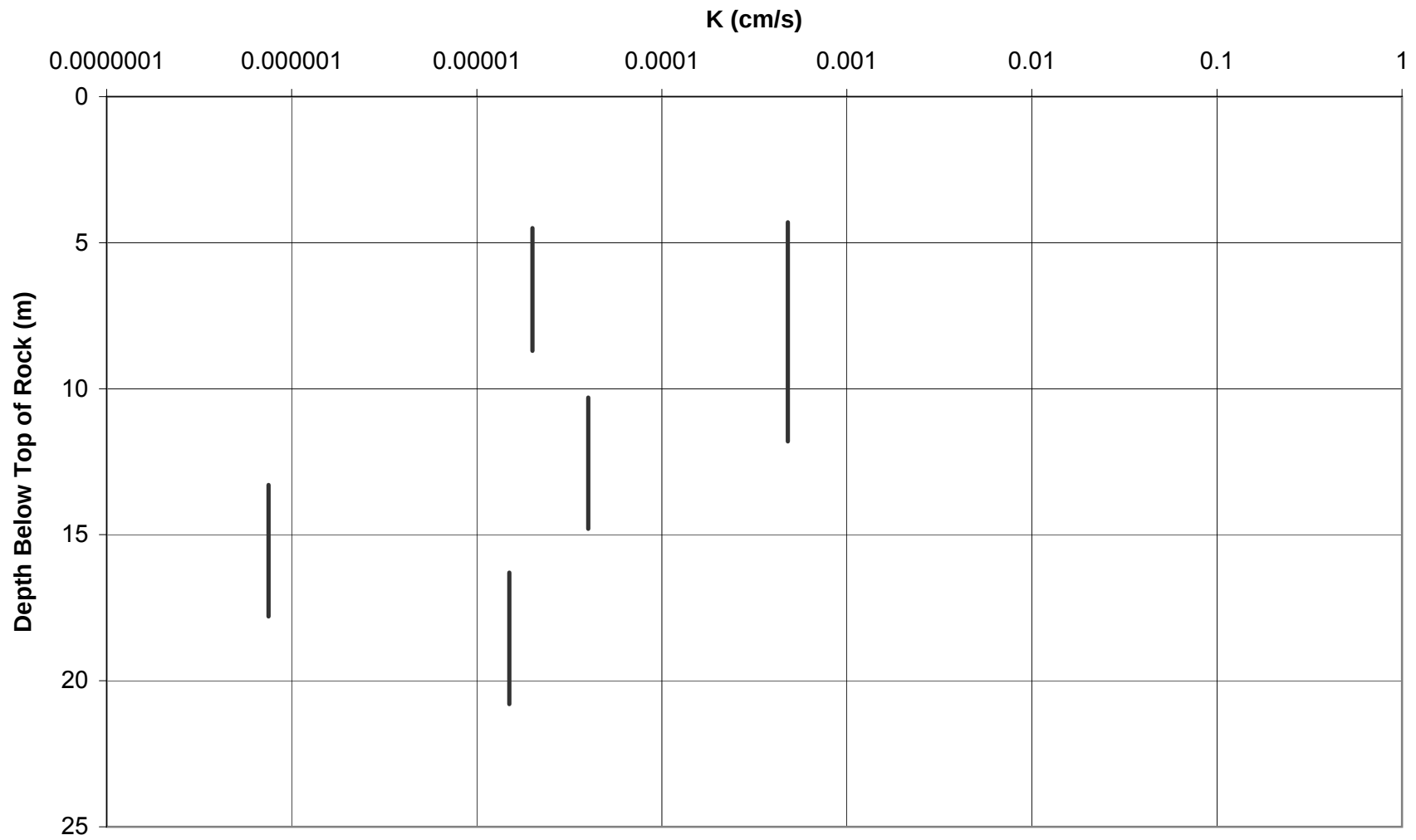
Date	Shift	Filename	Depth	Description
03/13/2004	DS 0700-1900	MPV-04-167C-16.0box1-dry	16.0-20.3m	bitotite granite
03/13/2004	DS 0700-1900	MPV-04-167C-20.3box2-dry	20.3 - 23.8m	
03/13/2004	NS 1900-0700	MPV-04-167C-23.8box3-dry	23.8 - 28.3m	
03/13/2004	NS 1900-0700	MPV-04-167C-28.3box4-dry	28.3 - 32.45m	
03/13/2004	NS 1900-0700	MPV-04-167C-32.45box5-dry	32.45 - 36.67m	
03/13/2004	NS 1900-0700	MPV-04-167C-36.67box6-dry	36.67 - 38.60m	

Core Box Record

MPV-04-167c

Box	From	To	Comments
1	16.00	20.30	
2	20.30	23.80	
3	23.80	28.30	
4	28.30	32.45	
5	32.45	36.67	
6	36.67	38.60	EOH

Permeability vs Depth
MPV_04_167C



Packer Test Data

Date	22-Feb-04
Staff	R. Bowden, M Storey
Init. WL:	0
Ref. Pt.	drill shack floor
Dip	90

MPV-04-167c

Test 1

22.3

26.5

[illegible]

Summary	22.3	26.5

Flow rate	Pressure

(gpm)	(psi)
10	100
20	100
30	100
40	100
50	100
60	100
70	100
80	100
90	100
100	100
110	100
120	100
130	100
140	100
150	100
160	100
170	100
180	100
190	100
200	100
210	100
220	100
230	100
240	100
250	100
260	100
270	100
280	100
290	100
300	100
310	100
320	100
330	100
340	100
350	100
360	100
370	100
380	100
390	100
400	100
410	100
420	100
430	100
440	100
450	100
460	100
470	100
480	100
490	100
500	100
510	100
520	100
530	100
540	100
550	100
560	100
570	100
580	100
590	100
600	100
610	100
620	100
630	100
640	100
650	100
660	100
670	100
680	100
690	100
700	100
710	100
720	100
730	100
740	100
750	100
760	100
770	100
780	100
790	100
800	100
810	100
820	100
830	100
840	100
850	100
860	100
870	100
880	100
890	100
900	100
910	100
920	100
930	100
940	100
950	100
960	100
970	100
980	100
990	100
1000	100

0.13	12.0

0.18	17.0

Test 2

22.1

29.6

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	495.80		5.0	
	1	497.00	1.20		
	2	498.40	1.40		
	3	499.80	1.40		
	4	501.30	1.50		
	5	503.10	1.80		
	6	504.90	1.80		
	7	506.75	1.85		
	8	508.80	2.05		
	9	510.80	2.00		
	10	513.10	2.30		
	11	515.30	2.20		
	12	517.50	2.20	2.23	
2	0	521.00		8.5	
	1	524.00	3.00		
	2	526.80	2.80		
	3	529.60	2.80		
	4	532.50	2.90		
	5	535.30	2.80	2.83	
3	0	653.00		12.0	
	1	657.60	4.60		
	2	662.30	4.70		
	3	667.10	4.80		
		671.90	4.80		
	4	676.70	4.80	4.80	
4	0	680.50		9.0	
	1	684.70	4.20		
	2	688.70	4.00		
	3	692.70	4.00		
	4	696.80	4.10	4.03	
5	0	703.30			
	1	706.60	3.30		
	2	709.90	3.30		
	3	713.20	3.30		
	4	716.40	3.20	3.27	

Summary 22.1 29.6

Flow rate (gpm) Pressure (psi)

2.23	5.0
2.83	8.5
4.80	12.0
4.03	9.0
3.27	5.0

Test 3

28.1

32.6

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	721.70		7.0	
	1	721.90	0.20		
	2	722.20	0.30		
	3	722.50	0.30		
	4	722.75	0.25		
	5	722.95	0.20		
	6	723.10	0.15		
	7	723.30	0.20		
	8	723.50	0.20	0.18	
2	0	723.66		14.0	
	1	724.50	0.85		
	2	724.80	0.30		
	3	725.10	0.30		
	3	725.40	0.30	0.30	
3	0	725.80		20.0	
	1	726.20	0.40		
	2	726.60	0.40		
	3	727.00	0.40		
	4	727.40	0.40	0.40	
	5				
4	0	727.80		14.0	
	1	728.10	0.30		
	2	728.40	0.30		
	3	728.75	0.35		
	4	729.20	0.45		
	5	729.35	0.15		
	6	729.70	0.35		
	7	730.00	0.30		
	8	730.30	0.30		
	9	730.60	0.30	0.30	
5	0	730.80		8.5	
	1	731.00	0.20		
	2	731.20	0.20		
	3	731.40	0.20		
	4	731.60	0.20	0.20	
	5				

Summary 28.1 32.6

Flow rate Pressure
(gpm) (psi)

0.18	7.0
0.30	14.0
0.40	20.0
0.30	14.0
0.20	8.5

Test 4

31.1

35.6

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	6732.65		8.5	
	1	6732.65	0.00		No response
	2	6732.65	0.00		
	3	6732.65	0.00		
	4	6732.65	0.00		
	5				
	6				
2	0	733.00		16.0	No response
	1	733.00	0.00		
	2	733.00	0.00		
	3	733.00	0.00		
	4	733.00	0.00		
	5				
	6				
	7				
3	0	733.50		30.0	No response
	1	733.50	0.00		
	2	733.50	0.00		
	3	733.50	0.00		
	4				
	5				
4	0	733.70		40.0	
	3	733.75	0.017		
	6	733.80	0.017		
	9	733.85	0.017		
	12	733.90	0.017		

Summary 31.1 35.6

Flow rate Pressure
(gpm) (psi)

0.02 40.0

Test 5

34.1

38.6

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	34.50		12.0	
	1	34.80	0.30		
	2	35.05	0.25		
	3	35.20	0.15		
	4	35.40	0.20		
	5	35.5	0.10		
	6	35.7	0.20		
	7	35.9	0.20		
	8	36.05	0.15		
	9	36.2	0.15		
	10	36.35	0.15	0.15	
2	0	36.80		20.0	
	1	37.10	0.30		
	2	37.40	0.30		
	3	37.60	0.20		
	4	37.80	0.20		
	5	37.95	0.15		
	6	38.20	0.25		
	7	38.40	0.20		
	8	38.65	0.25		
	9	38.85	0.20	0.22	
3	0	39.5		30.0	
	1	39.65	0.15		
	2	39.90	0.25		
	3	40.10	0.20		
	4	40.30	0.20		
	5	40.50	0.20	0.20	
4	0	40.60		20.0	
	1	40.75	0.15		
	2	40.80	0.05		
	3	40.95	0.15		
	4	41.10	0.15		
	5	41.25	0.15	0.15	
	6				
5	0	41.20		12.0	
	1	41.25	0.05		
	2	41.30	0.05		
	3	41.35	0.05	0.05	
	4				
	5		0.00		
	6		0.00		
	7		0.00		

Summary 34.1 38.6

Flow rate Pressure
(gpm) (psi)

0.15 12.0

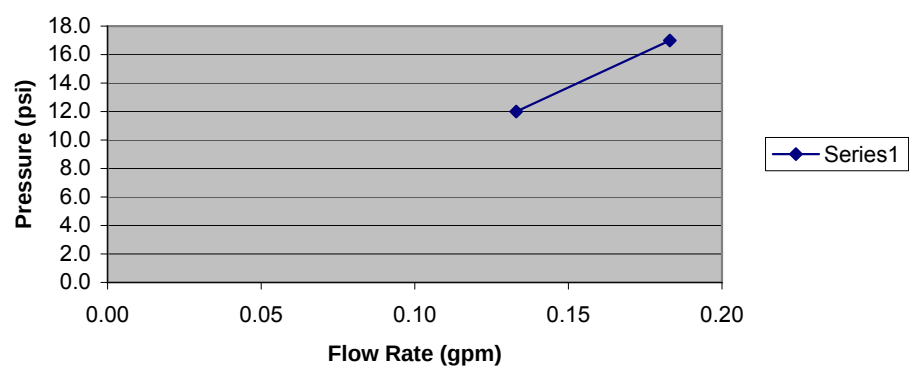
0.22 20.0

0.20 30.0

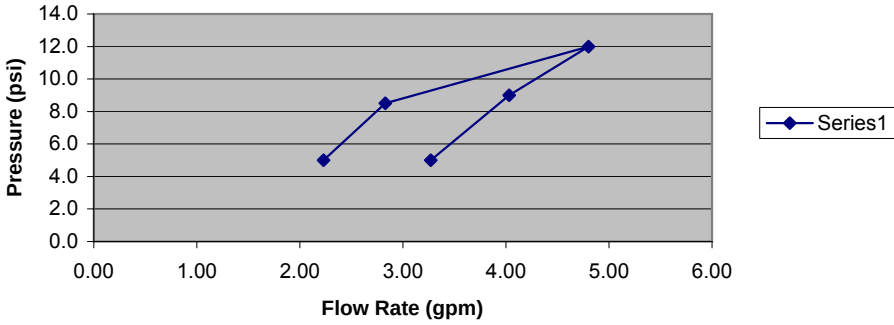
0.15 20.0

0.05 12.0

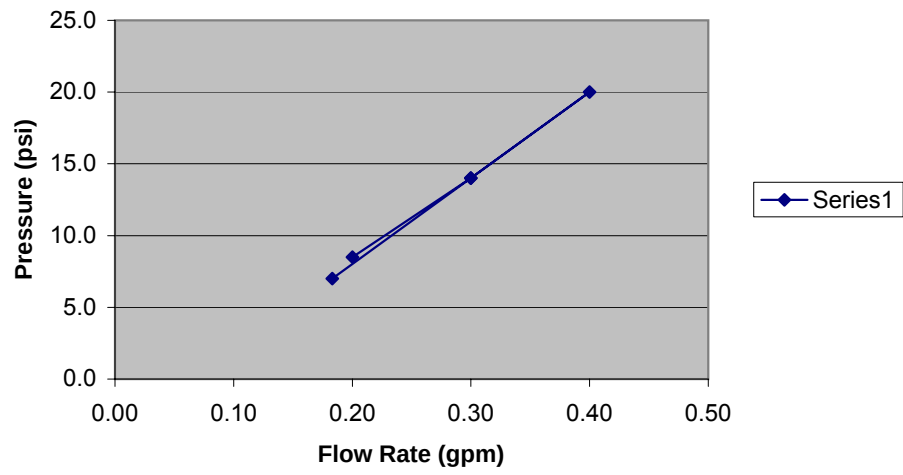
Test Zone (22.3-26.5m)

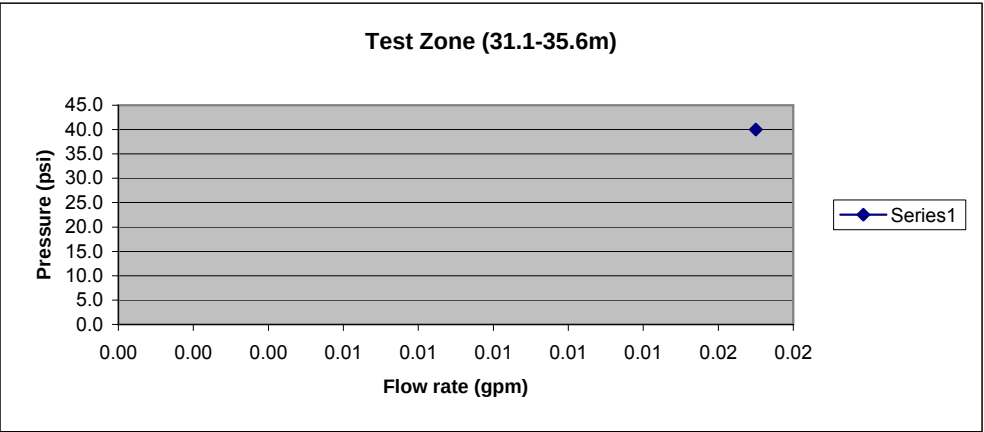


Test Zone 22.1 - 29.6m

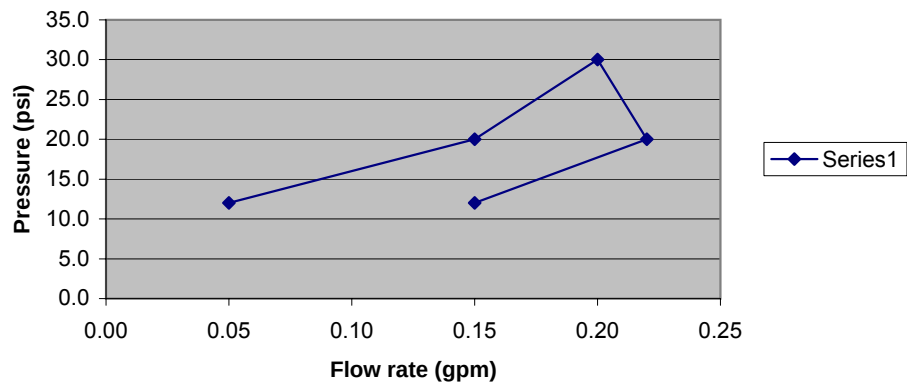


Test Zone 28.1 - 32.6m





Test Zone (34.1 - 38.6m)



Permeability Summary

MPV-04-167c

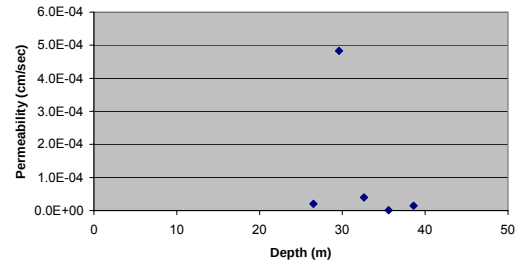
from	to	Step 1	Step 2	Step 3	Step 4	Step 5	Avg K
22.3	26.5	gauge (psi)	12	17			
		Qavg (igpm)	0.13	0.18			
		K cm/sec	2.0E-05	2.0E-05			2.0E-05
22.1	29.6	gauge (psi)	5	8.5	12	9	5
		Qavg (igpm)	2.23	2.83	4.8	4.03	3.27
		K cm/sec	4.7E-04	3.5E-04	4.2E-04	4.7E-04	6.9E-04
28.1	32.6	gauge (psi)	7	14	20	14	8.5
		Qavg (igpm)	0.18	0.3	0.4	0.3	0.2
		K cm/sec	4.5E-05	3.8E-05	3.5E-05	3.8E-05	4.2E-05
31.1	35.6	gauge (psi)	40				
		Qavg (igpm)	0.017				
		K cm/sec	7.5E-07				7.5E-07
34.1	38.6	gauge (psi)	12	20	30	20	12
		Qavg (igpm)	0.15	0.22	0.2	0.15	0.05
		K cm/sec	2.21E-05	1.94E-05	1.18E-05	1.32E-05	7.36E-06
		gauge (psi)					
		Qavg (igpm)					
		K cm/sec	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Equations: $Hf = 8.65 \times 10^{-15} (Q^2 * Lp / rp^5)$
 $H_{nit} = (Dw' + Hg - Hf) + Pg / 1.42$
 $K = (Q * Ln(R / r_o)) / (2 * \pi * H_{nit} * L)$

Overall 1.1E-04

assume
- vertical drillhole
- water at ground surface
- height of gauge is at rig flr
- negligible friction losses

Dw	Measured depth of static water (ft)	0	m
Dp	Measured depth to packer		m
Dt	Depth to midpoint of test		m
Inc	Inclination from horizontal	90	°
Dw'	Vertical depth to static water level		m
Dp'	Vertical depth to packer		m
Dt'	Vertical depth to midpoint of test		m
Hg	Gauge height	0	m
Lp	Length of discharge pipe		m
rp	Radius of discharge pipe (1" = 0.0127m)		m
R	Radius of influence (10m is standard)	10	m
rb	Drillhole radius (HQ=0.048m, NQ=0.038m)	0.038	m
L	Length of test section		m
Hf		0	m



Reflex Readings

MPV-04-167c

Date	
Hole Depth	
Azi/Dir	
Incl/dip	
Roll (Toolface re to Mag N)	
Magnetic Field	
Temp ©	

Not done for fear of instrument freezing

FIELD GEOLOGICAL LOG

HOLE ID

MPV-04-167c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.6	2.63	Ice/snow			MS
2.63	8.87	water			MS
8.87	17.8	Overburden			RB
17.80	25.6	GRN		Granite ranging from predominantly grey biotite-rich to pink pegmatitic to light green sericitic. Highly variable joint angles with frequent carbonate coatings.	RB
25.6	32.6	NGRN		Gneissic granite: biotite rich, dark grey; compact; joint often filled with calcite. granite is medium grained. Some ;large grained pegmatic sections.	MS
32.6	35.6	GRN		Granite ranging from predominantly biotite-rich salt and pepper to pegmatitic pink.	MS

UCS SAMPLES

HOLE ID: MPV-04-167C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-167C	6	38.09	Granite	04-UCS-167-001

DRILL HOLE ID: MPV-04-167C[illegible]

MPV_04_167C



Diary

MPV-04-169c

target is 50m into bedrock with 3 packer tests, approx 10m each, between 20m and 50m into bedrock

DS 14/03/2004

1230 moving from MPV-04-166c
1530 drilled ice to access circulation water
Key depths (rig floor = 0.0m) ...are
0.6m to ice
2.4m to water
3.0m to lake bed
8.0m to bedrock
casing set to 9.2m (9m + 0.2m below rig flr)
1800 rods to 8.8m (4+3+3 - 1.2 stick-up)
1830 rods at 11.8 - not pulled

NS 14/03/2004

1100hrs at 23m
0040hrs set up for packer test at 38.8 (pull four rods).
0150hrs Packer test completed. Reinsert rods.
0415hrs Drill bit finished. Drillers install new drill bit.
0700 at 50.8m

NS 15/03/2004

0830 finished packer test at 40.3 - 50.8m
0930 at 53.8
1015 at 56.8
1130 reflex test
1300 finished packer test at 49.3 - 59.8m
grouted
staked



HOLE NO:	MPV-04-169c
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	1500hrs March 14, 2004
FINISH DATE AND TIME	18:30hrs March 15, 2004
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

OVERALL HOLE DRILL RATE (m/hr)	1.66
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	2.66

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-169c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
		0.00								
		0.00								
8.00	8.80	0.80	GRN	0.80	100.0	0.80	100.0	0.80	100.0	
8.80	11.80	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	Some mechanical breakage. One break along longitudinal axis.
11.80	14.80	3.00	GRN	2.74	91.3	2.74	91.3	2.74	91.3	
14.80	17.80	3.00	GRN	2.93	97.7	2.93	97.7	2.93	97.7	
17.80	20.80	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
20.80	23.80	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
23.80	26.80	3.00	GRN	2.98	99.3	2.98	99.3	2.78	92.7	
26.80	29.80	3.00	GRN	2.97	99.0	2.97	99.0	2.75	91.7	
29.80	32.80	3.00	GRN	3.00	100.0	2.97	99.0	2.86	95.3	
32.80	35.80	3.00	GRN	2.80	93.3	2.80	93.3	2.80	93.3	
35.80	38.80	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
38.80	41.80	3.00	GRN	2.83	94.3	2.83	94.3	2.83	94.3	
41.80	44.80	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
44.80	47.80	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
47.80	50.80	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
50.80	53.80	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
53.80	56.80	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
56.80	59.80	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	EOH

DRILLHOLE ID: MPV-04-169c

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating old indicate artificial
Note any weak foliation, bedding, brecciation in comments

[illegible]

Photo Record**MPV-04-169c**

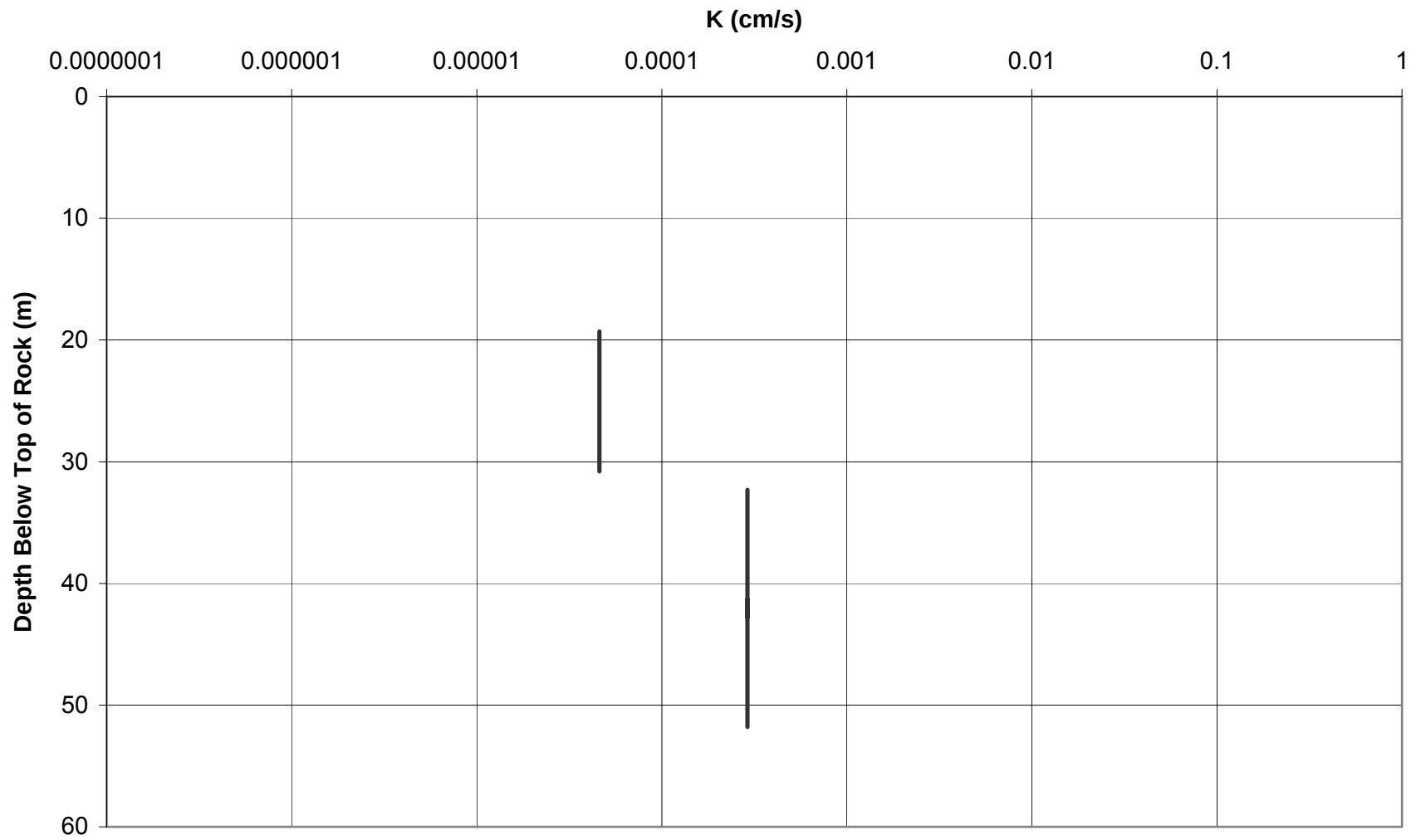
Date	Shift	Filename	Depth	Description
03/14/2004	NS 1900-0700	MPV-04-169C-8m_box1-dry	8 - 11.48m	GRN
03/14/2004	NS 1900-0700	MPV-04-169C-11.8m_box2-dry	11.48 - 16.48m	GRN
03/14/2004	NS 1900-0700	MPV-04-169C-16.48m_box3-dry	16.48 - 20.8 m	GRN
03/14/2004	NS 1900-0700	MPV-04-169C-20.8m_box4-dry	20.8 - 24.86m	GRN
03/14/2004	NS 1900-0700	MPV-04-169C-24.86m_box5-dry	24.86 - 29.24m	GRN
03/14/2004	NS 1900-0700	MPV-04-169C-29.24m_box6-dry	29.24 - 33.5m	GRN
03/14/2004	NS 1900-0700	MPV-04-169C-33.5m_box7-dry	33.5 - 38.1m	GRN
03/14/2004	NS 1900-0700	MPV-04-169C-38.1m_box8-dry	38.1 - 42.24m	GRN
03/14/2004	NS 1900-0700	MPV-04-169C-42.24m_box9-dry	42.24 - 46.75m	GRN
03/14/2004	NS 1900-0700	MPV-04-169C-46.75m_box10-dry	46.75 - 50.8m	GRN
03/15/2004	DS 0700-1900	MPV-04-169C-50.8m_box11-wet	50.8 - 55.2m	GRN
03/15/2004	DS 0700-1900	MPV-04-169C-55.1m_box12-dry	55.2 - 59.2m	GRN
03/15/2004	DS 0700-1900	MPV-04-169C-59.2m_box13-dry	59.2 - 59.8m	GRN

Core Box Record

MPV-04-169c

Box	From	To	Comments
1	8.00	11.48	
2	11.48	16.48	
3	16.48	20.80	
4	20.80	24.86	
5	24.86	29.24	
6	29.24	33.50	
7	33.50	38.10	
8	38.10	42.44	
9	42.44	46.75	
10	46.75	50.80	
11	50.80	55.10	
12	55.10	59.20	
13	59.20	59.80	
E.O.H.			

Permeability vs Depth
MPV_04_169C



Packer Test Data

Date	22-Feb-04
Staff	
Init. WL:	0
Ref. Pt.	drill shack floor
Dip	90

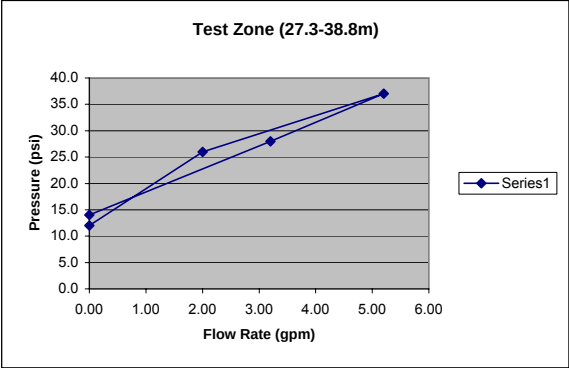
MPV-04-169c

Test 1 27.3 38.8

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	758.60		12.0	no leaks
	1	758.80	0.20		
	2	758.80	0.00		
	3	758.80	0.00		
	4	758.80	0.00		
	5	758.80	0.00	0.0	
2	0	764.00		26.0	no leaks
	1	767.30	3.30		
	2	769.40	2.10		
	3	771.30	1.90		
	4	773.40	2.10		
	5	775.30	1.90		
				2.0	
3	0	784.50		37.0	no leaks
	1	789.60	5.10		
	2	795.00	5.40		
	3	800.20	5.20		
	4	805.50	5.30		
	5	810.7	5.20	5.2	
4	0	812.50		28.0	no leaks
	1	816.00	3.50		
	2	819.30	3.30		
	3	822.50	3.20		
	4	825.70	3.20		
	5				
	6			3.2	
5	0	818.10		14.0	no leaks
	1	818.10	0.00		
	2	818.10	0.00		
	3	818.10	0.00		
	4	818.10	0.00		
	5				
	6		0.00		
	7		0.00		
	8		0.00	0.0	

Summary 27.3 38.8

Flow rate (gpm)	Pressure (psi)
0.00	12.0
2.00	26.0
5.20	37.0
3.20	28.0
0.00	14.0

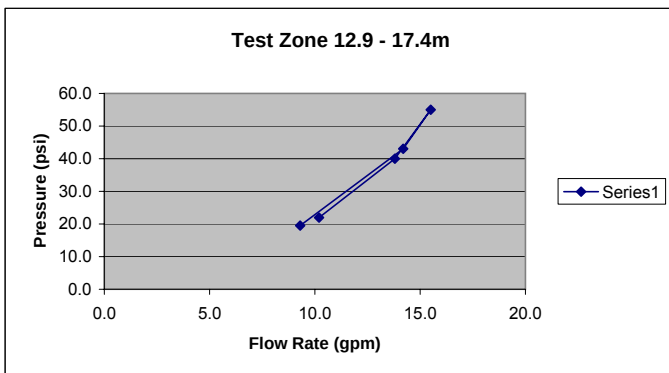


Test 2 40.3 50.8

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	820.80		22.0	
	1	830.80	830.80		
	2	841.00	10.20		
	3	851.20	10.20		
	4	861.40	10.20	10.2	
	5				
	6				
2	0	944.30		40.0	
	1	957.80	13.50		
	2	971.60	13.80		
	3	985.30	13.70		
	3	999.20	13.90		
	4	1012.90	13.70	13.8	
3	0	1027.60		55.0	
	1	1043.40	15.80		
	2	1058.80	15.40		
	3	1074.40	15.60		
	4	1090.00	15.60	15.5	
4	0	1104.40		43.0	
	1	1118.50	14.10		
	2	1132.70	14.20		
	3	1146.80	14.10		
	4	1161.00	14.20	14.2	
5	0	1171.50		19.5	
	1	1180.70	9.20		
	2	1189.80	9.10		
	3	1199.10	9.30		
	4	1208.40	9.30		
	5	1217.70	9.30	9.3	

Summary 40.3 50.8

Flow rate (gpm)	Pressure (psi)
10.2	22.0
13.8	40.0
15.5	55.0
14.2	43.0
9.3	19.5

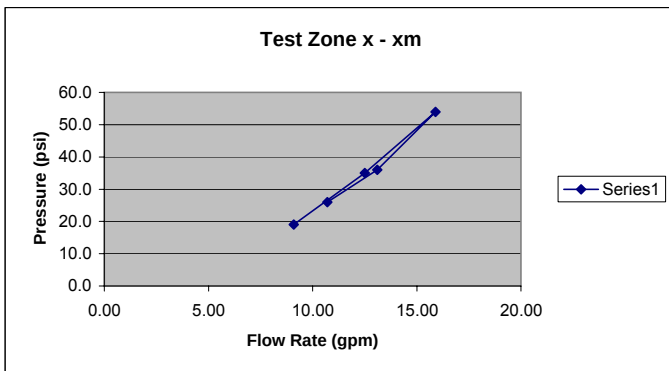


Test 3 49.3 59.8

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	224.50		26.0	
	1	235.10	10.60		
	2	245.70	10.60		
	3	256.40	10.70		
	4	267.10	10.70	10.7	
2	0	279.80		36.0	
	1	293.00	13.20		
	2	306.00	13.00		
	3	319.10	13.10		
	3	332.20	13.10	13.1	
3	0	371.50		54.0	
	1	387.20	15.70		
	2	403.40	16.20		
	3	419.20	15.80		
	4	435.10	15.90		
4	5	451	15.90	15.9	
	0	463.90		35.0	
	1	476.40	12.50		
	2	488.90	12.50		
	3	501.40	12.50	12.5	
5	0	510.80		19.0	
	1	519.80	9.00		
	2	528.80	9.00		
	3	537.90	9.10		
	4	547.00	9.10	9.1	

Summary 49.3 59.8

Flow rate (gpm)	Pressure (psi)
10.70	26.0
13.10	36.0
15.90	54.0
12.50	35.0
9.10	19.0



Permeability Summary

MPV-04-169c

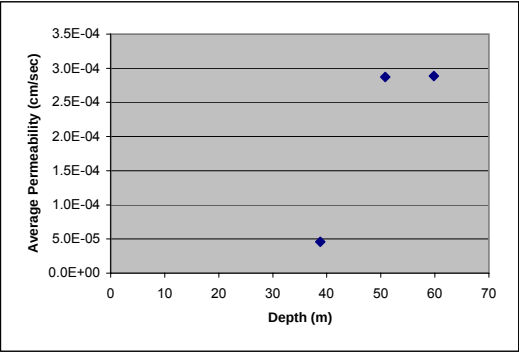
from	to		Step 1	Step 2	Step 3	Step 4	Step 5	Avg K
27.3	38.8	gauge (psi)	12	26	37	28	14	
		Qavg (igpm)	0	2	5.2	3.2	0	
		K cm/sec	0.0E+00	5.3E-05	9.7E-05	7.9E-05	0.0E+00	4.6E-05
40.3	50.8	gauge (psi)	22	40	55	43	19.5	
		Qavg (igpm)	10.2	13.8	15.5	14.2	9.3	
		K cm/sec	3.5E-04	2.6E-04	2.1E-04	2.5E-04	3.6E-04	2.9E-04
49.3	59.8	gauge (psi)	26	36	54	35	19	
		Qavg (igpm)	10.7	13.1	15.9	12.5	9.1	
		K cm/sec	3.1E-04	2.8E-04	2.2E-04	2.7E-04	3.6E-04	2.9E-04
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Equations: $H_f = 8.65 \times 10^{-15} (Q^2 \cdot L_p / r_p^5)$
 $H_{nit} = (Dw' + Hg - Hf) + Pg / 1.42$
 $K = (Q \cdot L_n (R / r_b)) / (2 \cdot \pi \cdot H_{nit} \cdot L)$

assume
- vertical drillhole
- water at ground surface
- height of gauge is at rig flr
- negligible friction losses

Overall #DIV/0!

Dw	Measured depth of static water (1)	0 m
Dp	Measured depth to packer	m
Dt	Depth to midpoint of test	m
Inc	Inclination from horizontal	90 m
Dw'	Vertical depth to static water level	°
Dp'	Vertical depth to packer	m
Dt'	Vertical depth to midpoint of test	m
Hg	Gauge height	0 m
Lp	Length of discharge pipe	m
rp	Radius of discharge pipe (1" = 0.0127m)	m
R	Radius of influence (10m is standard)	10 m
rb	Drillhole radius (HQ=0.048m, NQ=0.038m)	0.038 m
L	Length of test section	m
Hf		0 m



Reflex Readings

MPV-04-169c

Date	Mar 15-2004
Hole Depth	59.8
Azi/Dir	163.2
Incl/dip	-88.8
Roll (Toolface re to Mag N)	117.8
Magnetic Field	5977
Temp ©	6.2

MPV-04-169c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.60	2.40			Ice	MS
2.4	3			water	MS
3.00	8.00	OVBN		Overburden	MS
8.00	59.80	GRN		Granite: Biotite rich, pinkish-grey, medium grained with some pegmatitic sections, some quartz veins, hematite/chlorite staining observed at most joints, compact, fresh granite	MS

UCS SAMPLES

HOLE ID: MPV-04-169C

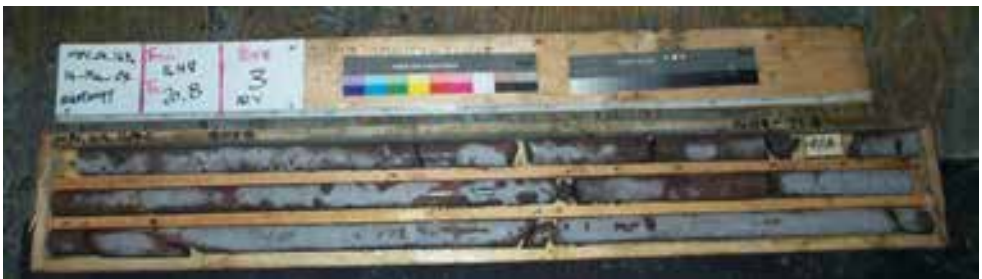
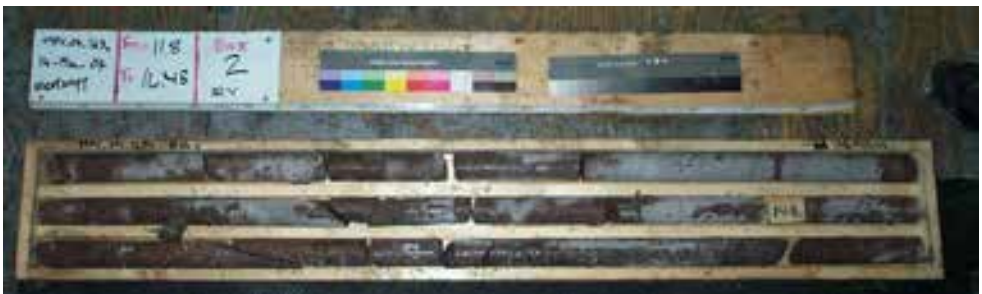
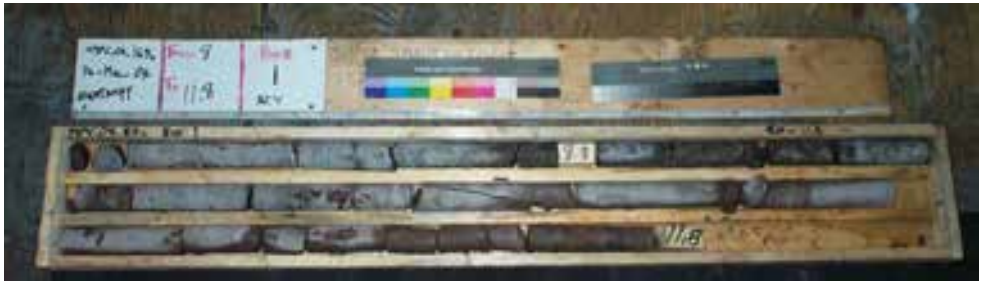
HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-169C	10	47.48-47.80	GRANITE	04-UCS-169-001

POINT LOAD TEST - INPUT

DRILL HOLE ID: MPV-04-169C

[illegible]

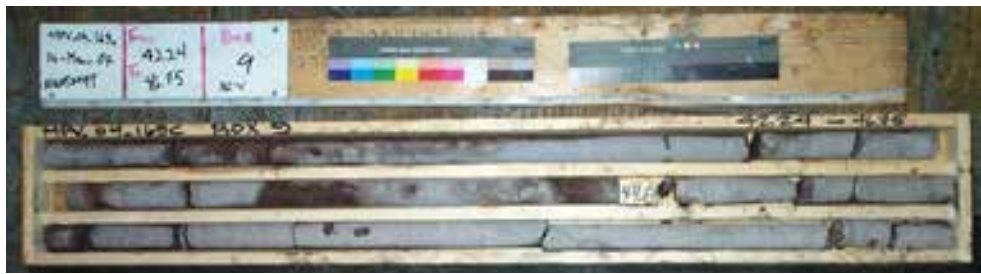
MPV_04_169C



MPV_04_169C



MPV_04_169C



Diary

MPV-04-170c

NS 15/03/2004 D2-GB-extra (adjacent to D2-GB-5) approx 1 South along axis of dyke
target is 50m into bedrock with 3 packer tests, approx 10m each, between 20m and 50m into bedrock

1930hrs drilled ice to access circulation water
install casing

Key depths (rig floor = 0.0m) ...are

0.6m to ice

2.0m to water

3.2m to lake bed

4.3m to bedrock

2130hrs Bottom of casing at 5.3m

0030hrs drill bit finished at 18m. Driller left to get new bit.

0100hrs drilling resumes

0330hrs at 33m

0400hrs set up for packer test at 36m.

0500hrs packer test completed.

DS 16/03/2004

740 at 39m

1030 at 50m

changed bit at 49.4m

at 52

1200hrs at 54 END OF HOLE

1230hrs pulled rods for packer testing

1245hrs started grouting hole

1430hrs



PROJECT	Gahcho Kue Geotech
PROJECT NO	2CD002.11
NORTHING	approx 1m south of D2-GB-5
EASTING	
SURFACE ELEVATION	
AZIMUTH	-
DIP	90

HOLE NO:	MPV-04-170c
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	1900hrs March 15, 2004
FINISH DATE AND TIME	1230hrs March 16, 2004
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

[illegible]

OVERALL HOLE DRILL RATE (m/hr)	2.25
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	3.48

GENERAL GEOTECH LOG

DRILLHOLE ID:

MPV-04-170c

Total Core Recovery = Total length of core recovered

Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)

Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)

NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
		0.00								
5.20	6.00	0.80	BGRN	0.80	100.0	0.77	96.3	0.77	96.3	Rock fragments (mechanical breaks).
6.00	9.00	3.00	BGRN	3.00	100.0	2.95	98.3	2.95	98.3	
9.00	12.00	3.00	BGRN	3.00	100.0	3.00	100.0	3.00	100.0	
12.00	15.00	3.00	BGRN	3.00	100.0	3.00	100.0	3.00	100.0	
15.00	18.00	3.00	BGRN	3.00	100.0	3.00	100.0	3.00	100.0	
18.00	21.00	3.00	BGRN	3.00	100.0	2.97	99.0	2.75	91.7	
21.00	24.00	3.00	BGRN	2.98	99.3	2.88	96.0	2.88	96.0	
24.00	27.00	3.00	BGRN	3.00	100.0	3.00	100.0	3.00	100.0	
27.00	30.00	3.00	BGRN	3.00	100.0	3.00	100.0	3.00	100.0	
30.00	33.00	3.00	BGRN	3.00	100.0	3.00	100.0	3.00	100.0	Pegmatite section 32 - 32.6m
33.00	36.00	3.00	BGRN	3.00	100.0	3.00	100.0	3.00	100.0	
36.00	39.00	3.00	BGRN	3.00	100.0	3.00	100.0	3.00	100.0	
39.00	42.00	3.00	BGRN	3.00	100.0	3.00	100.0	3.00	100.0	
42.00	45.00	3.00	BGRN	3.00	100.0	3.00	100.0	3.00	100.0	
45.00	48.00	3.00	BGRN	3.00	100.0	3.00	100.0	3.00	100.0	
48.00	49.40	1.40	BGRN	1.40	100.0	1.36	97.1	1.19	85.0	
49.40	51.00	1.60	BGRN	1.60	100.0	1.60	100.0	1.60	100.0	
51.00	54.00	3.00	BGRN	3.00	100.0	3.00	100.0	3.00	100.0	END OF HOLE

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID:

MPV-04-170c

NB: 3 sources of open joints and fractures found in drillcore
 Artificial breaks induced by drilling process
 Artificial breaks induced by core handling
 Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
 Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)
 Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating old indicate artificia
 Note any weak foliation, bedding, brecciation in comments

FROM (m)	TO (m)	ROCK TYPE	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of Sets	Type	Totals	JOINT CONDITIONS				COMMENT
			STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH				ANGLE	ROUGH	ALT	FILL	
6.0	9.0	BGRN	R6			25		2	0	0	0		2	J1	1	35	8	0	3	
														J2	1	65	5	0	3	
9.0	12.0	BGRN	R6			21		5	0	0	0		3	J1	2	75	5	0	3	J1 angles: 75, 65
														J2	1	35	4	0	3	
														J3	2	85	4	0	3	
12.0	15.0	BGRN	R4			26		3	0	0	1	0	2	J1	2	40	4	0	3	J1 angles 30, 40. Calcite coating on all joints.
														J2	1	85	5	0	3	
15.0	18.0	BGRN	R6			22		7	0	0	1	0	2	J1	6	75	5	0	3	J1 angles (4) 75, 55, 30;
														J2	1	45	5	0	6	
18.0	21.0	BGRN	R5			28		8	1	0	1	0	3	J1	3	35	5	0	3	
														J2	4	75	5	0	3	
														J3	1	40	2	0	3	
21.0	24.0	BGRN	R4			22		7	1	0	1	0	3	J1	1	50	5	0	3	J2 angles: 35; 40; 45; (2)80
														J2	5	45	4	0	3	
														J3	1	30	2	0	3	
24.0	27.0	BGRN	R3			26		2	0	0	2	0	1	J1	2	85	5	0	3	
27.0	30.0	BGRN	R4			24		1	1	0	1	0	1	J1	1	50	5	0	3	
30.0	33.0	BGRN	R4			24		2	1	0	1	0	1	J1	2	75	4	0	3	
33.0	36.0	BGRN	R4			22		0	0		1	0								Mechanical fractures only.
36.0	39.0	BGRN	R5			22		1	0		1	0	1	J1	1	72	5	0	3	slight carbonate coating
39.0	42.0	BGRN	R5			22		3	0		0		2	J1	2	32	7	0	3	J1 has one joint with carbonate coating; J2 is coated
														J2	1	84	5	0	3	
42.0	45.0	BGRN	R5			18		4	0		0		3	J1	1	80	4	0	3	
														J2	1	34	4	0	3	
														J3	1	72	5	0	3	
4.0	48.0	BGRN	R5			18		2	0		0		2	J1	1	35	5	0	3	J1 and J2 have carbonate coating
														J2	1	75	5	0	3	
48.0	49.4	BGRN	R5			9		4	0		0		2	J1	3	85	5	0	3	J1 has angles at 88 (2) and 84 with two joints with carbonate coating
														J2	1	30	5	0	3	
49.4	51.0	BGRN	R5			9		1	0		0		1	J1	1	30	5	0	3	
51.0	54.0	BGRN	R5			24		3	0		0		3	J1	2	80	4	0	3	J1 has angles of 74 and 80, both joints with carbonate copatings
														J2	1	5	7	0	3	END OF HOLE

Photo Record

MPV-04-170c

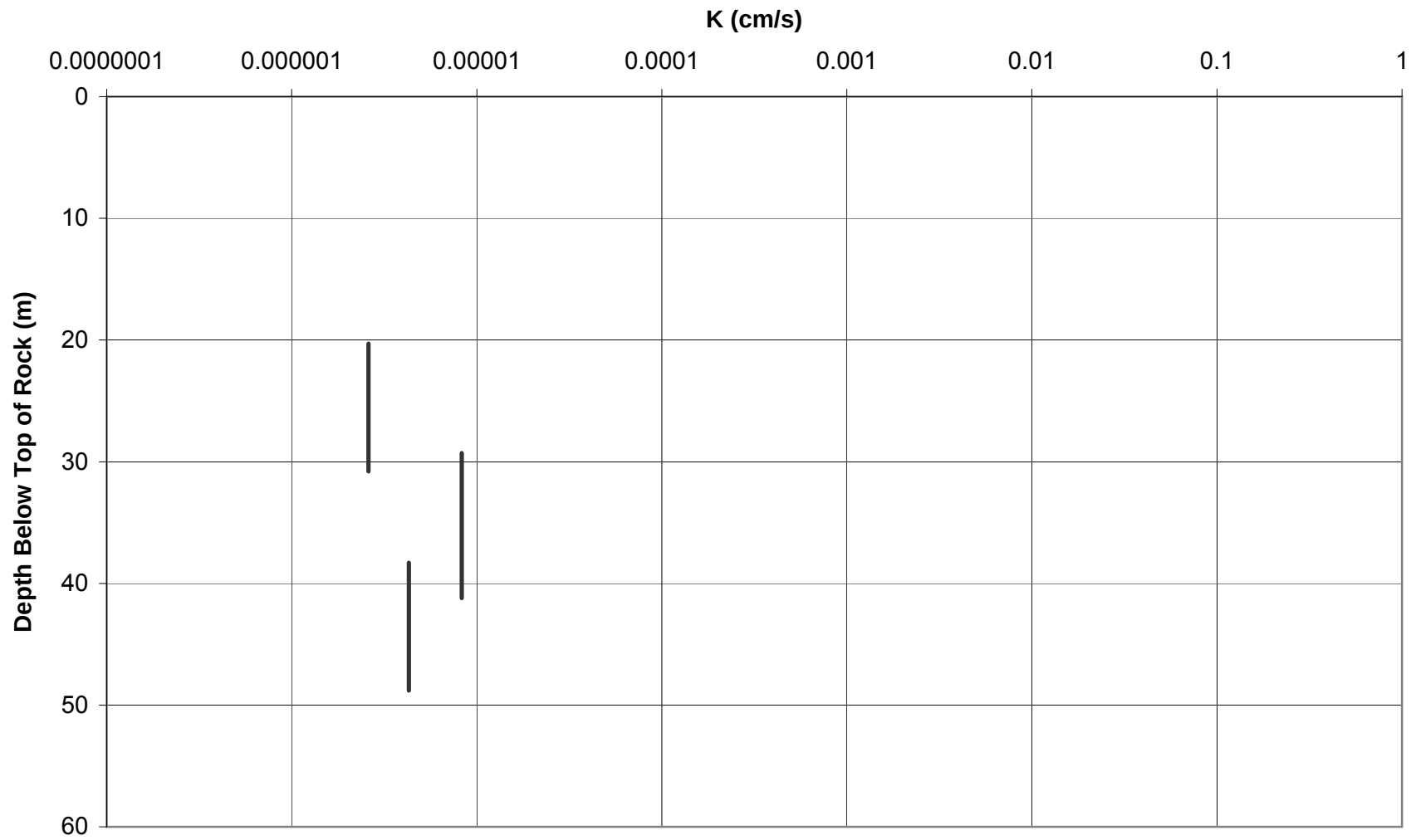
Date	Shift	Filename	Depth	Description
03/15/2004	NS 1900-0700	MPV-04-170C-5.2m_box1-dry	5.2 - 9m	
03/15/2004	NS 1900-0700	MPV-04-170C-9m_box2-wet	9 - 13.2m	
03/15/2004	NS 1900-0700	MPV-04-170C-9m_box3-dry	13.2 - 17.15m	
03/15/2004	NS 1900-0700	MPV-04-170C-21m_box4-dry	17.15 - 21m	
03/15/2004	NS 1900-0700	MPV-04-170C-21m_box5-dry	21 - 25.2m	
03/15/2004	NS 1900-0700	MPV-04-170C-25.92m_box6-wet	25.2 - 29.25m	
03/15/2004	NS 1900-0700	MPV-04-170C-29.25m_box7-wet	29.25 - 33m	
03/16/2004	DS 0700-1900	MPV-04-170C-33.0m_box8-dry	33.00 - 37.08	
03/16/2004	DS 0700-1900	MPV-04-170C-37.08m_box9-dry	37.08 - 41.08	
03/16/2004	DS 0700-1900	MPV-04-170C-41.08m_box10-dry	41.08-45.27	
03/16/2004	DS 0700-1900	MPV-04-170C-4.27m_box11-dry	45.27 - 49.50m	
03/16/2004	DS 0700-1900	MPV-04-170C-49.5m_box12-dry	49.50 - 53.80m	
03/16/2004	DS 0700-1900	MPV-04-170C-49.5m_box13-dry	53.80 - 54.00m	

Core Box Record

MPV-04-170c

Box	From	To	Comments
1	5.20	9.00	
2	9.00	13.20	
3	13.20	17.15	
4	17.15	21.00	
5	21.00	25.20	
6	25.20	29.25	
7	29.25	33.00	
8	33.00	37.08	
9	37.08	41.08	
10	41.08	45.27	
11	45.27	49.50	
12	49.50	53.80	
13	53.80	54.00	End of hole

Permeability vs Depth
MPV_04_170C



Packer Test Data

Date	15-Mar-04
Staff	
Init. WL:	0
Ref. Pt.	drill shack floor
Dip	90

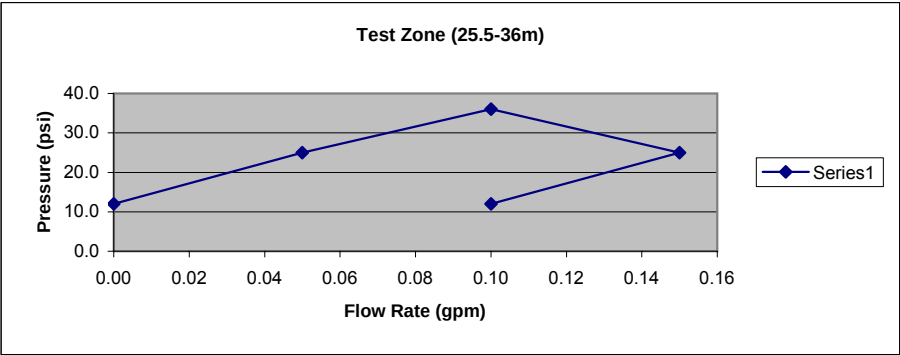
MPV-04-170c

Test 1 25.5 36

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	7551.40		12.0	no leaks
	1	7551.60	0.20		
	2	7551.70	0.10		
	3	7551.80	0.10		
	4	7551.80	0.00		
	5	7551.90	0.10		
	6	7552.00	0.10		
2	7	7552.10	0.10	0.10	no leaks
	0	7552.50		25.0	
	1	7552.65	0.15		
	2	7552.80	0.15		
	3	7552.95	0.15		
	4	7553.10	0.15	0.15	
3	0	7553.30		36.0	no leaks
	1	7553.50	0.20		
	2	7553.60	0.10		
	3	7553.70	0.10		
	4	7553.80	0.10	0.10	
4	0	7553.85		25.0	no leaks
	1	7553.90	0.05		
	2	7553.95	0.05		
	3	7554.00	0.05		
	4	7554.05	0.05	0.05	
5	0	7554.05		13.0	no leaks
	1	7554.05	0.00		
	2	7554.05	0.00		
	3	7554.05	0.00		
	4	7554.05	0.00	0.00	

Summary 25.5 36

Flow rate (gpm)	Pressure (psi)
0.10	12.0
0.15	25.0
0.10	36.0
0.05	25.0
0.00	12.0



Test 2

34.5

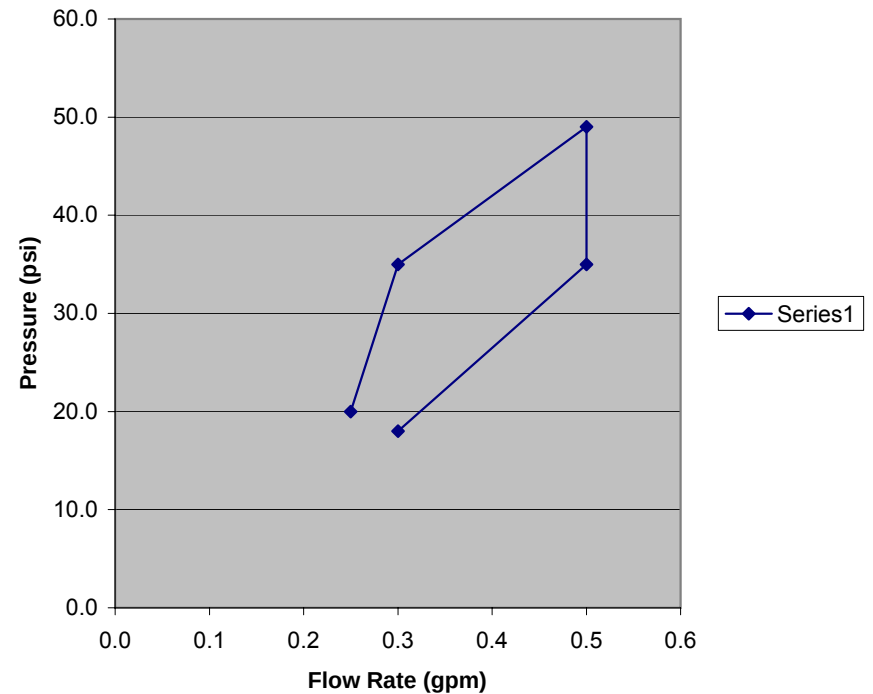
46.4

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	9:02	556.40		18.0	
	1	556.90	0.50		
	2	557.45	0.55		
	3	557.95	0.50		
	4	558.40	0.45		
	5	558.80	0.40		
	6	559.15	0.35		
	7	559.40	0.25		
	8	559.70	0.30		
	9	560.00	0.30	0.3	
2	9:12	560.95		35.0	
	1	561.70	0.75		
	2	562.35	0.65		
	3	563.00	0.65		
	4	563.45	0.45		
	5	564.00	0.55		
	6	564.40	0.40		
	7	565.00	0.60		
	8	565.50	0.50		
	9	566.00	0.50		
	10	566.50	0.50	0.5	
3	9:23	567.60		49.0	
	1	568.35	0.75		
	2	568.90	0.55		
	3	569.40	0.50		
	4	569.85	0.45		
	5	570.25	0.40		
	6	570.75	0.50		
	7	571.40	0.65		
	8	571.85	0.45		
	9	572.45	0.60		
	10	572.95	0.50		
	11	573.45	0.50		
	12	573.95	0.50	0.5	
4	9:37	574.10		35.0	very small leak
	1	574.40	0.30		
	2	574.70	0.30		
	3	575.00	0.30	0.3	
5	9:41	575.50		20.0	very small leak
	1	575.70	0.20		
	2	575.95	0.25		
	3	576.15	0.20		
	4	576.40	0.25		
	5	576.55	0.15		
	6	576.80	0.25		
	7	577.05	0.25		
	8	577.30	0.25	0.3	

Summary 34.5 46.4

Flow rate (gpm)	Pressure (psi)
0.3	18.0
0.5	35.0
0.5	49.0
0.3	35.0
0.3	20.0

Test Zone 34.5- 46.4m



Test 3

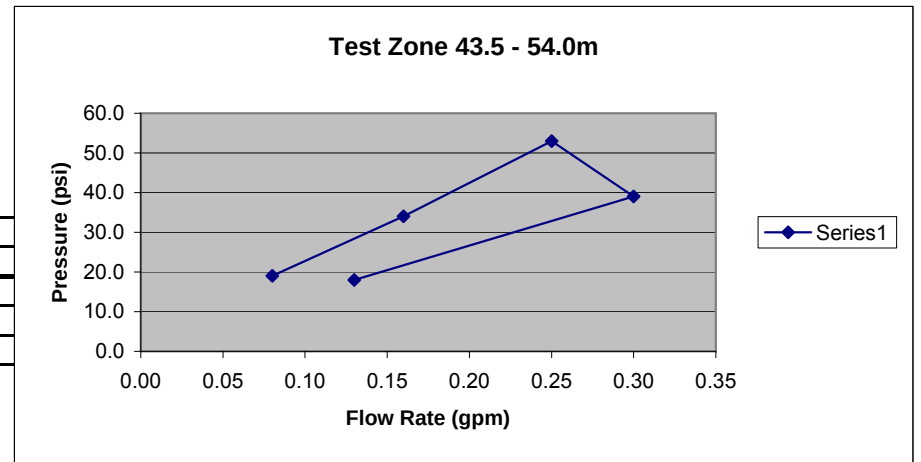
43.5

54

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	78.90		18.0	
	1	79.10	0.20		
	2	79.35	0.25		
	3	79.55	0.20		
	4	79.65	0.10		
	5	79.75	0.10		
	6	79.90	0.15		
	7	80.10	0.20		
	8	80.20	0.10		
		80.30	0.10		
		80.40	0.10	0.13	
2	0	81.20		39.0	
	1	81.50	0.30		
	2	81.80	0.30		
	3	82.00	0.20		
	3	82.30	0.30		
	4	82.55	0.25	0.25	
3	0	83.00		53.0	
	1	83.30	0.30		
	2	83.60	0.30		
	3	83.95	0.35		
	4	84.15	0.20		
	4	84.40	0.25		
	4	84.65	0.25		
	4	84.90	0.25	0.25	
4	0	84.90		34.0	
	1	85.00	0.10		
	2	85.10	0.10		
	3	85.30	0.20		
	4	85.50	0.20		
	5	85.60	0.10		
	6	85.75	0.15	0.16	
	0	85.65			
	1	85.70	0.05		
	2	85.75	0.05		
	3	85.85	0.10		
	4	85.95	0.10		
	5	86.00	0.05	0.08	

Summary 43.5 54

Flow rate (gpm)	Pressure (psi)
0.13	18.0
0.30	39.0
0.25	53.0
0.16	34.0
0.08	19.0



Permeability Summary

MPV-04-170c

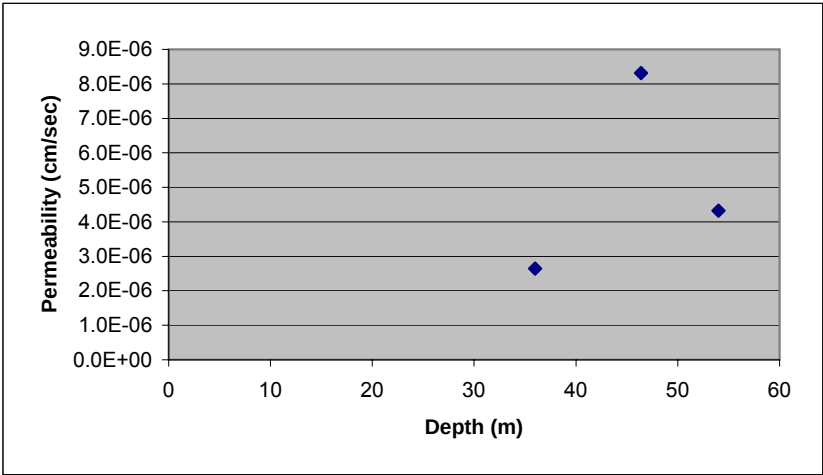
from	to		Step 1	Step 2	Step 3	Step 4	Step 5	Avg K
25.5	36	gauge (psi)	12	25	36	25	12	
		Qavg (igpm)	0.08	0.15	0.1	0.05	0	
		K cm/sec	5.0E-06	4.5E-06	2.1E-06	1.5E-06	0.0E+00	2.6E-06
34.5	46.4	gauge (psi)	18	35	49	35	20	
		Qavg (igpm)	0.3	0.5	0.5	0.3	0.25	
		K cm/sec	1.1E-05	9.5E-06	6.8E-06	5.7E-06	8.3E-06	8.3E-06
43.5	54	gauge (psi)	18	39	53	34	19	
		Qavg (igpm)	0.13	0.3	0.25	0.16	0.08	
		K cm/sec	5.5E-06	5.8E-06	3.6E-06	3.6E-06	3.2E-06	4.3E-06
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	

Equations: $H_f = 8.65 \times 10^{-15} (Q^2 \cdot L_p / r_p^5)$
 $H_{nit} = (Dw' + Hg - Hf) + Pg / 1.42$
 $K = (Q \cdot \ln(R/r_b)) / (2 \cdot \pi \cdot H_{nit} \cdot L)$

assume
 - vertical drillhole
 - water at ground surface
 - height of gauge is at rig flr
 - negligible friction losses

Overall 5.1E-06

Dw	Measured depth of static water (1)	0 m
Dp	Measured depth to packer	
Dt	Depth to midpoint of test	
Inc	Inclination from horizontal	90 m
Dw'	Vertical depth to static water level	
Dp'	Vertical depth to packer	
Dt'	Vertical depth to midpoint of test	
Hg	Gauge height	0 m
Lp	Length of discharge pipe	
rp	Radius of discharge pipe (1" = 0.0127m)	
R	Radius of influence (10m is standard)	10 m
rb	Drillhole radius (HQ=0.048m, NQ=0.038m)	0.038 m
L	Length of test section	
Hf		0 m



Reflex Readings

MPV-04-170c

Date	16-Mar-04
Hole Depth (m)	54
Azi/Dir	137.8
Incl/dip	88.7
Roll (Toolface re to Mag N)	222.9
Magnetic Field	5713
Temp ©	8

MPV-04-170c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	0.60	Ice			MS/RB
0.6	3.20	Water			MS/RB
3.20	4.30	OVBN			MS/RB
4.20	54.00	BGRN		biotite rich granite , some quartz veins, most joints carbonate coated, undular and planar.	MS/RB

UCS SAMPLES

HOLE ID: MPV-04-170C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-170C	12	49.94-50.22	GRANITE	04-UCS-170-001

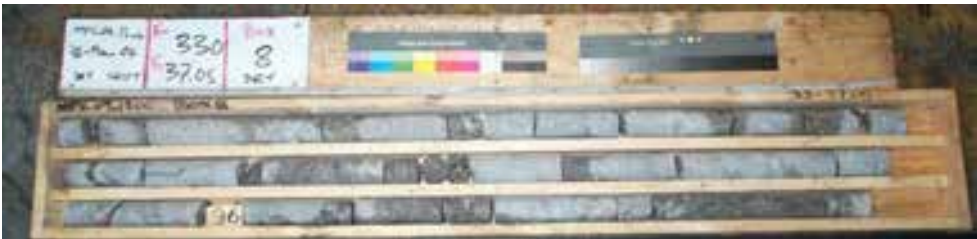
DRILL HOLE ID: **MPV-04-170C**

[illegible]

MPV_04_170C



MPV_04_170C



MPV_04_170C



MPV_04_172C



Diary

MPV-04-172c

target depth is 62m

NS 16/03/2004 J Siddorn
1900 setup
1930 misfiring ice auger, standby until fixed
2100 setting casing
2200 rig floor at 0.0m ... depth to top of ...
ice = 0.6m
water = 2.6m
top of lake bed = 10.8m

water depth 10.8m
2300 casing set to 12.3m depth
2300 dropping core barrel and rods
beginning to drill
0100 intersected amphibolite gneiss at 20.43m
0200 packer test 15.5m-23m interval
0300 resume drilling
0400 amphibolite gneiss 20.43-23.79m depth
0500 packer test 24.5-32m interval
0600 resume drilling
0630 End of shift @ 32m

DS17/03/2004 R Bowden
0730 at 35m
0820 at 38m
0840 new drill bit at 38m
0920 at 40.8m
1020 at 43.9
1100 packer test completed
1430 at 53
1500 packer test, 42.5 - 53.0m
1600 packer test completed
1700 at 59m
1900 packer at 51.5m - 62.0m



PROJECT	Gahcho Kue Geotech
PROJECT NO	2CD002.11
NORTHING	7036644.33
EASTING	589928.43
SURFACE ELEVATION	404.5
AZIMUTH	0
DIP	90

HOLE NO:	MPV-04-172c
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	1900 March 16, 2004
FINISH DATE AND TIME	1900 March 17, 2004
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

[illegible]

OVERALL HOLE DRILL RATE (m/hr)	2.58
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	3.10

GENERAL GEOTECH LOG

DRILLHOLE ID: **MPV-04-172c**

Total Core Recovery = Total length of core recovered

Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)

Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)

NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
12.00	14.00	2.00	GR	1.90	95.0	1.90	95.0	1.90	95.0	
14.00	17.00	3.00	GR	2.98	99.3	2.98	99.3	2.98	99.3	
17.00	20.00	3.00	GR	2.93	97.7	2.93	97.7	2.93	97.7	
20.00	20.43	0.43	GR	0.43	100.0	0.43	100.0	0.43	100.0	
20.43	23.00	2.57	AMP	2.57	100.0	2.57	100.0	2.57	100.0	amphibolite gneiss
23.00	23.79	0.79	AMP	0.79	100.0	0.79	100.0	0.79	100.0	amphibolite gneiss
23.79	26.00	2.21	GR	2.21	100.0	2.21	100.0	2.03	91.9	granite
26.00	29.00	3.00	GR	2.91	97.0	2.91	97.0	2.85	95.0	granite
29.00	32.00	3.00	GR	3.00	100.0	3.00	100.0	2.98	99.3	granite
32.00	35.00	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	granite
35.00	38.00	3.00	GR	3.00	100.0	2.88	96.0	2.77	92.3	
38.00	40.80	2.80	GR	2.80	100.0	2.78	99.3	2.66	95.0	
40.80	43.90	3.10	GR	3.10	100.0	3.02	97.4	2.80	90.3	
43.90	47.00	3.10	GR	3.10	100.0	3.10	100.0	3.03	97.7	
47.00	50.00	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
50.00	53.00	3.00	GR	3.00	100.0	2.96	98.7	2.53	84.3	
53.00	56.00	3.00	GR/GNG	3.00	100.0	2.67	89.0	2.39	79.7	Granite/ Gneissic granite
56.00	59.00	3.00	GR/GNG	3.00	100.0	2.98	99.3	2.91	97.0	
59.00	62.00	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	Granite/ Gneissic granite
		0.00								
		0.00								
		0.00								
		0.00								
		0.00								

DETAILED GEOTECHNICAL LOG	
NB: 3 sources of open joints and fractures found in drillcore	
Artificial breaks induced by drilling process	
Artificial breaks induced by core handling	
Natural joints that are present in the rock mass	

MPV-04-172c

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

[illegible]

Photo Record

MPV-04-172c

Date	Shift	Filename	Depth	Description
16/03/04	NS 1900-0700	MPV-04-172c_12m_Box1_dry	12-15.6	Box 1 core
16/03/04	NS 1900-0700	MPV-04-172c_15.6m_Box2_dry	15.6-20	Box 2 core
16/03/04	NS 1900-0700	MPV-04-172c_20.0m_Box3_dry	20-24.2	Box 3 core
16/03/04	NS 1900-0700	MPV-04-172c_24.2m_Box4_dry	24.2-28.4	Box 4 core
17/03/2004	DS 0700-1900	MPV-04-172c_28.4m_Box5_dry	28.4 - 32.6	
17/03/2004	DS 0700-1900	MPV-04-172c_32.6m_Box6_dry	32.6 - 37.0	
17/03/2004	DS 0700-1900	MPV-04-172c_37.0m_Box7_dry	37.0 - 40.8	
17/03/2004	DS 0700-1900	MPV-04-172c_40.8m_Box8_dry	40.8 - 45.0	
17/03/2004	DS 0700-1900	MPV-04-172c_45.0m_Box9_dry	45.0 - 48.95	
17/03/2004	DS 0700-1900	MPV-04-172c_48.95m_Box10_dry	48.9 - 53.20	
17/03/2004	DS 0700-1900	MPV-04-172c_53.2m_Box11_dry	53.2 - 57.5	
17/03/2004	NS 1900-0700	MPV-04-172c_57.5m_Box12_dry	57.5-62	

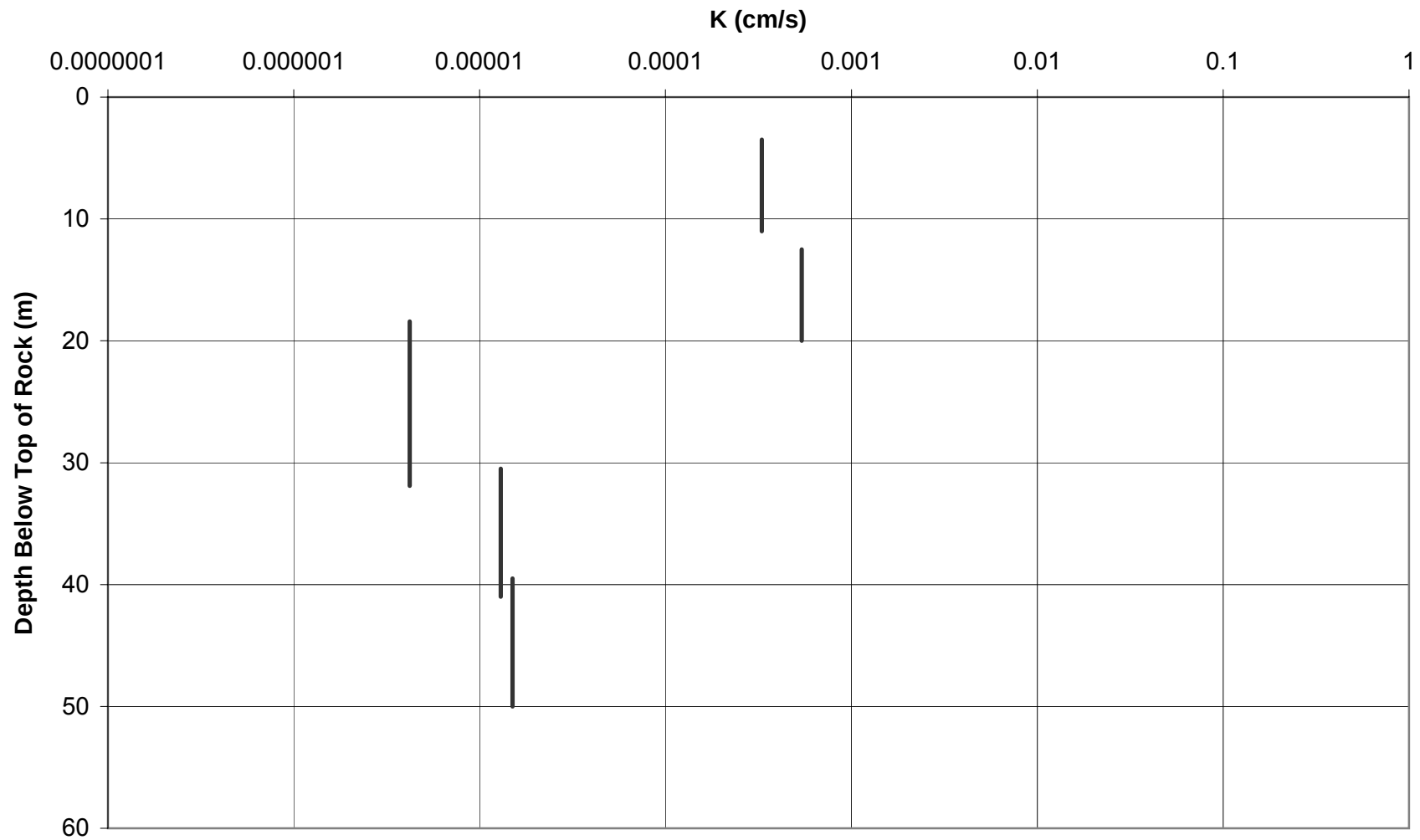
Core Box Record

MPV-04-172c

Box	From	To	Comments
1	12.00	15.60	
2	15.60	20.00	
3	20.00	24.20	
4	24.20	28.40	
5	28.40	32.60	
6	32.60	37.00	
7	37.00	40.80	
8	40.80	45.00	
9	45.00	48.95	
10	48.95	53.20	
11	53.20	57.50	
12	57.50	61.45	
13	61.45	62.00	

Permeability vs Depth

MPV_04_172C



Packer Test Data

Date	16-Mar-04
Staff	R. Bowden, J.Siddorn
Init. WL:	0
Ref. Pt.	drill shack floor
Dip	90

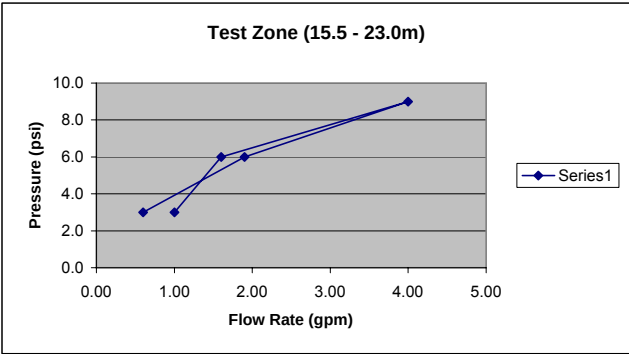
MPV-04-172c

Test 1 15.5 23

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres (psi)	Comments	
1	0	7589.00			no leaks	
	1	7590.00	1.00	3.0		
	2	7591.10	1.10			
	3	7592.00	0.90			
	4	7593.00	1.00			
	5	7594.05	1.05			
2	6	7594.95	0.90	1.0	no leaks	
	0	7597.50				
	1	7599.10	1.60	6.0		
	2	7600.65	1.55			
	3	7602.25	1.60			
	4	7603.85	1.60			
3	5	7605.40	1.55	1.6	no leaks	
	0	7609.00				
	1	7612.70	3.70	9.0		
	2	7616.00	3.30			
	3	7619.30	3.30			
	4	7622.70	3.40			
4	5	7626.05	3.35	4.5	no leaks	
	6	7629.3	6.60			
	0	7632.00				
	1	7634.00	2.00			6.0
	2	7635.80	1.80			
	3	7637.70	1.90			
5	4	7639.55	1.85	1.9	no leaks	
	5	7641.50	1.95			
	6	7643.50	2.00			
	0	7644.50				
	1	7645.05	0.55			3.0
	2	7645.60	0.55			
	3	7646.20	0.60	0.6		
	4	7646.80	0.60			
	5	7647.45	0.65			

Summary 15.5 23

Flow rate (gpm)	Pressure (psi)
1.00	3.0
1.60	6.0
4.00	9.0
1.90	6.0
0.60	3.0

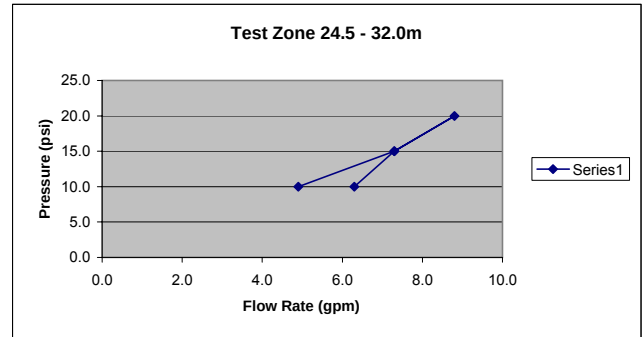


Test 2 24.5 32

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres: (psi)	Comments
1	0	7660.00	7660	10.0	
	1	7665.00	5.00		
	2	7669.60	4.60		
	3	7674.60	5.00		
	4	7679.50	4.90		
	5	7684.40	4.90		
	6	7689.20	4.80		
	7	7694.20	5.00	4.9	
2	0	7707.00		15.0	
	1	7714.40	7.40		
	2	7721.50	7.10		
	3	7728.70	7.20		
	4	7736.00	7.30		
	5	7743.40	7.40	7.3	
3	0	7790.00		20.0	
	1	7799.05	9.05		
	2	7807.70	8.65		
	3	7816.50	8.80		
	4	7825.30	8.80		
	5	7834.10	8.80	8.8	
4	0	7843.00		15.0	
	1	7850.10	7.10		
	2	7857.40	7.30		
	3	7864.80	7.40		
	4	7872.00	7.20		
	5	7879.30	7.30	7.3	
5	0	7885.00		10.0	
	1	7891.30	6.30		
	2	7897.40	6.10		
	3	7903.70	6.30		
	4	7909.90	6.20		
	5	7916.20	6.30	6.3	

Summary 24.5 32

Flow rate (gpm)	Pressure (psi)
4.9	10.0
7.3	15.0
8.8	20.0
7.3	15.0
6.3	10.0



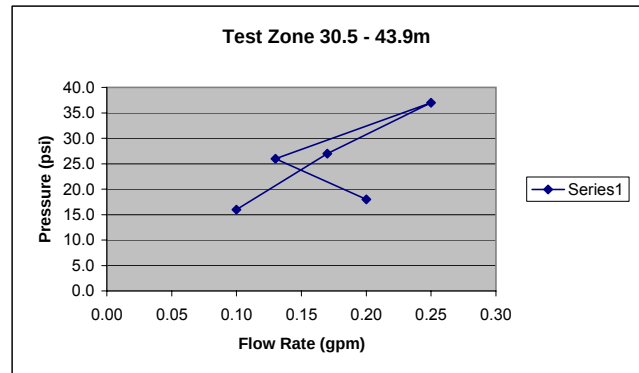
Test 3

30.5 43.9

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres: (psi)	Comments
1	0	21.20		18.0	no leaks
	1	21.45	0.25		
	2	21.70	0.25		
	3	21.90	0.20		
	4	22.10	0.20		
	5	22.30	0.20	0.20	
2	0	23.20		26.0	
	1	23.30	0.10		
	2	23.60	0.30		
	3	23.80	0.20		
	3	24.00	0.20		
	4	24.10	0.10		
	5	24.20	0.10	0.13	
3	0	24.60		38.0	
	1	24.85	0.25		
	2	25.10	0.25		
	3	25.35	0.25		
	4	25.60	0.25	0.25	
	5				
4	0	25.65		27.0	
	1	25.75	0.10		
	2	26.00	0.25		
	3	26.20	0.20		
	4	26.40	0.20		
	5	26.55	0.15		
		26.70	0.15	0.17	
5	0	26.75		16.0	
	1	26.80	0.05		
	2	26.90	0.10		
	3	27.00	0.10		
	4	27.10	0.10	0.10	
	5				

Summary 30.5 43.9

Flow rate (gpm)	Pressure (psi)
0.20	18.0
0.13	26.0
0.25	37.0
0.17	27.0
0.10	16.0



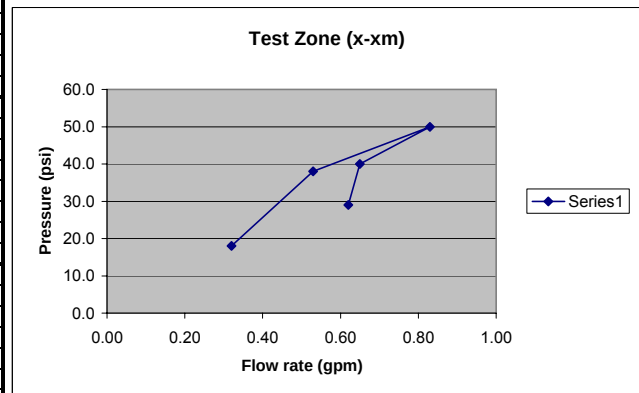
Test 4

42.5 53

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres: (psi)	Comments
1	0	29.50		29.0	
	1	30.20	0.70		
	2	30.8	0.60		
	3	31.40	0.60		
	4	32.00	0.60		
	5	32.65	0.65	0.62	
	6				
2	0	33.60		40.0	
	1	34.40	0.80		
	2	35.00	0.60		
	3	35.70	0.70		
	4	36.40	0.70		
	5	37.00	0.60		
	6	37.65	0.65	0.65	
	7				
3	0	38.40		50.0	
	1	39.20	0.80		
	2	39.90	0.70		
	3	40.60	0.70		
	4	41.45	0.85		
	5	42.25	0.80		
	6	43.10	0.85	0.83	
	7				
4	0	43.75		38.0	
	1	44.15	0.40		
	2	44.70	0.55		
	3	45.25	0.55		
	4	45.75	0.50	0.53	
	5				
	6				
5	0	46.00		18.0	
	1	46.30	0.30		
	2	46.55	0.25		
	3	46.90	0.35		
	4	47.20	0.30		
	5	47.50	0.30	0.32	

Summary 42.5 53

Flow rate (gpm)	Pressure (psi)
0.62	29.0
0.65	40.0
0.83	50.0
0.53	38.0
0.32	18.0



Test 5

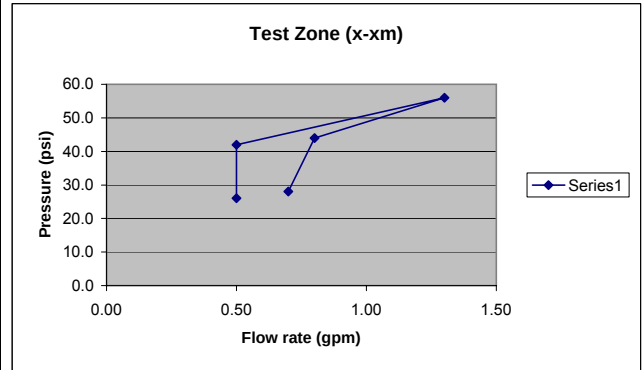
51.5

62

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pres: (psi)	Comments
1	0	953.45		28.0	
	1	954.05	0.60		
	2	954.75	0.70		
	3	955.40	0.65		
	4	956.20	0.80		
				0.7	
2	0	957.35		44.0	
	1	958.10	0.75		
	2	958.80	0.70		
	3	959.60	0.80		
	4	960.40	0.80		
				0.8	
3	0	961.25		56.0	
	1	962.10	0.85		
	2	963.05	0.95		
	3	963.80	0.75		
	4	964.55	0.75		
	5	965.1	2.05		
	6	965.7	1.90		
	7	966.3	1.75	1.3	
4	0	967.40		42.0	
	1	967.90	0.50		
	2	968.40	0.50		
	3	969.00	0.60		
	4	969.45	0.45		
	5	969.90	0.45		
	6	970.45	0.55	0.5	
5	0	970.90		26.0	
	1	971.20	0.30		
	2	971.70	0.50		
	3	972.05	0.35		
	4	972.60	0.55		
	5	973.00	0.40		
	6	973.50	0.50		
	7	974.00	0.50		
	8	974.50	0.50	0.5	

Summary 51.5 62

Flow rate (gpm)	Pressure (psi)
0.70	28.0
0.80	44.0
1.30	56.0
0.50	42.0
0.50	26.0



Permeability Summary

MPV-04-172c

from	to		Step 1	Step 2	Step 3	Step 4	Step 5	Avg K
15.5	23	gauge (psi)	3	6	9	6	3	
		Qavg (igpm)	1	1.6	4	1.9	0.6	
		K cm/sec	3.5E-04	2.8E-04	4.7E-04	3.4E-04	2.1E-04	3.3E-04
24.5	32	gauge (psi)	10	15	20	15	10	
		Qavg (igpm)	4.9	7.3	8.8	7.3	6.3	
		K cm/sec	5.2E-04	5.2E-04	4.7E-04	5.2E-04	6.7E-04	5.4E-04
30.4	43.9	gauge (psi)	18	26	37	27	16	
		Qavg (igpm)	0.2	0.13	0.25	0.17	0.1	
		K cm/sec	6.5E-06	2.9E-06	4.0E-06	3.7E-06	3.7E-06	4.2E-06
42.5	53	gauge (psi)	29	40	50	38	18	
		Qavg (igpm)	0.62	0.65	0.83	0.53	0.32	
		K cm/sec	1.6E-05	1.2E-05	1.3E-05	1.1E-05	1.3E-05	1.3E-05
51.5	62	gauge (psi)	28	44	56	42	26	
		Qavg (igpm)	0.7	0.8	1.3	0.5	0.5	
		K cm/sec	1.9E-05	1.4E-05	1.8E-05	9.0E-06	1.5E-05	1.5E-05
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

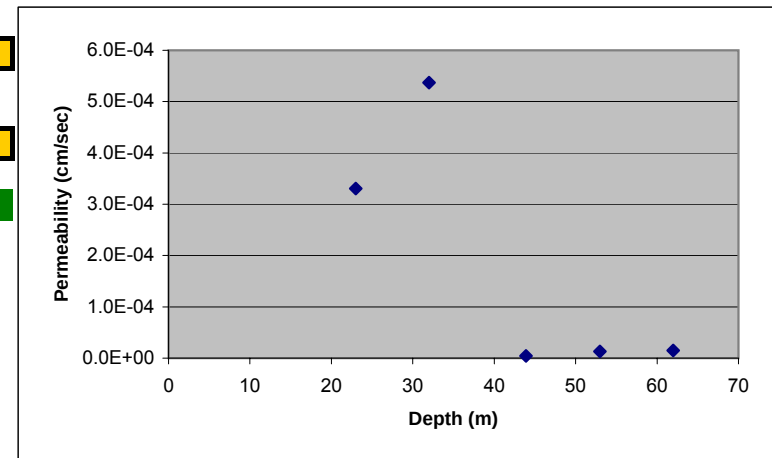
Equations: $H_f = 8.65 \times 10^{-15} (Q^2 \cdot L_p / r_p^5)$
 $H_{nit} = (Dw' + Hg - Hf) + Pg / 1.42$
 $K = (Q \cdot L_n(R/r_b)) / (2 \cdot \pi \cdot H_{nit} \cdot L)$

assume

- vertical drillhole
- water at ground surface
- height of gauge is at rig flr
- negligible friction losses

Overall 1.8E-04

Dw	Measured depth of static water (1)	0 m
Dp	Measured depth to packer	m
Dt	Depth to midpoint of test	m
Inc	Inclination from horizontal	90 m
Dw'	Vertical depth to static water level	°
Dp'	Vertical depth to packer	m
Dt'	Vertical depth to midpoint of test	m
Hg	Gauge height	0 m
Lp	Length of discharge pipe	m
rp	Radius of discharge pipe (1" = 0.0127m)	m
R	Radius of influence (10m is standard)	10 m
rb	Drillhole radius (HQ=0.048m, NQ=0.038m)	0.038 m
L	Length of test section	m
Hf		0 m



Reflex Readings

MPV-04-172c

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
17.03.04	62m	175.6	86	257.6	5975	8.5

FIELD GEOLOGICAL LOG

HOLE ID

MPV-04-172c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	0.60	ICE			JS/RB
0.60	2.60	Water			JS/RB
12	62	GRN/GNG		Granite, with minor amphibolite and gneissic granite sections, occasional biotite enrichment; most joints have carbonate coatings; generally low overall permeability	JS/RB

UCS SAMPLE LIST				
HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-172C	2	19.04	GRANITE	04-UCS-172-001

POINT LOAD TEST - INPUT

DRILL HOLE ID: **MPV-04-172C**

[illegible]

MPV_04_173C



MPV_04_173C



Diary

MPV-04-173c

Target depth 32m

NS 18/03/2004 J Siddorn

2200 drill move
0030 drill setup
0130 casing
0130 0.5m drill rig to ice
0200 2m ice thickness (to 2.5m depth)
0200 8m water (to 10.5m depth)
0230 1.5m till (to 12m depth)
0230 **bedrock @ 12m**
0230 casing to 11.5m need to deepen to put return funnel on
0300 coring NQ
0400 reaming casing down to 12m
0500 resume drilling
0530 @15m depth (3m into bedrock)
0600 @18m depth (6m into bedrock)
0600 tried to pull core but frozen inside rod
0600 trying to circulate hot water to remove ice plug inside rod
0630 end of shift @ 18m
Need to unfreeze rods first and pull core

DS 18/03/2004 R Bowden

at 21m - packer test 16.5m; could only remove 2 rods; third rod jamming, unlikely to get
0800 packer down if removed and also likelihood of having to ream.
0900 packer test terminated early because of no-flow test results
0940 at 24m
packer at 27
1130 at 29
1240 at 33m; packer test
1330 packer complete; reflex underway
1500 grouted
staked
1600 moving to D3-GB-2

FIELD DRILL PERFORMANCE LOG

PROJECT	Gahcho Kue Geotech
PROJECT NO	2CD002.11
NORTHING	7036685.23
EASTING	589979.31
SURFACE ELEVATION	405.35
AZIMUTH	0
DIP	90

HOLE NO:	MPV-04-173c
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	0000 18.03.04
FINISH DATE AND TIME	1030 Feb 19, 2004
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time	Standby time	Depth	Standby Reason	Metreage drilled	Actual drill time	Drill rate	Total drill time	Standby time	Actual drill time	Drill rate
				[hr]	[hr]	[m]		[m]	[hr]	[m/hr]	[hr]	[hr]	[hr]	[m/hr]
NS 1900-0700	J Siddorn	18.03.04	0630	12	10	18.00	drill move, setup, casing, frozen rods	18	2	9.00	12	10	2	9.00
DS 0700-1900	R Bowden	19.03.04	1830	12	3.5	32.00		14	8.5	1.65	24	13.5	10.5	3.05

OVERALL HOLE DRILL RATE (m/hr)	1.33
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	3.05

GENERAL GEOTECH LOG

DRILLHOLE ID:

MPV-04-173c

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
12.00	13.00	1.00	AMP	1.00	100.0	1.00	100.0	1.00	100.0	amphibolite gneiss
13.00	15.00	2.00	AMP	2.00	100.0	1.80	90.0	1.80	90.0	amphibolite gneiss
15.00	18.00	3.00	GRN	3.00	100.0	2.98	99.3	2.98	99.3	granite
18.00	21.00	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
21.00	24.00	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
24.00	27.00	3.00	GRN	3.00	100.0	3.00	100.0	2.88	96.0	
27.00	30.00	3.00	GRN/GGN	3.00	100.0	3.00	100.0	2.91	97.0	GGN = Gneissic Granite
30.00	33.00	3.00	GRN/GGN	3.00	100.0	2.90	96.7	2.77	92.3	

DETAILED GEOTECHNICAL LOG		DRILLHOLE ID:	MPV-04-173c

DRILLHOLE ID:	MPV-04-173c

NB: 3 sources of open joints and fractures found in drillcore

Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating old indicate artificial
Note any weak foliation, bedding, brecciation in comments

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

[illegible]

FIELD GEOLOGICAL LOG

HOLE ID

MPV-04-173c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
10.50	12.00	OVB			
12.00	15.00	Amphibolite			JS
15.00	29.50	Granite		Granite: occasional biotite enrichment, pinkish-grey, medium grained, carbonate coating on occasional joints, compact, fresh granite	RB
29.50	32.00	Gneissic Granite		Gneissic Granite	RB

Photo Record

MPV-04-173c

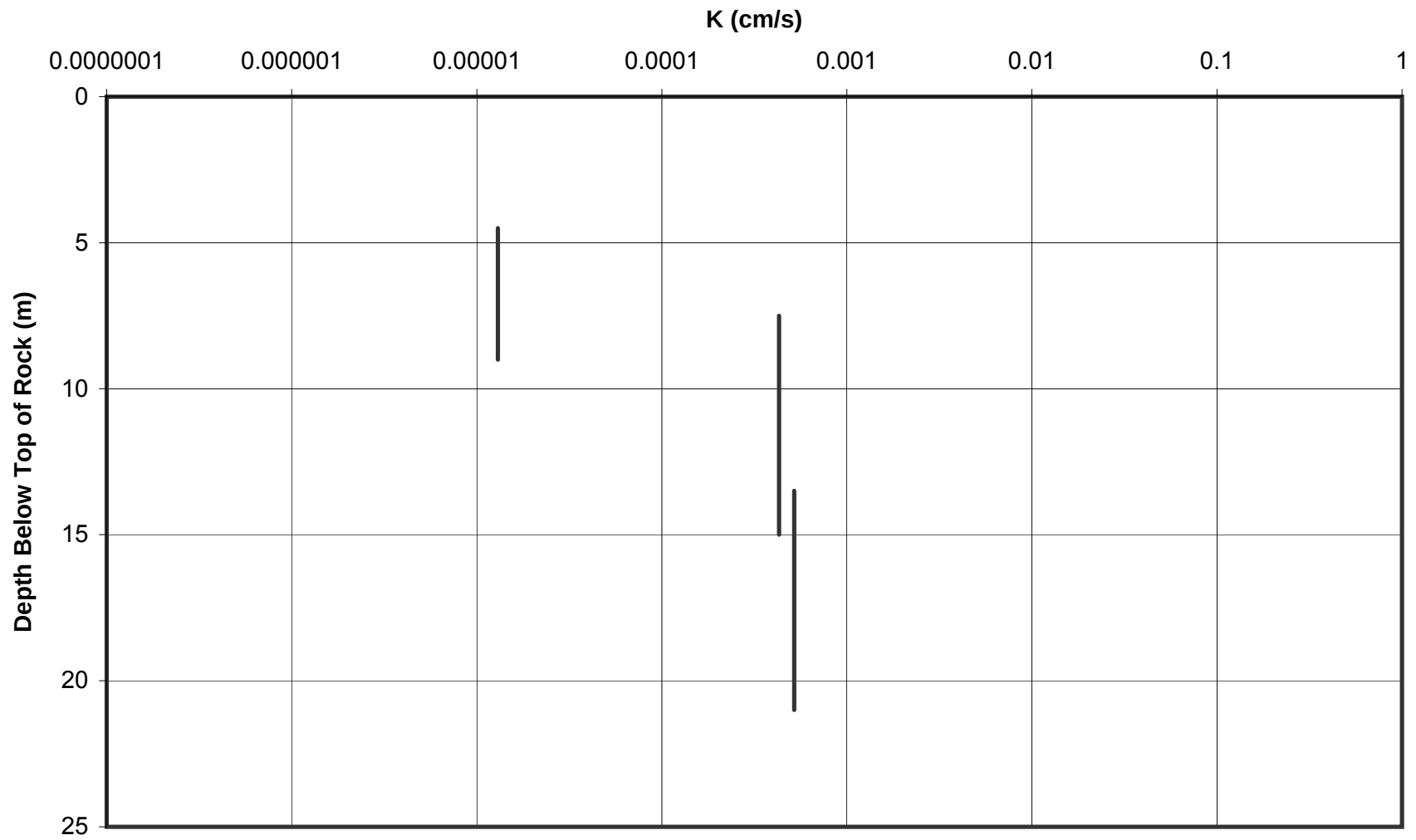
Date	Shift	Filename	Depth	Description
18-Mar-04	DS 0700-1900	MPV-04-173c_12.0m_Box1_dry	12.0 - 16.0	
18-Mar-04	DS 0700-1900	MPV-04-173c_16.0m_Box2_dry	16.0 - 20.2	
18-Mar-04	DS 0700-1900	MPV-04-173c_20.2m_Box3_dry	20.2 - 24.4	
18-Mar-04	DS 0700-1900	MPV-04-173c_24.4m_Box4_dry	24.4 - 28.4	
18-Mar-04	DS 0700-1900	MPV-04-173c_28.4m_Box5_dry	28.4 - 32.7	
18-Mar-04	DS 0700-1900	MPV-04-173c_32.7m_Box6_dry	32.7 - 33.0	

Core Box Record

MPV-04-173c

Box	From	To	Comments
1	12.00	16.00	
2	16.00	20.20	
3	20.20	24.40	
4	24.40	28.40	
5	28.40	32.70	
6	32.70	33.00	END OF HOLE
7			

Permeability vs Depth
MPV_04_173C



Packer Test Data

Date	18-Mar-04
Staff	
Init. WL:	0
Ref. Pt.	drill shack floor
Dip	90

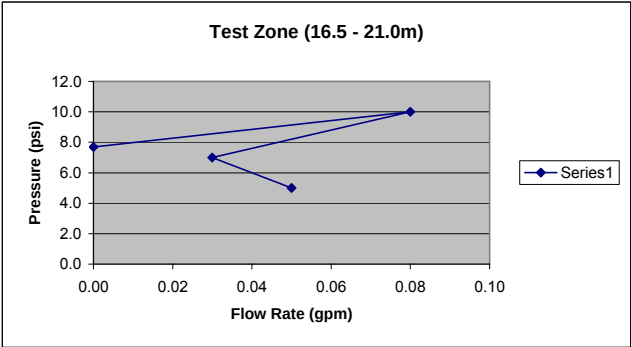
MPV-04-173c

Test 1 16.5 21

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	4.80		5.0	no leaks
	1	4.85	0.05		
	2	4.90	0.05		
	3	4.95	0.05		
	4	5.00	0.05	0.05	
	5		-5.00		
2	0	5.15		7.0	no leaks
	1	5.20	0.05		
	2	5.20	0.00		
	3	5.25	0.05		
	4	5.30	0.05	0.03	
	5				
	5				
3	0	5.60		10.5	no leaks
	1	5.70	0.10		
	2	5.80	0.10		
	3	5.90	0.10		
	4	5.95	0.05	0.08	
	5				
4	0	5.95		7.7	no flow
	1	5.95	0.00		
	2	5.95	0.00		
	3	5.95	0.00		
	4		-5.95		
	5		0.00		
	6		0.00	-2.0	
5	0				no leaks
	1		0.00		
	2		0.00		
	3		0.00		
	4		0.00		
	5		0.00		
	6		0.00		
	7		0.00		
	8		0.00	0.0	

Summary 16.5 21

Flow rate (gpm)	Pressure (psi)
0.05	5.0
0.03	7.0
0.08	10.0
0.00	7.7



Test 2

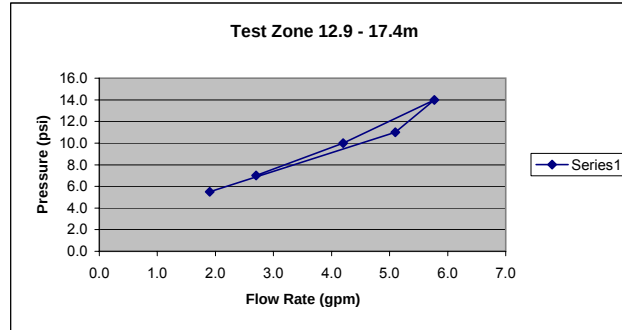
19.5

27

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	78.05		5.5	
	1	79.85	79.85		
	2	81.70	1.85		
	3	83.75	2.05		
	4	85.60	1.85		
	5	87.40	1.80	1.90	
	6				
2	0	91.90		11.0	
	1	97.10	5.20		
	2	102.10	5.00		
	3	107.20	5.10	5.10	
	4				
3	0	13.10		14.0	
	1	18.90	5.80		
	2	24.70	5.80		
	3	30.40	5.70	5.77	
	4				
4	0	35.20		10.0	
	1	39.30	4.10		
	2	43.60	4.30		
	3	47.70	4.10		
	4	51.80	4.10	4.2	
5	0	54.70		7.0	
	1	57.80	3.10		
	2	60.20	2.40		
	3	62.90	2.70		
	4	65.60	2.70		
	5	68.30	2.70	2.70	
	6				
	7				

Summary 19.5 27

Flow rate (gpm)	Pressure (psi)
1.9	5.5
5.1	11.0
5.8	14.0
4.2	10.0
2.7	7.0



Test 3

25.5

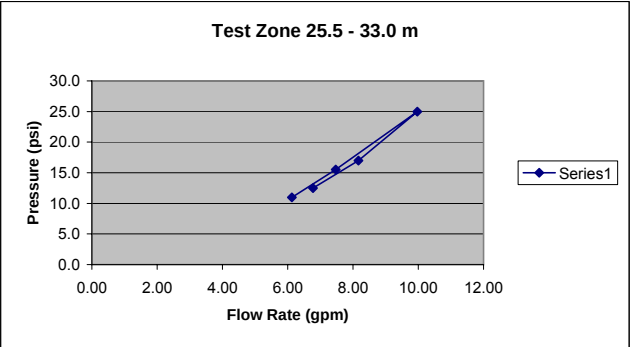
33

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	77.00		12.5	
	1	83.70	6.70		
	2	90.40	6.70		
	3	97.30	6.90	6.77	
	4				
2	0	105.30		17.0	
	1	113.40	8.10		
	2	121.50	8.10		
	3	129.70	8.20		
	3	137.90	8.20	8.17	
3	0	153.10		25.0	
	1	163.10	10.00		
	2	173.10	10.00		
	3	183.00	9.90	9.97	
	4				
4	0	192.10		15.5	
	1	199.70	7.60		
	2	207.20	7.50		
	3	214.70	7.50		
	4	222.10	7.40	7.47	
5	0	228.50		11.0	
	1	234.90	6.40		
	2	241.20	6.30		
	3	247.20	6.00		
	4	253.40	6.20		
	5	259.60	6.20	6.13	

Summary 25.5 33

Flow rate Pressure
(gpm) (psi)

6.77	12.5
8.17	17.0
9.97	25.0
7.47	15.5
6.13	11.0



Permeability Summary

MPV-04-173c

from	to		Step 1	Step 2	Step 3	Step 4	Step 5	Avg K
16.5	21	gauge (psi)	5	7	10	7.7		
		Qavg (igpm)	0.05	0.03	0.08	0		
		K cm/sec	1.8E-05	7.6E-06	1.4E-05	no flow		1.3E-05
19.5	27	gauge (psi)	5.5	11	14	10	7	
		Qavg (igpm)	1.9	5.1	5.77	4.2	2.7	
		K cm/sec	3.7E-04	4.9E-04	4.4E-04	4.4E-04	4.1E-04	4.3E-04
25.5	33	gauge (psi)	12.5	17	25	15.5	11	
		Qavg (igpm)	6.77	8.17	9.97	7.47	6.13	
		K cm/sec	5.7E-04	5.1E-04	4.2E-04	5.1E-04	5.9E-04	5.2E-04
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	

Equations: $H_f = 8.65 \times 10^{-15} (Q^2 * L_p / r_p^5)$
 $H_{nit} = (Dw' + Hg - Hf) + Pg / 1.42$
 $K = (Q * L_n (R / r_b)) / (2 * \pi * H_{nit} * L)$

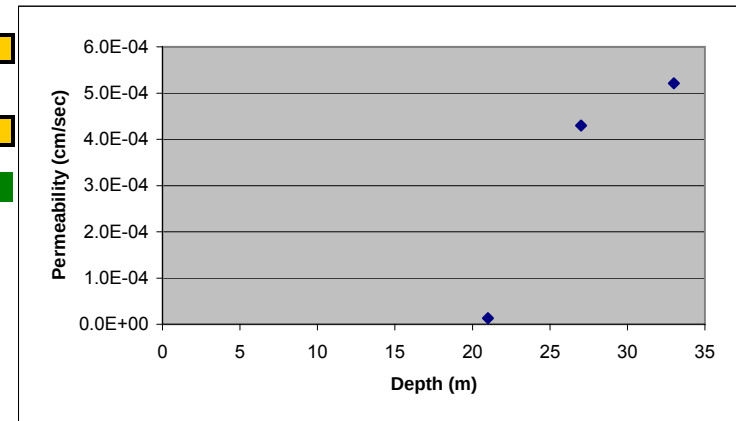
assume

- vertical drillhole
- water at ground surface
- height of gauge is at rig flr
- negligible friction losses

Overall 3.2E-04

Dw	Measured depth of static water (1)
Dp	Measured depth to packer
Dt	Depth to midpoint of test
Inc	Inclination from horizontal
Dw'	Vertical depth to static water level
Dp'	Vertical depth to packer
Dt'	Vertical depth to midpoint of test
Hg	Gauge height
Lp	Length of discharge pipe
rp	Radius of discharge pipe (1" = 0.0127m)
R	Radius of influence (10m is standard)
rb	Drillhole radius (HQ=0.048m, NQ=0.038m)
L	Length of test section
Hf	

0	m
	m
	m
90	m
	°
	m
	m
0	m
	m
	m
10	m
0.038	m
	m
0	m



Reflex Readings

MPV-04-173c

Date	Hole Depth	Azi/Dir	Incl/dip	olface re to	agnetic Fie	Temp ©
18-Mar-04	33	97.8	88.5	234.6	6021	6.5

UCS SAMPLE LIST				
HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-173C	2	18.00	GRANITE	04-UCS-173-001

POINT LOAD TEST - INPUT

DRILL HOLE ID: MPV-04-173C

[illegible]

Diary

MPV-04-174c

target depth 32m

NS 18/03/2004 J Siddorn

1900 rig floor = 0.0m ... depth to top of ...

ice = 0.6m

water = 2.6m

overburden = approx 7m

bedrock = 11.7m

2000 10.5m

2015 seal gone on chuck need to replace

2030 back to casing

2100 casing reamed to 12m

2125 setup to drill

2200 bedrock at 11.7m

2230 rods frozen in hole

2320 @ 15m

2320 need to run first packer test at 18m (13.5-18m)

0000 setup for first packer (13.5-18m)

0030 no flow in packer test

0100 resume drilling

0100 next packer at 24m (3 rods off)

0230 @24m

0245 packer test 16.5-24m

0315 no flow in packer test

0400 @27m

0500 @30m

End of shift @33m

Reflex done

DS 19/03/2004 R Bowden

0730 discovered that packer hose, downhole, was frozen

redid earlier 'no flow' tests

1130 started grouting

packed and moved to D5-GB-4

**FIELD DRILL
PERFORMANCE LOG**

PROJECT	Gahcho Kue Geotech
PROJECT NO	2CD002.11
NORTHING	7034891.2
EASTING	589901.8
SURFACE ELEVATION	404
AZIMUTH	0
DIP	90

HOLE NO:	MPV-04-174c
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	1900 18.03.04
FINISH DATE AND TIME	1100 19.03.04
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

Period	Logged by	Date	Time	Period Totals				Cumulative			
				Total drill time (hr)	Standby time (hr)	Depth (m)	Standby Reason	Metreage drilled (m)	Actual drill time (hr)	Drill rate (m/hr)	Total drill time (hr)
NS 1900-0700	J Siddorn	18.03.04	0630	12	5	30		30	7	4.29	12
DS 0700-1900	R Bowden	19.03.04		5	5	30.00	packer testing, grouting, pack and move	0	0	#DIV/0!	17

OVERALL HOLE DRILL RATE (m/hr) 1.76

OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr) 4.29

GENERAL GEOTECH LOG

DRILLHOLE ID: MPV-04-174c

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

[illegible]

DETAILED GEOTECHNICAL LOG

DRILLHOLE ID: MPV-04-174c

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

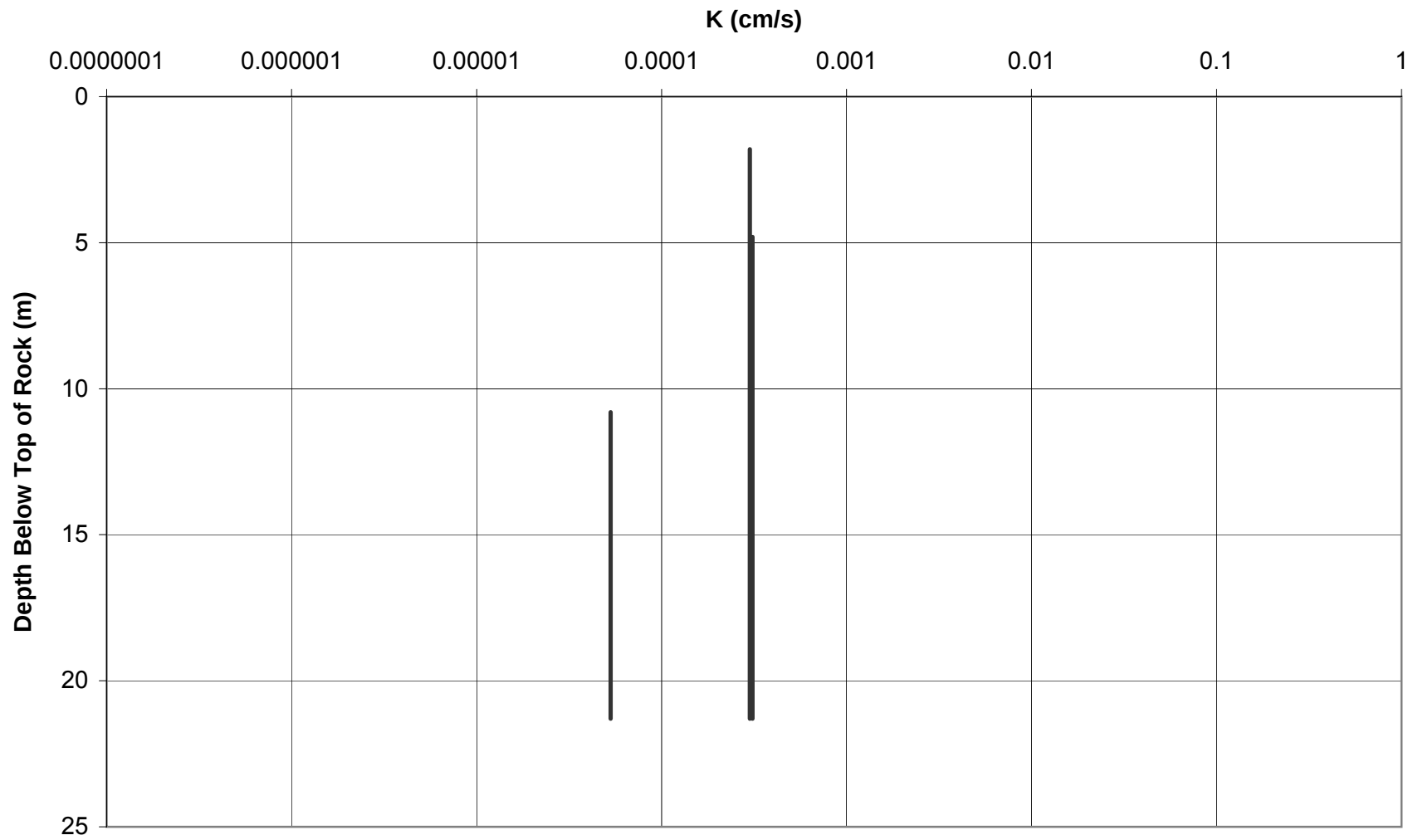
Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

[illegible]

Photo Record**MPV-04-174c**

Date	Shift	Filename	Depth	Description
18.03.04	NS 1900-0700	MPV-04-174C_11.7m_Box1_dry	11.7-15.4	box 1 altered granite
18.03.04	NS 1900-0700	MPV-04-174C_15.4m_Box2_dry	15.4-19.6	box 2
18.03.04	NS 1900-0700	MPV-04-174C_19.6m_Box3_dry	19.6-23.1	box 3
18.03.04	NS 1900-0700	MPV-04-174C_23.1m_Box4_dry	23.1-27	box 4
18.03.04	NS 1900-0700	MPV-04-174C_27m_Box5_dry	27-31.2	box 5
18.03.04	NS 1900-0700	MPV-04-174C_31.2m_Box6_dry	31.2-33	box 6

Permeability vs Depth
MPV_03_174C



Packer Test Data

Date	22-Feb-04
Staff	J. Siddorn/ R. Bowden
Init. WL:	0
Ref. Pt.	drill shack floor
Dip	90

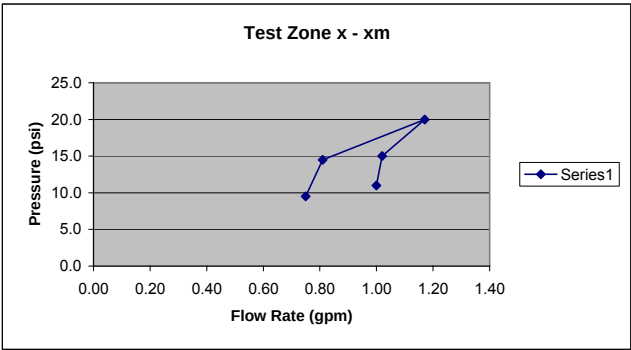
MPV-04-174c

Test 1 22.5 33

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	84.95		11.0	
	1	85.90	0.95		
	2	87.00	1.10		
	3	87.95	0.95		
	4	88.90	0.95	1.00	
	5				
2	0	90.15		15.0	
	1	91.30	1.15		
	2	92.50	1.20		
	3	93.70	1.20		
	3	94.75	1.05		
	4	95.75	1.00		
	5	96.75	1.00	1.02	
3	0	298.10		20.0	
	1	299.30	1.20		
	2	300.45	1.15		
	3	301.65	1.20		
	4	302.80	1.15	1.17	
	5				
4	0	307.35		14.5	
	1	308.35	1.00		
	2	309.40	1.05		
	3	310.40	1.00		
	4	311.45	1.05		
	5	312.65	1.20		
	5	312.65	0.00	0.81	
5	0	15.35		9.5	
	1	16.10	0.75		
	2	16.90	0.80		
	3	17.60	0.70		
	4	18.35	0.75	0.75	
	5				

Summary 22.5 33

Flow rate (gpm)	Pressure (psi)
1.00	11.0
1.02	15.0
1.17	20.0
0.81	14.5
0.75	9.5

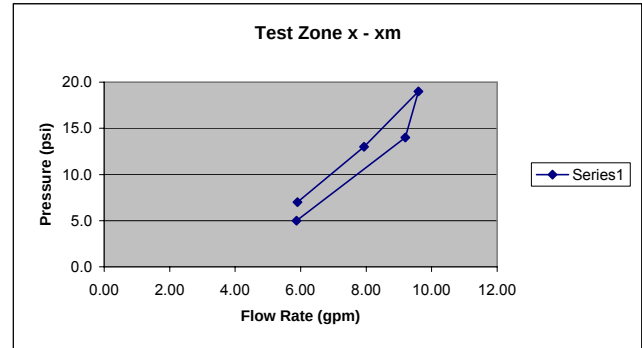


Test 2 16.5 33

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	35.10		7.0	
	1	40.70	5.60		
	2	46.60	5.90		
	3	52.50	5.90		
	4	58.40	5.90	5.90	
	5				
2	0	65.70		13.0	
	1	73.50	7.80		
	2	81.40	7.90		
	3	89.20	7.80		
	4	97.20	8.00		
	5	105.20	8.00	7.93	
3	0	414.40		19.0	
	1	424.00	9.60		
	2	433.60	9.60		
	3	443.20	9.60	9.60	
	4				
	5				
4	0	51.90		14.0	
	1	60.30	8.40		
	2	68.70	8.40		
	3	77.20	8.50		
	4	85.70	8.50		
	5	96.20	10.50	9.2	
5	0	5.00			
	1	10.70	5.70		
	2	16.60	5.90		
	3	22.50	5.90		
	4	28.30	5.80	5.87	
	5				

Summary 16.5 33

Flow rate (gpm)	Pressure (psi)
5.90	7.0
7.93	13.0
9.60	19.0
9.20	14.0
5.87	5.0

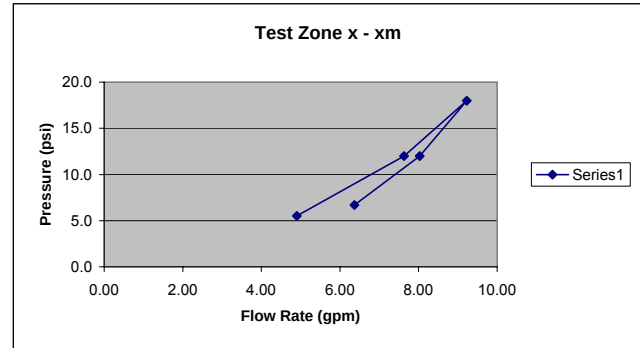


Test 3 13.5 33

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	707.20		5.5	
	1	712.20	5.00		
	2	717.10	4.90		
	3	721.90	4.80		
	4	726.90	5.00		
	5	731.80	4.90	4.90	
	0	37.50		12.0	
	1	45.10	7.60		
	2	52.70	7.60		
	3	60.30	7.60		
	3	68.00	7.70	7.63	
	4				
	5				
3	0	686.20		18.0	
	1	695.40	9.20		
	2	704.70	9.30		
	3	713.90	9.20	9.23	
	4				
	5				
	0	722.50		12.0	
	1	730.00	7.50		
	2	738.20	8.20		
	3	746.20	8.00		
	4	754.30	8.10		
	5	762.30	8.00	8.03	
5	0	77.40		6.7	
	1	783.70	706.30		
	2	790.00	6.30		
	3	796.40	6.40		
	4	802.80	6.40	6.37	
	5				

Summary 13.5 33

Flow rate (gpm)	Pressure (psi)
4.90	5.5
7.63	12.0
9.23	18.0
8.03	12.0
6.37	6.7



Core Box Record

MPV-04-174c

Box	From	To	Comments
1	11.70	15.40	
2	15.40	19.60	
3	19.60	23.10	
4	23.10	27.00	
5	27.00	31.20	
6	31.20	33.00	EOH

Reflex Readings

MPV-04-174c

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp °C
19.03.04	33m	61.7	84	48.2	6053	7.5

Permeability Summary

MPV-04-174c

from	to	Step 1	Step 2	Step 3	Step 4	Step 5	Avg K
22.5	33	gauge (psi)	11	15	20	14.5	9.5
		Qavg (igpm)	1	1.02	1.17	0.81	0.75
		K cm/sec	6.9E-05	5.1E-05	4.4E-05	4.2E-05	6.0E-05
16.5	33	gauge (psi)	7	134	19	14	5
		Qavg (igpm)	5.9	7.93	9.6	9.2	5.87
		K cm/sec	4.1E-04	2.8E-05	2.4E-04	3.2E-04	5.7E-04
13.5	33	gauge (psi)	5.5	12	18	12	6.7
		Qavg (igpm)	4.9	7.63	9.23	8.03	6.37
		K cm/sec	3.6E-04	2.6E-04	2.1E-04	2.7E-04	3.9E-04
		gauge (psi)					
		Qavg (igpm)					
		K cm/sec	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
		gauge (psi)					
		Qavg (igpm)					
		K cm/sec	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
		gauge (psi)					
		Qavg (igpm)					
		K cm/sec	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

FIELD GEOLOGICAL LOG

HOLE ID

MPV-04-174c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	0.60	Snow			
0.6	2.6	Ice			
2.60	7.00	Water			
7.00	11.70	Overburden			
11.70	33.00	Granite		Altered felsic granite, massive to highly fractured; carbonate coating and clay gouge occasionally on joints	

UCS SAMPLES

HOLE ID: MPV-04-174C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-174C	6	32.38	Granite	04-UCS-174-001

DRILL HOLE ID: MPV-04-174C

[illegible]

MPV_04_174C



MPV_04_175C



Diary

MPV-04-175C

DS 19/03/2004

1300 move from D3-GB-2
1600 drilled through ice
rig floor at 0.0m. Depths to top of ...
ice = 0.6m
water = 2.6m
lake bed = 10.0m
bedrock = 11.2m

1900 cased to 11.5m depth

NS 19/03/2004

1900 begin drilling
2000 @12m
2100 change bit and chuck seal
2200 resume drilling
2230 @15m
2230 first packer to be done @ 21m (16.5-21m)
2315 @21m
2330 run packer test
0030 resume drilling
0100 @24m
0130 @27m
0145 packer test @ 27m (19.5-27m)
0230 resume drilling
0230 next packer @ EOH 33m (25.5-33m)
0300 @30m
0330 change bit
0440 @33m EOH
0500 reflex
0530 packer test @ 33m
0600 remove packer, pull rods
0630 grout

FIELD DRILL PERFORMANCE LOG

PROJECT	Gahcho Kue Geotech
PROJECT NO	2CD002.11
NORTHING	7036727.82
EASTING	590030.45
SURFACE ELEVATION	404.34
AZIMUTH	-
DIP	90

HOLE NO:	MPV-04-175C
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	1600 March 19, 2004
FINISH DATE AND TIME	0800 March 20, 2004
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals						Cumulative				
Period	Logged by	Date	Time	Total drill time	Standby time	Depth	Standby Reason	Metreage drilled	Actual drill time	Drill rate	Total drill time	Standby time	Actual drill time	Drill rate
				[hr]	[hr]	[m]		[m]	[hr]	[m/hr]	[hr]	[hr]	[hr]	[m/hr]
DS 0700-1900	R Bowden	03/19/2004	1830	6	4	11	move on, banked in, cased	11	2	5.50	6	4	2	5.50
NS 1900-0700	J Siddorn	03/19/2004	0630	12	6	33.00	bit change, packer testing, reflex	22	6	3.67	18	10	8	4.13

OVERALL HOLE DRILL RATE (m/hr)	1.83
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	4.13

GENERAL GEOTECH LOG		DRILLHOLE ID:	MPV-04-175C

GENERAL GEOTECH LOG		DRILLHOLE ID:	MPV-04-175C

GENERAL GEOTECH LOG		DRILLHOLE ID:	MPV-04-175C

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

[illegible]

DETAILED GEOTECHNICAL LOG		DRILLHOLE ID:	MPV-04-175C

DRILLHOLE ID:	MPV-04-175C

NB: 3 sources of open joints and fractures found in drillcore

Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating old indicate artificial
Note any weak foliation, bedding, brecciation in comments

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM (m)	TO (m)	ROCK TYPE	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of Sets	Type	Totals	JOINT CONDITIONS				COMMENT
			STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH				ANGLE	ROUGH	ALT	FILL	
11.2	12.0	GR	R5		0	8		0												
12.0	15.0	GR	R5		0	8		3					1	J1	1	30	9	0	9	
														J2	2	70	5	0	9	
15.0	18.0	GR	R5		0	14		5			1	2	2	J1	2	65	5	0	9	
														J2	3	80	5	0	9	
18.0	21.0	GR	R5		0	13		2					1	J1	2	80	5	0	9	
21.0	24.0	GR	R5		0	17		8			2	2	2	J1	6	75	5	0	9	
														J2	2	50	6	0	9	fe staining in J1
24.0	27.0	GR	R5		0	9		6					2	J1	3	90	5	0	9	
														J2	3	65	6	0	9	
27.0	30.0	GR	R5		0	5		2					1	J1	2	75	5	0	9	
30.0	33.0	GR	R5		0	15		6					3	J1	2	65	5	0	9	
														J2	2	90	5	0	9	
EOH														J3	2	20	3	0	9	

Photo Record

MPV-04-175C

Date	Shift	Filename	Depth	Description
19.03.04	NS 1900-0700	MPV-04-175C_11.2m_Box1_dry	11.2-15.4	Box 1 granite
19.03.04	NS 1900-0700	MPV-04-175C_15.4m_Box2_dry	15.4-19.3	Box 2 granite
19.03.04	NS 1900-0700	MPV-04-175C_19.3m_Box3_dry	19.3-23.7	Box 3 granite
19.03.04	NS 1900-0700	MPV-04-175C_23.7m_Box4_dry	23.7-27.9	Box 4 granite
19.03.04	NS 1900-0700	MPV-04-175C_27.9m_Box5_Box6_dry	27.9-33	Box 5 Box 6 EOH

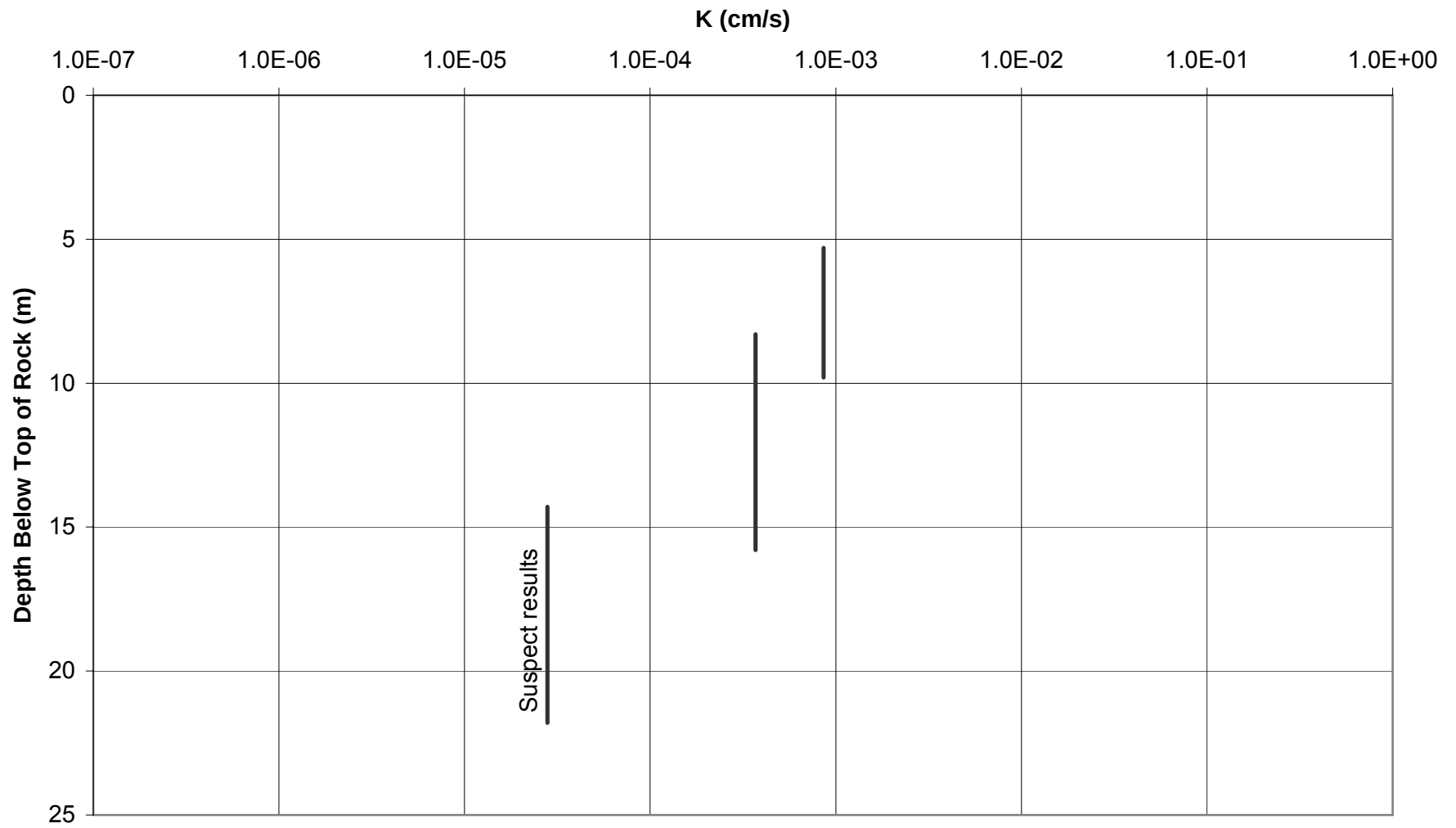
Core Box Record

MPV-04-175C

Box	From	To	Comments
1	11.20	15.40	
2	15.40	19.30	
3	19.30	23.70	
4	23.70	27.90	
5	27.90	32.40	
6	32.40	33.00	EOH

Permeability vs Depth

MPV_04_175C



Packer Test Data

Date	19/3/2004
Staff	J. Siddorn
Init. WL:	0
Ref. Pt.	drill shack floor
Dip	90

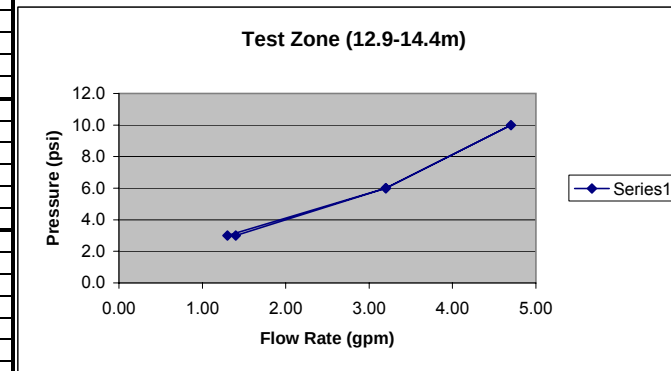
MPV-04-175C

Test 1 16.5 21

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	8805.20			no leaks
	1	8806.60	1.40	3.0	
	2	8807.90	1.30		
	3	8809.25	1.35		
	4	8810.50	1.25		
	5	8811.80	1.30	1.32	
2	0	8815.00			no leaks
	1	8818.10	3.10	6.0	
	2	8821.20	3.10		
	3	8824.40	3.20		
	4	8827.60	3.20		
	5	8830.75	3.15	3.15	
3	0	8836.00			no leaks
	1	8840.60	4.60	10.0	
	2	8845.30	4.70		
	3	8850.00	4.70		
	4	8854.80	4.80		
	5	8859.4	4.60	4.68	
4	0	8862.00			no leaks
	1	8865.30	3.30	6.0	
	2	8868.50	3.20		
	3	8871.60	3.10		
	4	8874.80	3.20		
	5	8877.90	3.10	3.18	
5	0	8878.60			no leaks
	1	8879.90	1.30	3.0	
	2	8881.30	1.40		
	3	8882.80	1.50		
	4	8884.10	1.30		
	5	8885.40	1.30	1.36	

Summary 16.5 21

Flow rate (gpm)	Pressure (psi)
1.30	3.0
3.20	6.0
4.70	10.0
3.20	6.0
1.40	3.0

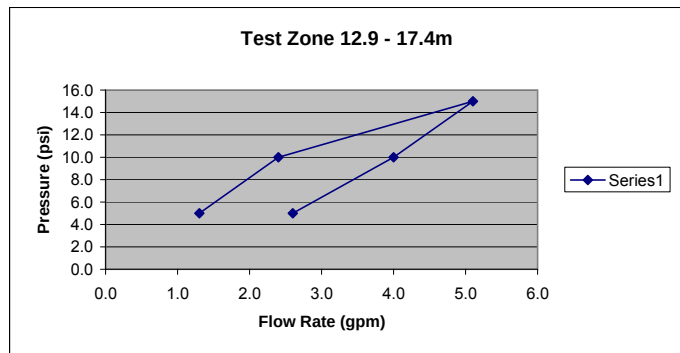


Test 2 19.5 27

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pressure (psi)	Comments
1	0	8887.00			
	1	8889.60	2.60	5.0	
2	2	8892.20	2.60		
	3	8894.90	2.70		
	4	8897.40	2.50	2.60	
2	0	8901.60			
	1	8905.70	4.10	10.0	
	2	8909.70	4.00		
	3	8913.70	4.00		
	4	8917.60	3.90	4.00	
3	0	8921.00			
	1	8925.60	4.60	15.0	
	2	8929.80	4.20		
	3	8934.10	8.50		
	4	8938.10	4.00		
	5	8942.10	4.00	5.06	
4	0	8944.50			
	1	8947.00	2.50	10.0	
	2	8949.30	2.30		
	3	8951.60	2.30		
	4	8954.00	2.40	2.38	
5	0	8955.00			
	1	8956.30	1.30	5.0	
	2	8957.60	1.30		
	3	8958.90	1.30		
	4	8960.20	1.30	1.30	

Summary 19.5 27

Flow rate (gpm)	Pressure (psi)
2.6	5.0
4.0	10.0
5.1	15.0
2.4	10.0
1.3	5.0



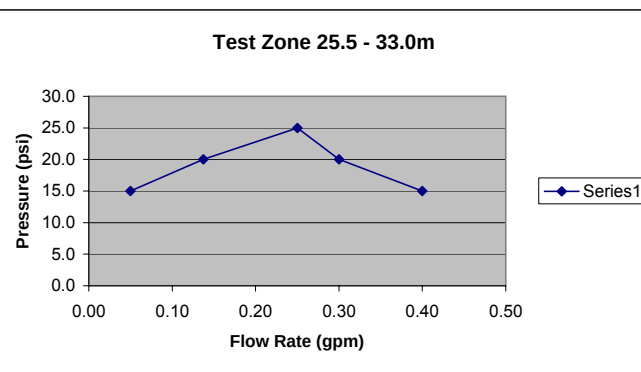
Test 3 25.5 33

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	8962.00			
	1	8962.40	0.40	15.0	
	2	8962.80	0.40		
	3	8963.20	0.40		
	4	8963.60	0.40		
				0.40	
2	0	8963.80			
	1	8964.10	0.30	20.0	
	2	8964.40	0.30		
	3	8964.70	0.30		
	4	8965.00	0.30		
				0.30	
3	0	8965.20			
	1	8965.45	0.25	25.0	
	2	8965.70	0.25		
	3	8965.95	0.25		
	4	8966.20	0.25		
				0.25	
4	0	8965.90			
	1	8966.05	0.15	20.0	
	2	8966.20	0.15		
	3	8966.30	0.10		
	4	8966.45	0.15		
				0.14	
5	0	8966.40			
	1	8966.45	0.05	15.0	
	2	8966.50	0.05		
	3	8966.55	0.05		
	4	8966.60	0.05		
				0.05	

Summary 25.5 33

Flow rate (gpm)	Pressure (psi)
0.40	15.0
0.30	20.0
0.25	25.0
0.14	20.0
0.05	15.0

Steps 2-5 discounted because of either test line freezing or fines migration/blockage (RB)



Reflex Readings

MPV-04-175C

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp °C
19.03.04	33	10.5	89.1	89.3	5998	6.2

FIELD GEOLOGICAL LOG

HOLE ID

MPV-04-175C

From (m)	To (m)	Material	Xeno. Content (%)	Description	Logged By
0.00	0.60	snow			RB
0.60	2.60	ice			RB
2.60	10.00	water			RB
10.00	11.20	Overburen			RB
11.20	33.00	Granite			JS

UCS SAMPLES

HOLE ID: MPV-04-175C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-175C	5	29.52-29.83	Granite	04-UCS-175-001

Permeability Summary

MPV-04-175C

from	to		Step 1	Step 2	Step 3	Step 4	Step 5	Avg K
16.5	21	gauge (psi)	3	6	10	6	3	
		Qavg (igpm)	1.3	3.2	4.7	3.2	1.4	
		K cm/sec	7.7E-04	9.4E-04	8.3E-04	9.4E-04	8.2E-04	8.6E-04
19.5	27	gauge (psi)	5	10	15	10	5	
		Qavg (igpm)	2.6	4	5.1	2.4	1.3	
		K cm/sec	5.5E-04	4.2E-04	3.6E-04	2.5E-04	2.8E-04	3.7E-04
25.5	33	gauge (psi)	15	20	25	20	15	
		Qavg (igpm)	0.4	0.3	0.25	0.14	0.05	
		K cm/sec	2.8E-05	1.6E-05	1.1E-05	7.4E-06	3.5E-06	2.8E-05
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Equations: $H_f = 8.65 \times 10^{-15} (Q^2 \cdot L_p / r_p^5)$
 $H_{nit} = (Dw' + Hg - Hf) + Pg / 1.42$
 $K = (Q \cdot L_n (R / r_b)) / (2 \cdot \pi \cdot H_{nit} \cdot L)$

Overall #DIV/0!

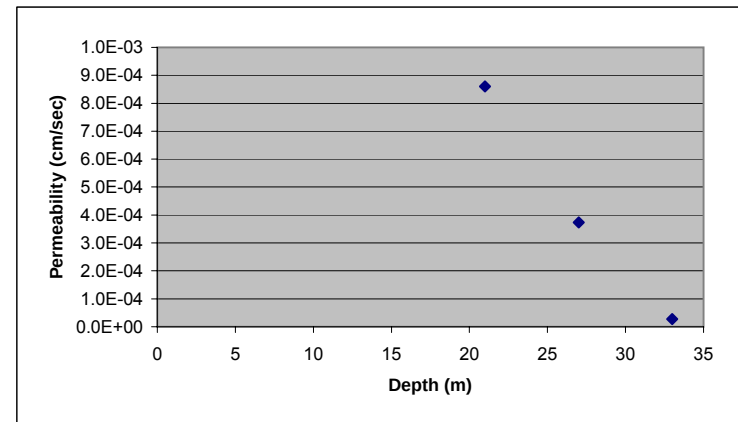
assume

- vertical drillhole
- water at ground surface
- height of gauge is at rig flr
- negligible friction losses

Note: Test 3, Steps 2-5 discounted; possible freezing
 possible freezing of pump line

Dw Measured depth of static water (1)
 Dp Measured depth to packer
 Dt Depth to midpoint of test
 Inc Inclination from horizontal
 Dw' Vertical depth to static water level
 Dp' Vertical depth to packer
 Dt' Vertical depth to midpoint of test
 Hg Gauge height
 Lp Length of discharge pipe
 rp Radius of discharge pipe (1" = 0.0127m)
 R Radius of influence (10m is standard)
 rb Drillhole radius (HQ=0.048m, NQ=0.038m)
 L Length of test section
 Hf

0	m
	m
	m
90	m
	°
	m
	m
0	m
	m
	m
10	m
0.038	m
	m
0	m



DRILL HOLE ID: MPV-04-175C

[illegible]

MPV_04_176C



Diary

MPV-04-176c

target depth is 33m

DS 20/03/2004

0900 setting up
0930 rig floor = 0.0m Depths to top of ...
ice = 0.6m
water = 2.6m
lake bed = 9.5m
bedrock = 13.1m
1030 casing set at 13.5m
1135 rods at 18m
1200 at 21m
1230 packer test 16.5 - 21.0m started
1320 test completed
1350 at 24m
1440 at 28m
1550 packer test 19.5 - 27.0m completed
1720 at 31.5 - bit dead

DS 20/03/2004

1900 replace bit
1930 resume drilling
2015 at 33m
2030 reflex
2100 final packer test at 25.5 - 33.0m
2300 grout and move

Checklist - delete before finalizing and printing file

reflex??
grouted?
staked?
summary for Todd updated?
point load test samples selected?

**FIELD DRILL
PERFORMANCE LOG**

PROJECT	Gahcho Kue Geotech
PROJECT NO	2CD002.11
NORTHING	7036771.47
EASTING	590080.72
SURFACE ELEVATION	404.8
AZIMUTH	-
DIP	90

HOLE NO:	MPV-04-176c
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	0900 March 20, 2004
FINISH DATE AND TIME	2200 March 20, 2004
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time (hr)	Standby time (hr)	Depth (m)	Standby Reason	Metreage drilled (m)	Actual drill time (hr)	Drill rate (m/hr)	Total drill time (hr)	Standby time (hr)	Actual drill time (hr)	Drill rate (m/hr)
DS 0700-1900	R Bowden	03/20/2004	1900	12	4.5	31	set-up, 2 packers	31	7.5	4.13	12	4.5	7.5	4.13
NS 1900-0700	J Siddorn	03/20/2004		3	2.5	33.00	change bit, packer test, reflex, grout	2	0.5	4.00	15	7	8	4.13

OVERALL HOLE DRILL RATE (m/hr)	2.20
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	4.13

GENERAL GEOTECH LOG

DRILLHOLE ID:

MPV-04-176c

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
0.00	0.60	0.60	snow							
0.60	2.60	2.00	ice							
2.60	9.50	6.90	water							
9.50	13.10	3.60	OVB							gravel, cobbles and boulders inferred from drill response
13.10	15.00	1.90	GRN	1.90	100.0	1.90	100.0	1.90	100.0	
15.00	18.00	3.00	GRN	3.00	100.0	2.95	98.3	2.95	98.3	
18.00	21.00	3.00	GRN	3.00	100.0	2.91	97.0	2.76	92.0	
21.00	24.00	3.00	GRN	3.00	100.0	2.70	90.0	2.50	83.3	
24.00	27.00	3.00	GRN	3.00	100.0	2.98	99.3	2.92	97.3	includes small pegmatitic zone
27.00	30.00	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	

DETAILED GEOTECHNICAL LOG		DRILLHOLE ID:	MPV-04-176c

DRILLHOLE ID: MPV-04-176c

NB: 3 sources of open joints and fractures found in drillcore

- Artificial breaks induced by drilling process
- Artificial breaks induced by core handling
- Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM (m)	TO (m)	ROCK TYPE	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of Sets	Type	Totals	JOINT CONDITIONS				COMMENT
			STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH				ANGLE	ROUGH	ALT	FILL	
13.1	15.0	GRN	R5			10	0	2	0		0		1	J1	2	65	5	0	9	weathered joints
15.0	18.0	GRN	R5			10	0	4	0		0		3	J1	1	53	7	0	3	J1 has sight silt coating; J2 has hematite coating
														J2	2	50	5	0	9	
														J3	1	78	7	0	9	
18.0	21.0	GRN	R5			13	0	8	0		0		3	J1	1	32	5	0	3	J1 has thin silt gouge layer; J3 joints have angles of 45, 65 and 70 and weathering and/or partial carbonate coating
														J2	2	78	2	0	3	
														J3	3		4	0	9	
21.0	24.0	GRN	R5			31	0	5	0		0		3	J1	2	80	4	0	3	J1 has thin silt coating; J2 has one silt and one partial carbonate coating; remaining joints are highly variable in angle and roughness
														J2	2	35	7	0	3	
														J3	1	53	4	0	3	
24.0	27.0	GRN	R5			12	0	5	0		0		3	J1	1	82	4	0	3	J1 has partial silt coating; J3 has artial carbonate coating
														J2	1	20	5	0	9	
														J3	1	38	4	0	3	
27.0	30.0	GRN	R5			9	0	2	0		0		1	J1	2	75	1	0	9	partial carbomate coating
30.0	33.0	GRN	R5			8	0	2	0		0		2	J1	1	35	4	0	9	
														J2	1	45	5	0	9	
EOH																				

Photo Record

MPV-04-176c

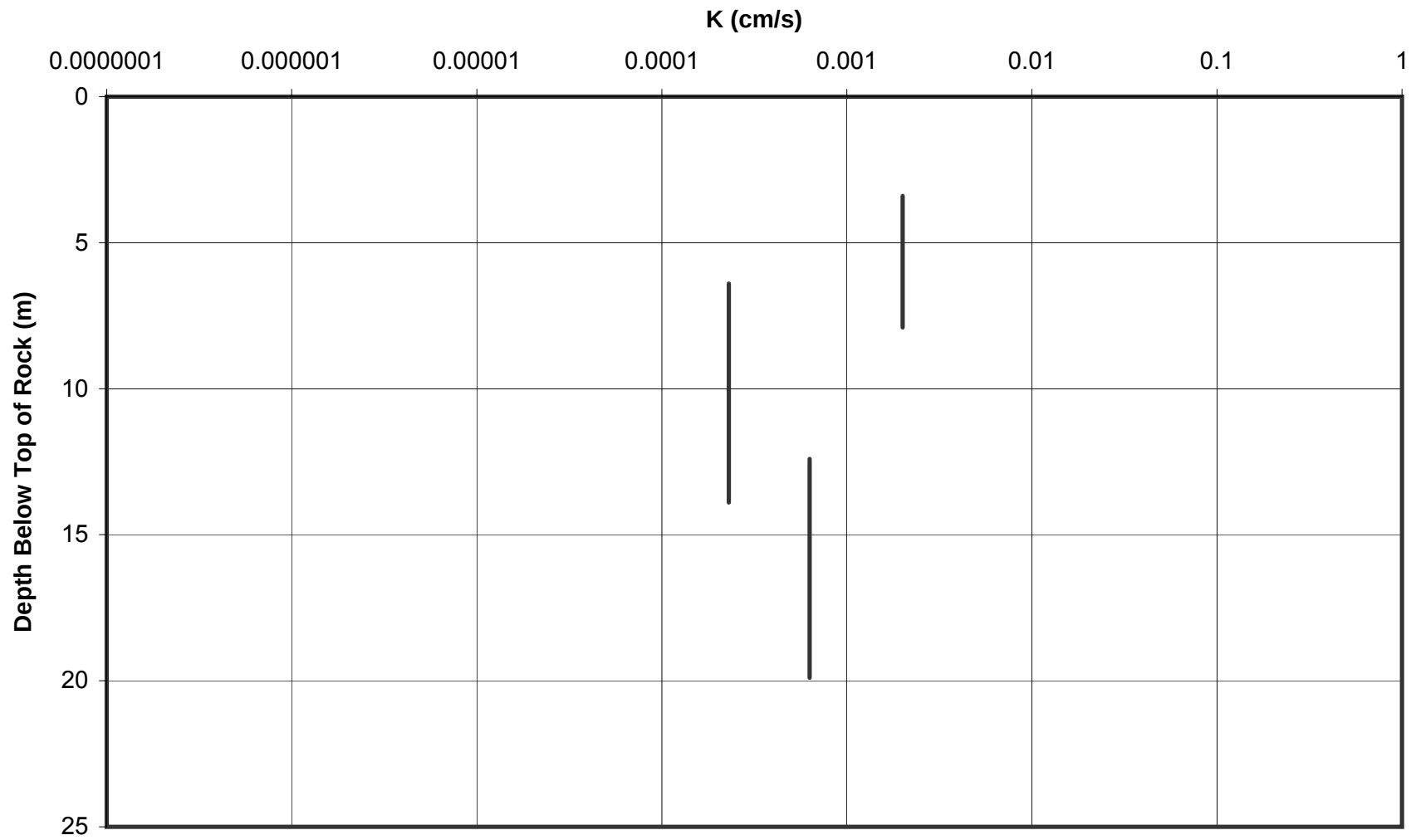
Date	Shift	Filename	Depth	Description
20-Mar-04	DS 0700-1900	MPV-04-176C_12.8m_Box1_dry	12.8 - 17.3	
20-Mar-04	DS 0700-1900	MPV-04-176C_17.3m_Box2_dry	17.3 - 21.35	
20-Mar-04	DS 0700-1900	MPV-04-176C_21.35m_Box3_dry	21.35 - 25.5	
20-Mar-04	NS 1900-0700	MPV-04-176C_25.5m_Box4_Box5	25.5-33	

Core Box Record

MPV-04-176c

Box	From	To	Comments
1	12.80	17.30	
2	17.30	21.30	
3	21.30	25.50	
4	25.50	31.20	
5	31.20	33.00	

Permeability vs Depth
MPV_04_176C



Packer Test Data

Date	20-Mar-04
Staff	R. Bowden
Init. WL:	0
Ref. Pt.	drill shack floor
Dip	90

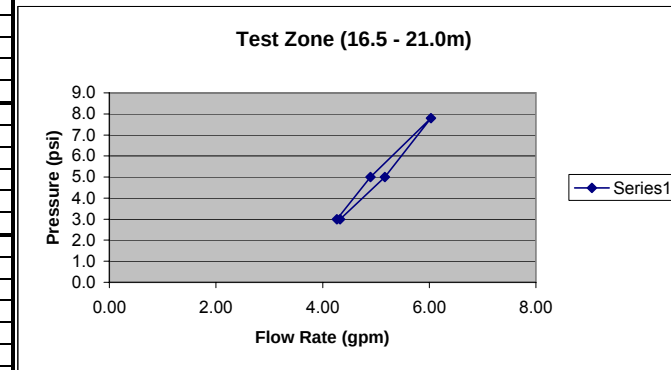
MPV-04-176c

Test 1 16.5 21

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	72.3		3.0	no leaks
	1	76.3	4.00		
	2	80.1	3.80		
	3	84.3	4.20		
	4	88.7	4.40		
	5	93.0	4.30		
	6	97.4	4.40		
	7	101.70	4.30	4.33	
2	0	6.60		5.0	no leaks
	1	11.80	5.20		
	2	17.00	5.20		
	3	22.10	5.10		
	4	27.30	5.20	5.17	
	5				
	5				
3	0	33.20		7.8	no leaks
	1	39.10	5.90		
	2	45.20	6.10		
	3	51.20	6.00		
	4	57.20	6.00	6.03	
	5				
4	0	62.30		5.0	no leaks
	1	67.30	5.00		
	2	72.20	4.90		
	3	77.10	4.90		
	4	82.00	4.90	4.90	
	5				
	6				
5	0	86.30		3.0	no leaks
	1	90.50	4.20		
	2	94.80	4.30		
	3	99.00	4.20		
	4	103.30	4.30	4.27	
	5				
	6				
	7				
	8				

Summary 16.5 21

Flow rate (gpm)	Pressure (psi)
4.33	3.0
5.17	5.0
6.03	7.8
4.90	5.0
4.27	3.0

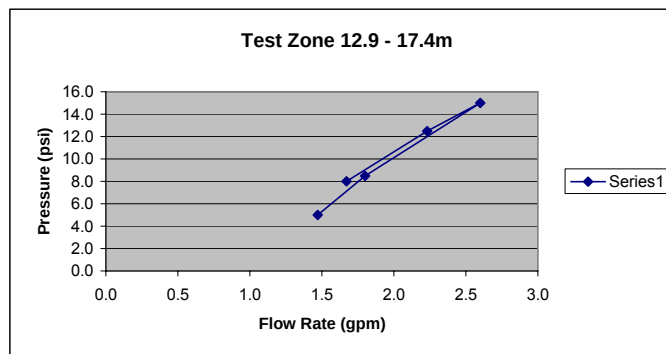


Test 2 19.5 27

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge pressure (psi)	Comments
1	0	8.40		8.0	
	1	10.10	10.10		
	2	11.80	1.70		
	3	13.50	1.70		
	4	15.10	1.60	1.67	
	5				
	6				
2	0	17.20		12.5	
	1	19.30	2.10		
	2	21.40	2.10		
	3	23.70	2.30		
	4	25.90	2.20		
	5	28.10	2.20	2.23	
3	0	30.65		15.0	
	1	33.40	2.75		
	2	36.00	2.60		
	3	38.60	2.60		
	4	41.20	2.60		
	5	43.80	2.60	2.60	
4	0	45.60		8.5	
	1	47.40	1.80		
	2	49.15	1.75		
	3	50.85	1.70		
	4	52.75	1.90		
	5	54.55	1.80	1.80	
5	0	55.95		5.0	
	1	57.35	1.40		
	2	58.80	1.45		
	3	60.10	1.30		
	4	61.60	1.50		
	5	63.05	1.45		

Summary 19.5 27

Flow rate (gpm)	Pressure (psi)
1.7	8.0
2.2	12.5
2.6	15.0
1.8	8.5
1.5	5.0

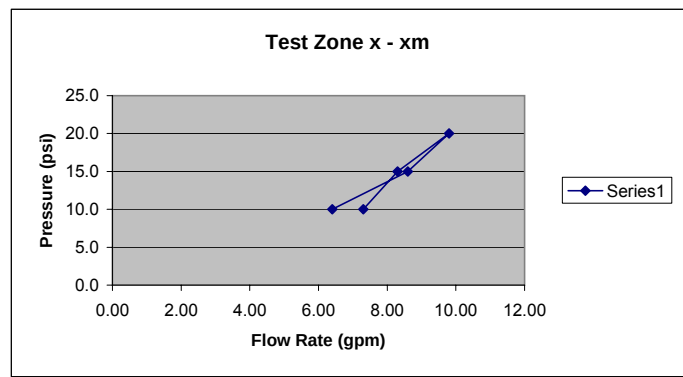


	6	64.50	1.45	1.47	
	7				

Test 3 25.5 33 Summary 25.5 33

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	9175.00			
	1	9181.40	6.40	10.0	
2	2	9187.80	6.40		
	3	9194.30	6.50		
	4	9200.80	6.50	6.4	
2	0	9210.00			
	1	9218.50	8.50	15.0	
	2	9227.00	8.50		
	3	9235.90	8.90		
	4	9244.40	8.50		
	5	9252.90	8.50	8.6	
3	0	9270.00			
	1	9279.70	9.70	20.0	
	2	9289.50	9.80		
	3	9299.30	9.80		
	4	9309.10	9.80	9.8	
4	0	9315.00			
	1	9323.50	8.50	15.0	
	2	9331.80	8.30		
	3	9340.10	8.30		
	4	9348.40	8.30	8.3	
5	0	9352.00			
	1	9359.30	7.30	10.0	
	2	9366.60	7.30		
	3	9373.90	7.30		
	4	9381.20	7.30	7.3	

Flow rate (gpm)	Pressure (psi)
6.40	10.0
8.60	15.0
9.80	20.0
8.30	15.0
7.30	10.0



FIELD GEOLOGICAL LOG

HOLE ID

MPV-04-176c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	0.60	snow	0.00		
0.60	2.6	ice	0.00		
2.60	9.50	water	0.00		
9.50	13.10	OVB	0.00	gravel, cobbles and boulders inferred from drill response	
13.10	33.00	Granite	0.00		

Permeability Summary

MPV-04-176c

from	to	Step 1	Step 2	Step 3	Step 4	Step 5	Avg K
16.5	21	gauge (psi)	3	5	7.8	5	3
		Qavg (igpm)	4.33	5.17	6.03	4.9	4.267
		K cm/sec	2.5E-03	1.8E-03	1.4E-03	1.7E-03	2.5E-03
19.5	27	gauge (psi)	8	12.5	15	8.5	5
		Qavg (igpm)	1.7	2.2	2.6	1.8	1.5
		K cm/sec	2.3E-04	1.9E-04	1.8E-04	2.2E-04	3.2E-04
25.5	33	gauge (psi)	10	15	20	15	10
		Qavg (igpm)	6.4	8.6	9.8	8.3	7.3
		K cm/sec	6.8E-04	6.1E-04	5.2E-04	5.9E-04	7.7E-04
		gauge (psi)					
		Qavg (igpm)					
		K cm/sec	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
		gauge (psi)					
		Qavg (igpm)					
		K cm/sec	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
		gauge (psi)					
		Qavg (igpm)					
		K cm/sec	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

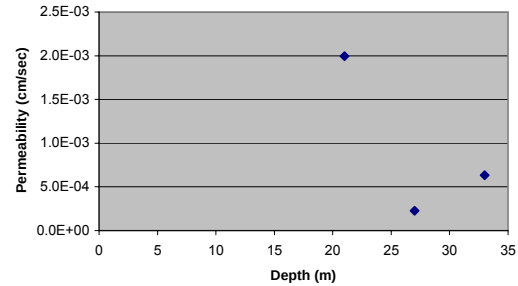
Equations: $H_f = 8.65 \times 10^{-15} (Q^2 * L_p / r_p^5)$
 $H_{nit} = (Dw' + Hg - Hf) + Pg / 1.42$
 $K = (Q * L_n (R / r_b)) / (2 * \pi * H_{nit} * L)$

Overall #DIV/0!

assume
- vertical drillhole
- water at ground surface
- height of gauge is at rig flr
- negligible friction losses

Dw Measured depth of static water (ft)
Dp Measured depth to packer
Dt Depth to midpoint of test
Inc Inclination from horizontal
Dw' Vertical depth to static water level
Dp' Vertical depth to packer
Dt' Vertical depth to midpoint of test
Hg Gauge height
Lp Length of discharge pipe
rp Radius of discharge pipe (1" = 0.0127m)
R Radius of influence (10m is standard)
rb Drillhole radius (HQ=0.048m, NQ=0.038m)
L Length of test section
Hf

0 m
m
m
90 °
m
m
m
0 m
m
m
10 m
0.038 m
m
0 m



Reflex Readings

MPV-04-176c

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp °C
20.03.04	33m	159.8	88.5	207.7	6070	8.2

UCS SAMPLE LIST				
HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-176C	3	24.00	GRANITE	04-UCS-176-001

POINT LOAD TEST - INPUT

DRILL HOLE ID: **MPV-04-176C**

[illegible]

MPV_04_177C



Diary

MPV-04-177c

target depth is 28.9m

NS 20/03/2004

0100 moved on to hole
0200 started casing
rig floor = 0m **Depths to top of ...**
ice = 0.6m
water = 1.6m
lake bed = 5.5m (est.)
bedrock = 8.9m (based on core)
casing set at 8.5m; reset at 10.2
0400 began coring
0500 problems with rods and inner tube entering hole

DS 21/03/04

casing deflected off of a boulder; deviation too great; pulled casing and re-set to 10.2m
0940 rods at 9m
1020 at 12m
1050 at 15m; driller noticed total loss of return at about 13.5m
at 18m; packer test completed: note that rods were raised an extra 1m above the rig head
1525 packer test at 24m completed
1700 at 27m - white out called

NS 21/03/2004

1900 whiteout ongoing
2130 whiteout over
1030 at 29.2m bit gone hole called
0000 packer test 22.5-29.2m
very little flow, all lines checked and clear
core almost contains no joints over this interval
0100 hole grouted ready to move

**FIELD DRILL
PERFORMANCE LOG**

PROJECT	Gahcho Kue Geotech
PROJECT NO	2CD002.11
NORTHING	7036814.92
EASTING	590132.92
SURFACE ELEVATION	404.26
AZIMUTH	0
DIP	90

HOLE NO:	MPV-04-177c
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	0300 March 20, 2004
FINISH DATE AND TIME	2300 March 21, 2004
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

Period	Logged by	Date	Time	Period Totals				Cumulative			
				Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]
NS 1900-0700	J Siddorn	20.03.04	0630	6	3.5	9	setup, problem with rods entering ddh	9	2.5	3.60	6
DS 0700-1900	R Bowden	21.03.04	1830	12	3	27.00	reset casing; whiteout;	18	9	2.00	18
NS 1900-0700	J Siddorn	21.03.04	0630	4	3.5	29.20	whiteout, packer testing	2.2	0.5	4.40	22

OVERALL HOLE DRILL RATE (m/hr)	1.33
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	2.43

GENERAL GEOTECH LOG

DRILLHOLE ID:

MPV-04-177c

Total Core Recovery = Total length of core recovered

Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)

Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)

NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

[illegible]

[illegible]

DRILLHOLE ID: MPV-04-177c

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM (m)	TO (m)	ROCK TYPE	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of Sets	Type	Totals	JOINT CONDITIONS				COMMENT
			STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH				ANGLE	ROUGH	ALT	FILL	
8.9	12.0	GRN	R5			8	0	4	0		0		3	J1	1	15	5	0	9	
														J2	2	45	4	0	9	
														J3	1	55	4	0	9	
12.0	15.0	GRN	R5			9		4	0				3	J1	2	70	4	0	3	J1 has silt gouge <1mm thick;
														J2	1	55	4	0	9	
														J3	1	45	4	0	9	
15.0	18.0	GRN	R5			7		3	0		0		3	J1	1	80	8	0	9	J1 as trace silt
														J2	1	40	7	0	9	
														J3	1	90	4	0	9	
18.0	21.0	GRN	R5			10		2	0		0		2	J1	1	45	1	0	9	
														J2	1	58	4	0	9	
21.0	24.0	GRN	R5			6		0	0		0									all fractures interpreted as mechanical
24.0	27.0	GRN	R5			7		7	0		0		1	J1	1	75	4	0	9	
27.0	29.2	GRN	R5			1		0	0		0									no joints solid core
EOH																				

Photo Record

MPV-04-177c

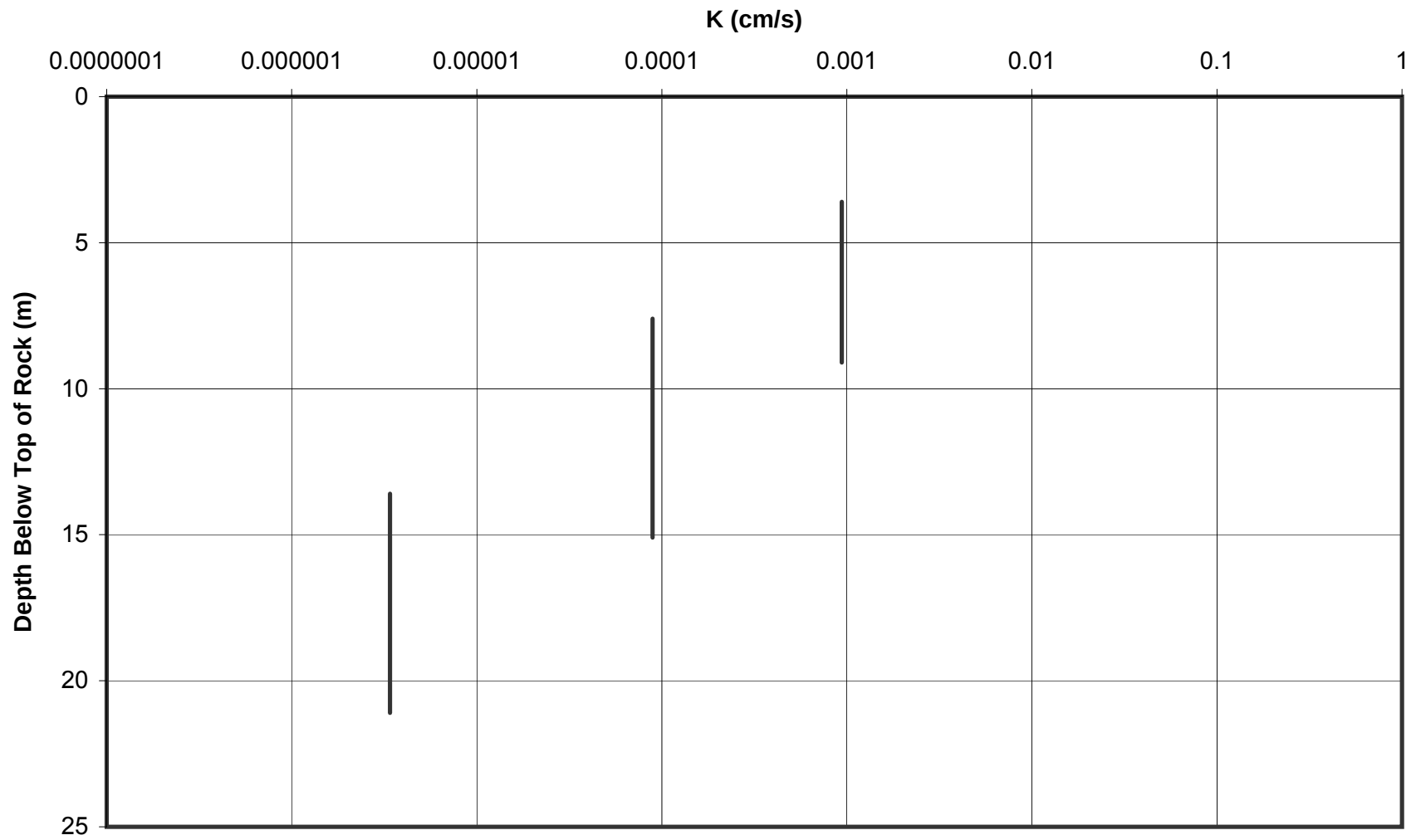
Date	Shift	Filename	Depth (m)	Description
21/3/04	DS 0700-1900	MPV-04-177C_8.1m_Box1_dry	8.1 - 13.7	
21/3/04	DS 0700-1900	MPV-04-177C_13.7m_Box2_dry	13.7 - 19.15	
21/3/04	DS 0700-1900	MPV-04-177C_19.15m_Box3_dry	19.15 - 24.8	
21/3/04	NS 1900-0700	MPV-04-177C_24.8m_Box4_dry	24.8-29.2	

Core Box Record

MPV-04-177c

Box	From	To	Comments
1	8.10	13.70	OVb and granite
2	13.70	19.15	
3	19.15	24.80	
4	24.80	29.20	

Permeability vs Depth
MPV_04_177C



Packer Test Data

Date	21-Mar-04
Staff	R. Bowden Jsiddorn
Init. WL:	0
Ref. Pt.	drill shack floor
Dip	90

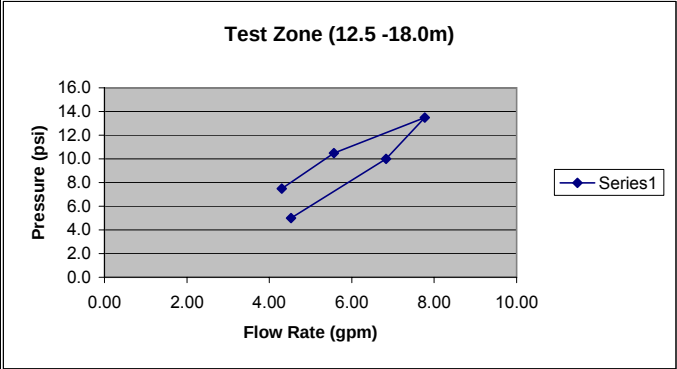
MPV-04-177c

Test 112.518

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	90.30		7.5	no leaks
	1	94.60	4.30		
	2	98.90	4.30		
	3	103.20	4.30		
	4	107.50	4.30	4.30	
2	0	13.50		10.5	no leaks
	1	19.70	6.20		
	2	26.00	6.30		
	3	32.20	6.20		
	4	36.40	4.20	5.57	
3	0	45.70		13.5	no leaks
	1	53.30	7.60		
	2	60.90	7.60		
	3	68.60	7.70		
	4	76.40	7.80		
4	0	91.30		10.0	no leaks
	1	98.10	6.80		
	2	105.00	6.90		
	3	111.70	6.70		
	4	118.70	7.00		
5	0	30.90		5.0	no leaks
	1	35.40	4.50		
	2	40.00	4.60		
	3	44.60	4.60		
	4	49.00	4.40		
6	0	53.60	4.60	4.53	
	1				
	2				
	3				
	4				
7	0				
	1				
	2				
	3				
	4				
8	0				
	1				
	2				
	3				
	4				

Summary12.518

Flow rate (gpm)	Pressure (psi)
4.30	7.5
5.57	10.5
7.77	13.5
6.83	10.0
4.53	5.0

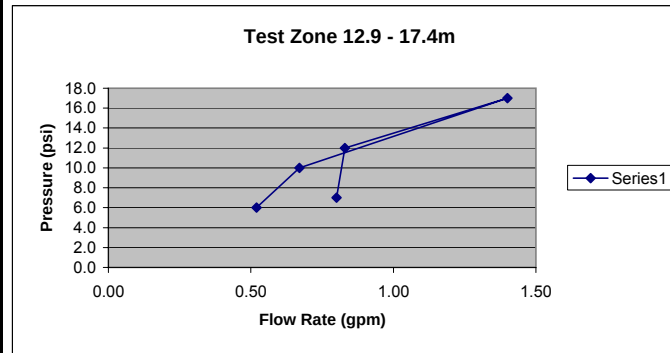


Test 2 16.5 24

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	57.00		7.0	
	1	57.70	0.70		
	2	58.40	0.70		
	3	59.15	0.75		
	4	60.00	0.85		
	5	60.80	0.80	0.80	
	6				
2	0	3.10		12.0	
	1	4.00	0.90		
	2	4.90	0.90		
	3	5.70	0.80		
	4	6.50	0.80	0.83	
3	0	8.10		17.0	
	1	9.45	1.35		
	2	10.90	1.45		
	3	12.50	1.60		
	4	14.10	1.60		
	5	15.40	1.30		
	6	16.70	1.30	1.40	
4	0	7.20		10.0	
	1	8.00	0.80		
	2	8.75	0.75		
	3	9.30	0.55		
	4	10.00	0.70		
	5	10.75	0.75	0.67	
5	0	1.30		6.0	
	1	1.70	0.40		
	2	2.15	0.45		
	3	2.75	0.60		
	4	3.30	0.55		
	5	3.70	0.40	0.52	

Summary 16.5 24

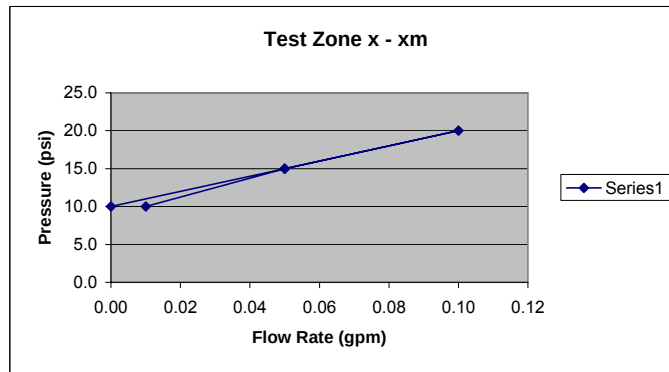
Flow rate (gpm)	Pressure (psi)
0.80	7.0
0.83	12.0
1.40	17.0
0.67	10.0
0.52	6.0



Test 3 22.5 29.2 Summary 22.5 29.2

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	9584.85			
	1	9584.86	0.01	10.0	
	2	9584.87	0.01		
	3	9584.88	0.01		
	4	9584.89	0.01		
	5	9584.90	0.01		
2	0	9585.20			
	1	9585.25	0.05	15.0	
	2	9585.30	0.05		
	3	9585.35	0.05		
	4	9585.40	0.05		
3	0	9585.60			
	1	9585.70	0.10	20.0	
	2	9585.80	0.10		
	3	9585.90	0.10		
	4	9586.00	0.10		
4	0	9586.20			
	1	9586.25	0.05	15.0	
	2	9586.30	0.05		
	3	9586.35	0.05		
	4	9586.40	0.05		
5	0	9586.50			
	1	9586.50	0.00	10.0	
	2	9586.50	0.00		
	3	9586.50	0.00		
	4	9586.50	0.00		

Flow rate (gpm)	Pressure (psi)
0.01	10.0
0.05	15.0
0.10	20.0
0.05	15.0
0.00	10.0



Reflex Readings

MPV-04-177c

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
21.03.04	29.2	261.32	88.4	282.9	5988	5.1

FIELD GEOLOGICAL LOG

HOLE ID

MPV-04-177c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	0.60	snow			JS/RB
0.60	1.6	ice			JS/RB
1.60	5.50	water			JS/RB
5.50	8.90	lake sediments		gravel, cobbles, and boulders up to at least 0.7m - see core box.	JS/RB
8.90	29.20	bedrock		Granite:	JS/RB

Permeability Summary

MPV-04-177c

from	to		Step 1	Step 2	Step 3	Step 4	Step 5	Avg K
12.5	18	gauge (psi)	7.5	10.5	13.5	10	5	
		Qavg (igpm)	4.3	5.57	7.77	6.83	4.53	
		K cm/sec	8.3E-04	7.7E-04	8.3E-04	9.9E-04	1.3E-03	9.4E-04
16.5	24	gauge (psi)	7	12	17	10	6	
		Qavg (igpm)	0.8	0.83	1.4	0.67	0.52	
		K cm/sec	1.2E-04	7.3E-05	8.7E-05	7.1E-05	9.2E-05	8.9E-05
22.5	30	gauge (psi)	10	15	20	15	10	
		Qavg (igpm)	0.01	0.05	0.1	0.05	0	
		K cm/sec	1.1E-06	3.5E-06	5.3E-06	3.5E-06	0.0E+00	3.4E-06
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
		gauge (psi)						
		Qavg (igpm)						
		K cm/sec	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	

Equations: $H_f = 8.65 \times 10^{-15} (Q^2 \cdot L_p / r_p^5)$
 $H_{nit} = (Dw' + Hg - Hf) + Pg / 1.42$
 $K = (Q \cdot L_n (R / r_b)) / (2 \cdot \pi \cdot H_{nit} \cdot L)$

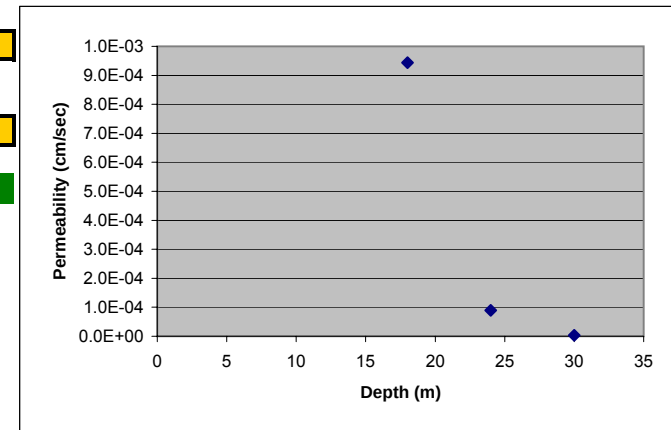
assume

- vertical drillhole
- water at ground surface
- height of gauge is at rig flr
- negligible friction losses

Overall 3.5E-04

Dw Measured depth of static water (1)
Dp Measured depth to packer
Dt Depth to midpoint of test
Inc Inclination from horizontal
Dw' Vertical depth to static water level
Dp' Vertical depth to packer
Dt' Vertical depth to midpoint of test
Hg Gauge height
Lp Length of discharge pipe
rp Radius of discharge pipe (1" = 0.0127m)
R Radius of influence (10m is standard)
rb Drillhole radius (HQ=0.048m, NQ=0.038m)
L Length of test section
Hf

0	m
	m
	m
90	m
	°
	m
	m
0	m
	m
	m
10	m
0.038	m
	m
0	m



UCS SAMPLES

HOLE ID: MPV-04-177C

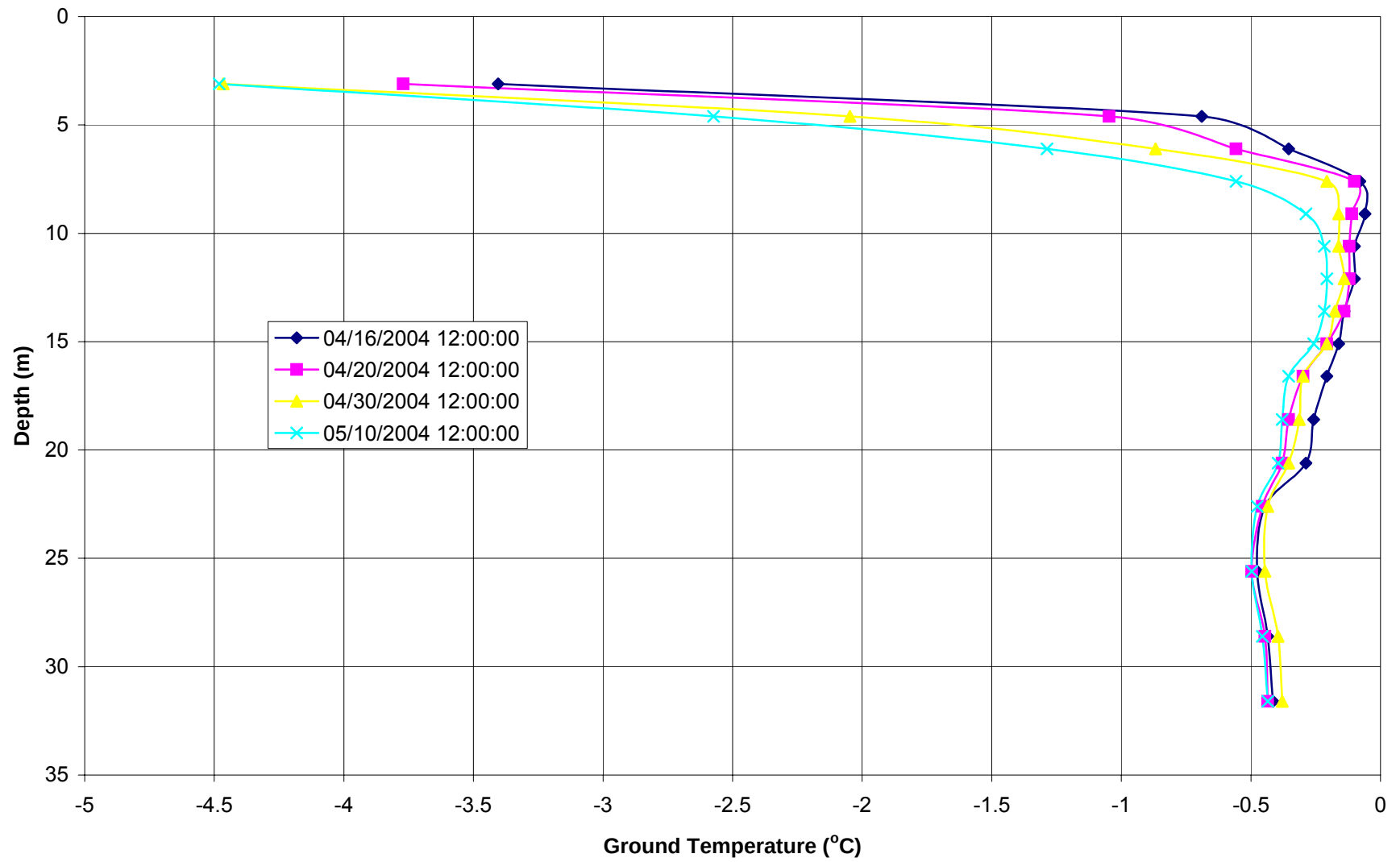
HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-177C	4	27.00-27.32	Granite	04-UCS-177-001

DRILL HOLE ID: MPV-04-177C[illegible]

MPV_04_178C



MPV-04-178C



Diary

MPV-04-178c

target depth is 31.6m

PVC length should be approx. 31.9m; each length is 5.975m

protective casing id is larger than drillhole casing id so it may be impossible to install

DS 22/03/2004

rig floor = 0.0m **Depths to top of ...**

ground surface = 1.6m

bedrock = 1.7m

casing set at 3.2m (3m casing + 0.2 ft below rig floor)

1400	at 5.65m
1445	at 8.65m
1520	at 11.65m
1640	at 17.65m
1730	at 20.65m
1820	at 23.65m

NS 22/03/2004

1900	refill hydraulic oil
2000	bit change
	had to ream hole
2145	resume drilling
1030	at 26.65
1115	at 29.65
0000	at 31.6 EOH
0030	Reflex
0200	installed thermistor; no protective pipe
0400	white out called

DS 23/03/2004

1700	white out cancelled
1800	moved off drillhole and staked

FIELD DRILL PERFORMANCE LOG

PROJECT	Gahcho Kue Geotech
PROJECT NO	2CD002.11
NORTHING	7036884.99
EASTING	590216.8
SURFACE ELEVATION	405.86
AZIMUTH	230
DIP	70

HOLE NO:	MPV-04-178c
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	1100 March 22, 2004
FINISH DATE AND TIME	0300 March 23, 2004
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

Period	Logged by	Date	Time	Period Totals							Cumulative			
				Total drill time	Standby time	Depth	Standby Reason	Metreage drilled	Actual drill time	Drill rate	Total drill time	Standby time	Actual drill time	Drill rate
				[hr]	[hr]	[m]		[m]	[hr]	[m/hr]	[hr]	[hr]	[hr]	[m/hr]
DS 0700-1900	R Bowden	03/22/2004	1830	12	5	20.7	set-up, hoses	20.7	7	2.96	12	5	7	2.96
NS 1900-0700	J Siddorn	03/22/2004	0630	8	5	31.60	refill hydraulic oil, change bit, install therm	10.9	3	3.63	20	10	10	3.16

OVERALL HOLE DRILL RATE (m/hr) 1.58
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr) 3.16

GENERAL GEOTECH LOG

DRILLHOLE ID:

MPV-04-178c

Total Core Recovery = Total length of core recovered

Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)

Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)

NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
		0.00								
3.20	5.65	2.45	GRN	2.45	100.0	2.34	95.5	2.24	91.4	2.5cm Silt/Clay seam at 4.97m
5.65	8.65	3.00	GRN	3.00	100.0	2.78	92.7	2.38	79.3	
8.65	11.65	3.00	GRN	3.00	100.0	2.93	97.7	2.56	85.3	
11.65	14.65	3.00	GRN	3.00	100.0	2.41	80.3	2.11	70.3	
14.65	17.65	3.00	GRN	3.00	100.0	2.87	95.7	1.77	59.0	
17.65	20.65	3.00	GRN	3.00	100.0	2.90	96.7	2.75	91.7	
20.65	23.65	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
23.65	26.65	3.00	GRN	3.00	100.0	2.98	99.3	2.82	94.0	
26.65	29.65	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	

[illegible]

DRILLHOLE ID: MPV-04-178c

NB: 3 sources of open joints and fractures found in drillcore

- Artificial breaks induced by drilling process
- Artificial breaks induced by core handling
- Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

[illegible]

Photo Record

MPV-04-178c

Date	Shift	Filename	Depth	Description
22-Mar-04	DS 0700-1900	MPV-04-178C_3.20m_Box1_dry	3.2 - 8.65	Granite
22-Mar-04	DS 0700-1900	MPV-04-178C_8.65m_Box2_dry	8.65 - 13.95	
22-Mar-04	DS 0700-1900	MPV-04-178C_13.95m_Box3_dry	13.95 - 19.20	
22-Mar-04	NS 1900-0700	MPV-04-178C_19.2m_Box4_dry	19.2-24.65	
22-Mar-04	NS 1900-0700	MPV-04-178C_24.65m_Box5_dry	24.65-29.65	
22-Mar-04	NS 1900-0700	MPV-04-178C_29.65m_Box6_dry	29.65-31.6	

Core Box Record

MPV-04-178c

[illegible]

Reflex Readings

MPV-04-178c

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp °C
23.03.04	33m	217.3	69.7	122.6	5972	11.5

Thermistor Readings

MPV-04-178c

Thermistor String ID

32/16 - 20

Thermis Node	Reading (kOhms)	Comments
1	6.11	all channels active before installation
2	6.69	
3	6.98	
4	7.28	
5	6.45	
6	6.76	
7	7.31	
8	6.81	
9	6.49	
10	6.58	
11	7.20	
12	7.00	
13	5.99	
14	6.52	
15	5.80	
16	6.10	

FIELD GEOLOGICAL LOG

HOLE ID

MPV-04-178c

From (m)	To (m)	Material	Xeno. Content (%)	Description	Logged By
0	1.6	snow	0		JS/RB
1.6	1.7	soil	0	overburden	JS/RB
1.7	31.6	granite	0		JS/RB

UCS SAMPLE LIST				
HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-178C	6	30.10	GRANITE	04-UCS-178-001

POINT LOAD TEST - INPUT

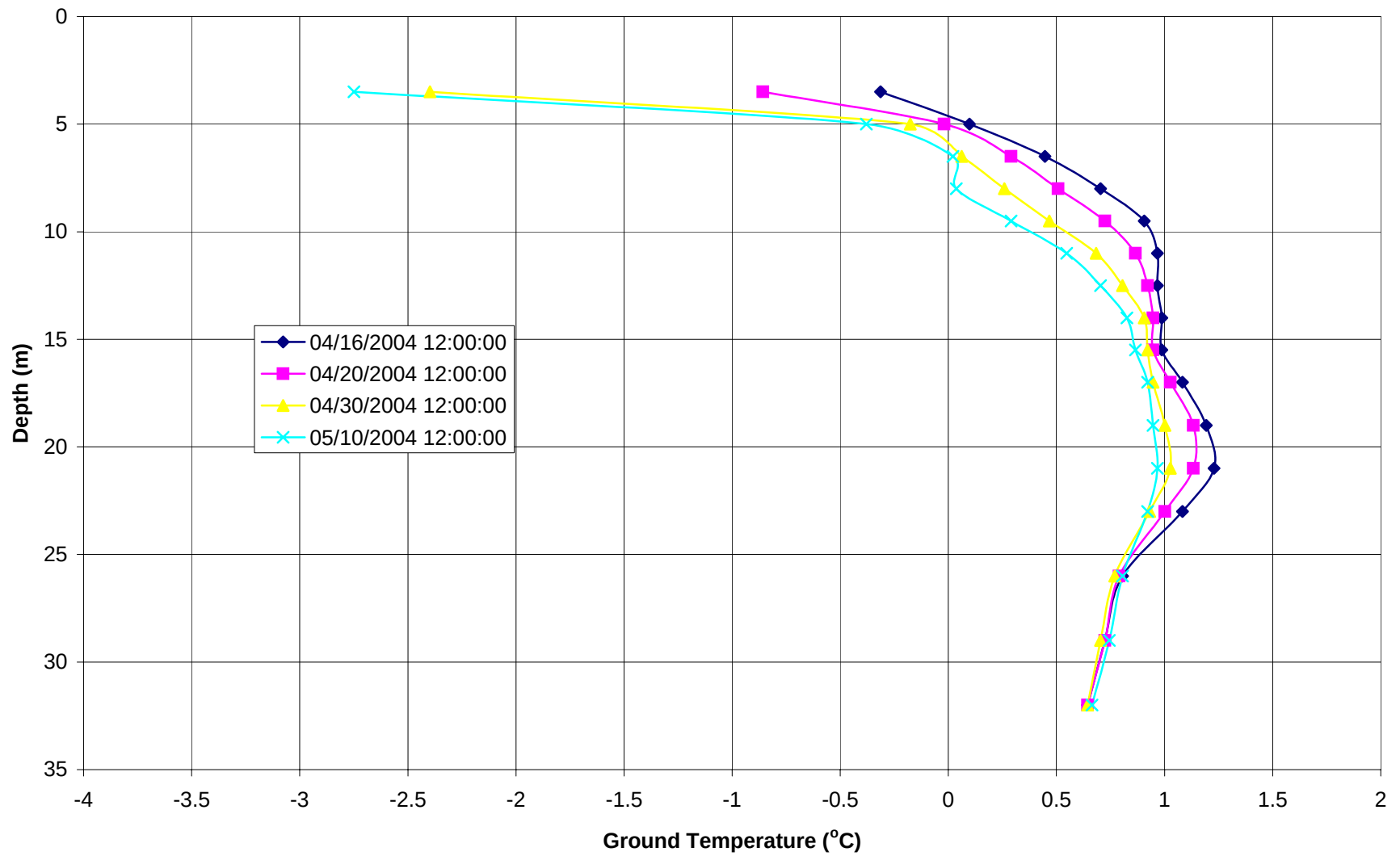
DRILL HOLE ID: **MPV-04-178C**

[illegible]

MPV_04_179C



MPV-04-179C



Diary

MPV-04-179c

NS 23/03/2004 Target depth is 31.8m

rig floor = 0.0m Depths to top of ...

ice = 0.8m

ground = 1.8

bedrock = 2.65m

0130 casing set at 2.75m
0200 need new NQ stabiliser
0230 begin drilling
0330 at 6m
core stuck in hole, need to retrieve
core blocking, hard drilling
0400 engine quit, battery discharged, need to boost
0500 back to drilling
core very poor, blocking (not entering core tube)
0600 8m

DS 24/03/2004

0730 changed bit
0810 at 9m
0850 at 12m
0930 at 15m
1012 at 18m
very cold in drill rig; stopped to tie tarp on
1110 at 21m
1230 at 24m
1300 at 27m
bit dead at 28.5m; severe problems pulling last 2 rods;
eventually redrilled rods to
reamed casing to 9m
ISO visit
rods frozen; probably due to loss of circulation above 8m
while reaming casing
starting to ream below 9m to free rods

NS 24/03/2004

1900 Reaming casing, need to ream casing to 24.5m
0300 had to change shoe bit twice, still reaming casing
0600 casing at 21m
0900 casing at 25m - rods free
1015 started drilling
1050 at 27m
1200 at 30m
1230 32.0m
1300 thermistor installed
no protective pipe
staked

**FIELD DRILL
PERFORMANCE LOG**

PROJECT	Gahcho Kue Geotech
PROJECT NO	2CD002.11
NORTHING	7036871.71
EASTING	590200.73
SURFACE ELEVATION	404.71
AZIMUTH	230
DIP	70

HOLE NO:	MPV-04-179c
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	2350 23.03.04
FINISH DATE AND TIME	1300 March 25, 2004
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals						Cumulative				
				Total drill time	Standby time	Depth		Metreage drilled	Actual drill time	Drill rate	Total drill time	Standby time	Actual drill time	Drill rate
Period	Logged by	Date	Time	[hr]	[hr]	[m]	Standby Reason	[m]	[hr]	[m/hr]	[hr]	[hr]	[hr]	[m/hr]
NS 1900-0700	J Siddorn	23.03.04	0630	8	3.5	8	install water line, setup, flat battery	8	4.5	1.78	8	3.5	4.5	1.78
DS 0700-1900	R Bowden	24.03.04	1830	12	1	25.00	tools/equip from site	17	11	1.55	20	4.5	15.5	1.61
NS 1900-0700	J Siddorn	24.03.04	0630	12	10		reamed casing		2	-12.50	32	14.5	17.5	0.00
DS 0700-1900	R Bowden	25.03.04	1830	7	1	32.00	installed termistor	32	6	5.33	39	15.5	23.5	1.36

OVERALL HOLE DRILL RATE (m/hr)	1.46
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	2.43

GENERAL GEOTECH LOG

DRILLHOLE ID:

MPV-04-179c

Total Core Recovery = Total length of core recovered

Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)

Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)

NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
0.00	0.80	0.80	Air							
0.80	1.80	1.00	Ice							
1.80	2.65	0.85	Till							
2.65	6.00	3.35	GRN	2.10	62.7	0.67	20.0	0.62	18.5	half of run looks like gravel
6.00	9.00	3.00	GRN	3.00	100.0	2.10	70.0	1.02	34.0	
9.00	12.00	3.00	GRN	3.00	100.0	2.77	92.3	2.58	86.0	Granite
12.00	15.00	3.00	GRN	3.00	100.0	2.96	98.7	2.96	98.7	Granite
15.00	18.00	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	pegmatitic sections
18.00	21.00	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
21.00	24.00	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
24.00	24.80	0.80	GRN	0.80	100.0	0.80	100.0	0.80	100.0	short run to change bit
24.80	27.00	2.20	GRN	2.20	100.0	2.20	100.0	2.20	100.0	
27.00	30.00	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
30.00	32.00	2.00	GRN	2.00	100.0	2.00	100.0	2.00	100.0	End of Hole

DETAILED GEOTECHNICAL LOG		DRILLHOLE ID:	MPV-04-179c

DRILLHOLE ID: **MPV-04-179c**

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

FROM (m)	TO (m)	ROCK TYPE	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of Sets	Type	Totals	JOINT CONDITIONS				COMMENT
			STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH				ANGLE	ROUGH	ALT	FILL	
0.0	0.8	Air																		
0.8	1.8	ICE																		
1.8	2.7	TILL																		
2.7	6.0	GRN	R5			50	0	30	0		0	3	J1	25		2	0	9	Half of run looks like gravel with weathered surfaces of roughness 1, 2 or 4 - lumped together as J1, wit various angles; J3 as angles of 45, 55, and 84 - all weathered/staining	
													J2	1	37	7	0	9		
													J3	3		5	0	9		
6.0	9.0	GRN	R5		50	0	30	0		0	3	J1	2	47	6	0	9	Vast majority of joints are weathered, have variable joint angles and roughness of 1, 2, and 4. Interpreted to be frost satter; trace silt on a few joints; blakc staining typical		
												J2	2	40	7	0	9			
												J3	1	5	3	0	9			
9.0	12.0	GRN	R5		24	0	14	0		0	3	J1	1	87	4	0	6	J1 and J2 gas thin silt coating; J3 are weathered; most of remaining joints are darkly stained		
												J2	1	35	1	0	6			
												J3	4	53	5	0	9			
12.0	15.0	GRN	R5		5	0	4	0		0	3	J1	1	45	9	0	6			
												J2	1	45	3	0	9			
												J3	1	45	2	0	9			
15.0	18.0	GRN	R5		8	0	1	0		0	1	J1	1	30	1	0	9			
18.0	21.0	GRN	R5		14	0	1	0		0	1	J1	1	37	1	0	9			
21.0	24.0	GRN	R5		13	0	0	0		0								no natural joints		

Photo Record

MPV-04-179c

Date	Shift	Filename	Depth	Description
24/03/2004	DS 0700-1900	MPV-04-179C_3.9m_Box1_dry	3.9 - 9.0	Box 1
24/03/2004	DS 0700-1900	MPV-04-179C_9.0m_Box2_dry	9.0 - 14.5	2
24/03/2004	DS 0700-1900	MPV-04-179C_14.5m_Box3_dry	14.5 - 20.1	3
25/03/2004	DS 0700-1900	MPV-04-179C_20.1m_Box4_dry	20.1 - 25.7	4
25/03/2004	DS 0700-1900	MPV-04-179C_25.3m_Boxes5and6_dry	25.7 - 32.0	Boxes 5 and 6

Core Box Record

MPV-04-179c

Box	From	To	Comments
1	3.90	9.00	
2	9.00	14.50	
3	14.50	20.10	
4	20.10	25.70	
5	25.70	31.20	
6	31.20	32.00	EOH

Reflex Readings

MPV-04-179c

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
25.03.04	32	216.2	70.3		6057	14.9

Thermistor Readings

MPV-04-179c

Thermistor String ID

32/16 - 19

Thermis Node	Reading (kOhms)	Comments
1		all channels active before installation
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		

FIELD GEOLOGICAL LOG

HOLE ID

MPV-04-179c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	0.8	Air			JS
0.80	1.80	ICE			JS
1.80	2.65	TILL		Gravel. Sand	JS
2.65	32.00	Granite		Granite; occasionally pegmatitic and biotitic; massive to highly fractured;	RB

UCS SAMPLES

HOLE ID: MPV-04-179C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-179C	5	29.27	Granite	04-UCS-179-001

POINT LOAD TEST - INPUT

DRILL HOLE ID: **MPV-04-179C**

[illegible]

MPV_04_182C



Diary

MPV-04-182c

NS 25/03/2004 **Target depth is 36m**

rig floor = 0.0m Depths to top of ...

ice = 0.6m

water = 2m

till = 10m

bedrock = 15m

1900 casing
2130 casing set to 15.3m
1030 begin drilling
1040 stop to add calcium as core tube (lifter) was freezing
1110 resume drilling
1200 at 18m
1200 core tube not locking need to pull rods to check bit
1215 engine failed to start replace starter motor on engine
0200 resume drilling
0345 at 24m
0400 first packer test 19.5-24m
0445 resume drilling
0500 at 27m
0615 at 30m

DS 26/03/2004

0730
packer test #2 completed; slush around seating cone; flow through
0800 feed hose to stuffing box confirmed
0915 at 32m - (1m stick up)
additional packer test (#3) at 22.5 - 32m; post-test, confirmed flow
through feed hose to stuffing box and flow through packer water
1030 pipe
1200 packer at 25.5 - 35.0m completed
reflex
grouted
staked
rig lub'ed
1400 moved to D5-A-1T

FIELD DRILL PERFORMANCE LOG

PROJECT	Gahcho Kue Geotech
PROJECT NO	2CD002.11
NORTHING	7036601.9
EASTING	589877.67
SURFACE ELEVATION	404.44
AZIMUTH	0
DIP	90

HOLE NO:	MPV-04-182c
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	25.03.04 1900
FINISH DATE AND TIME	26.03.04 1600
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time	Standby time	Depth	Standby Reason	Metreage drilled	Actual drill time	Drill rate	Total drill time	Standby time	Actual drill time	Drill rate
				[hr]	[hr]	[m]		[m]	[hr]	[m/hr]	[hr]	[hr]	[hr]	[m/hr]
NS 1900-0700	J Siddorn	25.03.04	0630	12	4.5	30	starter motor replaced, packer tests, repa	30	7.5	4.00	12	4.5	7.5	4.00
DS 0700-1900	R Bowden	26.03.04	1830	12	7	35.00	packers, reflex, grouted	5	5	1.00	24	11.5	12.5	2.80

OVERALL HOLE DRILL RATE (m/hr)	1.46
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	2.80

GENERAL GEOTECH LOG

DRILLHOLE ID:

MPV-04-182c

Total Core Recovery = Total length of core recovered

Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)

Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)

NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
0.00	0.60	0.60	AIR							rig floor to ice
0.60	2.00	1.40	ICE							
2.00	10.00	8.00	Water							
10.00	15.00	5.00	TILL							at least two boulders in till, granite and amphibolite
15.00	18.00	3.00	DIA	3.00	100.0	3.00	100.0	2.80	93.3	diabase dyke (dolerite)
18.00	21.00	3.00	DIA	3.00	100.0	2.80	93.3	2.54	84.7	diabase dyke (dolerite)
21.00	24.00	3.00	DIA	3.00	100.0	3.00	100.0	2.96	98.7	diabase dyke (dolerite)
24.00	27.00	3.00	DIA	3.00	100.0	2.97	99.0	2.97	99.0	diabase dyke (dolerite)
27.00	30.00	3.00	DIA	3.00	100.0	3.00	100.0	3.00	100.0	diabase dyke (dolerite)
30.00	32.00	2.00	DIA	2.00	100.0	1.97	98.5	1.89	94.5	
32.00	35.00	3.00	DIA	3.00	100.0	2.30	100.0	2.21	96.0	SCR and RQD based on 2.3m recovery; bottom 0.7m slipped from core tube during pulling and was recovered after packer testing; broken condition likely does not reflect actual ground condition

DETAILED GEOTECHNICAL LOG		DRILLHOLE ID:	MPV-04-182c

DRILLHOLE ID:	MPV-04-182c

NB: 3 sources of open joints and fractures found in drillcore
Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

[illegible]

Photo Record

MPV-04-182c

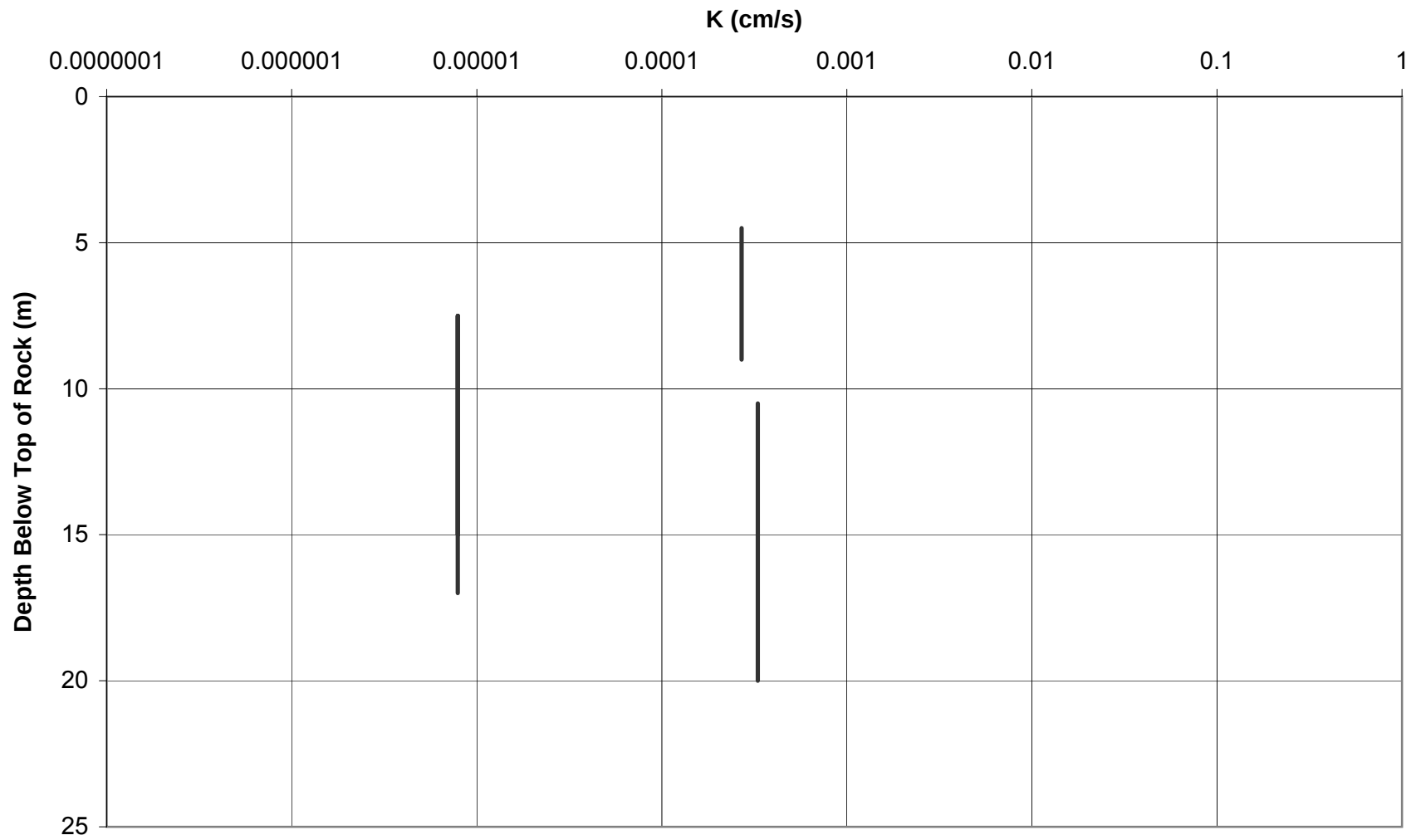
Date	Shift	Filename	Depth	Description
25.03.04	NS 1900-0700	MPV-04-182C_15m_Box1_wet	15-21m	diabase core
25.03.04	NS 1900-0700	MPV-04-182C_at22.5m_chloritic_cemented_joint_wet	22.5m	chloritic cemented joint in diabase
25.03.04	NS 1900-0700	MPV-04-182C_21m_Box2_wet	21-26.6m	diabase core
26.03.04	DS 0700-1900	MPV-04-182C_26.6m_Box3_dry	26.6 - 32.0	
26.03.04	DS 0700-1900	MPV-04-182C_32.0m_Box4_dry	32.0 - 35.0	

Core Box Record

MPV-04-182c

Box	From	To	Comments
1	15.00	21.00	
2	21.00	26.60	
3	26.60	32.00	
4	32.00	35.00	EOH

Permeability vs Depth
MPV_03_182C



Packer Test Data

Date	22-Feb-04
Staff	J SIDDORN
Init. WL:	0
Ref. Pt.	drill shack floor
Dip	90

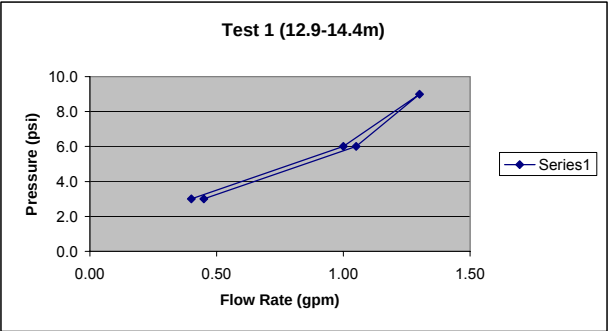
MPV-04-182c

Test 119.524

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	9588.00			no leaks
	1	9588.45	0.45		
	2	9588.90	0.45		
	3	9589.35	0.45		
	4	9589.80	0.45		
				0.45	
2	0	9591.00			no leaks
	1	9592.05	1.05		
	2	9593.10	1.05		
	3	9594.15	1.05		
	4	9595.20	1.05		
				1.05	
3	0	9596.00			no leaks
	1	9597.40	1.40		
	2	9598.75	1.35		
	3	9600.05	1.30		
	4	9601.35	1.30		
				1.30	
4	0	9603.00			no leaks
	1	9603.85	0.85		
	2	9604.80	0.95		
	3	9605.80	1.00		
	4	9606.80	1.00		
				1.00	
5	0	9607.60			no leaks
	1	9608.00	0.40		
	2	9608.40	0.40		
	3	9608.80	0.40		
	4	9609.20	0.40		
				0.40	

Summary19.524

Flow rate (gpm)	Pressure (psi)
0.45	3.0
1.05	6.0
1.30	9.0
1.00	6.0
0.40	3.0

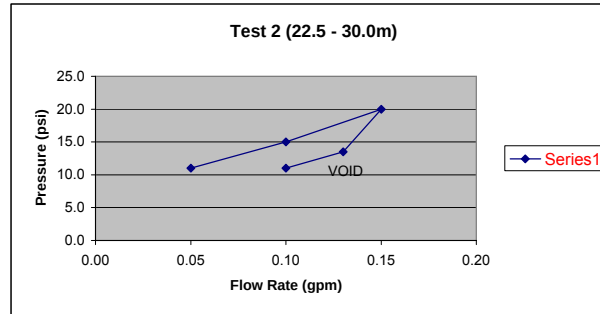


Test 2 22.5 30

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	10.60		11.0	
	1	10.75	0.15		
	2	10.90	0.15		
	3	11.00	0.10		
	4	11.10	0.10		
	5	11.20	0.10		
	6			0.10	
2	0	11.40		13.5	
	1	11.50	0.10		
	2	11.75	0.25		
	3	11.80	0.05		
	4	11.85	0.05		
	5	12.00	0.15		
	6	12.10	0.10		
	7	12.30	0.20	0.13	
3	0	12.80		20.0	
	1	13.00	0.20		
	2	13.15	0.15		
	3	13.35	0.20		
	4	13.50	0.15		
	5	13.60	0.10		
	6	13.75	0.15		
	7	13.90	0.15		
	8			0.15	
4	0	14.05		15.0	
	1	14.15	0.10		
	2	14.30	0.15		
	3	14.40	0.10		
	4	14.50	0.10		
	5	14.60	0.10	0.10	
5	0	14.65		11.0	
	1	14.65	0.00		
	2	14.65	0.00		
	3	14.70	0.05		
	4	14.75	0.05		
	5	14.85	0.10		
	6	14.90	0.05	0.05	
	7				

Summary 22.5 30

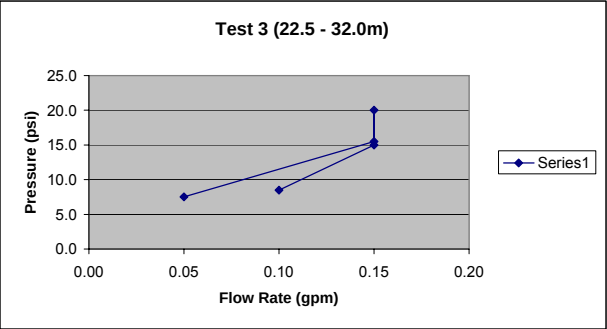
Flow rate (gpm)	Pressure (psi)
0.10	11.0
0.13	13.5
0.15	20.0
0.10	15.0
0.05	11.0



Test 3 22.5 32

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	4.80		8.5	
	1	4.90	0.10		
	2	5.00	0.10		
	3	5.10	0.10		
	4	5.20	0.10	0.10	
	5				
2	0	5.65		15.0	
	1	5.80	0.15		
	2	5.95	0.15		
	3	6.10	0.15		
	3	6.25	0.15	0.15	
	4				
	5				
3	0	6.60		20.0	
	1	6.80	0.20		
	2	7.10	0.30		
	3	7.35	0.25		
	4	7.50	0.15		
	5	7.65	0.15		
	6	7.80	0.15		
	7	7.95	0.15	0.15	
	8				
	9				
4	0	8.00		15.5	
	1	8.15	0.15		
	2	8.30	0.15		
	3	8.45	0.15		
	4	8.60	0.15	0.15	
	5				
5	0	8.60		7.5	
	1	8.65	0.05		
	2	8.70	0.05		
	3	8.75	0.05		
	4	8.80	0.05	0.05	
	5				

Summary	22.5	32
Flow rate (gpm)	Pressure (psi)	
0.10	8.5	
0.15	15.0	
0.15	20.0	
0.15	15.5	
0.05	7.5	

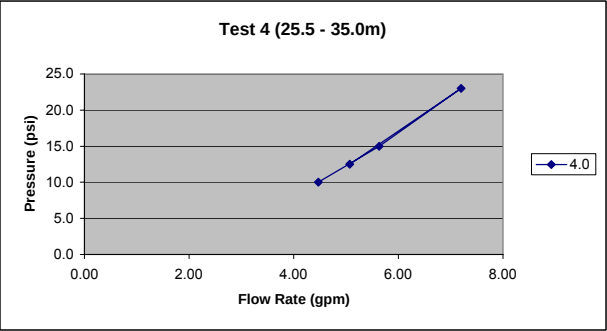


Test 3 25.5 35

Step	Elapsed time (min)	Flow (gal)	Flow rate (gpm)	Gauge press (psi)	Comments
1	0	27.20		4.0	
	1	28.90	1.70		
	2	30.60	1.70		
	3	32.40	1.80	1.73	
	4				
2	0	36.50		12.5	
	1	41.60	5.10		
	2	46.70	5.10		
	3	51.70	5.00	5.07	
	4				
3	0	60.60		23.0	
	1	67.70	7.10		
	2	75.00	7.30		
	3	82.10	7.10		
	4	89.30	7.20	7.20	
4	0	1.10		15.0	
	1	6.70	5.60		
	2	12.30	5.60		
	3	17.90	5.60		
	4	23.60	5.70	5.63	
5	0	28.10		10.0	
	1	32.50	4.40		
	2	37.00	4.50		
	3	41.40	4.40		
	4	45.90	4.50	4.47	

Summary 25.5 35

Flow rate (gpm)	Pressure (psi)
1.73	4.0
5.07	12.5
7.20	23.0
5.63	15.0
4.47	10.0



Permeability Summary

MPV-04-182c

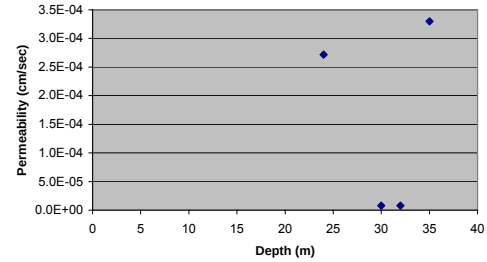
from	to	Step 1	Step 2	Step 3	Step 4	Step 5	Avg K
19.5	24	gauge (psi)	3	6	9	6	3
		Qavg (igpm)	0.45	1.05	1.3	1	0.4
		K cm/sec	2.6E-04	3.1E-04	2.6E-04	2.9E-04	2.4E-04
22.5	30	gauge (psi)	11	13.5	20	15	11
		Qavg (igpm)	0.1	0.13	0.15	0.1	0.05
		K cm/sec	9.6E-06	1.0E-05	7.9E-06	7.1E-06	4.8E-06
22.5	32	gauge (psi)	8.5	15	20	15.5	7.5
		Qavg (igpm)	0.1	0.15	0.15	0.15	0.05
		K cm/sec	9.8E-06	8.4E-06	6.3E-06	8.1E-06	5.6E-06
25.5	35	gauge (psi)	4	12.5	23	15	10
		Qavg (igpm)	1.73	5.07	7.2	5.63	4.47
		K cm/sec	3.6E-04	3.4E-04	2.6E-04	3.1E-04	3.7E-04
		gauge (psi)					
		Qavg (igpm)					
		K cm/sec	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
		gauge (psi)					
		Qavg (igpm)					
		K cm/sec	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Equations: $Hf = 8.65 \times 10^{-15} (Q^2 \cdot Lp / rp^5)$
 $H_{nit} = (Dw' + Hg - Hf) + Pg / 1.42$
 $K = (Q \cdot Ln(R/r_b)) / (2 \cdot \pi \cdot H_{nit} \cdot L)$

assume
- vertical drillhole
- water at ground surface
- height of gauge is at rig flr
- negligible friction losses

Overall 1.5E-04

Dw	Measured depth of static water (1)	0	m
Dp	Measured depth to packer		m
Dt	Depth to midpoint of test		m
Inc	Inclination from horizontal	90	m
Dw'	Vertical depth to static water level		°
Dp'	Vertical depth to packer		m
Dt'	Vertical depth to midpoint of test		m
Hg	Gauge height	0	m
Lp	Length of discharge pipe		m
rp	Radius of discharge pipe (1" = 0.0127m)		m
R	Radius of influence (10m is standard)	10	m
rb	Drillhole radius (HQ=0.048m, NQ=0.038m)	0.038	m
L	Length of test section		m
Hf		0	m



Reflex Readings

MPV-04-182c

Date	Hole Depth (m)	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp °C
26-Mar-04	35	215.9	86.4	165.8	5826	9.3

FIELD GEOLOGICAL LOG

HOLE ID

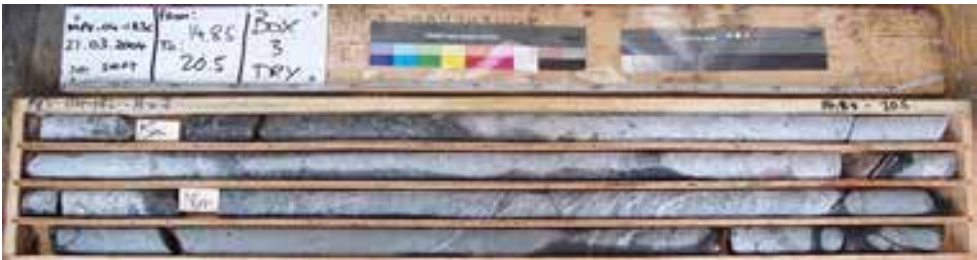
MPV-04-182c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	0.60	Air			JS
0.6	2	ICE			JS
2.00	10.00	Water			JS
10.00	15.00	TILL		two boulders in till, granite and amphibolite	JS
15.00	35.00	Diabase		medium grained, diabase dyke, ophitic texture.	JS

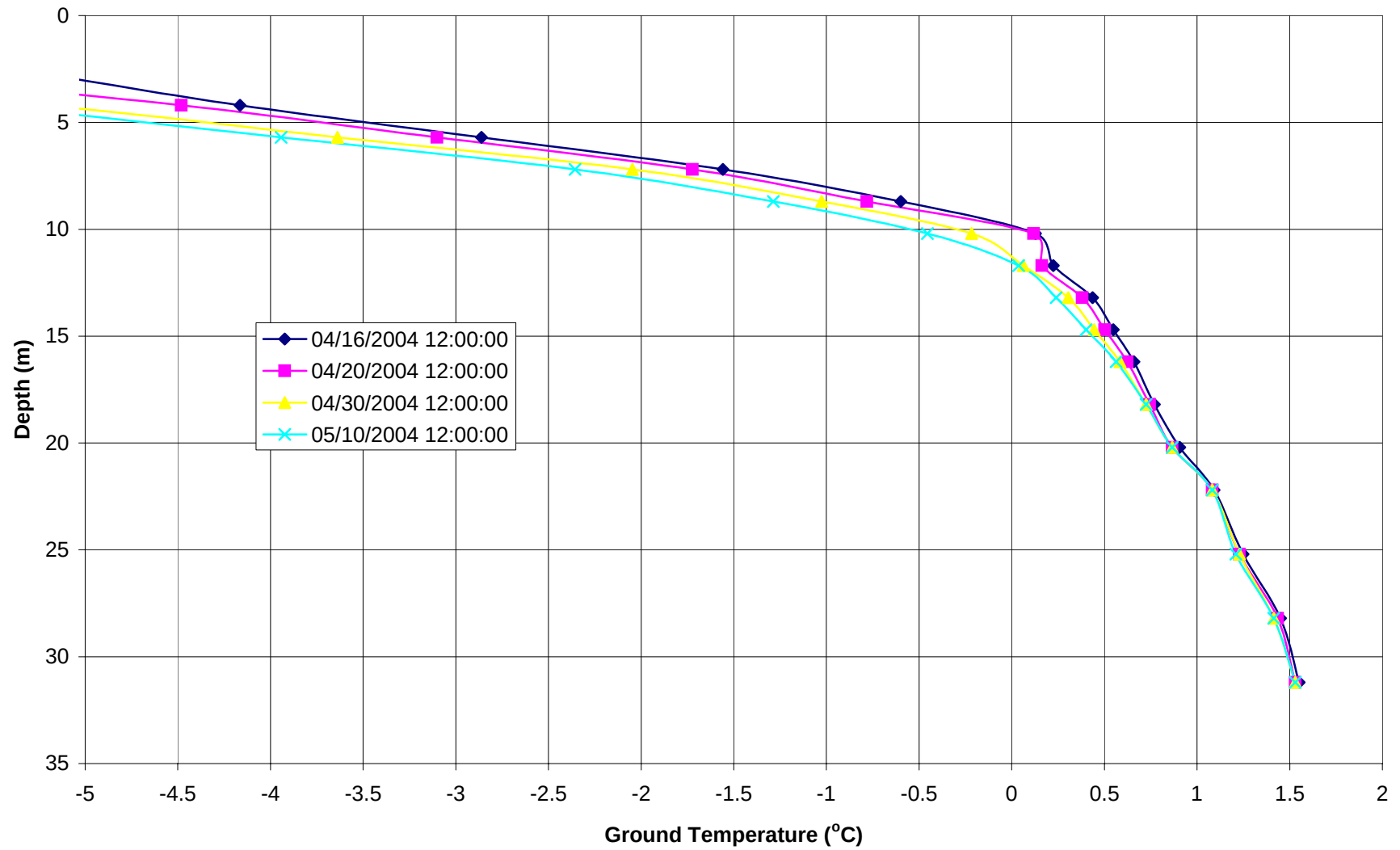
EOH

UCS SAMPLE MASTER LIST				
HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-182C	3	28.03	Ampibolite	04-UCS-182-001

MPV_04_183C



MPV-04-183C
Estimate



Diary

MPV-04-183c

NS 26/03/2004 **Target depth = 31.2m**

Rig floor = 0.0m, depths to top of:

ICE = 0.7m

TILL = 1.2m

Bedrock = 3m

1900	setup water line
	drop tower and setup
1000	casing
1045	replace valve in water line
1115	resume casing
0200	casing set to 3.5m
0200	begin coring
0300	at 9m
0345	change bit
0430	resume drilling
0510	check bit, need to change again?
0520	bit gone change
0555	resume drilling
0615	at 12m

DS 27/03/2004

0840	at 18
0920	at 21
0950	at 24
1050	at 27
1130	at 30
1200	reflex complete
1230	thermistor installed

**FIELD DRILL
PERFORMANCE LOG**

PROJECT	Gahcho Kue Geotech
PROJECT NO	2CD002.11
NORTHING	7036458.68
EASTING	589769.59
SURFACE ELEVATION	404.8
AZIMUTH	30
DIP	70

HOLE NO:	MPV-04-183c
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	2200 26.03.2004
FINISH DATE AND TIME	1230 27.03.2004
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time	Standby time	Depth	Standby Reason	Metreage drilled	Actual drill time	Drill rate	Total drill time	Standby time	Actual drill time	Drill rate
				[hr]	[hr]	[m]		[m]	[hr]	[m/hr]		[hr]	[hr]	
NS 1900-0700	J Siddorn	26/03/2004	0630	12	6	12	set-up, hoses, change bit twice	12	6	2.00	12	6	6	2.00
DS 0700-1900	R Bowden	27/03/04		5.5	1.5	19.20	install thermistor, reflex, end hole	7.2	4	1.80	17.5	7.5	10	1.92

OVERALL HOLE DRILL RATE (m/hr)	1.10
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.92

GENERAL GEOTECH LOG

DRILLHOLE ID:

MPV-04-183c

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
0.00	0.70	0.70	AIR							
0.70	1.20	0.50	ICE							
1.20	3.00	1.80	TILL							
3.00	6.00	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	0.5m core lost to reaming down with HQ bit
6.00	9.00	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
9.00	12.00	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
12.00	15.00	3.00	GR	3.00	100.0	2.83	94.3	2.83	94.3	
15.00	18.00	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
18.00	21.00	3.00	GGRN	3.00	100.0	2.97	99.0	2.97	99.0	Gniessic Granite with biotite seams
21.00	24.00	3.00	GRN	3.00	100.0	3.00	100.0	3.00	100.0	
24.00	27.00	3.00	GRN	3.00	100.0	2.46	82.0	2.41	80.3	
27.00	30.00	3.00	GRN	3.00	100.0	3.00	100.0	2.88	96.0	
30.00	31.20	1.20	GRN							

DETAILED GEOTECHNICAL LOG													DRILLHOLE ID:		MPV-04-183c										
NB: 3 sources of open joints and fractures found in drillcore Artificial breaks induced by drilling process Artificial breaks induced by core handling Natural joints that are present in the rock mass													Open Fractures = All Open Discontinuities (including those induced by drilling BUT excluding those created by core handling) Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process) Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial Note any weak foliation, bedding, brecciation in comments												
FROM (m)	TO (m)	ROCK TYPE	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of Sets	Type	Totals	JOINT CONDITIONS				COMMENT					
			STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH				ANGLE	ROUGH	ALT	FILL						
0.00	0.70	AIR																							
0.70	1.20	ICE																							
1.20	3.00	TILL																							
3.00	6.00	GR	R5		0	8	0	6	0	0	0	0	2	J1	3	45	5	0	9						
														J2	3	70	5	0	9						
6.00	9.00	GR	R5		0	14	0	9	0	0	0	0	2	J1	4	45	5	0	9						
														J2	5	70	5	0	9						
9.00	12.00	GR	R5		0	16	0	8	0	0	0	0	2	J1	6	70	8	0	9						
														J2	2	30	4	0	9						
12.00	15.00	GR	R5		0	8	0	4	0		0		3	J1	2	60	7	0	9						
														J2	1	40	7	0	9						
														J3	1	15	1	0	9						
15.00	18.00	GR	R5		0	5		1	0		0		1	J1	1	51	4	0	3	J1 as partial carbonate coating					
18.00	21.00	GGRN	R6		0	9		7	0		0		3	J1	2	55	4	0	3	GGRN = Gneissic Cranite, J1 and J2 have partial carbonate coatings; J2 fractures are mostly in biotite seams					
														J2	4	45	1	0	3						
														J3	1	20	7	0	3						
21.00	24.00	GR	R5		0	9	0	5	0		0		2	J1	3		1	0	3	J1 as angles of 30, 65, 80; J2 has angles of 30 and 62; all joints have carbonate coating					
														J2	2		5	0	3						
24.00	27.00	GR	R5		0	27	0	13	0		0		3	J1	2	20	6	0	3	J3 has carbonate coating on approx half of joints and roughness of 1 and 4					
														J2	1	85	3	0	9						
														J3	10		1	0	9						
27.00	30.00	GR	R5		0	11	0	8	0		0		3	J1	1	85	3	0	9	J2 has various angles reflecting foliation variability, and half of joints have carbonate coating					
														J2	5		1	0	3						
														J3	1	40	7	0	3						
30.00	31.20	GR	R5		0	4	0	2	0		0		2	J1	1	85	7	0	3						
														J2	1	35	3	0	3						

Photo Record

MPV-04-183c

Date	Shift	Filename	Depth	Description
26.03.04	NS 1900-0700	MPV-04-183C_3.5m_Box1_dry	3.5-9.3m	Box 1 granite
27.03.04	DS 0700-1900	MPV-04-182C_9.3m_Box2_dry	9.3 - 14.85	
27.03.04	DS 0700-1900	MPV-04-182C_14.85m_Box3_dry	14.85 - 20.5	
27.03.04	DS 0700-1900	MPV-04-183C_20.5m_Box4_dry	20.5 - 26.2	
27.03.04	DS 0700-1900	MPV-04-183C_26.2m_Box5_dry	26.2 - 31.2	Box 5, EOH

Core Box Record

MPV-04-183c

Box	From	To	Comments
1	3.50	9.30	
2	9.30	14.85	
3	14.85	20.50	
4	20.50	26.20	
5	26.20	31.20	EOH

Reflex Readings

MPV-04-183c

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
27-Mar-04	31.2	10.5	68.3	288.5	6007	13.9

Thermistor Readings

MPV-04-183c

Thermistor String ID

32/16 - 22

Thermis Node	Reading (kOhms)	Comments
1		all channels active before installation
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		

FIELD GEOLOGICAL LOG

HOLE ID

MPV-04-183c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	0.7	Air			JS
0.70	1.20	ICE		Ice	JS
1.20	3.00	Till		Overburden: till	JS
3.00	18.00	Granite		Granite	JS/RB
18.00	21.00	Gneissic Granite		Gneissic granite	RB
21.00	31.20	Granite		felsic granite; occasional biotitic seams, trace pyrite.	RB

UCS SAMPLE LIST				
HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-183C	5	30.47	GRANITE	04-UCS-183-001

POINT LOAD TEST - INPUT

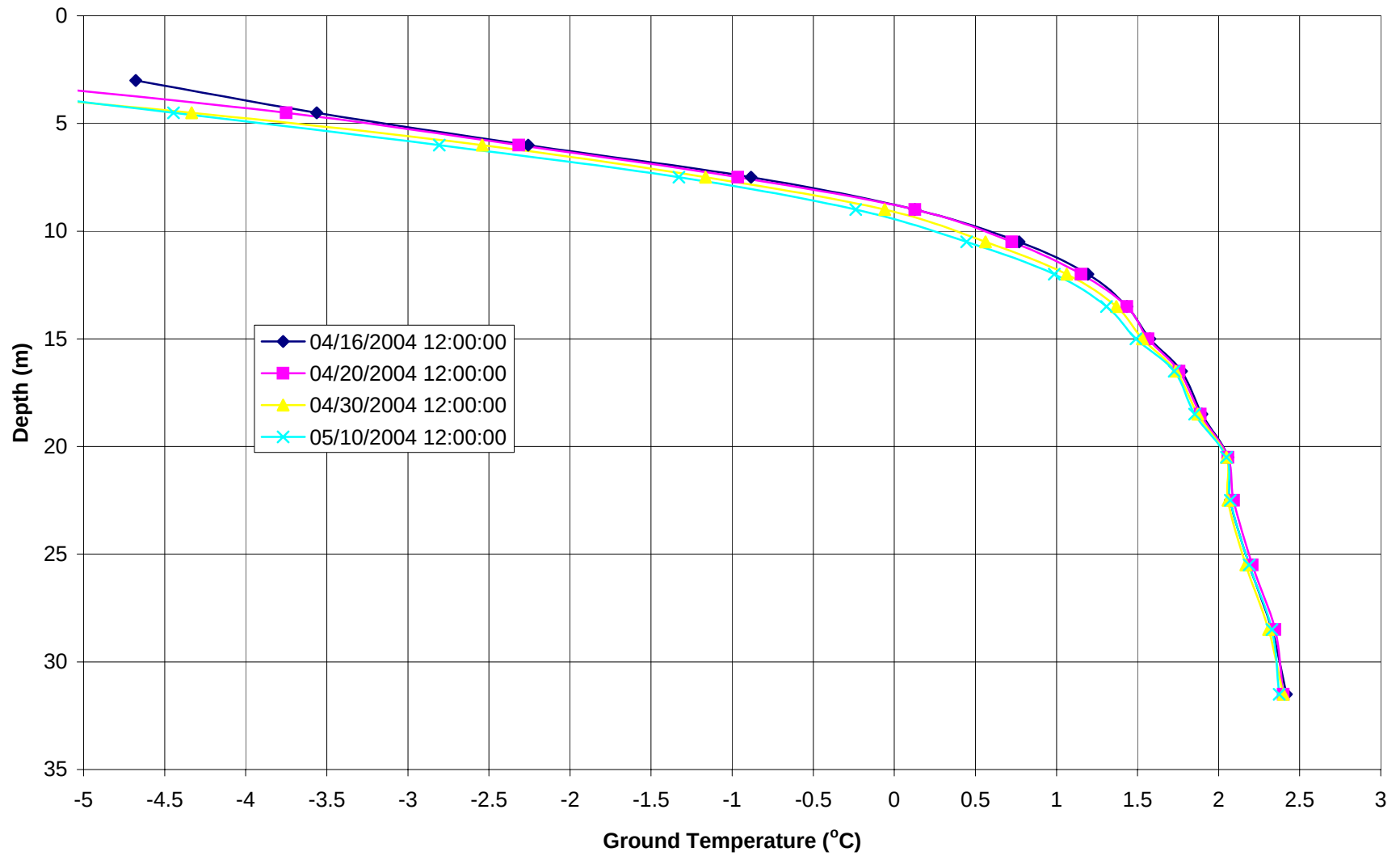
DRILL HOLE ID: MPV-04-183C

[illegible]

MPV_04_184C



MPV-04-184C



Diary

MPV-04-184c

DS 27/03/2004

1700

Rig floor = 0.0m. Depth to top of ...

Snow = 0.6m

Ground Surface = 1.5m

Bedrock Surface = 2.7m

Casing set at 3.3m

NS 27/03/2004 Target depth = 31.5m

1900 at 6m

2000 at 9m

2030 at 12m

2100 at 15m

2130 at 18m

2200 at 21m

2230 at 24m

2300 at 27m

2330 at 30m

0000 at 31.5m EOH

0030 reflex

0100 install thermistor

Checklist - delete before finalizing and printing file

reflex??

protective pipe?

staked?

summary updated?

point load test samples selected?



PROJECT	Gahcho Kue Geotech
PROJECT NO	2CD002.11
NORTHING	7035454
EASTING	591485
SURFACE ELEVATION	405.16
AZIMUTH	30
DIP	70

HOLE NO:	MPV-04-184c
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	1700 27.03.04
FINISH DATE AND TIME	0100 28.03.04
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

[illegible]

OVERALL HOLE DRILL RATE (m/hr)	4.20
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	4.85

[illegible][illegible][illegible]

Total Core Recovery = Total length of core recovered Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter) Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in) NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

Total Core Recovery = Total length of core recovered Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter) Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in) NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

Total Core Recovery = Total length of core recovered Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter) Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in) NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

Total Core Recovery = Total length of core recovered Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter) Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in) NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

[illegible]

DETAILED GEOTECHNICAL LOG

 DRILLHOLE ID: **MPV-04-184c**

NB: 3 sources of open joints and fractures found in drillcore
 Artificial breaks induced by drilling process
 Artificial breaks induced by core handling
 Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
 Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
 Note any weak foliation, bedding, brecciation in comments

FROM (m)	TO (m)	ROCK TYPE	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of Sets	Type	Totals	JOINT CONDITIONS				COMMENT
			STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH				ANGLE	ROUGH	ALT	FILL	
0.0	0.6	AIR																		
0.6	1.8	ICE																		
1.8	2.7	TILL																		
2.7	6.0	GR	R5		0	15	0	9	0	0	0	0	2	J1	6	70	5	0	9	
														J2	3	35	5	0	9	
6.0	9.0	GR	R5		0	9	0	6	0	0	0	0	1	J1	6	65	5	0	9	
9.0	12.0	GR	R5		0	11	0	6	0	0	0	0	1	0	6	65	5	0	9	
12.0	15.0	GR	R5		0	13	0	5	0	0	0	0	1	J1	5	65	5	0	9	
15.0	18.0	GR	R5		0	12	0	6	0	0	0	0	3	J1	3	65	5	0	9	
														J2	1	90	5	0	9	
														J3	2	110	5	0	9	
18.0	19.5	GR	R5		0	4	0	1	0	0	0	0	1	J1	1	65	5	0	9	
19.5	21.0	AMPGN	R4		0	10	0	7	0	0	0	0	3	J1	3	45	5	0	9	
														J2	2	65	5	0	9	
														J3	2	20	5	0	9	
21.0	24.0	GN/GR	R5	R4	40	9	0	5	0	0	0	0	3	J1	1	20	5	0	9	
														J2	3	60	5	0	9	
														J3	1	30	6	0	9	
24.0	27.0	GN	R4		0	17	0	14	0	0	0	0	3	J1	7	65	5	0	9	
														J2	7	35	5	0	9	
27.0	30.0	GN	R4		0	14	0	8	0	0	0	0	2	J1	4	20	5	0	9	broken section 25.5-25.8m multiple joints
														J2	4	40	8	0	9	
30.0	31.5	GN	R4		0	12	0	12	0	0	0	0	2	J1	6	20	5	0	9	
														J2	6	40	5	0	9	EOH. Broken zone 30.7-31.1m

Photo Record

MPV-04-184c

Date	Shift	Filename	Depth	Description
27.03.2004	NS 1900-0700	MPV-04-184C_2.7m_Box1_dry	2.7-9m	
27.03.2004	NS 1900-0700	MPV-04-184C_9m_Box2_dry	9-14.6m	
27.03.2004	NS 1900-0700	MPV-04-184C_14.6m_Box3_dry	14.6-20.1m	
27.03.2004	NS 1900-0700	MPV-04-184C_20.1m_Box4_dry	20.1-25.5m	
27.03.2004	NS 1900-0700	MPV-04-184C_25.5m_Box5_Box6_EOH_dry	25.5-31.5m	

Core Box Record

MPV-04-184c

Box	From	To	Comments
1	2.70	9.00	
2	9.00	14.60	
3	14.60	20.10	
4	20.10	25.50	
5	25.50	30.70	
6	30.70	31.50	EOH

Reflex Readings

MPV-04-184c

Date	Hole Depth	Pull back	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp °C
27.03.04	33m	7.5m	9.4	67.9	165.4	6005	10.1

FIELD GEOLOGICAL LOG

HOLE ID

MPV-04-184c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	0.60	AIR			
0.6	1.8	ICE			
1.80	2.70	TILL			
2.70	19.50	GRANITE		coarse grained granite, orthoclase feldspar, plagioclase feldspar, quartz, biotite. Minor pegmatite veins	
19.50	21.00	AMPHIBOLITE GNEISS		black amphibolite gneiss with quartz/feldspar bands, strong coarse foliation, in line with core axis	
21.00	24.00	Granite/amphibolite gneiss		mixed layers of granite and amphibolite gneiss (0.5m thick)	
24.00	31.50	AMPHIBOLITE GNEISS		black amphibolite gneiss with quartz/feldspar bands, strong coarse foliation, in line with core axis	

Thermistor Readings

MPV-04-184c

Thermistor String ID

32/16 B

Thermis Node	Reading (kOhms)	Comments
1	10.80	all thermistors working fine
2	10.80	
3	11.50	
4	11.28	
5	11.36	
6	10.93	
7	11.82	
8	11.45	
9	12.22	
10	11.98	
11	12.30	
12	12.09	
13	12.86	
14	12.19	
15	13.22	
16	12.95	

UCS SAMPLE LIST				
HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-184C	1	6.32	GRANITE	04-UCS-184-001

DRILL HOLE ID: MPV-04-184C[illegible]

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5 - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	DESCRIPTION
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	CATEGORY
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE		
CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THICKNESS < IRREGULARITIES	
8	GOUGE THICKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

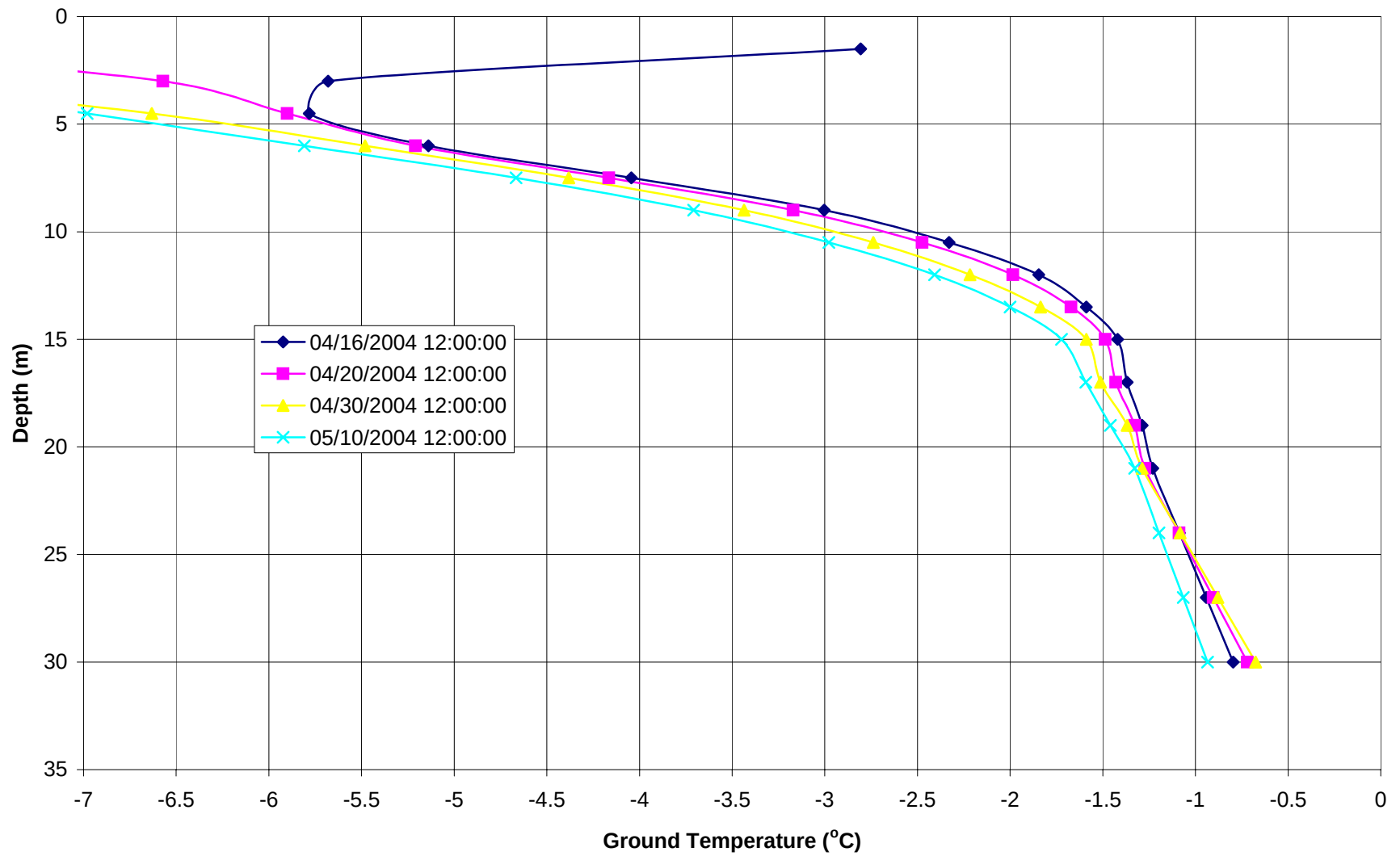
JOINT CONDITIONS - SMALL SCALE

Laubscher Jr JRC

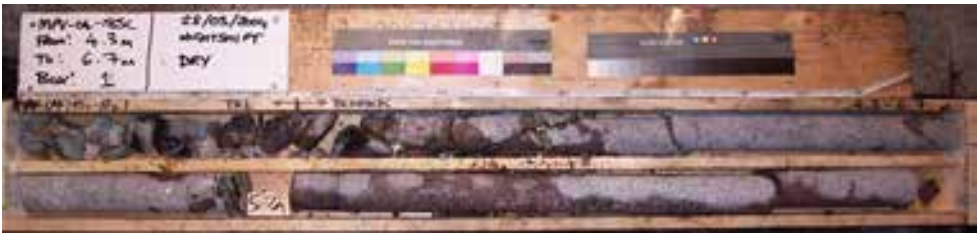
ROUGH		1	4	20
SMOOTH		2	3	14
SLICKEN-SIDED		3	2	11
STEPPED				
ROUGH		4	3	14
SMOOTH		5	2	11
SLICKEN-SIDED		6	1.5	7
UNDULATING				
ROUGH		7	1.5	2.5
SMOOTH		8	2	1.5
SLICKEN-SIDED		9	0.5	0.5
PLANAR				



MPV-04-185C



MPV_04_185C



MPV_04_185C



Diary

MPV-04-185c

DS 28/03/2004 setup drill

NS 28/03/2004 **Target depth 31.2m**

rig floor = 0.0m Depths to top of ...

snow = 0.7m

Till = 1.2m

bedrock = 4.3m

1900 drilling HQ; no NQ bits on site
setup water lines (in and return)
2230 begin casing
2330 casing set at 4.5m
0005 at 5.7m
1230 wrong spring and bit (hq-3) need hq
no locking rings for hq either
0215 resume drilling
0400 at 11.7m
0415 return line (box) problems
0515 resume drilling
0625 at 14.7m

DS 29/03/2004

0900 at 20.7m
Hardy sludge pump lame; slow repairs; new pieces;
inexperience
1200 drilling again
1300 at 26.7m
1430 at 29.7m
sludge pump under-sized; unable to keep up with drilling
flows; found and installed battery and made connections to
bring larger pump online
1530 larger pump online but flows persisting beneath rig
1600 moved sludge line discharge point approx 30m east to try
and identify source of, and reduce, flows beneath the drill rig
and onto pad 3T; currently no flow through rods or into
cuttings box so this cannot be the source
flows diminished when drilling and circulation stopped
space between cuttings box and casing stuffed
stopped drilling and lifted floor boards - no apparent flows
beneath rig although flows continuing outside rig
all hoses checked - no leaks
1700 ice undermined at drill
hole stopped at 30m
thermistor installed, no reflex taken

FIELD DRILL PERFORMANCE LOG

PROJECT	Gahcho Kue Geotech
PROJECT NO	2CD002.11
NORTHING	7034738.82
EASTING	589929.45
SURFACE ELEVATION	407.67
AZIMUTH	310
DIP	70

HOLE NO:	MPV-04-185c
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	28.03.04 0100
FINISH DATE AND TIME	29.03.2004 1930
HOLE DIAMETER	63.3 (HQ)
DRILLING METHOD	Diamond core

				Period Totals						Cumulative				
Period	Logged by	Date	Time	Total drill time	Standby time	Depth	Standby Reason	Metreage drilled	Actual drill time	Drill rate	Total drill time	Standby time	Actual drill time	Drill rate
				[hr]	[hr]	[m]		[m]	[hr]	[m/hr]	[hr]	[hr]	[hr]	[m/hr]
NS 1900-0700	J Siddorn	28.03.04		12	6	14.7	setup drill at site	14.7	6	2.45	12	6	6	2.45
DS 0700-1900	R Bowden	29.03.04		12	6	30.00		15.3	6	2.55	24	12	12	2.50

OVERALL HOLE DRILL RATE (m/hr)	1.25
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	2.50

[illegible][illegible][illegible]

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

[illegible]

[illegible]

DRILLHOLE ID: **MPV-04-185c**

Photo Record

MPV-04-185c

[illegible]

Core Box Record

MPV-04-185c

Box	From	To	Comments
1	4.30	6.70	
2	6.70	9.50	
3	9.50	12.00	
4	12.00	14.70	
5	14.70	17.50	
6	17.50	20.10	
7	20.10	22.85	
8	22.85	25.70	
9	25.70	28.70	
10	28.70	30.00	

Reflex Readings

MPV-04-185c

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
not completed						

Thermistor Readings

MPV-04-185c

Thermistor String ID

32/16-C

Thermis Node	Reading (kOhms)	Comments
1		all channels active before installation
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		

FIELD GEOLOGICAL LOG

HOLE ID

MPV-04-185c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	0.7	Air			
0.70	1.20	ICE			
1.20	4.30	Till			
4.30	30.00	Granite			

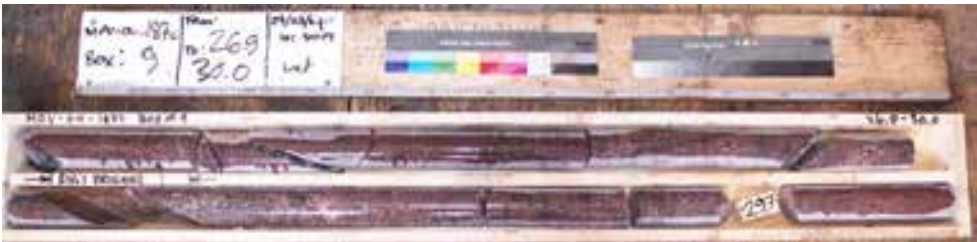
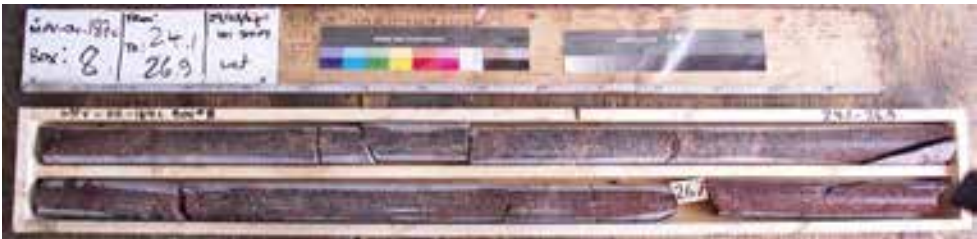
UCS SAMPLE LIST				
HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-185C	10	28.99	GRANITE	04-UCS-185-001

DRILL HOLE ID: MPV-04-185C[illegible]

MPV_04_187C



MPV_04_187C



Diary

MPV-04-187c

NS 30/03/2004	Target depth 32.65m
	rig floor = 0.0m Depths to top of ...
	snow = 0.65m
	Till = 2.65m
	bedrock = 5.2m
1900	begin move to new ddh
0130	begin casing
0210	casing set to 5.5m
0300	at 5.7m
0345	at 8.7m
0415	at 11.7m
0445	at 14.7m
0530	at 17.7m
0615	at 20.7m
DS 30/03/2004	
0740	at 23.7m
0820	at 26.7m
0930	at 32.7m
1030	reflex
1100	thermistor installed
	staked
	no protective pipe - ground surface 2.7m below snow surface

FIELD DRILL PERFORMANCE LOG

PROJECT	Gahcho Kue Geotech
PROJECT NO	2CD002.11
NORTHING	7034758.38
EASTING	589925.77
SURFACE ELEVATION	405.2
AZIMUTH	310
DIP	70

HOLE NO:	MPV-04-187c
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	1900 29.03.04
FINISH DATE AND TIME	1230 30.03.04
HOLE DIAMETER	63.3 (HQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	J Siddorn	29.03.04	0630	12	6.5	20.7	move and setup drill at site	20.7	5.5	3.76	12	6.5	5.5	3.76
DS 0700-1900	R Bowden	30.03.04	1830	12	7	32.70	packing and moving	12	5	2.40	24	13.5	10.5	3.11

OVERALL HOLE DRILL RATE (m/hr)	1.36
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	3.11

GENERAL GEOTECH LOG

DRILLHOLE ID:

MPV-04-187c

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
		0.00								
0.00	0.65	0.65	Air							
0.65	2.65	2.00	ICE							
2.65	5.20	2.55	Till							
5.20	5.70	0.50	GR	0.50	100.0	0.50	100.0	0.50	100.0	
5.70	8.70	3.00	GR	3.00	100.0	3.00	100.0	2.93	97.7	
8.70	11.70	3.00	GR	3.00	100.0	3.00	100.0	2.85	95.0	
11.70	14.70	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
14.70	17.70	3.00	GR	3.00	100.0	3.00	100.0	2.91	97.0	
17.70	20.70	3.00	GR	3.00	100.0	2.96	98.7	2.96	98.7	
20.70	23.70	3.00	GR	3.00	100.0	3.00	100.0	2.91	97.0	
23.70	26.70	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
26.70	29.70	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
29.70	32.70	3.00	GR	3.00	100.0	2.92	97.3	2.92	97.3	EOH

DETAILED GEOTECHNICAL LOG																DRILLHOLE ID: MPV-04-187c				
NB: 3 sources of open joints and fractures found in drillcore Artificial breaks induced by drilling process Artificial breaks induced by core handling Natural joints that are present in the rock mass									Open Fractures = All Open Discontinuities (including those induced by drilling BUT excluding those created by core handling) Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process) Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial Note any weak foliation, bedding, brecciation in comments											
FROM (m)	TO (m)	ROCK TYPE	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of Sets	Type	Totals	JOINT CONDITIONS				COMMENT
			STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH				ANGLE	ROUGH	ALT	FILL	
0.0	0.7	Air																		
0.7	2.7	ICE																		
2.7	5.2	Till																		
5.2	5.7	GR	R5		0	2	0	0	0	0	0	0								
5.7	8.7	GR	R5		0	13	0	9	0	0	1	0	3	J1	2	25	4	0	9	
														J2	2	35	5	0	9	
														J3	5	60	6	0	9	
8.7	11.7	GR	R5		0	15	0	13	0	0	0	0	3	J1	7	25	6	0	9	
														J2	3	60	5	0	9	
														J3	3	45	5	0	9	
11.7	14.7	GR	R5		0	10	0	5	1	0	0	0	2	J1	4	60				J2 one is cemented joint, strong slickenside
														J2	2	20	9	0	9	
14.7	17.7	GR	R5		0	10	0	4	0	0	1	0	2	J1	3	58	5	0	9	
														J2	1	20	5	0	9	
17.7	20.7	GR	R5		0	3	0	2	0	0	0	0	1	J1	2	70	5	0	9	
20.7	23.7	GR	R5		0	8	0	2	0	0	0	0	2	J1	1	74	4	0	9	
														J2	1	90	1	0	9	
23.7	26.7	GR	R5		0	9	0	5	0	0	0	0	3	J1	1	15	7	0	9	J2 has angles of 20, 50, 72 and partial carbonate coating
														J2	3		1	0	9	
														J3	1	60	4	0	9	
26.7	29.7	GR	R5		0	9	0	4	0	0	0	0	2	J1	2	30	1	0	9	Joints have partial carbonate coating
														J2	2	20	4	0	9	
29.7	32.7	GR	R5		0	8	0	5	0	0	0	0	3	J1	3		4	0	9	J1 has angles of 10, 30, 60 and patrial to complete carbonate coating
														J2	1	30	5	0	9	
														J3	1	20	1	0	9	

FIELD GEOLOGICAL LOG

HOLE ID

MPV-04-187c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	0.65	Air			JS
0.65	2.65	ICE			JS
2.65	5.20	Till			JS
5.20	32.70	Granite			JS/RB

Photo Record**MPV-04-187c**

Date	Shift	Filename	Depth	Description
29/03/04	NS 1900-0700	MPV-04-187C_5.2m_Box1_dry	5.2-7.5m	
29/03/04	NS 1900-0700	MPV-04-187C_7.5m_Box2_dry	7.5-10.1m	
29/03/04	NS 1900-0700	MPV-04-187C_10.1m_Box3_dry	10.1-12.9m	
29/03/04	NS 1900-0700	MPV-04-187C_12.9m_Box4_dry	12.9-15.7m	
29/03/04	NS 1900-0700	MPV-04-187C_15.7m_Box5_dry	15.7-18.6m	
30/03/04	DS 0700-1900	MPV-04-187C_18.6m_Box5_wet	18.8-21.4m	
30/03/04	DS 0700-1900	MPV-04-187C_21.4m_Box7_wet	21.4-24.1m	
30/03/04	DS 0700-1900	MPV-04-187C_24.1m_Box8_wet	24.1 - 26.9m	
30/03/04	DS 0700-1900	MPV-04-187C_26.9m_Box9_wet	2.69-30.0m	
30/03/04	DS 0700-1900	MPV-04-187C_30.0m_Box10_wet	30.0 - 32.7m	

Core Box Record

MPV-04-187c

Box	From	To	Comments
1	5.20	7.50	
2	7.50	10.10	
3	10.10	12.90	
4	12.90	15.70	
5	15.70	18.60	
6	18.60	21.40	
7	21.40	24.10	
8	24.10	26.90	
9	26.90	30.00	
10	30.00	32.70	EOH

Reflex Readings

MPV-04-187c

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp ©
30/03/03	32.7	340.1	70.6	41.7	6048	11

Thermistor Readings

MPV-04-187c

Thermistor String ID

32/16 - A

Thermis Node	Reading (kOhms)	Comments
1		all channels active before installation
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		

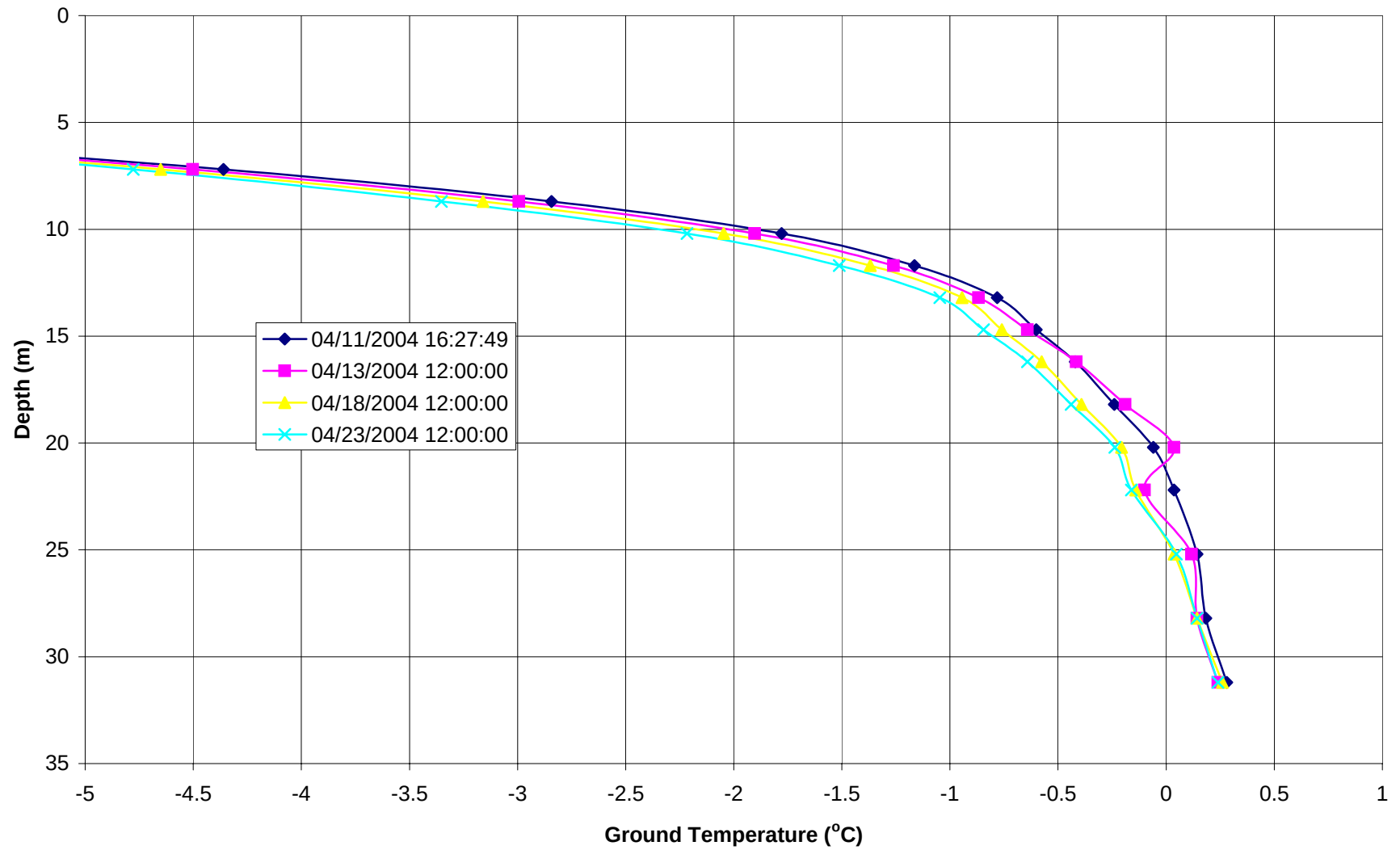
UCS SAMPLE LIST				
HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-187C	5	17.19	GRANITE	04-UCS-187-001

POINT LOAD TEST - INPUT

DRILL HOLE ID: MPV-04-187C

[illegible]

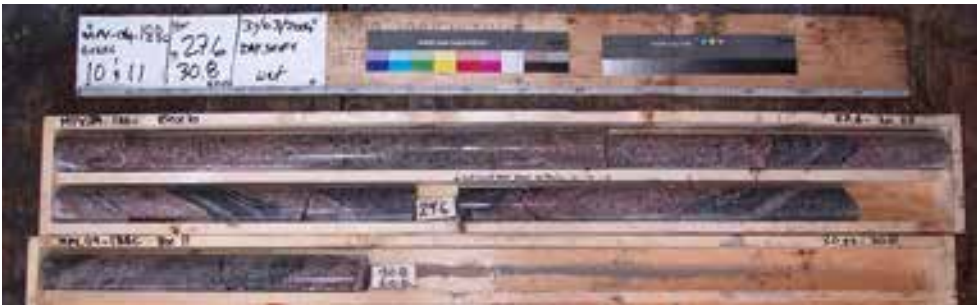
MPV-04-188C
Estimate



MPV_04_188C



MPV_04_188C



Diary

MPV-04-188c

NS 30/03/2004 **Target depth 30.8m**

rig floor = 0.0m Depths to top of ...

snow = 0.7m

Till = 0.8m

bedrock = 2.6m (= 1.8m till thickness)

1900 setup pump shack, water line, rod sloop, shacks

1040 begin casing

1110 casing set to 2.9m

1230 at 5.3m

1245 fixing pump

0115 resume drilling

0145 at 8.4m

0145 core stuck in bit/barrel

need to pull rods to clear bit

0215 resume drilling

0300 at 11.5m

0400 at 14.5m

core keeps being lost from lifter, checked bit wrong, HQ3 need

0415 to pull rods to change to HQ

0450 resume drilling

0530 at 17.55m

0615 at 20.6m

0615 driller now caught back up to 3m runs

DS 31/03/2004

0730 at 23.6m

0820 at 26.6m

0900 at 29.6m

0940 at 30.8 EOH

1010 reflex

1030 white out called

1230 white out cancelled

1300 reflex

thermistor installed

protective pipe installed

staked

UCS samples dropped off at core shack

Rig 2 summary updated

FIELD DRILL PERFORMANCE LOG

PROJECT	Gahcho Kue Geotech
PROJECT NO	2CD002.11
NORTHING	7034995.21
EASTING	589883.15
SURFACE ELEVATION	405.65
AZIMUTH	171
DIP	70

HOLE NO:	MPV-04-188c
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	1900 30 Mar20 04
FINISH DATE AND TIME	1100 31 Mar 2004
HOLE DIAMETER	63.5 (HQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time	Standby time	Depth	Standby Reason	Metreage drilled	Actual drill time	Drill rate	Total drill time	Standby time	Actual drill time	Drill rate
				[hr]	[hr]	[m]		[m]	[hr]	[m/hr]	[hr]	[hr]	[hr]	[m/hr]
NS 1900-0700	J Siddorn	30.03.04	0630	12	4.5	20.6	setup water line, pumps, sloop, shacks, f	20.6	7.5	2.75	12	4.5	7.5	2.75
DS 0700-1900	R Bowden			4	3	30.80		10.2	1	10.20	16	7.5	8.5	3.62

OVERALL HOLE DRILL RATE (m/hr) 1.93
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr) 3.62

GENERAL GEOTECH LOG

DRILLHOLE ID:

MPV-04-188c

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
0.00	0.70	0.70	Air							
0.70	0.80	0.10	ICE							
0.80	2.60	1.80	Till							
2.60	5.30	2.70	GR	2.70	100.0	2.50	92.6	2.40	88.9	
5.30	8.40	3.10	GR	3.10	100.0	2.95	95.2	2.95	95.2	Driller is overdrilling to make up run
8.40	11.50	3.10	GR	3.10	100.0	3.10	100.0	3.10	100.0	Driller is overdrilling to make up run
11.50	14.50	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
14.50	17.55	3.05	GR	3.05	100.0	3.05	100.0	3.05	100.0	Driller is overdrilling to make up run
17.55	20.60	3.05	GR	3.05	100.0	3.05	100.0	3.05	100.0	Driller is now caught up 3m runs from now on
20.60	23.60	3.00	GR	3.00	100.0	2.97	99.0	2.97	99.0	
23.60	26.60	3.00	GR	3.00	100.0	2.96	98.7	2.96	98.7	
26.60	29.60	3.00	GR	3.00	100.0	2.92	97.3	2.92	97.3	

DETAILED GEOTECHNICAL LOG		DRILLHOLE ID:	MPV-04-188c

DRILLHOLE ID:	MPV-04-188c

NB: 3 sources of open joints and fractures found in drillcore

Artificial breaks induced by drilling process
Artificial breaks induced by core handling
Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

[illegible]

MPV-04-188c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	0.70	Air			JS
0.7	0.8	Snow			JS
0.80	2.60	Till			JS
2.60	30.80	Granite			JS/RB

Photo Record

MPV-04-188c

Date	Shift	Filename	Depth	Description
30.03.04	NS 1900-0700	MPV-04-188C_2.6m_Box1_dry	2.6-4.95m	
30.03.04	NS 1900-0700	MPV-04-188C_4.95m_Box2_dry	4.95-8.1m	
30.03.04	NS 1900-0700	MPV-04-188C_8.1m_Box3_dry	8.1-10.55m	
30.03.04	NS 1900-0700	MPV-04-188C_10.55m_Box4_dry	10.55-13.55m	
30.03.04	NS 1900-0700	MPV-04-188C_13.55m_Box5_dry	13.55-16.2m	
30.03.04	NS 1900-0700	MPV-04-188C_16.2m_Box6_dry	16.2-18.95m	
31.03.04	DS 0700-1900	MPV-04-188C_Box7_18.95m_wet	18.95-21.95m	
31.03.04	DS 0700-1900	MPV-04-188C_Box8_21.95m_wet	21.95-24.70m	
31.03.04	DS 0700-1900	MPV-04-188C_Box9_24.7m_wet	24.7 - 27.6m	
31.03.04	DS 0700-1900	MPV-04-188C_Box10and11_27.6m_wet	27.6 - 30.8	EOH

Core Box Record

MPV-04-188c

Box	From	To	Comments
1	2.60	4.95	
2	4.95	8.10	
3	8.10	10.55	
4	10.55	13.55	
5	13.55	16.20	
6	16.20	18.95	
7	18.95	21.95	
8	21.95	24.70	
9	24.70	27.60	
10	27.60	30.25	
11	30.25	30.80	EOH

Reflex Readings

MPV-04-188c

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Field	Temp °C
Mar 31 2004	30.8	161.4	30.8	260.8	5951	10.4

Thermistor Readings

MPV-04-188c

Thermistor String ID

32/16 - 21

Thermis Node	Reading (kOhms)	Comments
1		all channels active before installation
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		

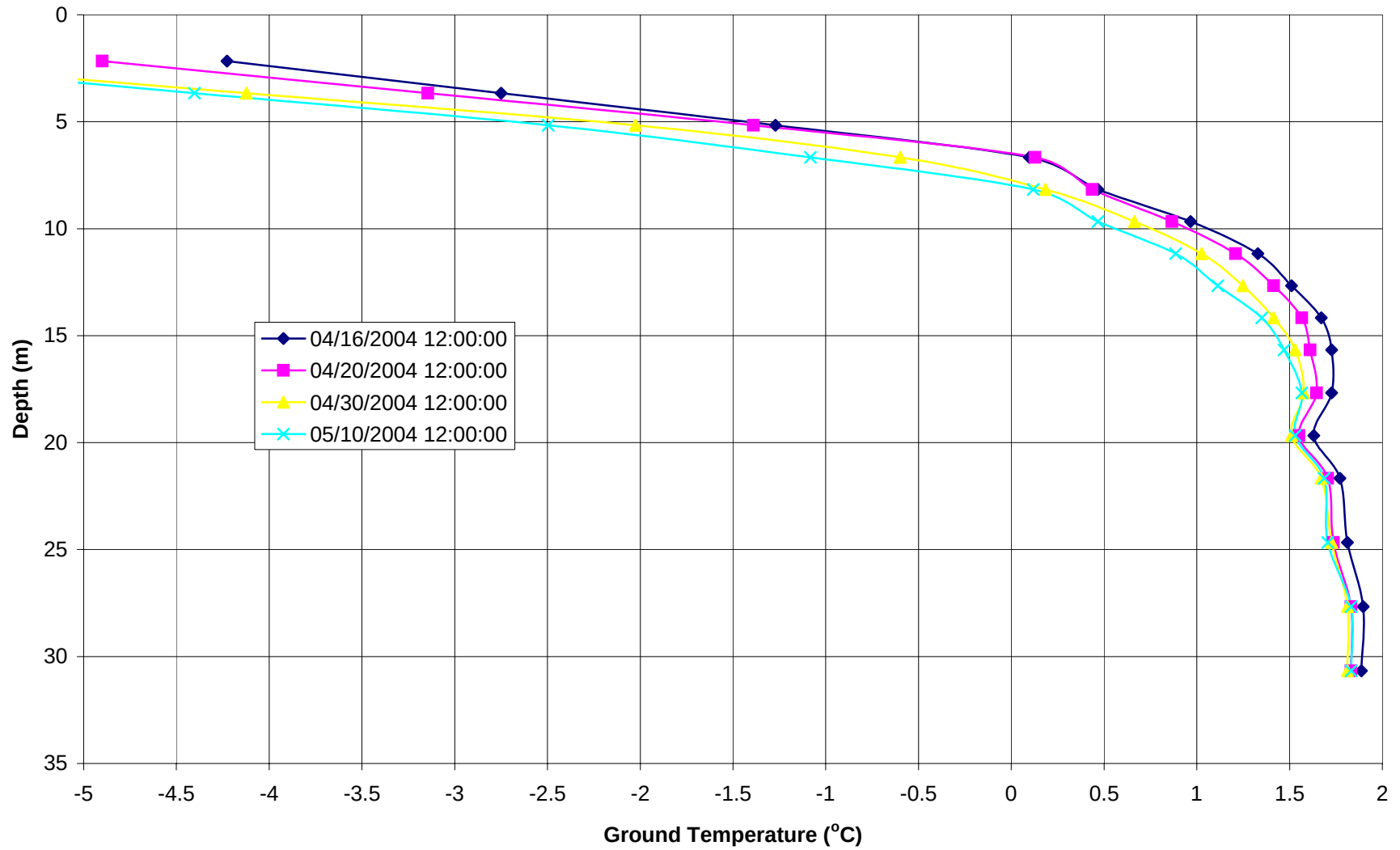
UCS SAMPLE LIST				
HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-188C	11	30.26	GRANITE	04-UCS-188-001

POINT LOAD TEST - INPUT

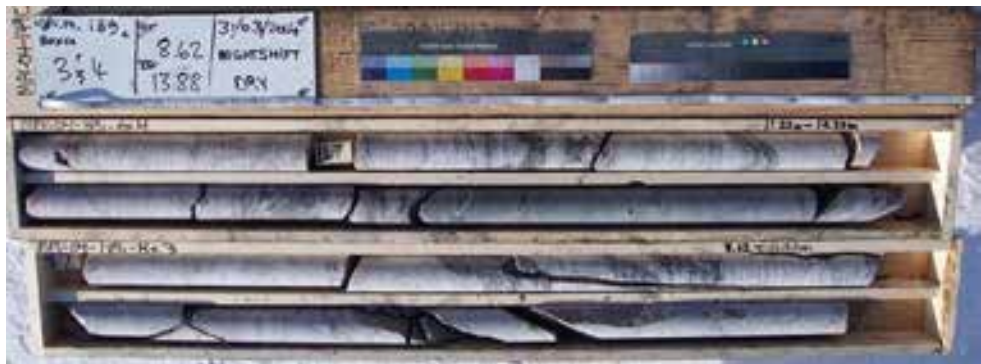
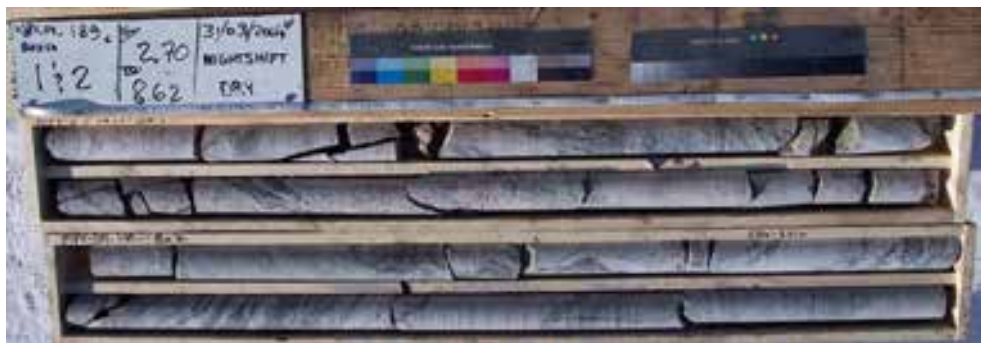
DRILL HOLE ID: **MPV-04-188C**

[illegible]

MPV-04-189C
Estimate



MPV_04_189C



Diary

MPV-04-189c

	target depth is 30.0m below ground surface
DS 31/03/2004	
1830	casing at 0.6m - not set
	Rig Floor = 0.0m Depths to top of ...
	snow = 0.7m
	ground surface = 0.73m
	bedrock = 2.7m
NS 31/03/2004	
20:30	casing set to 3.0m
21:15	at 5.7m
22:00	at 8.7m
23:00	at 14.7m
23:45	changing bit
0:15	at 17.7m
0:45	at 20.7m
1:45	at 23.7m
2:20	at 26.7m
3:15	EOH @ 30.67
4:15	reflex
5:00	thermistor installed
	protective pipe installed
	staked
	point load samples dropped off at core shack
	Rig 2 summary for Todd updated

FIELD DRILL PERFORMANCE LOG

PROJECT	Gahcho Kue Geotech
PROJECT NO	2CD002.11
NORTHING	7034975.54
EASTING	589886.7
SURFACE ELEVATION	404.28
AZIMUTH	171
DIP	70

HOLE NO:	MPV-04-189c
DRILL CONTRACTOR	Boart Longyear
START DATE AND TIME	1900 March 31, 2004
FINISH DATE AND TIME	0500 April 1, 2994
HOLE DIAMETER	47.6 (NQ)
DRILLING METHOD	Diamond core

				Period Totals							Cumulative			
Period	Logged by	Date	Time	Total drill time [hr]	Standby time [hr]	Depth [m]	Standby Reason	Metreage drilled [m]	Actual drill time [hr]	Drill rate [m/hr]	Total drill time [hr]	Standby time [hr]	Actual drill time [hr]	Drill rate [m/hr]
NS 1900-0700	P Mikes	03/31/2004		12	0.3	30.7		changed bits	30.7	11.7	2.62	12	0.3	11.7

OVERALL HOLE DRILL RATE (m/hr)	2.56
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	2.62

GENERAL GEOTECH LOG

DRILLHOLE ID:

MPV-04-189c

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

FROM (m)	TO (m)	RUN (m)	ROCK TYPE	TCR (m)	TCR (%)	SCR (m)	SCR (%)	RQD (m)	RQD (%)	COMMENT
0.00	0.70	0.70	Air							
0.70	0.73	0.03	Snow							
0.73	2.70	1.97	Overburden							
2.70	5.70	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
5.70	8.70	3.00	GR	2.92	97.3	2.92	97.3	2.92	97.3	
8.70	11.70	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
11.70	14.70	3.00	GR	2.97	99.0	2.97	99.0	2.97	99.0	
14.70	17.70	3.00	GR	3.04	101.3	3.04	101.3	3.04	101.3	
17.70	20.70	3.00	GR	2.98	99.3	2.98	99.3	2.98	99.3	
20.70	23.70	3.00	GR	3.03	101.0	3.03	101.0	3.03	101.0	
23.70	26.70	3.00	GR	3.00	100.0	3.00	100.0	3.00	100.0	
25.70	29.70	4.00	GR	2.90	72.5	2.90	72.5	2.90	72.5	
29.70	30.67	0.97	GR	0.97	100.0	0.97	100.0	0.97	100.0	

DETAILED GEOTECHNICAL LOG

 DRILLHOLE ID: **MPV-04-189c**

NB: 3 sources of open joints and fractures found in drillcore
 Artificial breaks induced by drilling process
 Artificial breaks induced by core handling
 Natural joints that are present in the rock mass

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
 Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
 Note any weak foliation, bedding, brecciation in comments

FROM (m)	TO (m)	ROCK TYPE	IRS			OPEN FRACTURES			CEMENTED JOINTS		MICRO DEFECTS		No of Sets	Type	Totals	JOINT CONDITIONS				COMMENT
			STRONG R	WEAK R	% WEAK	ALL	OPEN BEDS	JOINTS	COUNT	FILL	INTENSITY	STRENGTH				ANGLE	ROUGH	ALT	FILL	
0.00	0.70	Air																		
0.70	0.73	Snow																		
0.73	2.70	OVB																		
2.70	5.70	GR	R5		0	21		5	0	0	0	0	2	J1	3	25	5	0	3	
														J2	2	60	5	0	9	
5.70	8.70	GR	R5		0	11		3	1	2	0	0	3	J1	1	22	1	0	9	
														J2	1	35	5	0	3	
														J3	1	50	4	0	3	
8.70	11.70	GR	R5		0	12		5	2	1	0	0	3	J1	2	10	4	0	9	
														J2	2	30	5	0	3	
														J3	1	33	6	0	9	
11.7	14.7	GR	R5		0	11		3	0	0	1	0	3	J1	2	27	2	0	9	
														J2	1	64	4	0	3	
14.7	17.7	GR	R5		0	8		2	0	0	1	0	2	J1	1	52	5	0	3	
														J2	1	57	4	0	3	
17.7	20.7	GR	R5		0	12		7	1	0	0	0	3	J1	1	41	4	0	3	
														J2	2	33	3	0	3	
														J3	2	50	5	0	3	
20.7	23.7	GR	R5		0	8		2	1	0	1	0	2	J1	1	10	4	0	9	
														J2	1	20	4	0	3	
23.7	26.7	GR	R5		0	13		2	1	1	1	0	2	J1	1	25	5	0	3	
														J2	1	20	4	0	9	
26.7	29.7	GR	R5		0	17		5	1	1	0	0	2	J1	4	30	5	0	3	
														J2	1	40	5	0	9	
29.7	30.7	GR	R5		0	6		2	0	0	1	1	2	J1	1	20	5	0	3	
														J2	1	35	5	0	9	

Photo Record

MPV-04-189c

Date	Shift	Filename	Depth	Description
1.04.04	DS	MPV-04-189C_Box1to2_2.7m_dry	2.7 - 8.62	
1.04.04	DS	MPV-04-189C_Box3to4_8.62m_dry	8.62 - 13.88	
1.04.04	DS	MPV-04-189C_Box5to7_13.88m_dry	13.88 - 22.35	
1.04.04	DS	MPV-04-189C_Box8to10_22.35m_dry	22.35 - 30.67	

Core Box Record

MPV-04-189c

Box	From	To	Comments
1	2.70	5.70	
2	5.70	8.62	
3	8.62	11.22	
4	11.22	13.88	
5	13.88	16.80	
6	16.80	19.75	
7	19.75	22.35	
8	22.35	25.05	
9	25.05	27.83	
10	27.83	30.67	EOH

Reflex Readings

MPV-04-189c

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface)	Magnetic Field	Temp °C
April 1st, 2004	30.7	154.6	68.6		5881	12.1

(no adjustment)

Thermistor Readings

MPV-04-189c

Thermistor String ID

32/16 - 24

Thermis Node	Reading (kOhms)	Comments
1		all channels active before installation
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		

FIELD GEOLOGICAL LOG

HOLE ID

MPV-04-189c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	0.70	Air			P Mikes
0.7	0.73	Snow			P Mikes
0.73	2.70	Overburden			P Mikes
2.70	30.67	Granite			P Mikes

<i>UCS SAMPLE LIST</i>				
HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-189C	10	28.67	GRANITE	04-UCS-189-001

POINT LOAD TEST - INPUT

DRILL HOLE ID: **MPV-04-189C**

[illegible]

Diary

MPV-04-131c

NS 09/02/2004	
1900hrs	setting up on hole
0000hrs	white out declared and drilling shut-down
DS 10/02/2004	
0900hrs	white out ended
	cold again; continued setting up
1700hrs	started installing casing
1830hrs	casing set to 4.7m
NS 10/02/2004	
1900hrs	water tank spill
2030hrs	setup return funnel to catch return
2100hrs	drilling
0700hrs	end of shift at m
DS 11/02/2004	
0700hrs	changed alternator
0900hrs	at 23.35m
0930hrs	at 23.55m
1030hrs	at 26.55m
1150hrs	at 29.55m
1330hrs	at 31.00m
1450hrs	thermistor installed
	excessive PVC stick-up; thermistor cable partially severed while trying to cut PVC longitudinally
	5 of 16 thermistors active
1600hrs	began packing up to move

FIELD DRILL PERFORMANCE LOG

PROJECT:	Gahcho Kue Geotech
PROJECT NO:	2CD002.11
NORTHING:	7035 332.6
EASTING:	588 804.9
SURFACE ELEVATION:	405.15
AZIMUTH:	24
DIP:	70

HOLE NO:	MPV-04-131c
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	1700hrs 10/2/2004
DATE AND TIME FINISHED:	1200hrs 11/2/2004
HOLE DIAMETER:	63.5 (HQ)
DRILLING METHOD:	Diamond core

[illegible]

OVERALL HOLE DRILL RATE (m/hr)	0.86
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.77

(GENERAL GEOTECH LOG)

DRILLHOLE ID: **MPV-04-131c**

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

[illegible]

DRILLHOLE ID: **MPV-04-131c**

Open Fractures = All Open Discontinuities (including those induced by drilling **BUT** excluding those created by core handling)
Open Joints = All Open Natural Discontinuities (excluding all created by drilling and core handling process)

Natural fracture: not fresh looking, usually not perpendicular to core axis, usually not rough, no coating cld indicate artificial
Note any weak foliation, bedding, brecciation in comments

[illegible]

SRK Photo Log Sheet

Drillhole ID:

MPV-04-131c

[illegible]

Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-131c	1	4.60	6.65
MPV-04-131c	2	6.65	9.54
MPV-04-131c	3	9.54	12.20
MPV-04-131c	4	12.20	14.95
MPV-04-131c	5	14.95	17.35
MPV-04-131c	6	17.35	19.90
MPV-04-131c	7	19.90	22.35
MPV-04-131c	8	22.35	25.05
MPV-04-131c	9	25.05	27.70
MPV-04-131c	10	27.70	30.50
MPV-04-131c	11	30.50	31.00
MPV-04-131c	12	31.00	End of Hole
	13		
	14		
	15		
	16		
	17		
	18		
	19		
	20		
	21		
	22		
	23		
	24		
	25		
	26		
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	29		
	30		

DRILL HOLE ID: **MPV-03-131C**

[illegible]

UCS SAMPLES

HOLE ID: MPV-04-131C

HOLE #	BOX #	DEPTH	ROCK TYPE	SAMPLE #
MPV-04-131C	7	20.76	Amphibole	04-UCS-131-001

FIELD GEOLOGICAL LOG

HOLE ID

MPV-04-131c

From (m)	To (m)	Rock Type	Xeno. Content (%)	Description	Logged By
0.00	4.60	Ice/water	n/a	1m ice, to 4.6m water	RB/JS
4.60	9.02	Granite	n/a	Granite	RB/JS
9.02	11.70	Amphibolite	n/a	Amphibolite	RB/JS
9.00	31.00	Granite and Amphibolite	n/a	Granite and Amphibolite	RB/JS
EOH					

Reflex Readings

MPV-04-131C

Date	Hole Depth	Azi/Dir	Incl/dip	Roll (Toolface re to Mag N)	Magnetic Fielc	Temp ©
Feb 11 2004	31	10.5	69.3	63.2	5880	13.9

Borehole ID

MPV-04-131c

Thermistor String ID

16/32 - 1

Ice Bath Readings

Thermistor	Reading (kOhms)	Comments

1	16.25	

2	16.22	

3	16.25	

4	16.23	

5	16.27	

6	16.24	

7	16.25	

8	16.26	

9	16.28	still changing long after others had stabilized

10	16.21	

11	16.27	

12	16.19	

13	16.25	

14	16.18	

15	16.15	

16	16.16	

Cable partially severed at about 0.3m from 16pin connector; 5 channels active

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5 - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	DESCRIPTION
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	CATEGORY
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

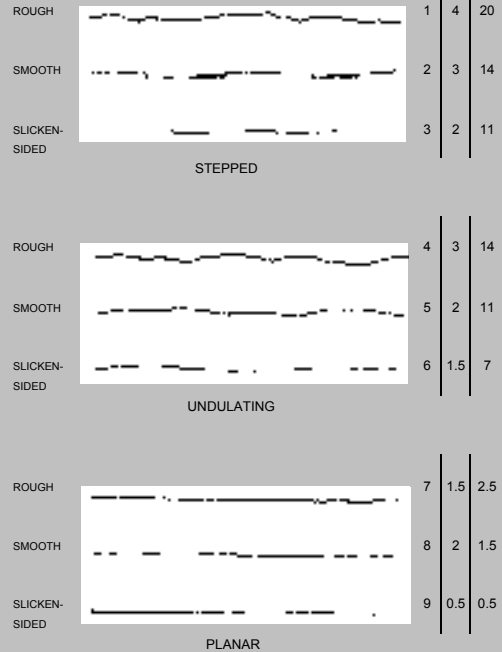
JOINT CONDITION - SMALL SCALE		
CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THICKNESS < IRREGULARITIES	
8	GOUGE THICKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher Jr JRC





HOLE NO:	MPV-04-192
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	04/03/2004 15:30
DATE AND TIME FINISHED:	04/07/2004 1:30
HOLE DIAMETER (mm):	148.0 / 96.1 (SQ / HQ)
CORE DIAMETER (mm):	101.6 / 63.5 (SQ / HQ)

[illegible]

OVERALL HOLE DRILL RATE (m/hr)	0.21
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.30

AMEC Photo Log Sheet

Drillhole ID:

MPV-04-192

[illegible]

Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-192	1	0.50	1.65
MPV-04-192	2	1.65	3.15
MPV-04-192	3	3.15	4.65
MPV-04-192	4	4.65	6.00
MPV-04-192	5	6.00	7.30
MPV-04-192	6	7.00	9.46
MPV-04-192	7	9.46	12.00
MPV-04-192	8	12.00	15.00
MPV-04-192	9	15.00	18.00
MPV-04-192	10	18.00	20.20
	11	20.20	
	12		
	13		
	14		
	15		
	16		
	17		
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	30		

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

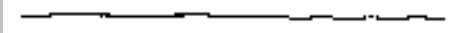
MICRODEFECTS - QUANTITY		DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	DESCRIPTION	CODE	CATEGORY
0	NONE	0	STRONG (NEVER BREAKS)
1	MINOR	1	MODERATE (SOMETIMES BREAKS)
2	MODERATE	3	WEAK (ALWAYS BREAKS)
3	HEAVY		

JOINT CONDITION - SMALL SCALE			JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY	CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH	1	NON	COARSE
2		SMOOTH	2	SOFTENING	MEDIUM
3		SLICKENSIDED	3		FINE
4	UNDULATING	ROUGH	4	SOFT	COARSE
5		SMOOTH	5	SHEARED	MEDIUM
6		SLICKENSIDED	6		FINE
7	PLANAR	ROUGH	7	GOUGE THICKNESS < IRREGULARITIES	
8		SMOOTH	8	GOUGE THICKNESS > IRREGULARITIES	
9		SLICKENSIDED	9	NO INFILL	

JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

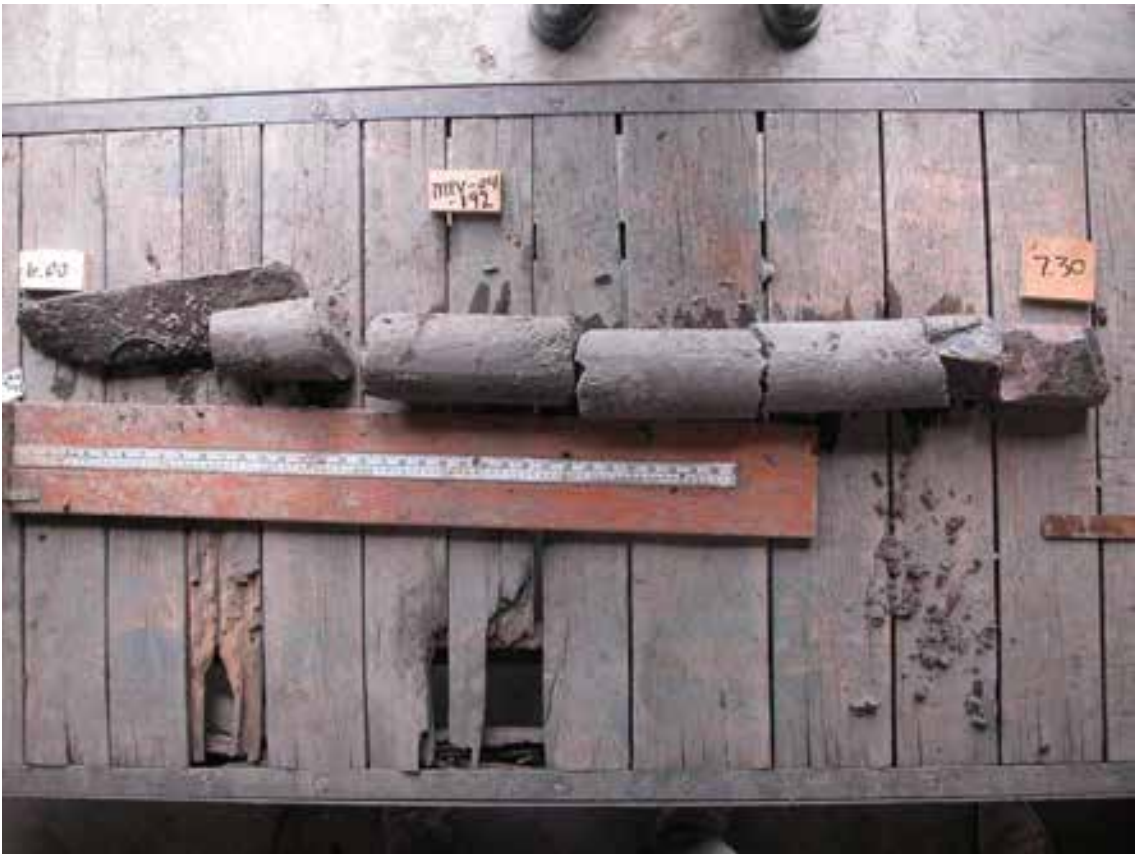
Laubscher Jr JRC

ROUGH		1	4	20
SMOOTH		2	3	14
SLICKEN-SIDED		3	2	11
STEPPED				
ROUGH		4	3	14
SMOOTH		5	2	11
SLICKEN-SIDED		6	1.5	7
UNDULATING				
ROUGH		7	1.5	2.5
SMOOTH		8	2	1.5
SLICKEN-SIDED		9	0.5	0.5
PLANAR				

MPV_04_192C



MPV_04_192C



MPV_04_192C





HOLE NO:	MPV-04-194
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	04/07/2004 19:00
DATE AND TIME FINISHED:	04/08/2004 19:00
HOLE DIAMETER (mm):	148.0 / 75.8 (SQ / NQ)
CORE DIAMETER (mm):	101.6 / 47.6 (SQ / NQ)

[illegible]

OVERALL HOLE DRILL RATE (m/hr)	0.57
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	2.41

[illegible]

AMEC Photo Log Sheet

Drillhole ID:

MPV-04-194

[illegible]

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-194	1	0.75	1.70
MPV-04-194	2	1.70	2.80
MPV-04-194	3	2.80	6.92
MPV-04-194	4	6.92	11.17
MPV-04-194	5	11.17	15.42
MPV-04-194	6	15.42	18.77
MPV-04-194	7	18.77	20.50
	8	20.50	
	9		
	10		
	11		
	12		
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY		DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	DESCRIPTION	CODE	CATEGORY
0	NONE	0	STRONG (NEVER BREAKS)
1	MINOR	1	MODERATE (SOMETIMES BREAKS)
2	MODERATE	3	WEAK (ALWAYS BREAKS)
3	HEAVY		

JOINT CONDITION - SMALL SCALE			JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY	CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH	1	NON	COARSE
2		SMOOTH	2	SOFTENING	MEDIUM
3		SLICKENSIDED	3		FINE
4	UNDULATING	ROUGH	4	SOFT	COARSE
5		SMOOTH	5	SHEARED	MEDIUM
6		SLICKENSIDED	6		FINE
7	PLANAR	ROUGH	7	GOUGE THICKNESS < IRREGULARITIES	
8		SMOOTH	8	GOUGE THICKNESS > IRREGULARITIES	
9		SLICKENSIDED	9	NO INFILL	

JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher Jr JRC

ROUGH		1	4	20
SMOOTH		2	3	14
SLICKEN-SIDED		3	2	11

STEPPED

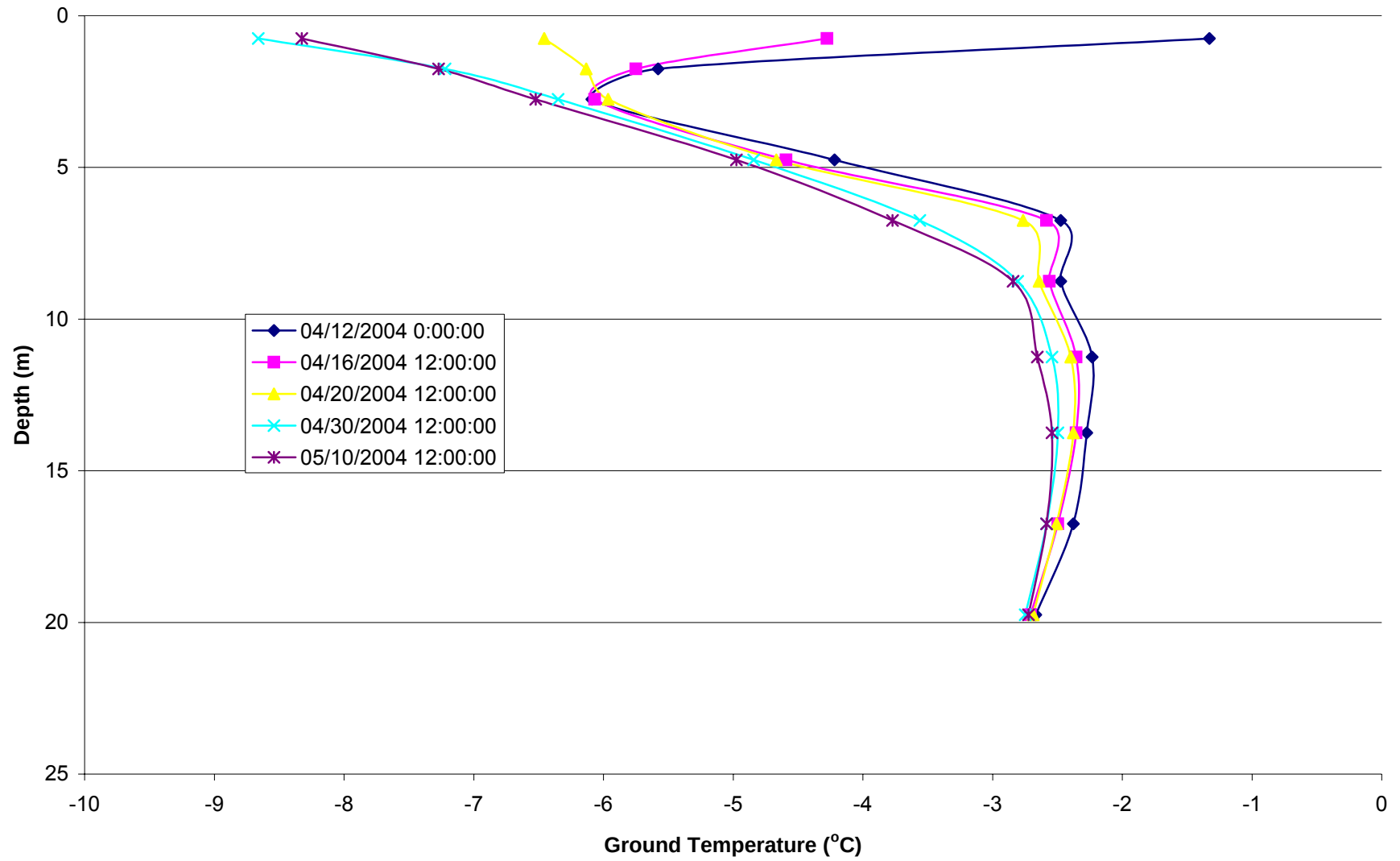
ROUGH		4	3	14
SMOOTH		5	2	11
SLICKEN-SIDED		6	1.5	7

UNDULATING

ROUGH		7	1.5	2.5
SMOOTH		8	2	1.5
SLICKEN-SIDED		9	0.5	0.5

PLANAR

MPV-04-194C



MPV_04_194C



MPV_04_194C



MPV_04_194C





HOLE NO:	MPV-04-195
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	04/08/2004 19:00
DATE AND TIME FINISHED:	04/09/2004 19:00
HOLE DIAMETER (mm):	148.0 / 75.8 (SQ / NQ)
CORE DIAMETER (mm):	101.6 / 47.6 (SQ / NQ)

[illegible]

OVERALL HOLE DRILL RATE (m/hr)	0.57
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	2.41

AMEC Photo Log Sheet

Drillhole ID:

MPV-04-195

[illegible]

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-195	1	0.60	1.20
MPV-04-195	2	1.20	2.52
MPV-04-195	3	2.52	6.71
MPV-04-195	4	6.71	10.92
MPV-04-195	5	10.92	15.00
MPV-04-195	6	15.00	19.35
MPV-04-195	7	19.35	20.50
	8	20.50	
	9		
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	30		

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY		DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	DESCRIPTION	CODE	CATEGORY
0	NONE	0	STRONG (NEVER BREAKS)
1	MINOR	1	MODERATE (SOMETIMES BREAKS)
2	MODERATE	3	WEAK (ALWAYS BREAKS)
3	HEAVY		

JOINT CONDITION - SMALL SCALE			JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY	CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH	1	NON	COARSE
2		SMOOTH	2	SOFTENING	MEDIUM
3		SLICKENSIDED	3		FINE
4	UNDULATING	ROUGH	4	SOFT	COARSE
5		SMOOTH	5	SHEARED	MEDIUM
6		SLICKENSIDED	6		FINE
7	PLANAR	ROUGH	7	GOUGE THICKNESS < IRREGULARITIES	
8		SMOOTH	8	GOUGE THICKNESS > IRREGULARITIES	
9		SLICKENSIDED	9	NO INFILL	

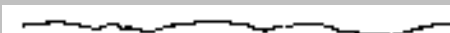
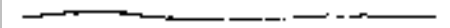
JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher Jr JRC

ROUGH		1	4	20
SMOOTH		2	3	14
SLICKEN-SIDED		3	2	11

STEPPED

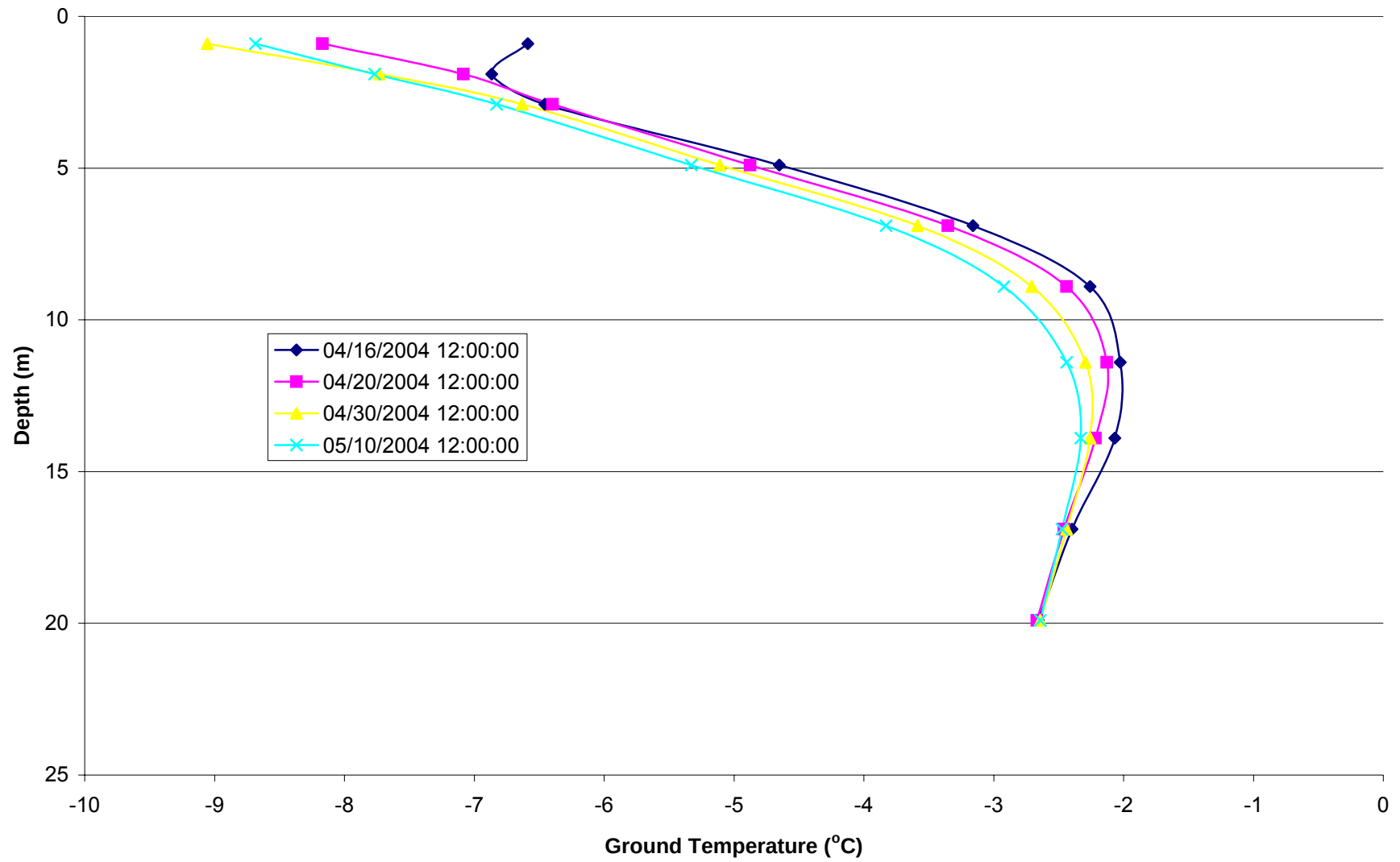
ROUGH		4	3	14
SMOOTH		5	2	11
SLICKEN-SIDED		6	1.5	7

UNDULATING

ROUGH		7	1.5	2.5
SMOOTH		8	2	1.5
SLICKEN-SIDED		9	0.5	0.5

PLANAR

MPV-04-195C
Estimate



MPV_04_195C



MPV_04_195C



MPV_04_195C





HOLE NO:	MPV-04-197
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	04/10/2004 19:00
DATE AND TIME FINISHED:	04/11/2004 7:00
HOLE DIAMETER (mm):	148.0 / 75.8 (SQ / NQ)
CORE DIAMETER (mm):	101.6 / 47.6 (SQ / NQ)

OVERALL HOLE DRILL RATE (m/hr)	0.57
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	2.41

AMEC Photo Log Sheet

Drillhole ID:

MPV-04-197

[illegible]

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-197	1	0.85	1.45
MPV-04-197	2	2.75	5.85
MPV-04-197	3	5.85	9.90
MPV-04-197	4	9.90	14.25
MPV-04-197	5	14.25	18.00
MPV-04-197	6	18.00	20.70
	7	20.70	
	8		
	9		
	10		
	11		
	12		
	13		
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	30		

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY		DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	DESCRIPTION	CODE	CATEGORY
0	NONE	0	STRONG (NEVER BREAKS)
1	MINOR	1	MODERATE (SOMETIMES BREAKS)
2	MODERATE	3	WEAK (ALWAYS BREAKS)
3	HEAVY		

JOINT CONDITION - SMALL SCALE			JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY	CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH	1	NON	COARSE
2		SMOOTH	2	SOFTENING	MEDIUM
3		SLICKENSIDED	3		FINE
4	UNDULATING	ROUGH	4	SOFT	COARSE
5		SMOOTH	5	SHEARED	MEDIUM
6		SLICKENSIDED	6		FINE
7	PLANAR	ROUGH	7	GOUGE THICKNESS < IRREGULARITIES	
8		SMOOTH	8	GOUGE THICKNESS > IRREGULARITIES	
9		SLICKENSIDED	9	NO INFILL	

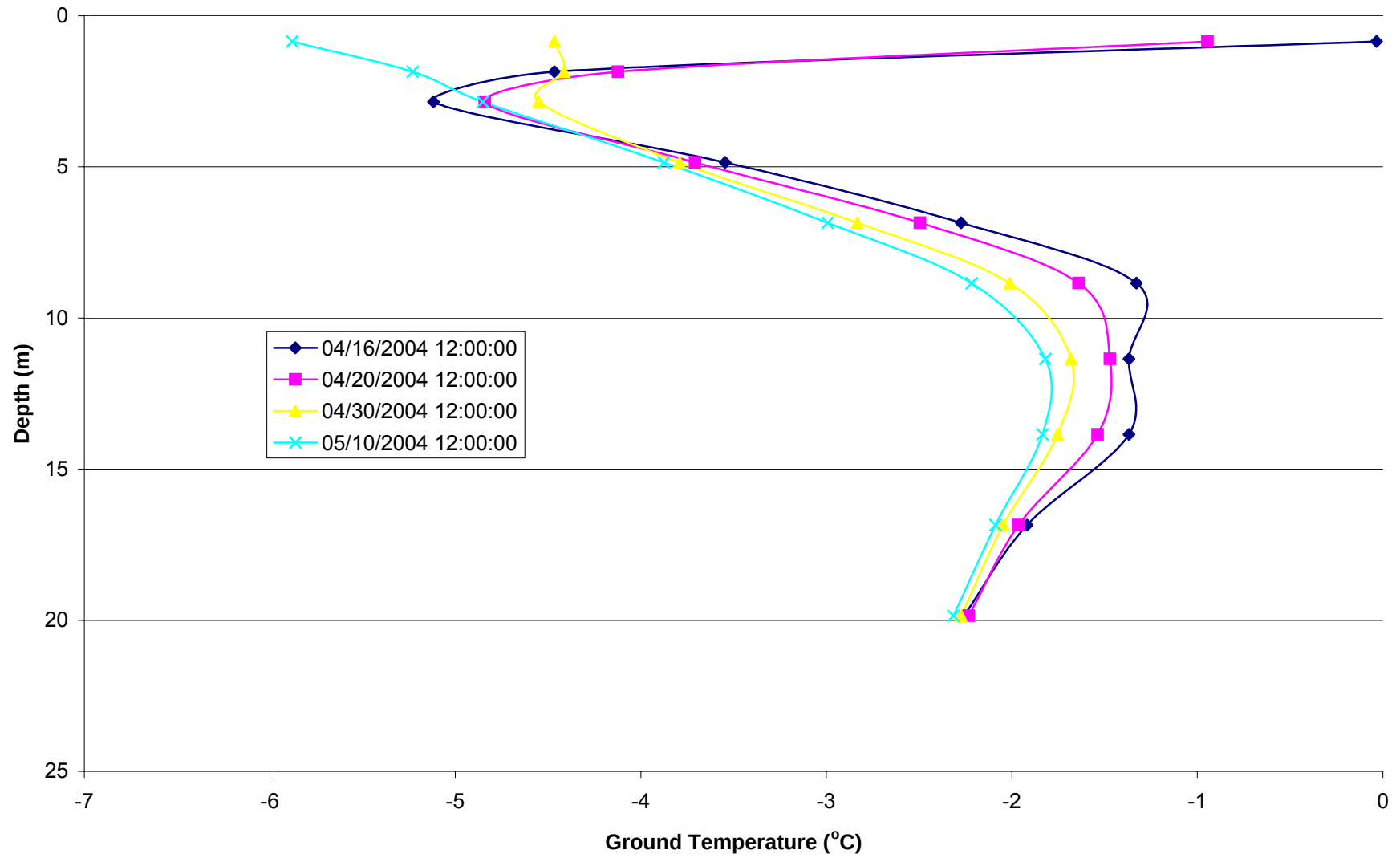
JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher Jr JRC

ROUGH		1	4	20
SMOOTH		2	3	14
SLICKEN-SIDED		3	2	11
STEPPED				
ROUGH		4	3	14
SMOOTH		5	2	11
SLICKEN-SIDED		6	1.5	7
UNDULATING				
ROUGH		7	1.5	2.5
SMOOTH		8	2	1.5
SLICKEN-SIDED		9	0.5	0.5
PLANAR				

MPV-04-197C



MPV_04_197C



MPV_04_197C





HOLE NO:	MPV-04-198
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	04/11/2004 19:00
DATE AND TIME FINISHED:	04/12/2004 19:00
HOLE DIAMETER (mm):	148.0 / 75.8 (SQ / NQ)
CORE DIAMETER (mm):	101.6 / 47.6 (SQ / NQ)

[illegible]

OVERALL HOLE DRILL RATE (m/hr)	0.58
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	2.21

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

[illegible]

AMEC Photo Log Sheet

Drillhole ID:

MPV-04-198

[illegible]

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-198	1	1.25	2.75
MPV-04-198	2	2.75	2.90
MPV-04-198	3	3.20	7.27
MPV-04-198	4	7.27	11.52
MPV-04-198	5	11.52	15.56
MPV-04-198	6	15.56	19.75
MPV-04-198	7	19.75	21.00
	8	21.00	
	9		
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY		DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	DESCRIPTION	CODE	CATEGORY
0	NONE	0	STRONG (NEVER BREAKS)
1	MINOR	1	MODERATE (SOMETIMES BREAKS)
2	MODERATE	3	WEAK (ALWAYS BREAKS)
3	HEAVY		

JOINT CONDITION - SMALL SCALE			JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY	CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH	1	NON	COARSE
2		SMOOTH	2	SOFTENING	MEDIUM
3		SLICKENSIDED	3		FINE
4	UNDULATING	ROUGH	4	SOFT	COARSE
5		SMOOTH	5	SHEARED	MEDIUM
6		SLICKENSIDED	6		FINE
7	PLANAR	ROUGH	7	GOUGE THICKNESS < IRREGULARITIES	
8		SMOOTH	8	GOUGE THICKNESS > IRREGULARITIES	
9		SLICKENSIDED	9	NO INFILL	

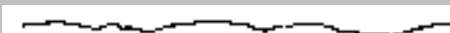
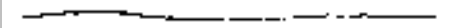
JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher Jr JRC

ROUGH		1	4	20
SMOOTH		2	3	14
SLICKEN-SIDED		3	2	11

STEPPED

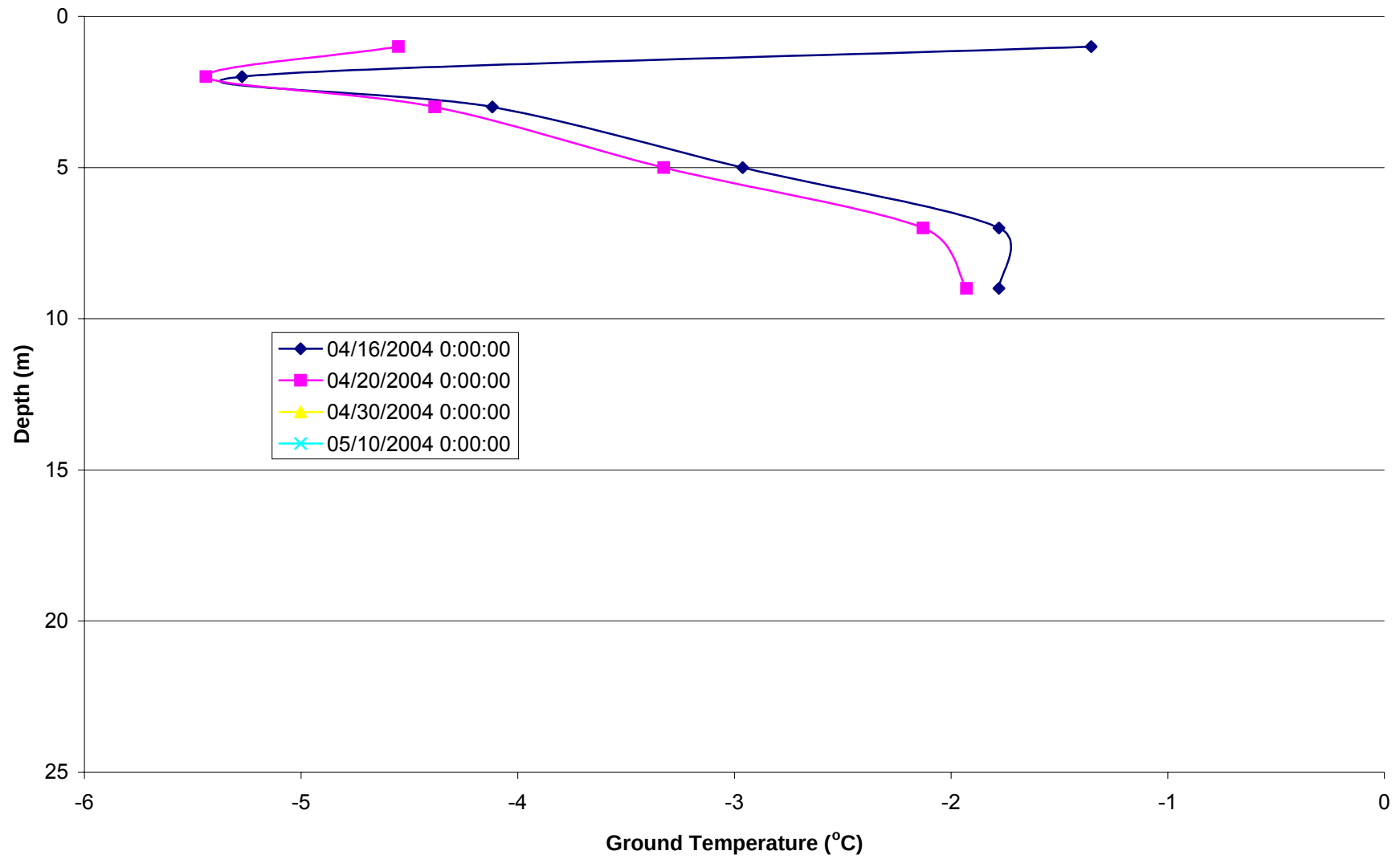
ROUGH		4	3	14
SMOOTH		5	2	11
SLICKEN-SIDED		6	1.5	7

UNDULATING

ROUGH		7	1.5	2.5
SMOOTH		8	2	1.5
SLICKEN-SIDED		9	0.5	0.5

PLANAR

MPV-04-198C
Estimate



MPV_04_198C



MPV_04_198C



MPV_04_198C





HOLE NO:	MPV-04-201
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	04/13/2004 7:00
DATE AND TIME FINISHED:	04/14/2004 7:00
HOLE DIAMETER (mm):	148.0 / 75.8 (SQ / NQ)
CORE DIAMETER (mm):	101.6 / 47.6 (SQ / NQ)

[illegible]

OVERALL HOLE DRILL RATE (m/hr)	0.61
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.83

AMEC Photo Log Sheet

Drillhole ID:

MPV-04-201

[illegible]

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-201	1	2.61	6.91
MPV-04-201	2	6.91	11.15
MPV-04-201	3	11.15	15.41
MPV-04-201	4	15.41	19.67
MPV-04-201	5	19.67	22.00
	6	22.00	
	7		
	8		
	9		
	10		
	11		
	12		
	13		
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	30		

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

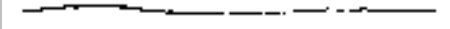
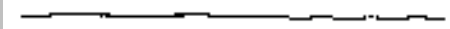
MICRODEFECTS - QUANTITY		DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	DESCRIPTION	CODE	CATEGORY
0	NONE	0	STRONG (NEVER BREAKS)
1	MINOR	1	MODERATE (SOMETIMES BREAKS)
2	MODERATE	3	WEAK (ALWAYS BREAKS)
3	HEAVY		

JOINT CONDITION - SMALL SCALE			JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY	CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH	1	NON	COARSE
2		SMOOTH	2	SOFTENING	MEDIUM
3		SLICKENSIDED	3		FINE
4	UNDULATING	ROUGH	4	SOFT	COARSE
5		SMOOTH	5	SHEARED	MEDIUM
6		SLICKENSIDED	6		FINE
7	PLANAR	ROUGH	7	GOUGE THICKNESS < IRREGULARITIES	
8		SMOOTH	8	GOUGE THICKNESS > IRREGULARITIES	
9		SLICKENSIDED	9	NO INFILL	

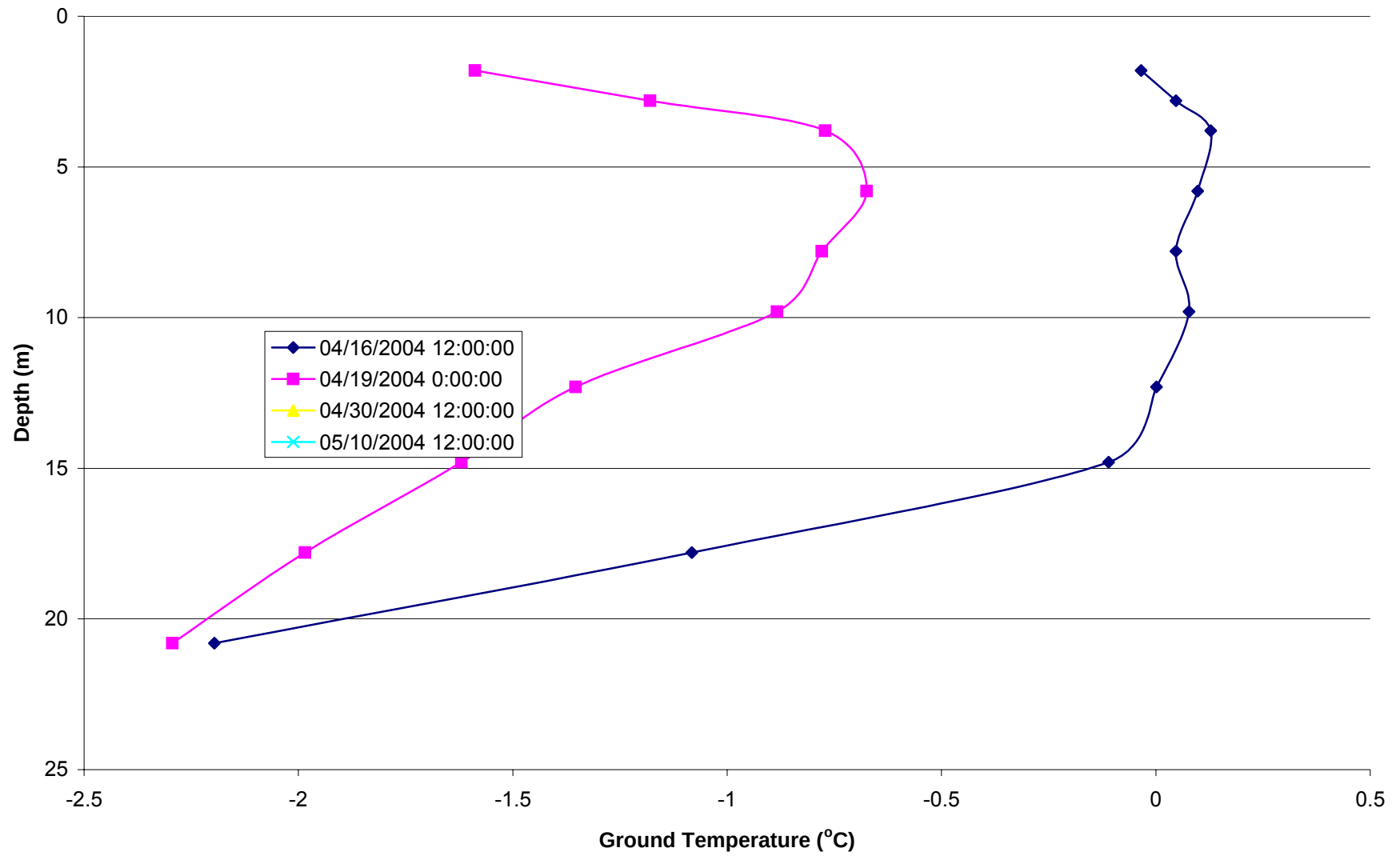
JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher Jr JRC

ROUGH		1	4	20
SMOOTH		2	3	14
SLICKEN-SIDED		3	2	11
STEPPED				
ROUGH		4	3	14
SMOOTH		5	2	11
SLICKEN-SIDED		6	1.5	7
UNDULATING				
ROUGH		7	1.5	2.5
SMOOTH		8	2	1.5
SLICKEN-SIDED		9	0.5	0.5
PLANAR				

MPV-04-201C
Estimate



MPV_04_201C



MPV_04_201C





HOLE NO:	MPV-04-204
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	04/30/2004 7:00
DATE AND TIME FINISHED:	04/30/2004 7:00
HOLE DIAMETER (mm):	148.0 / 96.1 (SQ / HQ)
CORE DIAMETER (mm):	101.6 / 63.5 (SQ / HQ)

OVERALL HOLE DRILL RATE (m/hr)	0.48
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.05

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

[illegible]

AMEC Photo Log Sheet

Drillhole ID:

MPV-04-204

[illegible]

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-204	1	0.55	0.85
MPV-04-204	2	0.85	2.35
MPV-04-204	3	2.35	3.85
MPV-04-204	4	3.85	5.60
	5		
MPV-04-204	6	5.05	7.00
MPV-04-204	7	7.00	9.80
MPV-04-204	8	9.80	11.50
	9	11.50	
	10		
	11		
	12		
	13		
	14		
	15		
	16		
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	30		

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

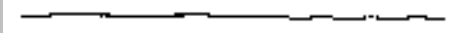
MICRODEFECTS - QUANTITY		DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	DESCRIPTION	CODE	CATEGORY
0	NONE	0	STRONG (NEVER BREAKS)
1	MINOR	1	MODERATE (SOMETIMES BREAKS)
2	MODERATE	3	WEAK (ALWAYS BREAKS)
3	HEAVY		

JOINT CONDITION - SMALL SCALE			JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY	CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH	1	NON	COARSE
2		SMOOTH	2	SOFTENING	MEDIUM
3		SLICKENSIDED	3		FINE
4	UNDULATING	ROUGH	4	SOFT	COARSE
5		SMOOTH	5	SHEARED	MEDIUM
6		SLICKENSIDED	6		FINE
7	PLANAR	ROUGH	7	GOUGE THICKNESS < IRREGULARITIES	
8		SMOOTH	8	GOUGE THICKNESS > IRREGULARITIES	
9		SLICKENSIDED	9	NO INFILL	

JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher Jr JRC

ROUGH		1	4	20
SMOOTH		2	3	14
SLICKEN-SIDED		3	2	11
STEPPED				
ROUGH		4	3	14
SMOOTH		5	2	11
SLICKEN-SIDED		6	1.5	7
UNDULATING				
ROUGH		7	1.5	2.5
SMOOTH		8	2	1.5
SLICKEN-SIDED		9	0.5	0.5
PLANAR				

MPV_04_204C



MPV_04_204C



MPV_04_204C





HOLE NO:	MPV-04-205C
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/01/2004 7:00
DATE AND TIME FINISHED:	05/02/2004 7:00
HOLE DIAMETER (mm):	148.0 / 96.1 (SQ / HQ)
CORE DIAMETER (mm):	101.6 / 63.5 (SQ / HQ)

OVERALL HOLE DRILL RATE (m/hr)	0.27
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	0.64

AMEC Photo Log Sheet

Drillhole ID:

MPV-04-205C

[illegible]

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-205C	1	0.00	2.35
MPV-04-205C	2	2.35	2.60
MPV-04-205C	3	2.60	3.85
MPV-04-205C	4	3.85	4.57
MPV-04-205C	5	4.57	7.57
MPV-04-205C	6	7.57	9.30
	7	9.30	
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY		DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	DESCRIPTION	CODE	CATEGORY
0	NONE	0	STRONG (NEVER BREAKS)
1	MINOR	1	MODERATE (SOMETIMES BREAKS)
2	MODERATE	3	WEAK (ALWAYS BREAKS)
3	HEAVY		

JOINT CONDITION - SMALL SCALE			JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY	CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH	1	NON	COARSE
2		SMOOTH	2	SOFTENING	MEDIUM
3		SLICKENSIDED	3		FINE
4	UNDULATING	ROUGH	4	SOFT	COARSE
5		SMOOTH	5	SHEARED	MEDIUM
6		SLICKENSIDED	6		FINE
7	PLANAR	ROUGH	7	GOUGE THICKNESS < IRREGULARITIES	
8		SMOOTH	8	GOUGE THICKNESS > IRREGULARITIES	
9		SLICKENSIDED	9	NO INFILL	

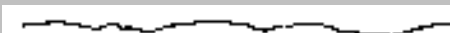
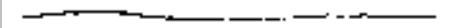
JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher Jr JRC

ROUGH		1	4	20
SMOOTH		2	3	14
SLICKEN-SIDED		3	2	11

STEPPED

ROUGH		4	3	14
SMOOTH		5	2	11
SLICKEN-SIDED		6	1.5	7

UNDULATING

ROUGH		7	1.5	2.5
SMOOTH		8	2	1.5
SLICKEN-SIDED		9	0.5	0.5

PLANAR

MPV_04_205C



MPV_04_205C





HOLE NO:	MPV-04-206C
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/01/2004 7:00
DATE AND TIME FINISHED:	05/02/2004 7:00
HOLE DIAMETER (mm):	148.0 / 96.1 (SQ / HQ)
CORE DIAMETER (mm):	101.6 / 63.5 (SQ / HQ)

[illegible]

OVERALL HOLE DRILL RATE (m/hr)	0.29
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	0.79

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

[illegible]

AMEC Photo Log Sheet

Drillhole ID:

MPV-04-206C

[illegible]

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-206C	1	1.70	2.90
MPV-04-206C	2	2.90	4.40
MPV-04-206C	3	4.40	5.40
MPV-04-206C	4	5.40	7.00
MPV-04-206C	5	7.00	9.70
MPV-04-206C	6	9.70	12.50
MPV-04-206C	7	12.50	13.07
	8	13.07	
	9		
	10		
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	30		

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY	
CODE	DESCRIPTION
0	NONE
1	MINOR
2	MODERATE
3	HEAVY

DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	CATEGORY
0	STRONG (NEVER BREAKS)
1	MODERATE (SOMETIMES BREAKS)
3	WEAK (ALWAYS BREAKS)

JOINT CONDITION - SMALL SCALE		
CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH
2		SMOOTH
3		SLICKENSIDED
4	UNDULATING	ROUGH
5		SMOOTH
6		SLICKENSIDED
7	PLANAR	ROUGH
8		SMOOTH
9		SLICKENSIDED

JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY
1	NON	COARSE
2	SOFTENING	MEDIUM
3		FINE
4	SOFT	COARSE
5	SHEARED	MEDIUM
6		FINE
7	GOUGE THICKNESS < IRREGULARITIES	
8	GOUGE THICKNESS > IRREGULARITIES	
9	NO INFILL	

JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher Jr JRC

ROUGH

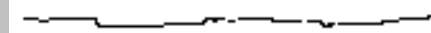


1

4

20

SMOOTH



2

3

14

SLICKEN-SIDED



3

2

11

STEPPED

ROUGH



4

3

14

SMOOTH

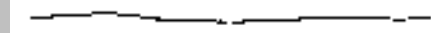


5

2

11

SLICKEN-SIDED



6

1.5

7

UNDULATING

ROUGH

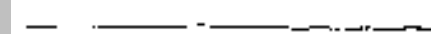


7

1.5

2.5

SMOOTH



8

2

1.5

SLICKEN-SIDED



9

0.5

0.5

PLANAR

MPV_04_206C



MPV_04_206C



MPV_04_206C





HOLE NO:	MPV-04-207C
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/03/2004 19:00
DATE AND TIME FINISHED:	05/04/2004 0:00
HOLE DIAMETER (mm):	148.0 / 96.1 (SQ / HQ)
CORE DIAMETER (mm):	101.6 / 63.5 (SQ / HQ)

[illegible]

OVERALL HOLE DRILL RATE (m/hr)	0.48
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.16

AMEC Photo Log Sheet

Drillhole ID:

MPV-04-207C

[illegible]

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-207C	1	0.00	2.05
MPV-04-207C		2.05	2.68
MPV-04-207C	2	2.68	4.15
MPV-04-207C	3	4.15	5.50
MPV-04-207C	4	5.50	8.23
MPV-04-207C	5	8.23	10.83
MPV-04-207C	6	10.83	11.59
	7	11.59	
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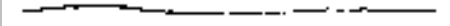
GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY		DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	DESCRIPTION	CODE	CATEGORY
0	NONE	0	STRONG (NEVER BREAKS)
1	MINOR	1	MODERATE (SOMETIMES BREAKS)
2	MODERATE	3	WEAK (ALWAYS BREAKS)
3	HEAVY		

JOINT CONDITION - SMALL SCALE			JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY	CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH	1	NON	COARSE
2		SMOOTH	2	SOFTENING	MEDIUM
3		SLICKENSIDED	3		FINE
4	UNDULATING	ROUGH	4	SOFT	COARSE
5		SMOOTH	5	SHEARED	MEDIUM
6		SLICKENSIDED	6		FINE
7	PLANAR	ROUGH	7	GOUGE THICKNESS < IRREGULARITIES	
8		SMOOTH	8	GOUGE THICKNESS > IRREGULARITIES	
9		SLICKENSIDED	9	NO INFILL	

JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE		Laubscher	Jr	JRC
ROUGH		1	4	20
SMOOTH		2	3	14
SLICKEN-SIDED		3	2	11
STEPPED				
ROUGH		4	3	14
SMOOTH		5	2	11
SLICKEN-SIDED		6	1.5	7
UNDULATING				
ROUGH		7	1.5	2.5
SMOOTH		8	2	1.5
SLICKEN-SIDED		9	0.5	0.5
PLANAR				

MPV_04_207C



MPV_04_207C



MPV_04_207C





HOLE NO:	MPV-04-208C
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/04/2004 19:00
DATE AND TIME FINISHED:	05/05/2004 0:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

OVERALL HOLE DRILL RATE (m/hr)	0.63
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.07

[illegible]

AMEC Photo Log Sheet

Drillhole ID:

MPV-04-208C

[illegible]

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-208C	1	2.54	4.33
MPV-04-208C	2	4.33	7.13
MPV-04-208C	3	7.13	7.50
	4	7.50	
	5		
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY		DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	DESCRIPTION	CODE	CATEGORY
0	NONE	0	STRONG (NEVER BREAKS)
1	MINOR	1	MODERATE (SOMETIMES BREAKS)
2	MODERATE	3	WEAK (ALWAYS BREAKS)
3	HEAVY		

JOINT CONDITION - SMALL SCALE			JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY	CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH	1	NON	COARSE
2		SMOOTH	2	SOFTENING	MEDIUM
3		SLICKENSIDED	3		FINE
4	UNDULATING	ROUGH	4	SOFT	COARSE
5		SMOOTH	5	SHEARED	MEDIUM
6		SLICKENSIDED	6		FINE
7	PLANAR	ROUGH	7	GOUGE THICKNESS < IRREGULARITIES	
8		SMOOTH	8	GOUGE THICKNESS > IRREGULARITIES	
9		SLICKENSIDED	9	NO INFILL	

JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher Jr JRC

ROUGH		1	4	20
SMOOTH		2	3	14
SLICKEN-SIDED		3	2	11

STEPPED

ROUGH		4	3	14
SMOOTH		5	2	11
SLICKEN-SIDED		6	1.5	7

UNDULATING

ROUGH		7	1.5	2.5
SMOOTH		8	2	1.5
SLICKEN-SIDED		9	0.5	0.5

PLANAR

MPV_04_208C





HOLE NO:	MPV-04-209C
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/05/2004 7:00
DATE AND TIME FINISHED:	05/06/2004 7:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

OVERALL HOLE DRILL RATE (m/hr)	0.63
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.25

AMEC Photo Log Sheet

Drillhole ID:

MPV-04-209C

[illegible]

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-209C	1	2.51	4.88
MPV-04-209C	2	4.88	7.80
MPV-04-209C	3	7.80	8.41
	4	8.41	
	5		
	6		
	7		
	8		
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

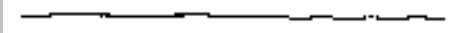
MICRODEFECTS - QUANTITY		DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	DESCRIPTION	CODE	CATEGORY
0	NONE	0	STRONG (NEVER BREAKS)
1	MINOR	1	MODERATE (SOMETIMES BREAKS)
2	MODERATE	3	WEAK (ALWAYS BREAKS)
3	HEAVY		

JOINT CONDITION - SMALL SCALE			JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY	CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH	1	NON	COARSE
2		SMOOTH	2	SOFTENING	MEDIUM
3		SLICKENSIDED	3		FINE
4	UNDULATING	ROUGH	4	SOFT	COARSE
5		SMOOTH	5	SHEARED	MEDIUM
6		SLICKENSIDED	6		FINE
7	PLANAR	ROUGH	7	GOUGE THICKNESS < IRREGULARITIES	
8		SMOOTH	8	GOUGE THICKNESS > IRREGULARITIES	
9		SLICKENSIDED	9	NO INFILL	

JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher Jr JRC

ROUGH		1	4	20
SMOOTH		2	3	14
SLICKEN-SIDED		3	2	11
STEPPED				
ROUGH		4	3	14
SMOOTH		5	2	11
SLICKEN-SIDED		6	1.5	7
UNDULATING				
ROUGH		7	1.5	2.5
SMOOTH		8	2	1.5
SLICKEN-SIDED		9	0.5	0.5
PLANAR				

MPV_04_209C





HOLE NO:	MPV-04-210C
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/05/2004 19:00
DATE AND TIME FINISHED:	05/06/2004 7:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

OVERALL HOLE DRILL RATE (m/hr)	0.63
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.25

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-210C	1	1.78	4.88
MPV-04-210C	2	4.88	7.50
	3	7.50	
	4		
	5		
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	8		
	9		
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY		DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	DESCRIPTION	CODE	CATEGORY
0	NONE	0	STRONG (NEVER BREAKS)
1	MINOR	1	MODERATE (SOMETIMES BREAKS)
2	MODERATE	3	WEAK (ALWAYS BREAKS)
3	HEAVY		

JOINT CONDITION - SMALL SCALE			JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY	CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH	1	NON	COARSE
2		SMOOTH	2	SOFTENING	MEDIUM
3		SLICKENSIDED	3		FINE
4	UNDULATING	ROUGH	4	SOFT	COARSE
5		SMOOTH	5	SHEARED	MEDIUM
6		SLICKENSIDED	6		FINE
7	PLANAR	ROUGH	7	GOUGE THICKNESS < IRREGULARITIES	
8		SMOOTH	8	GOUGE THICKNESS > IRREGULARITIES	
9		SLICKENSIDED	9	NO INFILL	

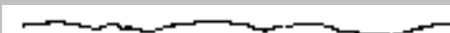
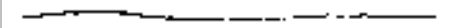
JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher Jr JRC

ROUGH		1	4	20
SMOOTH		2	3	14
SLICKEN-SIDED		3	2	11

STEPPED

ROUGH		4	3	14
SMOOTH		5	2	11
SLICKEN-SIDED		6	1.5	7

UNDULATING

ROUGH		7	1.5	2.5
SMOOTH		8	2	1.5
SLICKEN-SIDED		9	0.5	0.5

PLANAR

MPV_04_210C





HOLE NO:	MPV-04-211C
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/06/2004 7:00
DATE AND TIME FINISHED:	05/06/2004 19:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

[illegible]

OVERALL HOLE DRILL RATE (m/hr)	0.63
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.25

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

[illegible]

AMEC Photo Log Sheet

Drillhole ID:

MPV-04-211C

[illegible]

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-211C	1	1.78	4.88
MPV-04-211C	2	4.88	7.50
	3	7.50	
	4		
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

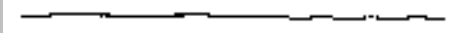
MICRODEFECTS - QUANTITY		DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	DESCRIPTION	CODE	CATEGORY
0	NONE	0	STRONG (NEVER BREAKS)
1	MINOR	1	MODERATE (SOMETIMES BREAKS)
2	MODERATE	3	WEAK (ALWAYS BREAKS)
3	HEAVY		

JOINT CONDITION - SMALL SCALE			JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY	CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH	1	NON	COARSE
2		SMOOTH	2	SOFTENING	MEDIUM
3		SLICKENSIDED	3		FINE
4	UNDULATING	ROUGH	4	SOFT	COARSE
5		SMOOTH	5	SHEARED	MEDIUM
6		SLICKENSIDED	6		FINE
7	PLANAR	ROUGH	7	GOUGE THICKNESS < IRREGULARITIES	
8		SMOOTH	8	GOUGE THICKNESS > IRREGULARITIES	
9		SLICKENSIDED	9	NO INFILL	

JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher Jr JRC

ROUGH		1	4	20
SMOOTH		2	3	14
SLICKEN-SIDED		3	2	11
STEPPED				
ROUGH		4	3	14
SMOOTH		5	2	11
SLICKEN-SIDED		6	1.5	7
UNDULATING				
ROUGH		7	1.5	2.5
SMOOTH		8	2	1.5
SLICKEN-SIDED		9	0.5	0.5
PLANAR				

MPV_04_211C





HOLE NO:	MPV-04-212C
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/06/2004 7:00
DATE AND TIME FINISHED:	05/07/2004 7:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

OVERALL HOLE DRILL RATE (m/hr)	0.75
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.50

AMEC Photo Log Sheet

Drillhole ID:

MPV-04-212C

[illegible]

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-212C	1	3.62	6.42
MPV-04-212C	2	6.42	9.00
	3	9.00	
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY		DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	DESCRIPTION	CODE	CATEGORY
0	NONE	0	STRONG (NEVER BREAKS)
1	MINOR	1	MODERATE (SOMETIMES BREAKS)
2	MODERATE	3	WEAK (ALWAYS BREAKS)
3	HEAVY		

JOINT CONDITION - SMALL SCALE			JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY	CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH	1	NON	COARSE
2		SMOOTH	2	SOFTENING	MEDIUM
3		SLICKENSIDED	3		FINE
4	UNDULATING	ROUGH	4	SOFT	COARSE
5		SMOOTH	5	SHEARED	MEDIUM
6		SLICKENSIDED	6		FINE
7	PLANAR	ROUGH	7	GOUGE THICKNESS < IRREGULARITIES	
8		SMOOTH	8	GOUGE THICKNESS > IRREGULARITIES	
9		SLICKENSIDED	9	NO INFILL	

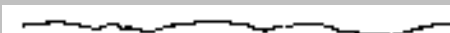
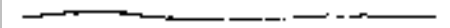
JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher Jr JRC

ROUGH		1	4	20
SMOOTH		2	3	14
SLICKEN-SIDED		3	2	11

STEPPED

ROUGH		4	3	14
SMOOTH		5	2	11
SLICKEN-SIDED		6	1.5	7

UNDULATING

ROUGH		7	1.5	2.5
SMOOTH		8	2	1.5
SLICKEN-SIDED		9	0.5	0.5

PLANAR

MPV_04_212C





HOLE NO:	MPV-04-213C
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/04/2004 19:00
DATE AND TIME FINISHED:	05/05/2004 0:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

OVERALL HOLE DRILL RATE (m/hr)	0.32
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	0.97

AMEC Photo Log Sheet

Drillhole ID:

MPV-04-213C

[illegible]

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-213C	1	2.55	5.41
MPV-04-213C	2	5.41	7.75
	3	7.75	
	4		
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY		DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	DESCRIPTION	CODE	CATEGORY
0	NONE	0	STRONG (NEVER BREAKS)
1	MINOR	1	MODERATE (SOMETIMES BREAKS)
2	MODERATE	3	WEAK (ALWAYS BREAKS)
3	HEAVY		

JOINT CONDITION - SMALL SCALE			JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY	CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH	1	NON	COARSE
2		SMOOTH	2	SOFTENING	MEDIUM
3		SLICKENSIDED	3		FINE
4	UNDULATING	ROUGH	4	SOFT	COARSE
5		SMOOTH	5	SHEARED	MEDIUM
6		SLICKENSIDED	6		FINE
7	PLANAR	ROUGH	7	GOUGE THICKNESS < IRREGULARITIES	
8		SMOOTH	8	GOUGE THICKNESS > IRREGULARITIES	
9		SLICKENSIDED	9	NO INFILL	

JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher Jr JRC

ROUGH		1	4	20
SMOOTH		2	3	14
SLICKEN-SIDED		3	2	11

STEPPED

ROUGH		4	3	14
SMOOTH		5	2	11
SLICKEN-SIDED		6	1.5	7

UNDULATING

ROUGH		7	1.5	2.5
SMOOTH		8	2	1.5
SLICKEN-SIDED		9	0.5	0.5

PLANAR

MPV_04_213C





HOLE NO:	MPV-04-214C
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/07/2004 19:00
DATE AND TIME FINISHED:	05/08/2004 1:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

OVERALL HOLE DRILL RATE (m/hr)	0.62
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.24

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

[illegible]

AMEC Photo Log Sheet

Drillhole ID:

MPV-04-214C

[illegible]

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-214C	1	2.20	4.78
MPV-04-214C	2	4.78	7.45
	3	7.45	
	4		
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

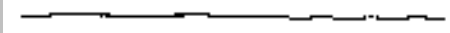
MICRODEFECTS - QUANTITY		DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	DESCRIPTION	CODE	CATEGORY
0	NONE	0	STRONG (NEVER BREAKS)
1	MINOR	1	MODERATE (SOMETIMES BREAKS)
2	MODERATE	3	WEAK (ALWAYS BREAKS)
3	HEAVY		

JOINT CONDITION - SMALL SCALE			JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY	CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH	1	NON	COARSE
2		SMOOTH	2	SOFTENING	MEDIUM
3		SLICKENSIDED	3		FINE
4	UNDULATING	ROUGH	4	SOFT	COARSE
5		SMOOTH	5	SHEARED	MEDIUM
6		SLICKENSIDED	6		FINE
7	PLANAR	ROUGH	7	GOUGE THICKNESS < IRREGULARITIES	
8		SMOOTH	8	GOUGE THICKNESS > IRREGULARITIES	
9		SLICKENSIDED	9	NO INFILL	

JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher Jr JRC

ROUGH		1	4	20
SMOOTH		2	3	14
SLICKEN-SIDED		3	2	11
STEPPED				
ROUGH		4	3	14
SMOOTH		5	2	11
SLICKEN-SIDED		6	1.5	7
UNDULATING				
ROUGH		7	1.5	2.5
SMOOTH		8	2	1.5
SLICKEN-SIDED		9	0.5	0.5
PLANAR				

MPV_04_214C





HOLE NO:	MPV-04-215C
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/08/2004 19:00
DATE AND TIME FINISHED:	05/09/2004 0:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

OVERALL HOLE DRILL RATE (m/hr)	0.63
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.25

AMEC Photo Log Sheet

Drillhole ID:

MPV-04-215C

[illegible]

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-215C	1	1.27	4.50
MPV-04-215C	2	4.50	7.50
	3	7.50	
	4		
	5		
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY		DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	DESCRIPTION	CODE	CATEGORY
0	NONE	0	STRONG (NEVER BREAKS)
1	MINOR	1	MODERATE (SOMETIMES BREAKS)
2	MODERATE	3	WEAK (ALWAYS BREAKS)
3	HEAVY		

JOINT CONDITION - SMALL SCALE			JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY	CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH	1	NON	COARSE
2		SMOOTH	2	SOFTENING	MEDIUM
3		SLICKENSIDED	3		FINE
4	UNDULATING	ROUGH	4	SOFT	COARSE
5		SMOOTH	5	SHEARED	MEDIUM
6		SLICKENSIDED	6		FINE
7	PLANAR	ROUGH	7	GOUGE THICKNESS < IRREGULARITIES	
8		SMOOTH	8	GOUGE THICKNESS > IRREGULARITIES	
9		SLICKENSIDED	9	NO INFILL	

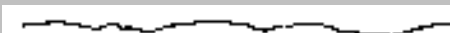
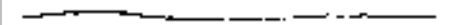
JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher Jr JRC

ROUGH		1	4	20
SMOOTH		2	3	14
SLICKEN-SIDED		3	2	11

STEPPED

ROUGH		4	3	14
SMOOTH		5	2	11
SLICKEN-SIDED		6	1.5	7

UNDULATING

ROUGH		7	1.5	2.5
SMOOTH		8	2	1.5
SLICKEN-SIDED		9	0.5	0.5

PLANAR

MPV_04_215C





HOLE NO:	MPV-04-216C
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/08/2004 19:00
DATE AND TIME FINISHED:	05/09/2004 2:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

[illegible]

OVERALL HOLE DRILL RATE (m/hr)	0.63
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.07

AMEC Photo Log Sheet

Drillhole ID:

MPV-04-216C

[illegible]

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-216C	1	2.26	5.01
MPV-04-216C	2	5.01	7.50
	3	7.50	
	4		
	5		
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY		DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	DESCRIPTION	CODE	CATEGORY
0	NONE	0	STRONG (NEVER BREAKS)
1	MINOR	1	MODERATE (SOMETIMES BREAKS)
2	MODERATE	3	WEAK (ALWAYS BREAKS)
3	HEAVY		

JOINT CONDITION - SMALL SCALE			JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY	CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH	1	NON	COARSE
2		SMOOTH	2	SOFTENING	MEDIUM
3		SLICKENSIDED	3		FINE
4	UNDULATING	ROUGH	4	SOFT	COARSE
5		SMOOTH	5	SHEARED	MEDIUM
6		SLICKENSIDED	6		FINE
7	PLANAR	ROUGH	7	GOUGE THICKNESS < IRREGULARITIES	
8		SMOOTH	8	GOUGE THICKNESS > IRREGULARITIES	
9		SLICKENSIDED	9	NO INFILL	

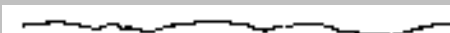
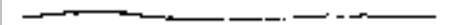
JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher Jr JRC

ROUGH		1	4	20
SMOOTH		2	3	14
SLICKEN-SIDED		3	2	11

STEPPED

ROUGH		4	3	14
SMOOTH		5	2	11
SLICKEN-SIDED		6	1.5	7

UNDULATING

ROUGH		7	1.5	2.5
SMOOTH		8	2	1.5
SLICKEN-SIDED		9	0.5	0.5

PLANAR

MPV_04_216C





HOLE NO:	MPV-04-217C
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/09/2004 7:00
DATE AND TIME FINISHED:	05/09/2004 19:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

OVERALL HOLE DRILL RATE (m/hr)	0.68
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.16

AMEC Photo Log Sheet

Drillhole ID:

MPV-04-217C

[illegible]

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-217C	1	2.25	4.85
MPV-04-217C	2	4.85	7.60
MPV-04-217C	3	7.60	8.15
	4	8.15	
	5		
	6		
	7		
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY		DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	DESCRIPTION	CODE	CATEGORY
0	NONE	0	STRONG (NEVER BREAKS)
1	MINOR	1	MODERATE (SOMETIMES BREAKS)
2	MODERATE	3	WEAK (ALWAYS BREAKS)
3	HEAVY		

JOINT CONDITION - SMALL SCALE			JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY	CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH	1	NON	COARSE
2		SMOOTH	2	SOFTENING	MEDIUM
3		SLICKENSIDED	3		FINE
4	UNDULATING	ROUGH	4	SOFT	COARSE
5		SMOOTH	5	SHEARED	MEDIUM
6		SLICKENSIDED	6		FINE
7	PLANAR	ROUGH	7	GOUGE THICKNESS < IRREGULARITIES	
8		SMOOTH	8	GOUGE THICKNESS > IRREGULARITIES	
9		SLICKENSIDED	9	NO INFILL	

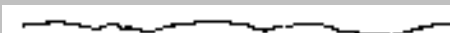
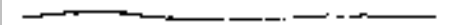
JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher Jr JRC

ROUGH		1	4	20
SMOOTH		2	3	14
SLICKEN-SIDED		3	2	11

STEPPED

ROUGH		4	3	14
SMOOTH		5	2	11
SLICKEN-SIDED		6	1.5	7

UNDULATING

ROUGH		7	1.5	2.5
SMOOTH		8	2	1.5
SLICKEN-SIDED		9	0.5	0.5

PLANAR

MPV_04_217C





HOLE NO:	MPV-04-218C
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/09/2004 7:00
DATE AND TIME FINISHED:	05/09/2004 19:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

[illegible]

OVERALL HOLE DRILL RATE (m/hr)	0.71
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.41

AMEC Photo Log Sheet

Drillhole ID:

MPV-04-218C

[illegible]

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-218C	1	3.25	5.80
MPV-04-218C	2	5.80	8.47
	3	8.47	
	4		
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY		DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	DESCRIPTION	CODE	CATEGORY
0	NONE	0	STRONG (NEVER BREAKS)
1	MINOR	1	MODERATE (SOMETIMES BREAKS)
2	MODERATE	3	WEAK (ALWAYS BREAKS)
3	HEAVY		

JOINT CONDITION - SMALL SCALE			JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY	CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH	1	NON	COARSE
2		SMOOTH	2	SOFTENING	MEDIUM
3		SLICKENSIDED	3		FINE
4	UNDULATING	ROUGH	4	SOFT	COARSE
5		SMOOTH	5	SHEARED	MEDIUM
6		SLICKENSIDED	6		FINE
7	PLANAR	ROUGH	7	GOUGE THICKNESS < IRREGULARITIES	
8		SMOOTH	8	GOUGE THICKNESS > IRREGULARITIES	
9		SLICKENSIDED	9	NO INFILL	

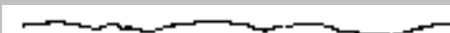
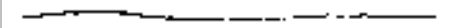
JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher Jr JRC

ROUGH		1	4	20
SMOOTH		2	3	14
SLICKEN-SIDED		3	2	11

STEPPED

ROUGH		4	3	14
SMOOTH		5	2	11
SLICKEN-SIDED		6	1.5	7

UNDULATING

ROUGH		7	1.5	2.5
SMOOTH		8	2	1.5
SLICKEN-SIDED		9	0.5	0.5

PLANAR

MPV_04_218C





HOLE NO:	MPV-04-219C
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/09/2004 19:00
DATE AND TIME FINISHED:	05/10/2004 7:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

[illegible]

OVERALL HOLE DRILL RATE (m/hr)	0.63
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.25

AMEC Photo Log Sheet

Drillhole ID:

MPV-04-219C

[illegible]

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-219C	1	1.90	4.50
MPV-04-219C	2	4.50	7.50
	3	7.50	
	4		
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY		DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	DESCRIPTION	CODE	CATEGORY
0	NONE	0	STRONG (NEVER BREAKS)
1	MINOR	1	MODERATE (SOMETIMES BREAKS)
2	MODERATE	3	WEAK (ALWAYS BREAKS)
3	HEAVY		

JOINT CONDITION - SMALL SCALE			JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY	CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH	1	NON	COARSE
2		SMOOTH	2	SOFTENING	MEDIUM
3		SLICKENSIDED	3		FINE
4	UNDULATING	ROUGH	4	SOFT	COARSE
5		SMOOTH	5	SHEARED	MEDIUM
6		SLICKENSIDED	6		FINE
7	PLANAR	ROUGH	7	GOUGE THICKNESS < IRREGULARITIES	
8		SMOOTH	8	GOUGE THICKNESS > IRREGULARITIES	
9		SLICKENSIDED	9	NO INFILL	

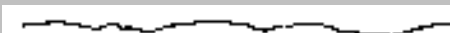
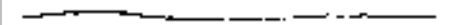
JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher Jr JRC

ROUGH		1	4	20
SMOOTH		2	3	14
SLICKEN-SIDED		3	2	11

STEPPED

ROUGH		4	3	14
SMOOTH		5	2	11
SLICKEN-SIDED		6	1.5	7

UNDULATING

ROUGH		7	1.5	2.5
SMOOTH		8	2	1.5
SLICKEN-SIDED		9	0.5	0.5

PLANAR

MPV_04_219C





HOLE NO:	MPV-04-220C
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/10/2004 7:00
DATE AND TIME FINISHED:	05/10/2004 22:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

[illegible]

OVERALL HOLE DRILL RATE (m/hr)	0.44
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	0.70

AMEC Photo Log Sheet

Drillhole ID:

MPV-04-220C[illegible]

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-220C	1	2.00	5.27
MPV-04-220C	2	5.27	8.07
MPV-04-220C	3	8.07	10.44
	4	10.44	
	5		
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY		DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	DESCRIPTION	CODE	CATEGORY
0	NONE	0	STRONG (NEVER BREAKS)
1	MINOR	1	MODERATE (SOMETIMES BREAKS)
2	MODERATE	3	WEAK (ALWAYS BREAKS)
3	HEAVY		

JOINT CONDITION - SMALL SCALE			JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY	CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH	1	NON	COARSE
2		SMOOTH	2	SOFTENING	MEDIUM
3		SLICKENSIDED	3		FINE
4	UNDULATING	ROUGH	4	SOFT	COARSE
5		SMOOTH	5	SHEARED	MEDIUM
6		SLICKENSIDED	6		FINE
7	PLANAR	ROUGH	7	GOUGE THICKNESS < IRREGULARITIES	
8		SMOOTH	8	GOUGE THICKNESS > IRREGULARITIES	
9		SLICKENSIDED	9	NO INFILL	

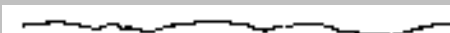
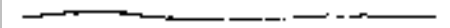
JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher Jr JRC

ROUGH		1	4	20
SMOOTH		2	3	14
SLICKEN-SIDED		3	2	11

STEPPED

ROUGH		4	3	14
SMOOTH		5	2	11
SLICKEN-SIDED		6	1.5	7

UNDULATING

ROUGH		7	1.5	2.5
SMOOTH		8	2	1.5
SLICKEN-SIDED		9	0.5	0.5

PLANAR

MPV_04_220C





HOLE NO:	MPV-04-221C
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/10/2004 7:00
DATE AND TIME FINISHED:	05/11/2004 0:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

[illegible]

OVERALL HOLE DRILL RATE (m/hr)	0.39
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.03

AMEC Photo Log Sheet

Drillhole ID:

MPV-04-221C

[illegible]

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-221C	1	2.25	4.98
MPV-04-221C	2	4.98	7.75
MPV-04-221C	3	7.75	9.25
	4	9.25	
	5		
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY		DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	DESCRIPTION	CODE	CATEGORY
0	NONE	0	STRONG (NEVER BREAKS)
1	MINOR	1	MODERATE (SOMETIMES BREAKS)
2	MODERATE	3	WEAK (ALWAYS BREAKS)
3	HEAVY		

JOINT CONDITION - SMALL SCALE			JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY	CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH	1	NON	COARSE
2		SMOOTH	2	SOFTENING	MEDIUM
3		SLICKENSIDED	3		FINE
4	UNDULATING	ROUGH	4	SOFT	COARSE
5		SMOOTH	5	SHEARED	MEDIUM
6		SLICKENSIDED	6		FINE
7	PLANAR	ROUGH	7	GOUGE THICKNESS < IRREGULARITIES	
8		SMOOTH	8	GOUGE THICKNESS > IRREGULARITIES	
9		SLICKENSIDED	9	NO INFILL	

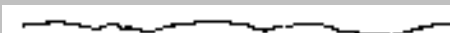
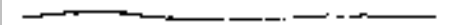
JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher Jr JRC

ROUGH		1	4	20
SMOOTH		2	3	14
SLICKEN-SIDED		3	2	11

STEPPED

ROUGH		4	3	14
SMOOTH		5	2	11
SLICKEN-SIDED		6	1.5	7

UNDULATING

ROUGH		7	1.5	2.5
SMOOTH		8	2	1.5
SLICKEN-SIDED		9	0.5	0.5

PLANAR

MPV_04_221C





HOLE NO:	MPV-04-222C
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/11/2004 7:00
DATE AND TIME FINISHED:	05/10/2004 22:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

[illegible]

OVERALL HOLE DRILL RATE (m/hr)	0.35
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	0.76

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

[illegible]

AMEC Photo Log Sheet

Drillhole ID:

MPV-04-222C

[illegible]

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-222C	1	3.00	5.34
MPV-04-222C	2	5.34	8.34
	3	8.34	
	4		
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY		DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	DESCRIPTION	CODE	CATEGORY
0	NONE	0	STRONG (NEVER BREAKS)
1	MINOR	1	MODERATE (SOMETIMES BREAKS)
2	MODERATE	3	WEAK (ALWAYS BREAKS)
3	HEAVY		

JOINT CONDITION - SMALL SCALE			JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY	CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH	1	NON	COARSE
2		SMOOTH	2	SOFTENING	MEDIUM
3		SLICKENSIDED	3		FINE
4	UNDULATING	ROUGH	4	SOFT	COARSE
5		SMOOTH	5	SHEARED	MEDIUM
6		SLICKENSIDED	6		FINE
7	PLANAR	ROUGH	7	GOUGE THICKNESS < IRREGULARITIES	
8		SMOOTH	8	GOUGE THICKNESS > IRREGULARITIES	
9		SLICKENSIDED	9	NO INFILL	

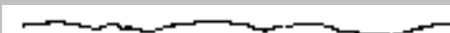
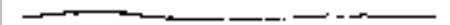
JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher Jr JRC

ROUGH		1	4	20
SMOOTH		2	3	14
SLICKEN-SIDED		3	2	11

STEPPED

ROUGH		4	3	14
SMOOTH		5	2	11
SLICKEN-SIDED		6	1.5	7

UNDULATING

ROUGH		7	1.5	2.5
SMOOTH		8	2	1.5
SLICKEN-SIDED		9	0.5	0.5

PLANAR

MPV_04_222C





HOLE NO:	MPV-04-223C
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/11/2004 7:00
DATE AND TIME FINISHED:	05/12/2004 7:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

OVERALL HOLE DRILL RATE (m/hr)	0.38
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	0.69

[illegible]

AMEC Photo Log Sheet

Drillhole ID:

MPV-04-223C

[illegible]

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-223C	1	3.50	6.47
MPV-04-223C	2	6.47	9.00
	3	9.00	
	4		
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY		DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	DESCRIPTION	CODE	CATEGORY
0	NONE	0	STRONG (NEVER BREAKS)
1	MINOR	1	MODERATE (SOMETIMES BREAKS)
2	MODERATE	3	WEAK (ALWAYS BREAKS)
3	HEAVY		

JOINT CONDITION - SMALL SCALE			JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY	CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH	1	NON	COARSE
2		SMOOTH	2	SOFTENING	MEDIUM
3		SLICKENSIDED	3		FINE
4	UNDULATING	ROUGH	4	SOFT	COARSE
5		SMOOTH	5	SHEARED	MEDIUM
6		SLICKENSIDED	6		FINE
7	PLANAR	ROUGH	7	GOUGE THICKNESS < IRREGULARITIES	
8		SMOOTH	8	GOUGE THICKNESS > IRREGULARITIES	
9		SLICKENSIDED	9	NO INFILL	

JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher Jr JRC

ROUGH		1	4	20
SMOOTH		2	3	14
SLICKEN-SIDED		3	2	11

STEPPED

ROUGH		4	3	14
SMOOTH		5	2	11
SLICKEN-SIDED		6	1.5	7

UNDULATING

ROUGH		7	1.5	2.5
SMOOTH		8	2	1.5
SLICKEN-SIDED		9	0.5	0.5

PLANAR

MPV_04_223C





HOLE NO:	MPV-04-224C
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/12/2004 7:00
DATE AND TIME FINISHED:	05/12/2004 22:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

[illegible]

OVERALL HOLE DRILL RATE (m/hr)	0.34
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	0.81

AMEC Photo Log Sheet

Drillhole ID:

MPV-04-224C

[illegible]

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-224C	1	2.84	5.28
MPV-04-224C	2	5.28	8.07
	3	8.07	
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GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY		DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	DESCRIPTION	CODE	CATEGORY
0	NONE	0	STRONG (NEVER BREAKS)
1	MINOR	1	MODERATE (SOMETIMES BREAKS)
2	MODERATE	3	WEAK (ALWAYS BREAKS)
3	HEAVY		

JOINT CONDITION - SMALL SCALE			JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY	CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH	1	NON	COARSE
2		SMOOTH	2	SOFTENING	MEDIUM
3		SLICKENSIDED	3		FINE
4	UNDULATING	ROUGH	4	SOFT	COARSE
5		SMOOTH	5	SHEARED	MEDIUM
6		SLICKENSIDED	6		FINE
7	PLANAR	ROUGH	7	GOUGE THICKNESS < IRREGULARITIES	
8		SMOOTH	8	GOUGE THICKNESS > IRREGULARITIES	
9		SLICKENSIDED	9	NO INFILL	

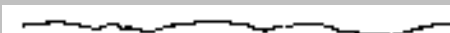
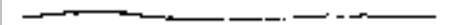
JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher Jr JRC

ROUGH		1	4	20
SMOOTH		2	3	14
SLICKEN-SIDED		3	2	11

STEPPED

ROUGH		4	3	14
SMOOTH		5	2	11
SLICKEN-SIDED		6	1.5	7

UNDULATING

ROUGH		7	1.5	2.5
SMOOTH		8	2	1.5
SLICKEN-SIDED		9	0.5	0.5

PLANAR

MPV_04_224C





HOLE NO:	MPV-04-225C
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/12/2004 7:00
DATE AND TIME FINISHED:	05/13/2004 7:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

OVERALL HOLE DRILL RATE (m/hr)	0.37
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	0.68

AMEC Photo Log Sheet

Drillhole ID:

MPV-04-225C

[illegible]

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-225C	1	3.30	6.41
MPV-04-225C	2	6.41	8.80
	3	8.80	
	4		
	5		
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	8		
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	30		

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY		DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	DESCRIPTION	CODE	CATEGORY
0	NONE	0	STRONG (NEVER BREAKS)
1	MINOR	1	MODERATE (SOMETIMES BREAKS)
2	MODERATE	3	WEAK (ALWAYS BREAKS)
3	HEAVY		

JOINT CONDITION - SMALL SCALE			JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY	CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH	1	NON	COARSE
2		SMOOTH	2	SOFTENING	MEDIUM
3		SLICKENSIDED	3		FINE
4	UNDULATING	ROUGH	4	SOFT	COARSE
5		SMOOTH	5	SHEARED	MEDIUM
6		SLICKENSIDED	6		FINE
7	PLANAR	ROUGH	7	GOUGE THICKNESS < IRREGULARITIES	
8		SMOOTH	8	GOUGE THICKNESS > IRREGULARITIES	
9		SLICKENSIDED	9	NO INFILL	

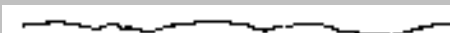
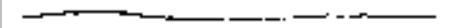
JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher Jr JRC

ROUGH		1	4	20
SMOOTH		2	3	14
SLICKEN-SIDED		3	2	11

STEPPED

ROUGH		4	3	14
SMOOTH		5	2	11
SLICKEN-SIDED		6	1.5	7

UNDULATING

ROUGH		7	1.5	2.5
SMOOTH		8	2	1.5
SLICKEN-SIDED		9	0.5	0.5

PLANAR

MPV_04_225C





HOLE NO:	MPV-04-226C
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/12/2004 19:00
DATE AND TIME FINISHED:	05/13/2004 7:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

OVERALL HOLE DRILL RATE (m/hr)	0.88
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	1.50

Total Core Recovery = Total length of core recovered
Solid Core Recovery = Total length of solid core (excluding pieces smaller than core diameter)
Rock Quality Designation = Total length of solid core pieces that are longer than 10cm (4 in)
NB... IGNORE INFLUENCE OF ANY UNNATURAL FRACTURES IN ABOVE PARAMETERS

[illegible]

AMEC Photo Log Sheet

Drillhole ID:

MPV-04-226C

[illegible]

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-226C	1	4.50	7.02
MPV-04-226C	2	7.02	10.03
MPV-04-226C	3	10.03	10.50
	4	10.50	
	5		
	6		
	7		
	8		
	9		
	10		
	11		
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MPV_04_226C





HOLE NO:	MPV-04-227C
DRILL CONTRACTOR:	Boart Longyear
DATE AND TIME STARTED:	05/13/2004 12:00
DATE AND TIME FINISHED:	05/14/2004 7:00
HOLE DIAMETER (mm):	96.1 (HQ)
CORE DIAMETER (mm):	63.5 (HQ)

[illegible]

OVERALL HOLE DRILL RATE (m/hr)	1.25
OVERALL HOLE DRILL RATE EXCLUDING STANDBY TIME (m/hr)	2.14

AMEC Photo Log Sheet

Drillhole ID:

MPV-04-227C

[illegible]

AMEC Core Box Tracking Sheet

Drillhole ID	Box	From	To
MPV-04-227C	1	5.00	6.70
MPV-04-227C	2	6.70	8.90
MPV-04-227C	3	8.90	11.67
MPV-04-227C	4	11.67	14.50
MPV-04-227C	5	14.50	17.10
MPV-04-227C	6	17.10	19.68
MPV-04-227C	7	19.68	22.50
MPV-04-227C	8	22.50	25.26
MPV-04-227C	9	25.26	27.68
MPV-04-227C	10	27.68	30.00
	11	30.00	
	12		
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	30		

GEOTECHNICAL LOGGING EXPLANATION SHEET

INTACT ROCK STRENGTH			
	CATEGORY	DESCRIPTION	Mpa
R0	EXTREMELY WEAK ROCK	SPECIMEN CAN BE INDENTED BY THUMBNAIL	0.25 - 1
R1	VERY WEAK ROCK	CRUMBLES UNDER FIRM BLOW WITH POINT OF HAMMER, CAN BE PEELED WITH POCKET KNIFE	1.0 - 5
R2	WEAK ROCK	SHALLOW INDENTATIONS MADE BY POINT OF HAMMER, CAN BE PEELED BY KNIFE WITH DIFFICULTY	5. - 25
R3	MEDIUM STRONG ROCK	SPECIMEN CAN BE FRACTURED WITH SINGLE FIRM BLOW, CANNOT BE PEELED OR SCRAPED WITH KNIFE	25 - 50
R4	STRONG ROCK	SPECIMEN REQUIRES MORE THAN ONE BLOW TO FRACTURE IT	50 - 100
R5	VERY STRONG ROCK	SPECIMEN REQUIRES MANY BLOWS TO FRACTURE IT	100 - 250
R6	EXTREMELY STRONG ROCK	SPECIMEN CAN ONLY BE CHIPPED WITH HAMMER	> 250

MICRODEFECTS - QUANTITY		DROP TEST - CEMENTED JOINTS/DEFECTS	
CODE	DESCRIPTION	CODE	CATEGORY
0	NONE	0	STRONG (NEVER BREAKS)
1	MINOR	1	MODERATE (SOMETIMES BREAKS)
2	MODERATE	3	WEAK (ALWAYS BREAKS)
3	HEAVY		

JOINT CONDITION - SMALL SCALE			JOINT FILLING		
CODE	CATEGORY	SUBCATEGORY	CODE	CATEGORY	SUBCATEGORY
1	STEPPED	ROUGH	1	NON	COARSE
2		SMOOTH	2	SOFTENING	MEDIUM
3		SLICKENSIDED	3		FINE
4	UNDULATING	ROUGH	4	SOFT	COARSE
5		SMOOTH	5	SHEARED	MEDIUM
6		SLICKENSIDED	6		FINE
7	PLANAR	ROUGH	7	GOUGE THICKNESS < IRREGULARITIES	
8		SMOOTH	8	GOUGE THICKNESS > IRREGULARITIES	
9		SLICKENSIDED	9	NO INFILL	

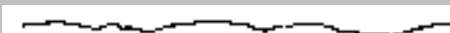
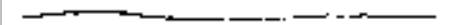
JOINT ALTERATION	
CODE	DESCRIPTION
0	NO ALTERATION
1	WEAKER THAN WALLROCK
2	STRONGER THAN WALLROCK

JOINT CONDITIONS - SMALL SCALE

Laubscher Jr JRC

ROUGH		1	4	20
SMOOTH		2	3	14
SLICKEN-SIDED		3	2	11

STEPPED

ROUGH		4	3	14
SMOOTH		5	2	11
SLICKEN-SIDED		6	1.5	7

UNDULATING

ROUGH		7	1.5	2.5
SMOOTH		8	2	1.5
SLICKEN-SIDED		9	0.5	0.5

PLANAR

MPV_04_227C



MPV_04_227C



MPV_04_227C



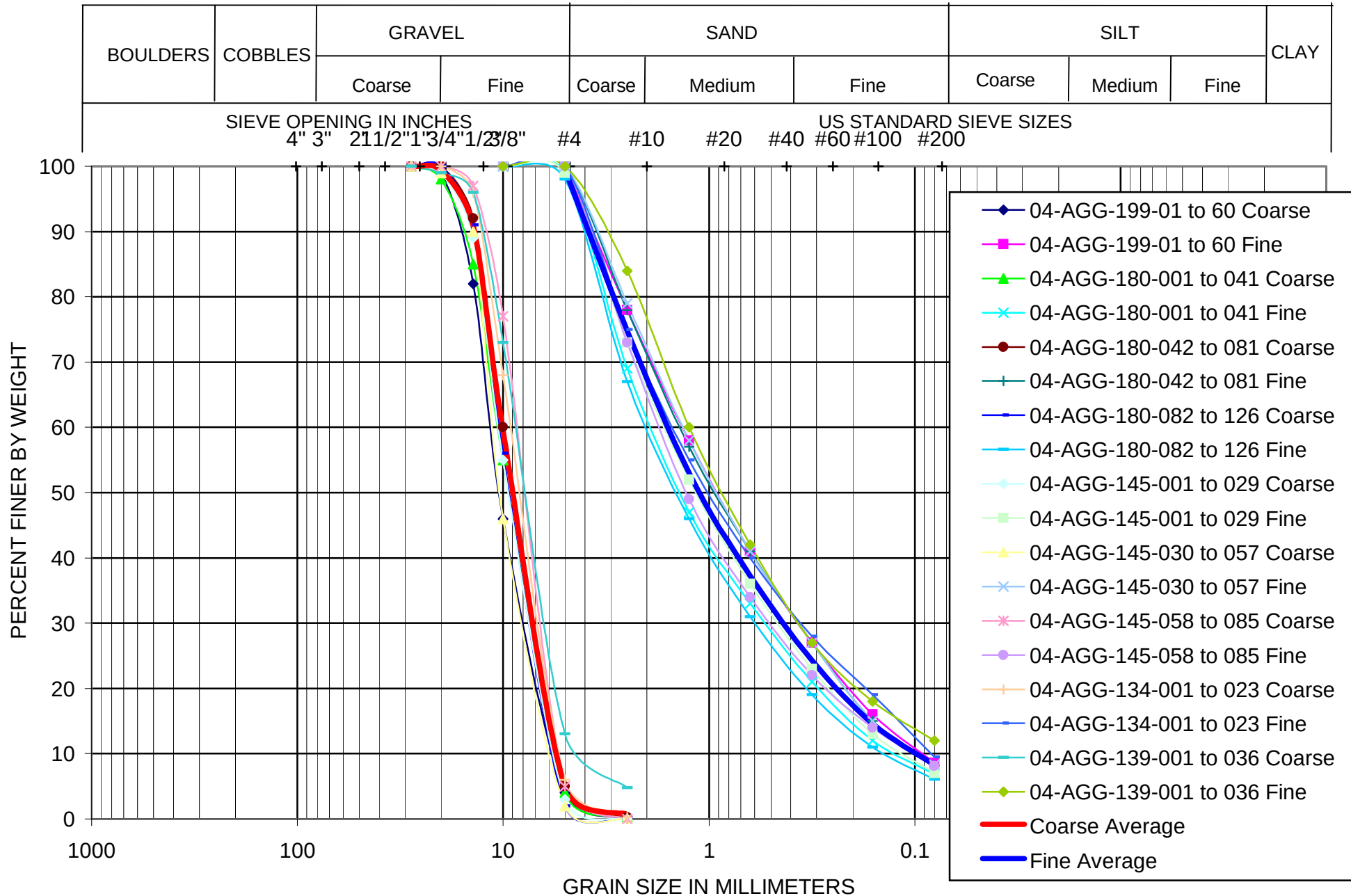
MPV_04_227C



MPV_04_227C



GRAIN SIZE ANALYSES



ASTM Designation: C295

Project:	VM00351	Source:	Gahcho Kue Pre-Feasibility Study
Lab No.:	S0321	Date:	September 15, 2004
Client:	AMEC E&C SERVICES LIMITED	Analyst:	Ivan Severinsky

Individual
Percentage
Retained
on Sieve

20-10 mm

[illegible]

CALCULATION OF RESULTS OF PARTICLE COUNTS

WEIGHTED PERCENTAGES OF CONSTITUENTS IN EACH SIEVE FRACTION[illegible]

COMPOSITION AND CONDITION OF AGGREGATE SAMPLE

NUMBER OF PARTICLES IN PERCENT

In Whole Sample

CONSTITUENTS	20-10	mm	Good	Fair	Poor	Totals
Alkali granite, coarse grained, angular, subhedral grains, rough texture, hard			85.4			85.4
Alkali granite, coarse grained, angular, rough texture, brittle, subhedral grains				11.1		11.1
Alkali feldspar, angular, subhedral, some quartz present			3.5			3.5

ASTM Designation: C-295

Enclosure 2

Project:	VM00351	Source:	Sample 1 (-5 mm)
Lab No.:	S231 - B, Fine Aggregate	Date:	14 September 2004
Client:	AMEC E & C Services Limited	Analyst:	Zlatko Brcic, B. Sc.

AMOUNT, AS NUMBER OF PARTICLES IN PERCENT

CONSTITUENTS	In Fractions Retained on Sieves shown Below (%)						In Whole Sample (%)			
	2.5 mm	1.25 mm	630 µm	315 µm	160 µm	80 µm	Good	Fair	Poor	Totals
Alkali Granite, light coloured and reddish with biotite up to 10 %, medium hard	88.0	70.0	55.5	11.5	-	-	53.3			53.3
Alkali Granite, light coloured and reddish with biotite up to 15 %, brittle	3.5	5.0	5.0	-	-	-		3.0		3.0
Alkali Granite, light coloured and reddish with biotite up to 15 %, friable	1.0	1.0	-	-	-	-			0.5	0.5
Quartz, milky coloured and colourless, compact, high strength, hard	3.0	12.0	15.0	56.0	73.5	79.5	26.3			26.3
Quartz with Feldspar, colourless and reddish, medium strength	2.0	5.5	7.5	15.5	3.5	0.5	5.8			5.8
Feldspar, pink, white and yellow, compact, high strength	2.5	5.5	8.0	6.5	8.5	9.5	5.7			5.7
Amphibole Group, green to black, compact, hard	-	-	2.0	3.5	5.5	3.5	1.6			1.6
Mica Group, dark brown, black, low strength, soft	-	1.0	7.0	7.0	9.0	7.0			3.8	3.8

[illegible]

ASTM Designation: C295

Table 2

WEIGHTED PERCENTAGES OF CONSTITUENTS IN EACH SIEVE FRACTION

Constituents	2.5 mm	1.25 mm	630 µm	315 µm	160 µm	80 µm	Weighted Composition of Sample
Alkali Granite, light coloured and reddish with biotite up to 10 %, medium hard, good	25.9	16.3	9.4	1.6	0.0	0.0	53.3
Alkali Granite, light coloured and reddish with biotite up to 15 %, brittle, fair	1.0	1.2	0.9	0.0	0.0	0.0	3.0
Alkali Granite, light coloured and reddish with biotite up to 15 %, friable, poor	0.3	0.2	0.0	0.0	0.0	0.0	0.5
Quartz, milky coloured and colourless, compact, high strength, hard, good	0.9	2.8	2.6	8.0	7.6	4.5	26.3
Quartz with Feldspar, colourless and reddish, medium strength, good	0.6	1.3	1.3	2.2	0.4	0.0	5.8
Feldspar, pink, white and yellow, compact, high strength, good	0.7	1.3	1.4	0.9	0.9	0.5	5.7
Amphibole Group, green to black colour, compact, hard, good	0.0	0.0	0.3	0.5	0.6	0.2	1.6
Mica Group, dark brown, black colour, low strength, soft, poor	0.0	0.2	1.2	1.0	0.9	0.4	3.8
Total in sieve fraction (in %)	29.4	23.3	17.0	14.3	10.3	5.7	100
Total in sample, good aggregate							
Total in sample, fair aggregate							
Total in sample, poor aggregate							

ASTM Designation: C295

CALCULATION OF RESULTS OF PARTICLE COUNTS

Table 1

[illegible]

SIEVE ANALYSIS AMEC Earth & Environmental, A division of AMEC Americas Ltd.
REPORT
CSA 23.1-80 SERIES

4810 - 93 Street
 Edmonton, AB T6E 5M4



PROJECT NO. VM00351
 CLIENT AMEC-Burnaby BC
 C.C.

TO AMEC-Burnaby BC

ATTN: Daryl Dufalt

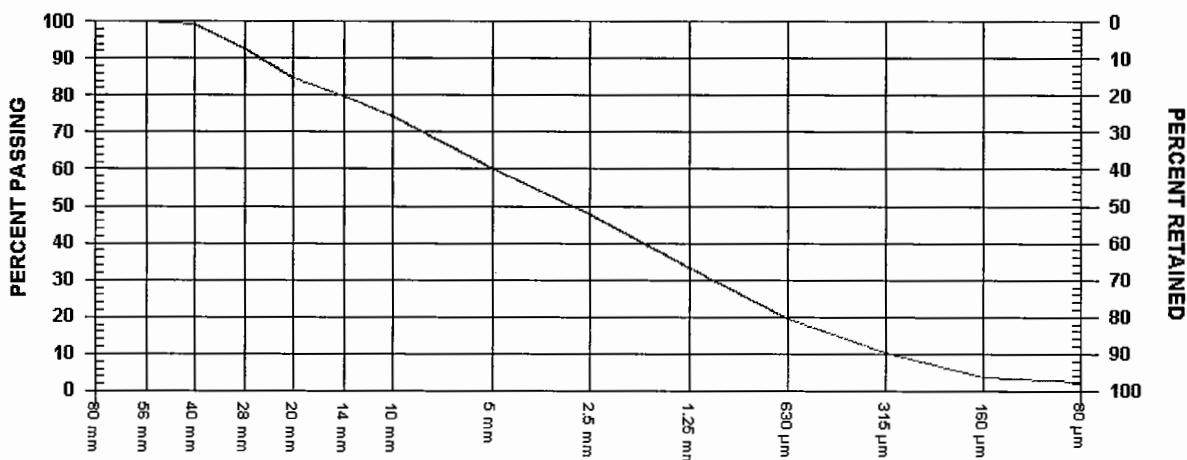
PROJECT AMEC-Burnaby BC
 Esker Sieves
 CONTRACTOR

SIEVE TEST NO. 1

DATE TESTED 2004.Sep.24 DATE SAMPLED 2004.Sep.23

SUPPLIER
 SOURCE
 SPECIFICATION
 MATERIAL TYPE

SAMPLED BY
 TESTED BY
 TEST METHOD WASHED



GRAVEL SIZES		PERCENT PASSING	GRADATION LIMITS
80	mm	100.0	
56	mm	100.0	
40	mm	99.1	
28	mm	92.4	
20	mm	84.8	
14	mm	79.7	
10	mm	74.4	

SAND SIZES AND FINES		PERCENT PASSING	GRADATION LIMITS
5	mm	60.4	
2.5	mm	47.8	
1.25	mm	33.1	
630	µm	19.3	
315	µm	10.2	
160	µm	3.8	
80	µm	2.3	

COMMENTS
 A70, SA-1, 593654, 7033338

PROJECT NO. VM00351
CLIENT AMEC-Burnaby BC
C.C.TO
AMEC-Burnaby BC

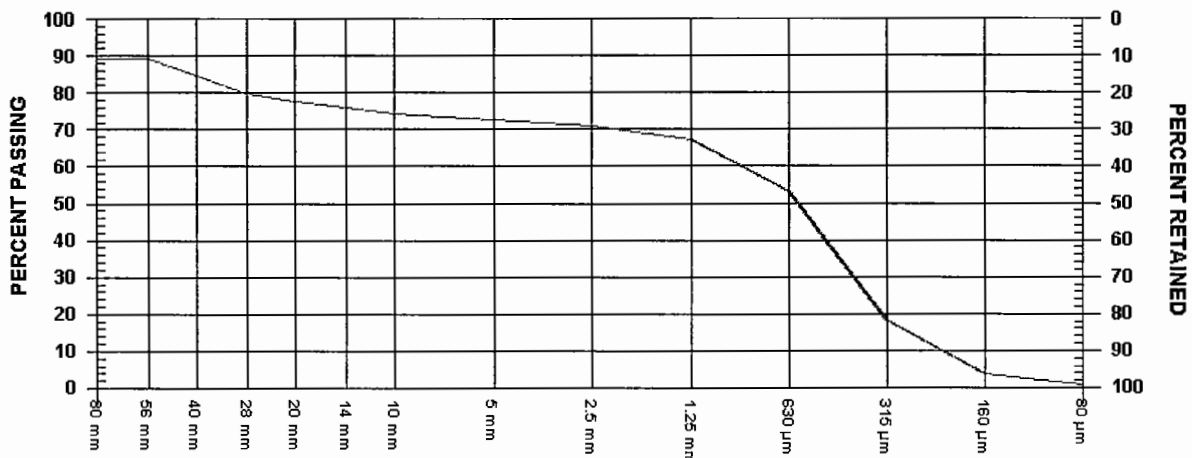
ATTN: Daryl Dufalt

PROJECT AMEC-Burnaby BC
Esker Sieves

CONTRACTOR

SIEVE TEST NO. 2

DATE TESTED 2004.Sep.24 DATE SAMPLED 2004.Sep.23

SUPPLIER
SOURCE
SPECIFICATION
MATERIAL TYPESAMPLED BY
TESTED BY
TEST METHOD WASHED

GRAVEL SIZES		PERCENT PASSING	GRADATION LIMITS
80	mm	89.3	
56	mm	89.3	
40	mm	84.5	
28	mm	79.8	
20	mm	77.6	
14	mm	75.9	
10	mm	74.4	

SAND SIZES AND FINES		PERCENT PASSING	GRADATION LIMITS
5	mm	72.6	
2.5	mm	70.9	
1.25	mm	67.2	
630	μm	53.1	
315	μm	18.3	
160	μm	3.6	
80	μm	0.7	

COMMENTS

A71, SA-2, 594017, 7033446

PROJECT NO. VM00351
 CLIENT AMEC-Burnaby BC
 C.C.

TO
 AMEC-Burnaby BC

ATTN: Daryl Dufalt

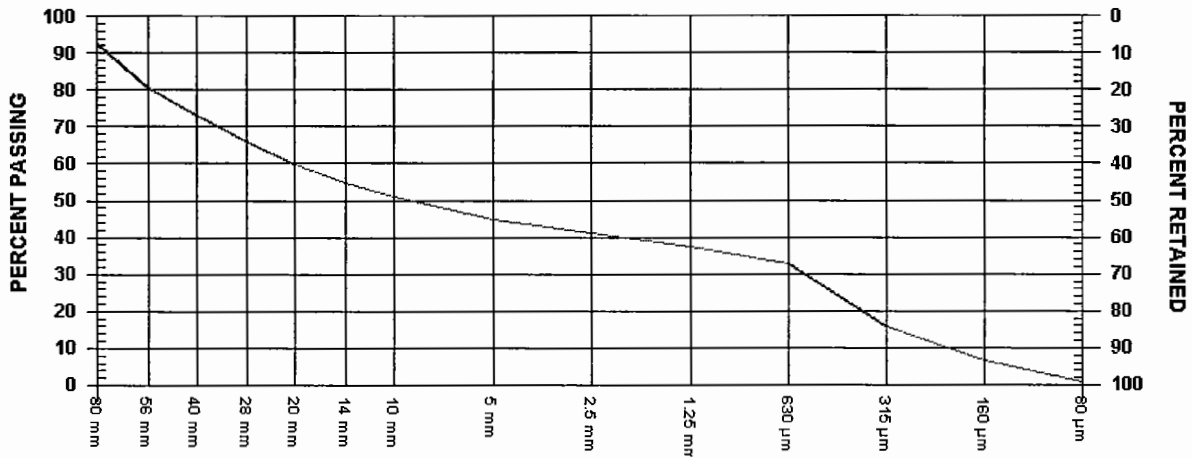
PROJECT AMEC-Burnaby BC
 Esker Sieves
 CONTRACTOR

SIEVE TEST NO. 3

DATE TESTED 2004.Sep.24 DATE SAMPLED 2004.Sep.23

SUPPLIER
 SOURCE
 SPECIFICATION
 MATERIAL TYPE

SAMPLED BY
 TESTED BY
 TEST METHOD WASHED



GRAVEL SIZES		PERCENT PASSING	GRADATION LIMITS
80	mm	92.6	
56	mm	80.4	
40	mm	73.0	
28	mm	66.2	
20	mm	59.9	
14	mm	54.7	
10	mm	50.9	

SAND SIZES AND FINES		PERCENT PASSING	GRADATION LIMITS
5	mm	45.0	
2.5	mm	40.9	
1.25	mm	37.2	
630	μm	32.7	
315	μm	15.7	
160	μm	6.7	
80	μm	1.0	

COMMENTS
 A72, SA-3, 594364, 7033537

PROJECT NO. VM00351
CLIENT AMEC-Burnaby BC
C.C.

TO
AMEC-Burnaby BC

ATTN: Daryl Dufalt

PROJECT AMEC-Burnaby BC
Esker Sieves

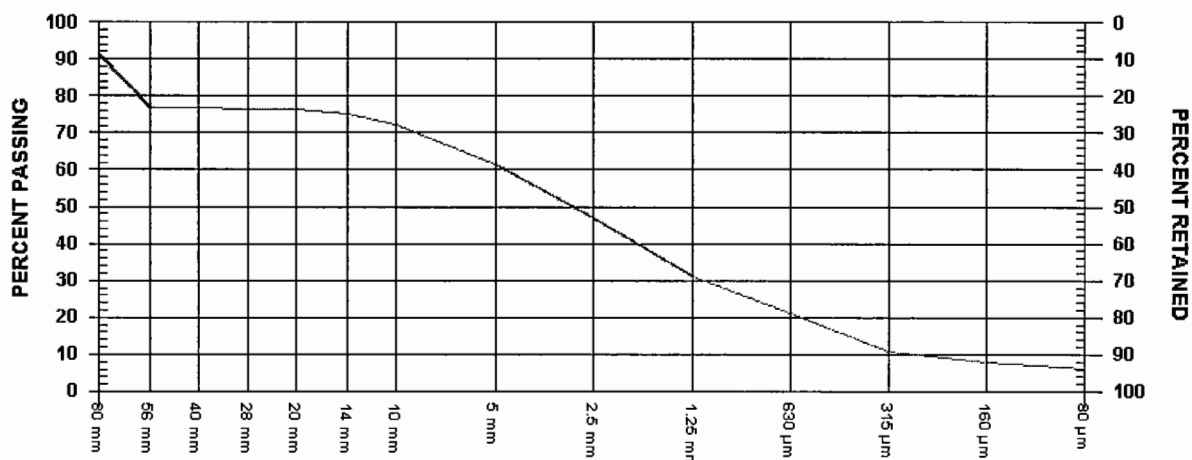
CONTRACTOR

SIEVE TEST NO. 4

DATE TESTED 2004.Sep.24 DATE SAMPLED 2004.Sep.23

SUPPLIER
SOURCE
SPECIFICATION
MATERIAL TYPE

SAMPLED BY
TESTED BY
TEST METHOD WASHED



GRAVEL SIZES		PERCENT PASSING	GRADATION LIMITS
80	mm	91.5	
56	mm	76.9	
40	mm	76.9	
28	mm	76.5	
20	mm	76.4	
14	mm	75.2	
10	mm	72.2	

SAND SIZES AND FINES		PERCENT PASSING	GRADATION LIMITS
5	mm	61.6	
2.5	mm	46.9	
1.25	mm	31.1	
630	μm	21.0	
315	μm	10.9	
160	μm	7.8	
80	μm	6.4	

COMMENTS

A73, SA-4, 594758, 7033590

PROJECT NO. VM00351

CLIENT AMEC-Burnaby BC

C.C.

TO
AMEC-Burnaby BC

ATTN: Daryl Dufalt

PROJECT AMEC-Burnaby BC
Esker Sieves

CONTRACTOR

SIEVE TEST NO. 5

DATE TESTED 2004.Sep.24 DATE SAMPLED 2004.Sep.23

SUPPLIER

SOURCE

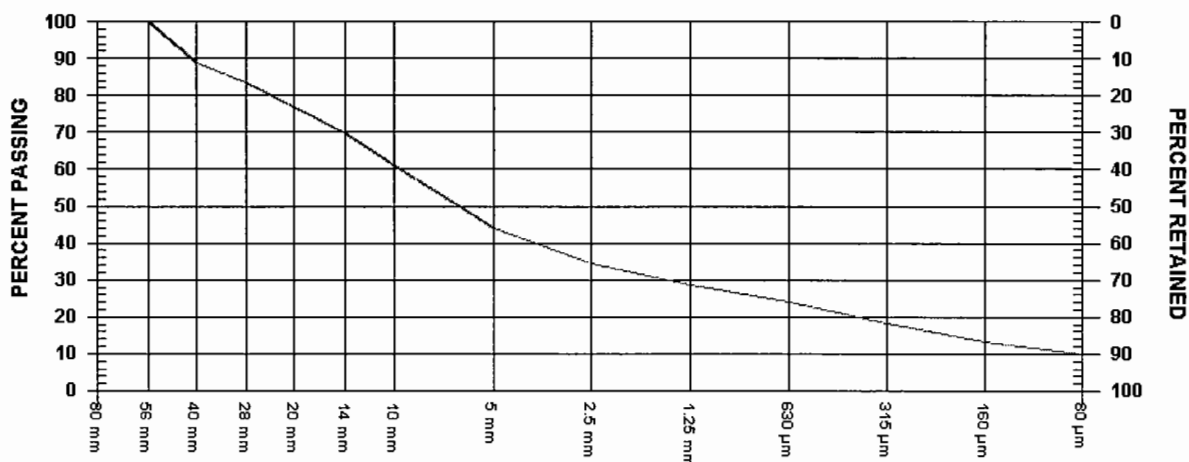
SPECIFICATION

MATERIAL TYPE

SAMPLED BY

TESTED BY

TEST METHOD WASHED



GRAVEL SIZES		PERCENT PASSING	GRADATION LIMITS
80	mm	100.0	
56	mm	100.0	
40	mm	88.7	
28	mm	83.6	
20	mm	76.7	
14	mm	69.7	
10	mm	61.1	

SAND SIZES AND FINES		PERCENT PASSING	GRADATION LIMITS
5	mm	44.1	
2.5	mm	34.3	
1.25	mm	28.6	
630	µm	24.1	
315	µm	18.4	
160	µm	13.2	
80	µm	9.9	

COMMENTS

A74, SA-5, 595114, 7033710

PROJECT NO. VM00351

CLIENT AMEC-Burnaby BC

C.C.

TO
AMEC-Burnaby BC

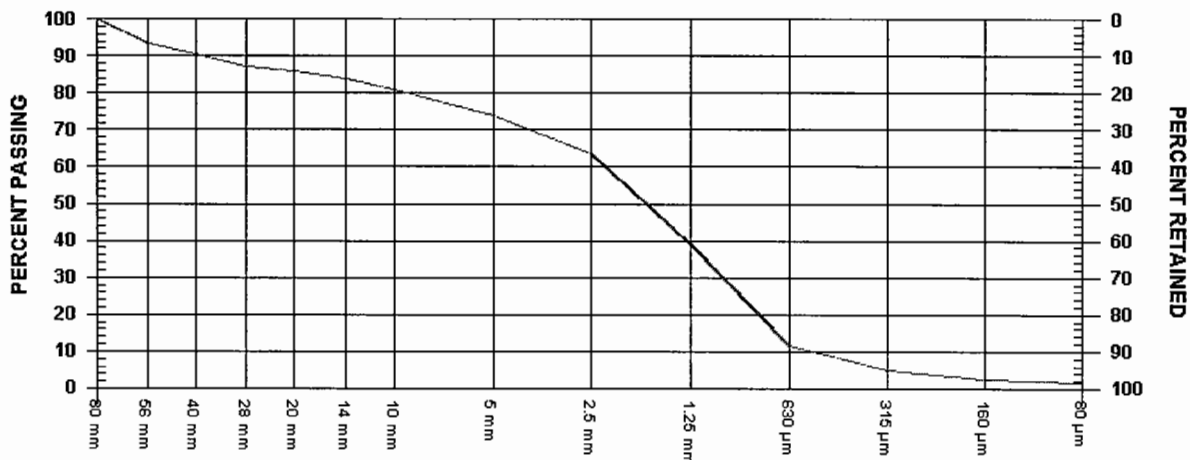
ATTN: Daryl Dufalt

PROJECT AMEC-Burnaby BC
Esker Sieves

CONTRACTOR

SIEVE TEST NO. 6

DATE TESTED 2004.Sep.24 DATE SAMPLED 2004.Sep.23

SUPPLIER
SOURCE
SPECIFICATION
MATERIAL TYPESAMPLED BY
TESTED BY
TEST METHOD WASHED

GRAVEL SIZES		PERCENT PASSING	GRADATION LIMITS
80	mm	100.0	
56	mm	93.5	
40	mm	90.5	
28	mm	87.2	
20	mm	85.9	
14	mm	83.9	
10	mm	81.0	

SAND SIZES AND FINES		PERCENT PASSING	GRADATION LIMITS
5	mm	73.7	
2.5	mm	63.5	
1.25	mm	39.1	
630	µm	11.5	
315	µm	5.1	
160	µm	2.5	
80	µm	1.5	

COMMENTS

A75, SA-6, 595390, 7033985

PROJECT NO. VM00351
CLIENT AMEC-Burnaby BC
C.C.TO
AMEC-Burnaby BC

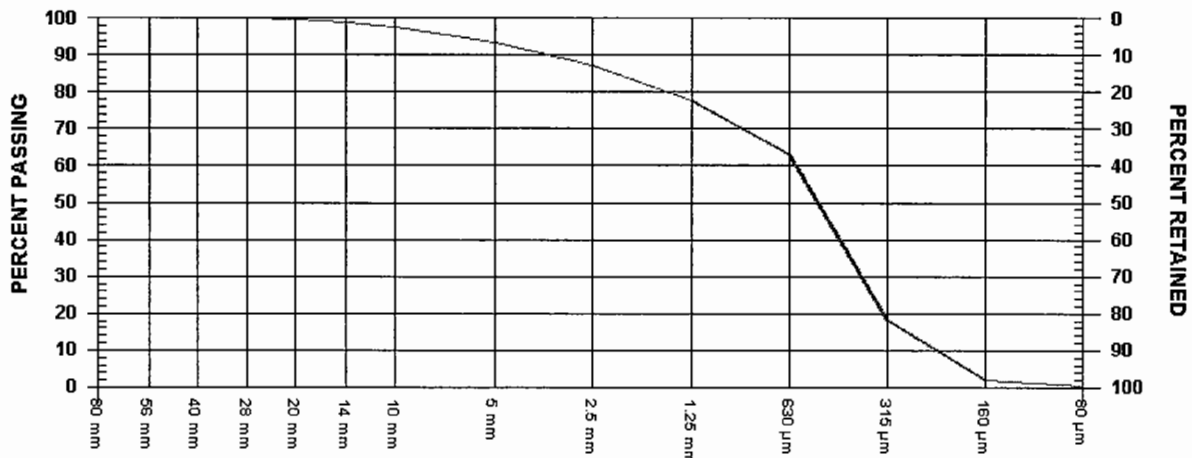
ATTN: Daryl Dufalt

PROJECT AMEC-Burnaby BC
Esker Sieves

CONTRACTOR

SIEVE TEST NO. 7

DATE TESTED 2004.Sep.24 DATE SAMPLED 2004.Sep.23

SUPPLIER
SOURCE
SPECIFICATION
MATERIAL TYPESAMPLED BY
TESTED BY
TEST METHOD WASHED

GRAVEL SIZES		PERCENT PASSING	GRADATION LIMITS
80	mm	100.0	
56	mm	100.0	
40	mm	100.0	
28	mm	100.0	
20	mm	99.7	
14	mm	98.9	
10	mm	97.7	

SAND SIZES AND FINES		PERCENT PASSING	GRADATION LIMITS
5	mm	93.4	
2.5	mm	87.2	
1.25	mm	77.5	
630	μm	63.3	
315	μm	18.1	
160	μm	1.9	
80	μm	0.4	

COMMENTS

A76, SA-7, 595544, 7034255

PROJECT NO. VM00351

CLIENT AMEC-Burnaby BC
C.C.TO
AMEC-Burnaby BC

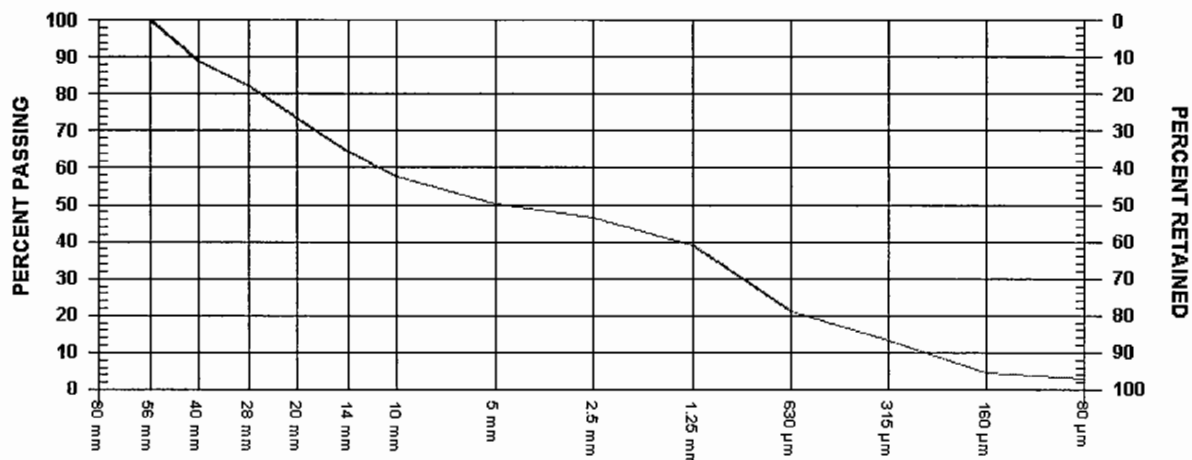
ATTN: Daryl Dufalt

PROJECT AMEC-Burnaby BC
Esker Sieves

CONTRACTOR

SIEVE TEST NO. 8

DATE TESTED 2004.Sep.24 DATE SAMPLED 2004.Sep.23

SUPPLIER
SOURCE
SPECIFICATION
MATERIAL TYPESAMPLED BY
TESTED BY
TEST METHOD WASHED

GRAVEL SIZES		PERCENT PASSING	GRADATION LIMITS
80	mm	100.0	
56	mm	100.0	
40	mm	89.0	
28	mm	82.3	
20	mm	73.5	
14	mm	64.5	
10	mm	57.8	

SAND SIZES AND FINES		PERCENT PASSING	GRADATION LIMITS
5	mm	50.2	
2.5	mm	46.5	
1.25	mm	38.9	
630	μm	21.3	
315	μm	13.4	
160	μm	4.7	
80	μm	3.0	

COMMENTS

A77, SA-8, 595918, 7034489

PROJECT NO. VM00351

CLIENT AMEC-Burnaby BC
C.C.TO
AMEC-Burnaby BC

ATTN: Daryl Dufalt

PROJECT AMEC-Burnaby BC
Esker Sieves

CONTRACTOR

SIEVE TEST NO. 9

DATE TESTED 2004.Sep.25 DATE SAMPLED 2004.Sep.24

SUPPLIER

SOURCE

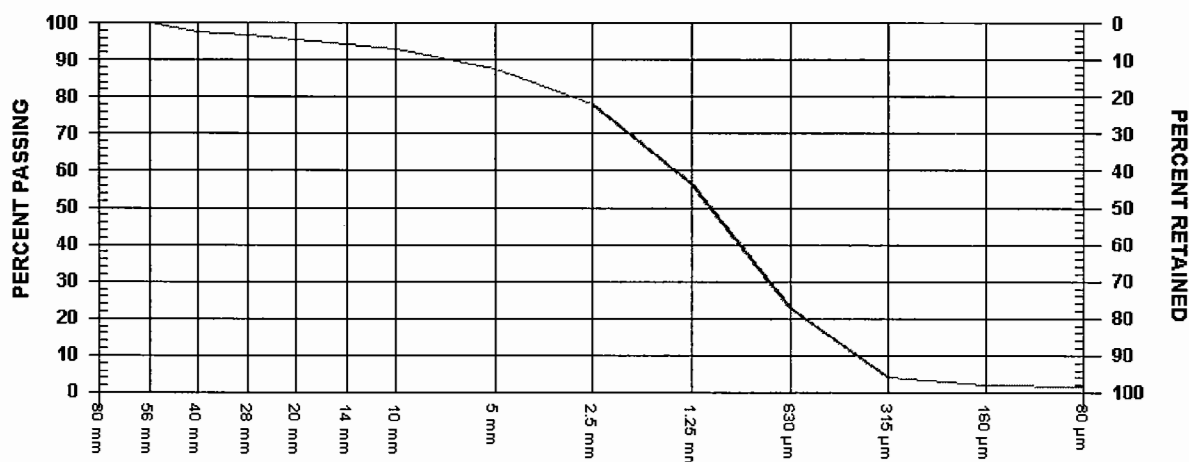
SPECIFICATION

MATERIAL TYPE

SAMPLED BY

TESTED BY

TEST METHOD WASHED



GRAVEL SIZES		PERCENT PASSING	GRADATION LIMITS
80	mm	100.0	
56	mm	100.0	
40	mm	97.7	
28	mm	96.7	
20	mm	95.5	
14	mm	94.4	
10	mm	92.8	

SAND SIZES AND FINES		PERCENT PASSING	GRADATION LIMITS
5	mm	87.7	
2.5	mm	77.9	
1.25	mm	56.3	
630	μm	23.0	
315	μm	4.1	
160	μm	2.1	
80	μm	1.8	

COMMENTS

A78, SA-9, 584930, 7033301

PROJECT NO. VM00351

CLIENT AMEC-Burnaby BC
C.C.TO
AMEC-Burnaby BC

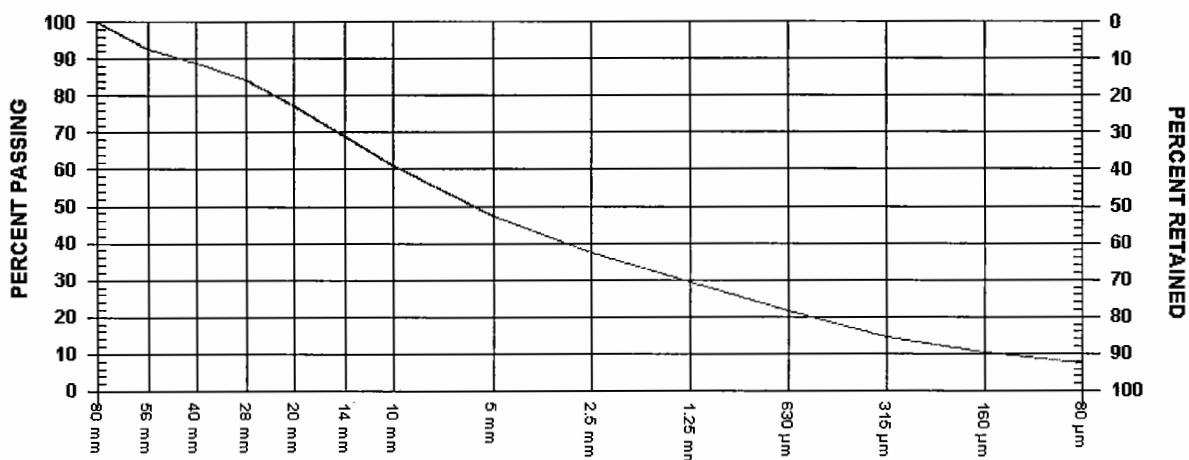
ATTN: Daryl Dufalt

PROJECT AMEC-Burnaby BC
Esker Sieves

CONTRACTOR

SIEVE TEST NO. 10

DATE TESTED 2004.Sep.25 DATE SAMPLED 2004.Sep.24

SUPPLIER
SOURCE
SPECIFICATION
MATERIAL TYPESAMPLED BY
TESTED BY
TEST METHOD WASHED

GRAVEL SIZES		PERCENT PASSING	GRADATION LIMITS
80	mm	100.0	
56	mm	92.6	
40	mm	88.7	
28	mm	84.4	
20	mm	77.4	
14	mm	69.1	
10	mm	60.8	

SAND SIZES AND FINES		PERCENT PASSING	GRADATION LIMITS
5	mm	47.3	
2.5	mm	37.4	
1.25	mm	29.5	
630	μm	21.6	
315	μm	14.4	
160	μm	10.4	
80	μm	7.6	

COMMENTS

A79, SA-10, 584730, 7033236

PROJECT NO. VM00351
CLIENT AMEC-Burnaby BC
C.C.TO
AMEC-Burnaby BC

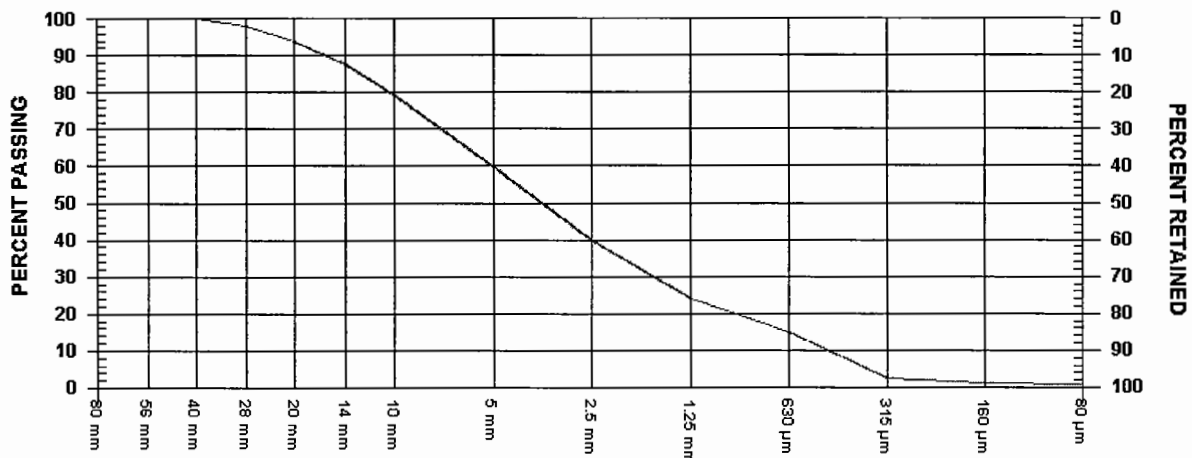
ATTN: Daryl Dufalt

PROJECT AMEC-Burnaby BC
Esker Sieves

CONTRACTOR

SIEVE TEST NO. 11

DATE TESTED 2004.Sep.25 DATE SAMPLED 2004.Sep.24

SUPPLIER
SOURCE
SPECIFICATION
MATERIAL TYPESAMPLED BY
TESTED BY
TEST METHOD WASHED

GRAVEL SIZES		PERCENT PASSING	GRADATION LIMITS
80	mm	100.0	
56	mm	100.0	
40	mm	100.0	
28	mm	97.9	
20	mm	94.0	
14	mm	87.7	
10	mm	79.4	

SAND SIZES AND FINES		PERCENT PASSING	GRADATION LIMITS
5	mm	59.6	
2.5	mm	39.7	
1.25	mm	24.2	
630	μm	14.8	
315	μm	2.6	
160	μm	1.1	
80	μm	0.9	

COMMENTS

A80, SA-11, 584583, 7033140

PROJECT NO. VM00351

CLIENT AMEC-Burnaby BC
C.C.TO
AMEC-Burnaby BC

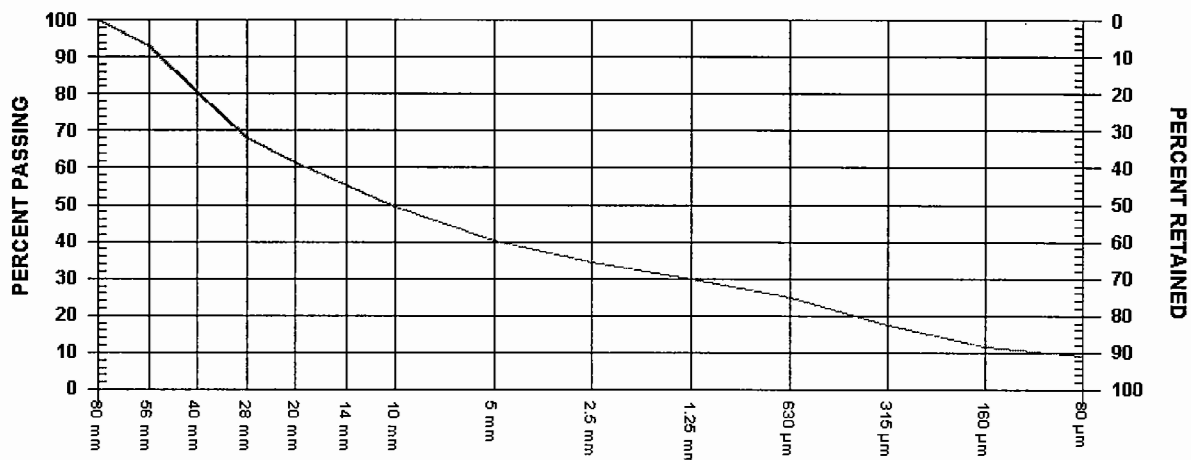
ATTN: Daryl Dufalt

PROJECT AMEC-Burnaby BC
Esker Sieves

CONTRACTOR

SIEVE TEST NO. 12

DATE TESTED 2004.Sep.25 DATE SAMPLED 2004.Sep.24

SUPPLIER
SOURCE
SPECIFICATION
MATERIAL TYPESAMPLED BY
TESTED BY
TEST METHOD WASHED

GRAVEL SIZES		PERCENT PASSING	GRADATION LIMITS
80	mm	100.0	
56	mm	92.9	
40	mm	80.4	
28	mm	68.2	
20	mm	61.3	
14	mm	55.3	
10	mm	49.6	

SAND SIZES AND FINES		PERCENT PASSING	GRADATION LIMITS
5	mm	40.3	
2.5	mm	34.5	
1.25	mm	30.0	
630	μm	25.1	
315	μm	17.6	
160	μm	11.8	
80	μm	9.1	

COMMENTS

A81, SA-12, 584445, 7032926

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REPORT
CSA 23.1-80 SERIES

4810 - 93 Street
 Edmonton, AB T6E 5M4



PROJECT NO. VM00351
 CLIENT AMEC-Burnaby BC
 C.C.

TO [AMEC-Burnaby BC

ATTN: Daryl Dufalt

PROJECT AMEC-Burnaby BC
 Esker Sieves

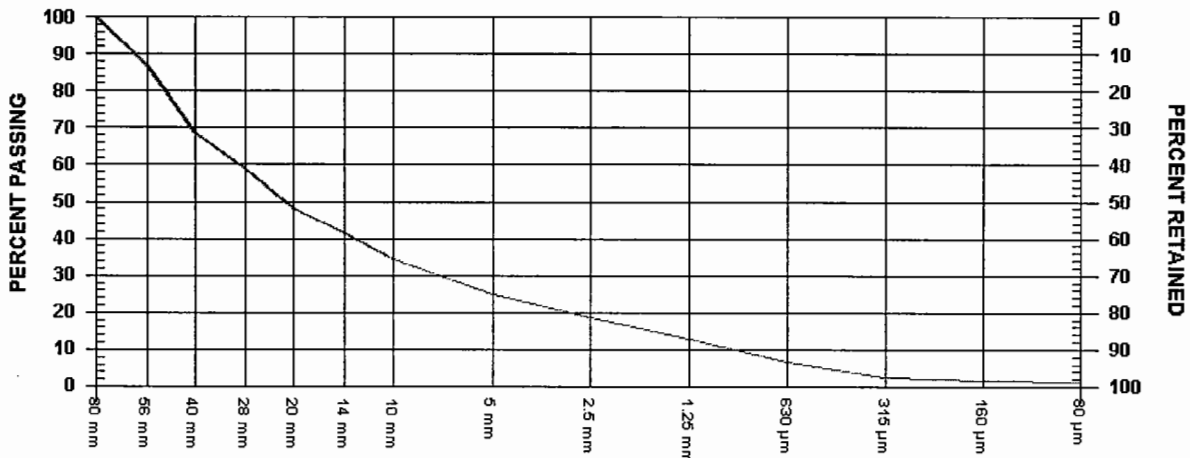
CONTRACTOR

SIEVE TEST NO. 13

DATE TESTED 2004.Sep.25 DATE SAMPLED 2004.Sep.24

SUPPLIER
 SOURCE
 SPECIFICATION
 MATERIAL TYPE

SAMPLED BY
 TESTED BY
 TEST METHOD WASHED



GRAVEL SIZES		PERCENT PASSING	GRADATION LIMITS
80	mm	100.0	
56	mm	86.9	
40	mm	68.6	
28	mm	59.1	
20	mm	48.2	
14	mm	41.3	
10	mm	34.5	

SAND SIZES AND FINES		PERCENT PASSING	GRADATION LIMITS
5	mm	25.1	
2.5	mm	18.8	
1.25	mm	12.9	
630	µm	6.6	
315	µm	2.6	
160	µm	1.7	
80	µm	1.2	

COMMENTS
 A82, SA-13, 584354, 7032852

PER. 

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REPORT
CSA 23.1-80 SERIES

4810 - 93 Street
 Edmonton, AB T6E 5M4



PROJECT NO. VM00351
 CLIENT AMEC-Burnaby BC
 C.C.

TO AMEC-Burnaby BC

ATTN: Daryl Dufalt

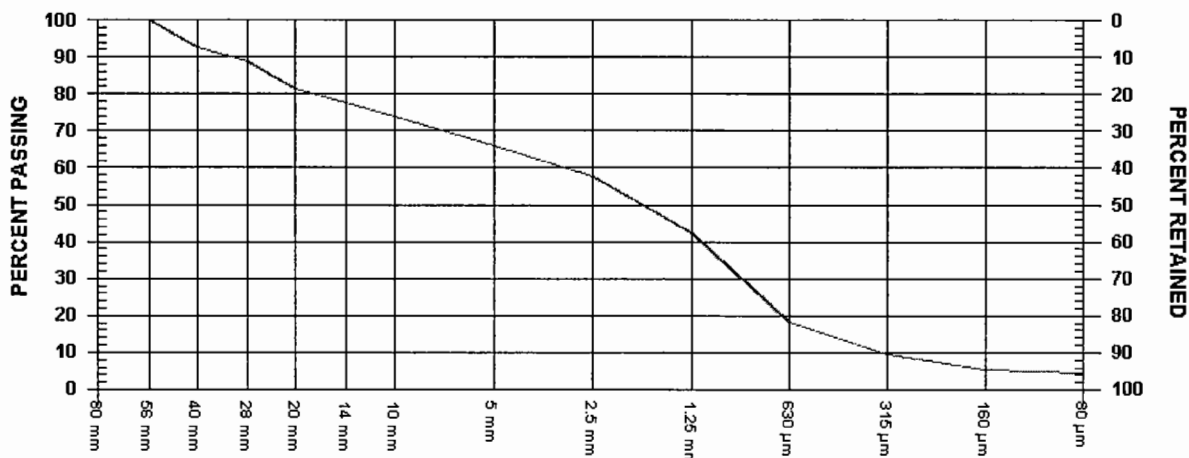
PROJECT AMEC-Burnaby BC
 Esker Sieves
 CONTRACTOR

SIEVE TEST NO. 14

DATE TESTED 2004.Sep.25 DATE SAMPLED 2004.Sep.24

SUPPLIER
 SOURCE
 SPECIFICATION
 MATERIAL TYPE

SAMPLED BY
 TESTED BY
 TEST METHOD WASHED



GRAVEL SIZES		PERCENT PASSING	GRADATION LIMITS
80	mm	100.0	
56	mm	100.0	
40	mm	92.6	
28	mm	88.9	
20	mm	81.5	
14	mm	77.7	
10	mm	73.7	

SAND SIZES AND FINES		PERCENT PASSING	GRADATION LIMITS
5	mm	66.1	
2.5	mm	57.8	
1.25	mm	42.4	
630	μm	18.4	
315	μm	9.7	
160	μm	5.5	
80	μm	4.5	

COMMENTS
 A83, SA-14, 584247, 7032699

PROJECT NO. VM00351

CLIENT AMEC-Burnaby BC
C.C.TO
AMEC-Burnaby BC

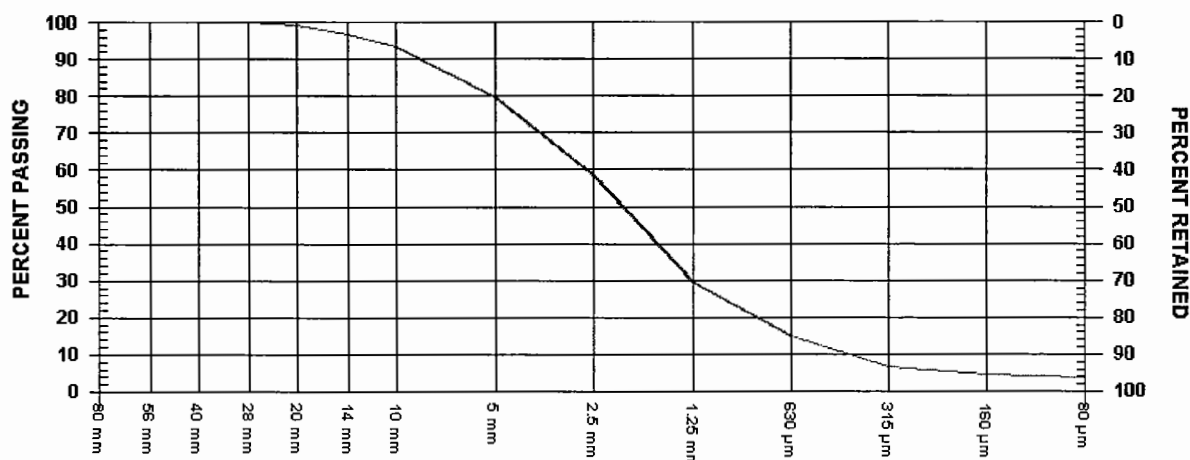
ATTN: Daryl Dufalt

PROJECT AMEC-Burnaby BC
Esker Sieves

CONTRACTOR

SIEVE TEST NO. 15

DATE TESTED 2004.Sep.25 DATE SAMPLED 2004.Sep.24

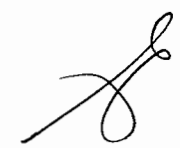
SUPPLIER
SOURCE
SPECIFICATION
MATERIAL TYPESAMPLED BY
TESTED BY
TEST METHOD WASHED

GRAVEL SIZES		PERCENT PASSING	GRADATION LIMITS
80	mm	100.0	
56	mm	100.0	
40	mm	100.0	
28	mm	100.0	
20	mm	99.1	
14	mm	96.7	
10	mm	93.3	

SAND SIZES AND FINES		PERCENT PASSING	GRADATION LIMITS
5	mm	79.6	
2.5	mm	58.6	
1.25	mm	29.3	
630	μm	15.0	
315	μm	6.5	
160	μm	4.4	
80	μm	3.9	

COMMENTS

A84, SA-15, 584084, 7032660

PER. 

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REPORT
CSA 23.1-80 SERIES

4810 - 93 Street
 Edmonton, AB T6E 5M4



PROJECT NO. VM00351
 CLIENT AMEC-Burnaby BC
 C.C.

TO AMEC-Burnaby BC

ATTN: Daryl Dufalt

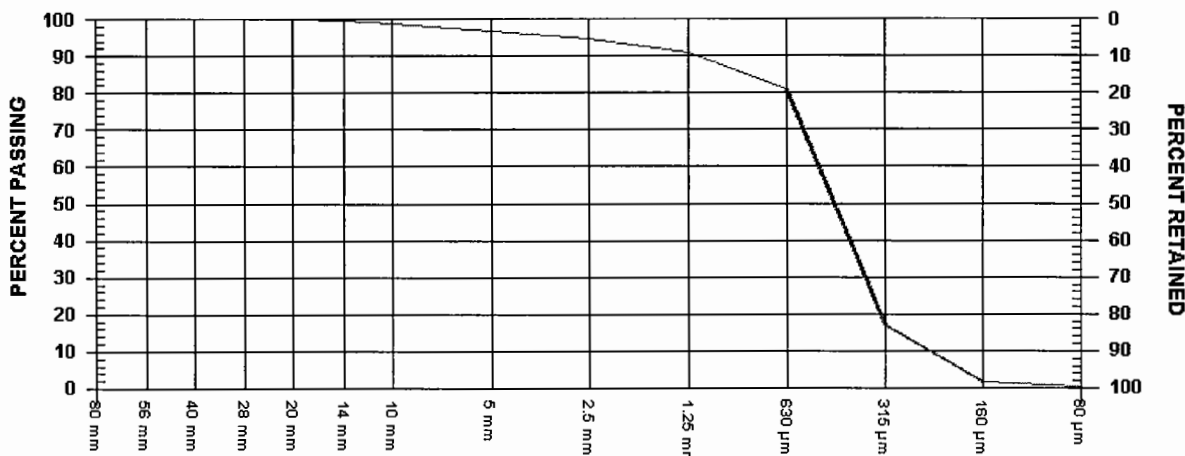
PROJECT AMEC-Burnaby BC
 Esker Sieves
 CONTRACTOR

SIEVE TEST NO. 16

DATE TESTED 2004.Sep.25 DATE SAMPLED 2004.Sep.24

SUPPLIER
 SOURCE
 SPECIFICATION
 MATERIAL TYPE

SAMPLED BY
 TESTED BY
 TEST METHOD WASHED



GRAVEL SIZES		PERCENT PASSING	GRADATION LIMITS
80	mm	100.0	
56	mm	100.0	
40	mm	100.0	
28	mm	100.0	
20	mm	100.0	
14	mm	99.7	
10	mm	98.6	

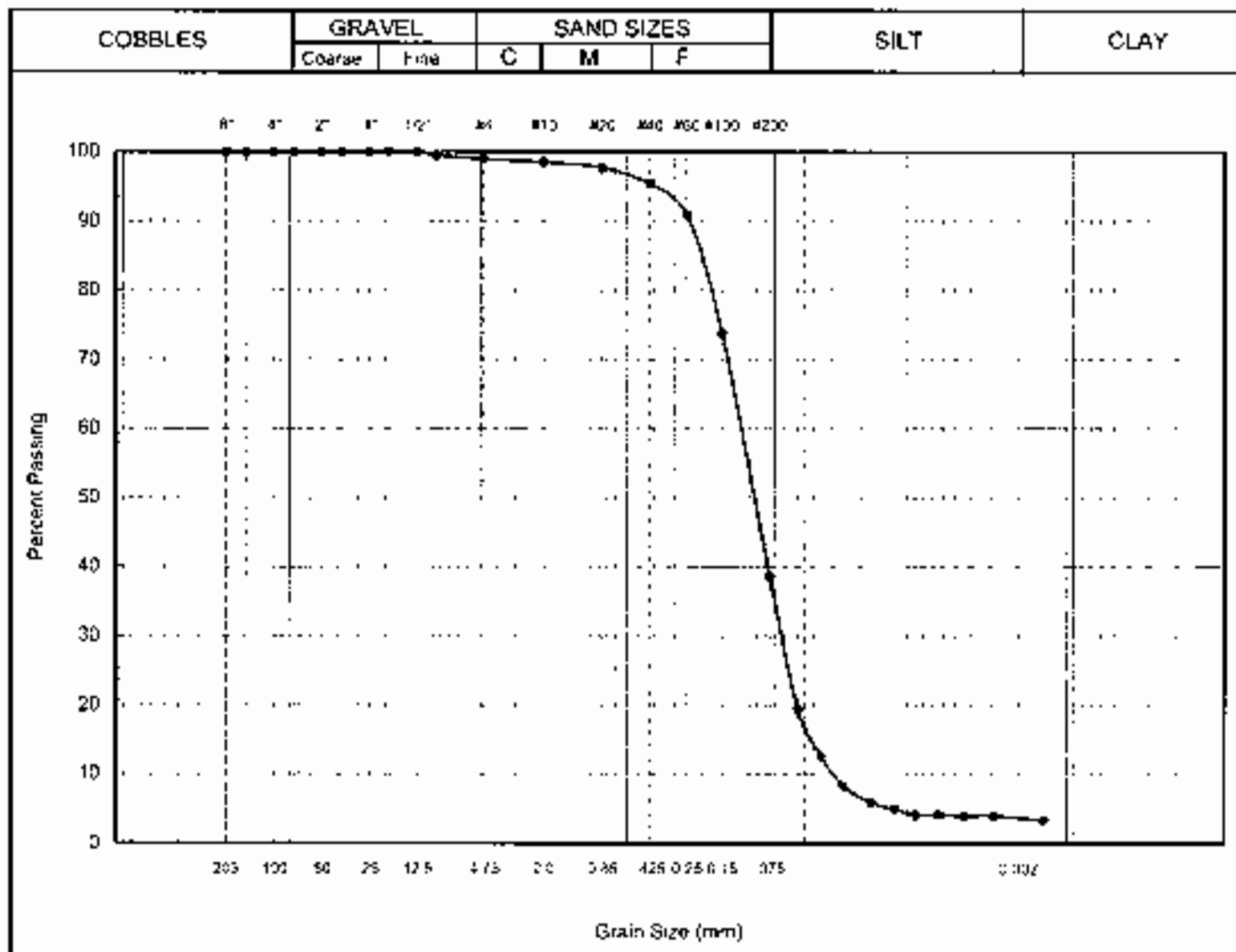
SAND SIZES AND FINES		PERCENT PASSING	GRADATION LIMITS
5	mm	96.6	
2.5	mm	94.5	
1.25	mm	90.9	
630	µm	81.1	
315	µm	17.1	
160	µm	1.7	
80	µm	0.4	

COMMENTS

A85, SA-16, 583966, 7032598

HYDROMETER TEST

AMEC Earth & Environmental



Remarks:

Atterberg Limits = Non plastic

Summary

D10 = 0.0295 mm	Gravel	1	%
D30 = 0.0537 mm	Sand	60	%
D60 = 0.1206 mm	Silt	35	%
Cu = 4.09	Clay	4	%
Cc = 1.14			

Project No: VM00351
Hole No: MPV-04-192
Depth (m): 4.65-4.70

Location: Gahcho Kue Diamond Project
Sample: SA 3
Technician: LR

Date: 16-Jul-04

SIEVE ANALYSIS REPORT

AMEC Earth & Environmental



To: AMEC E & C Services Ltd.
400 111 Dunsmuir Street
Vancouver, B.C. V6B 5W3

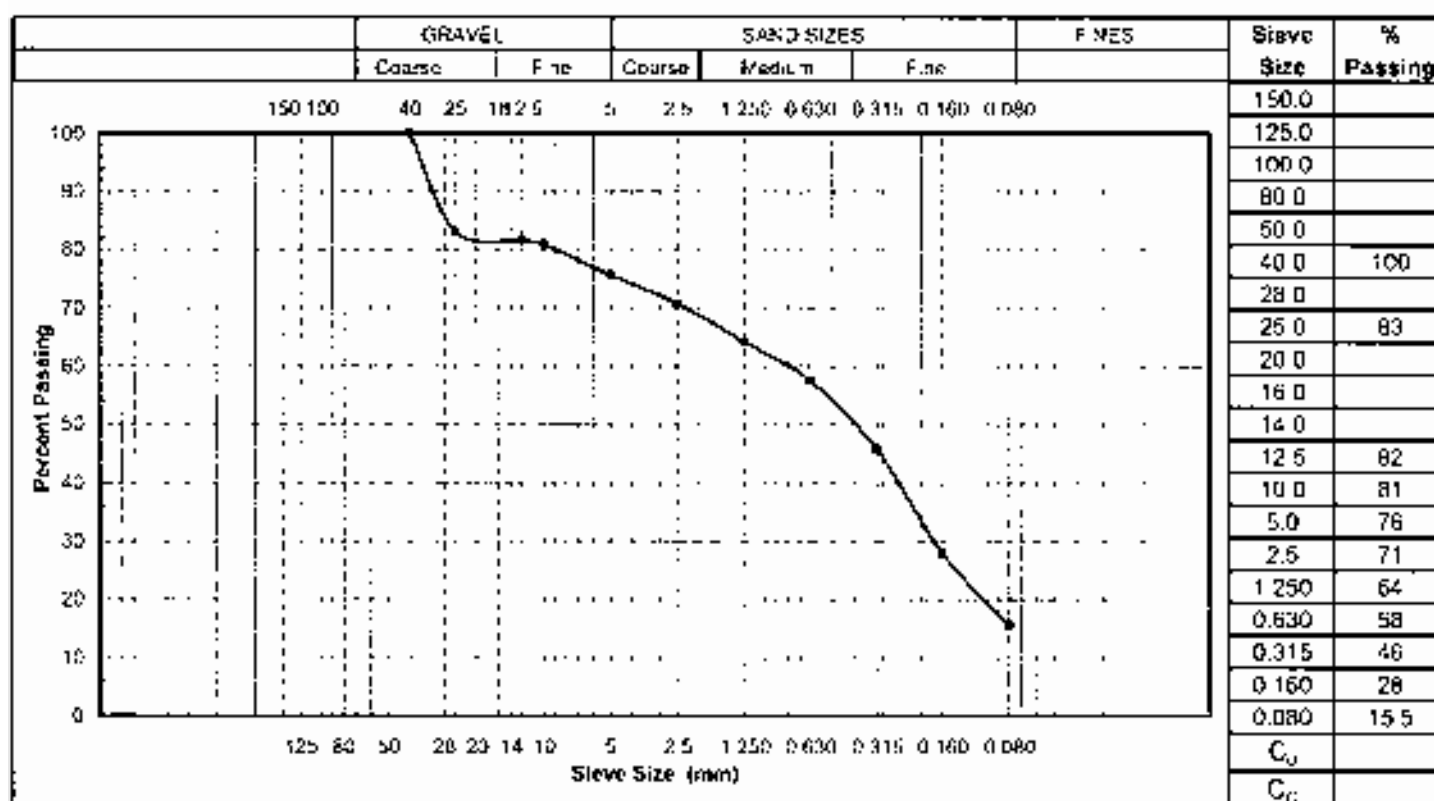
Office : Calgary
Project No: VM00351
Client : AMEC E & C Services Ltd.
Copies to :

Attn: Todd Martin

Project: Gahcho Kue Diamond Project

Sample ID: MPV-04-192, SA 4 Sample Type: Sampled By: AMEC

Date Sampled: 04-Apr-04 Date Received: Date Tested: 08-Jul-04



Source: MPV-04-192, Sample 4

Sample Description: 5.9 m - 6.0 m

Comments: No specs.

AMEC Earth & Environmental

Per: _____

SIEVE ANALYSIS REPORT

AMEC Earth & Environmental



To: AMEC E & C Services Ltd.
400 111 Dunsmuir Street
Vancouver, B.C. V6B 5W3

Office : Calgary
Project No: VM00351
Client : AMEC E & C Services Ltd.
Copies to :

Attn: Todd Martin

Project: Gahcho Kue Diamond Project

Sample ID: MPV-04-192, SA 6

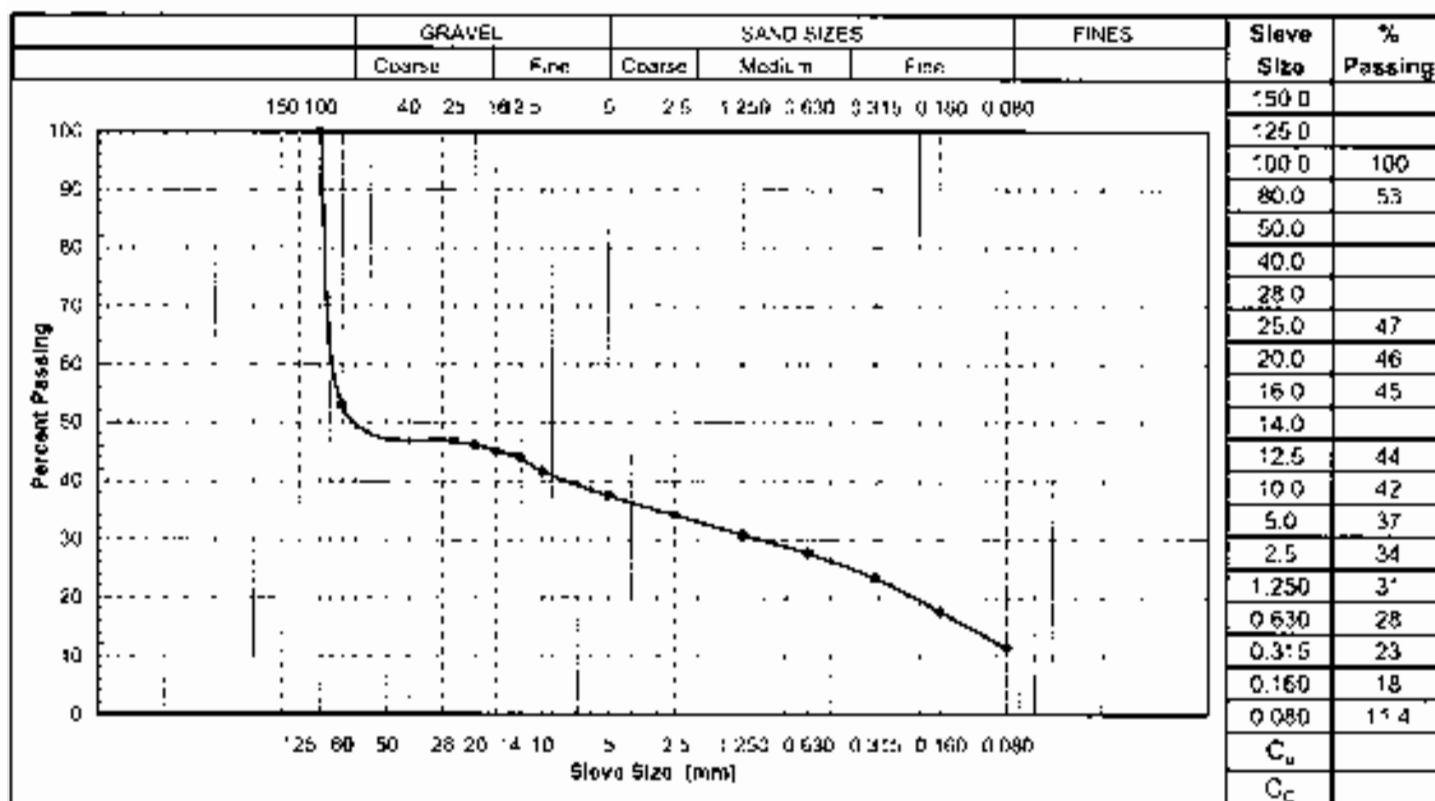
Sample Type:

Sampled By: AMEC

Date Sampled:

Date Received:

Date Tested: 16-Jul-04



Source: MPV-04-192, Sample 6

Sample Description: 6.85 m x 7.0 m

Comments: No specs.

AMEC Earth & Environmental

Per: _____

AMEC Earth & Environmental

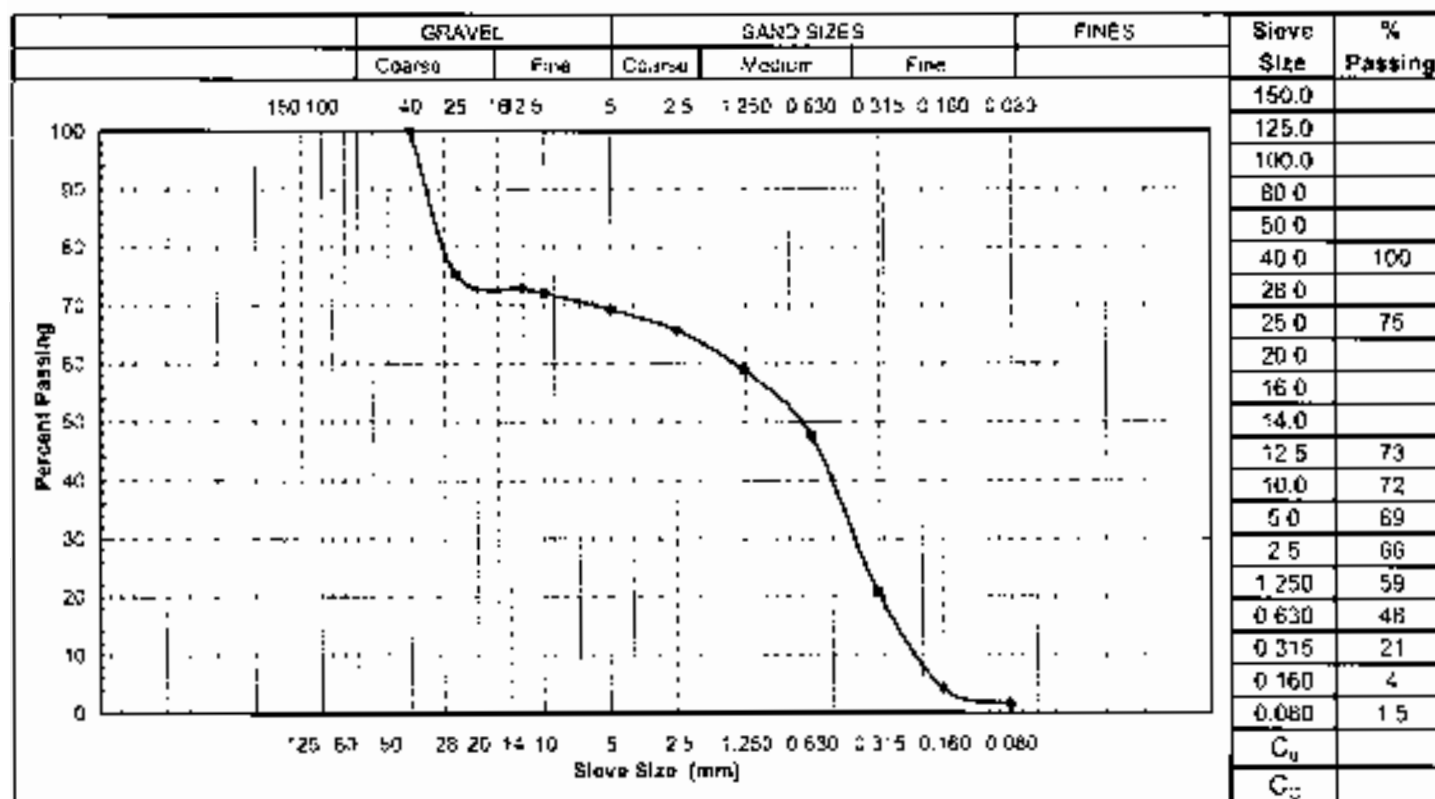


Office : Calgary
Project No: VM00351
Client : AMEC E & C Services Ltd.
Copies to :

Attn: Todd Martin

Project: Gahcho Kue Diamond Project

Sample ID:	MPV-04-194. SA 1	Sample Type:		Sampled By:	AMEC
Date Sampled:	08-Apr-04	Date Received:		Date Tested:	05-Jul-04



Source: MPV-04-194, Sample 1
Sample Description: 0.95 m - 1.05 m
Comments: No specs.

AMEC Earth & Environmental

Per: _____

SIEVE ANALYSIS REPORT

AMEC Earth & Environmental



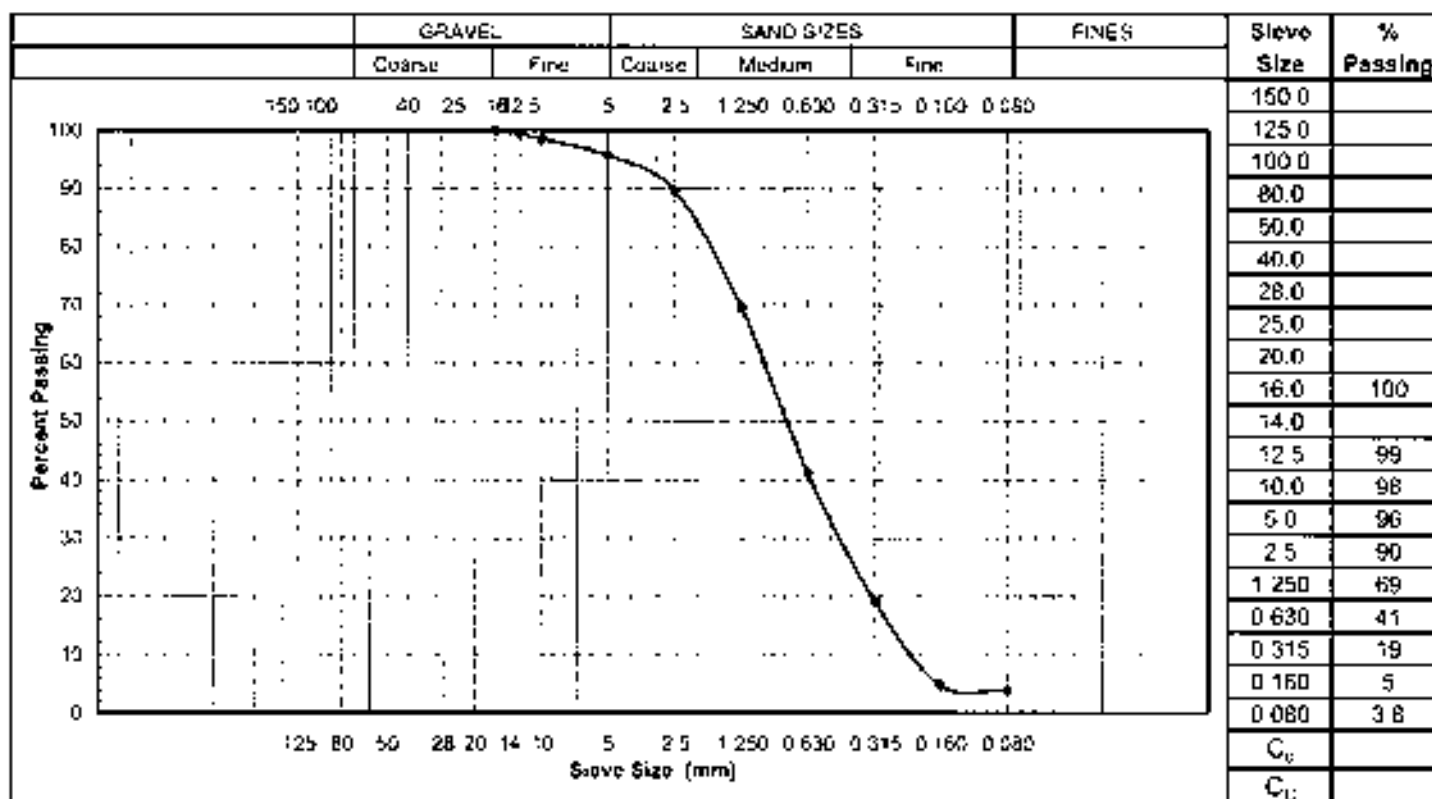
To: AMEC E & C Services Ltd.
400 111 Dunsmuir Street
Vancouver, B.C. V6B 5W3

Office : Calgary
Project No: VM00351
Client : AMEC E & C Services Ltd.
Copies to :

Attn: Todd Marlin

Project: Gahcho Kue Diamond Project

Sample ID: MPV-04-194, SA 2 Sample Type: Sampled By: AMEC
Date Sampled: 08-Apr-04 Date Received: Date Tested: 08-Jul-04



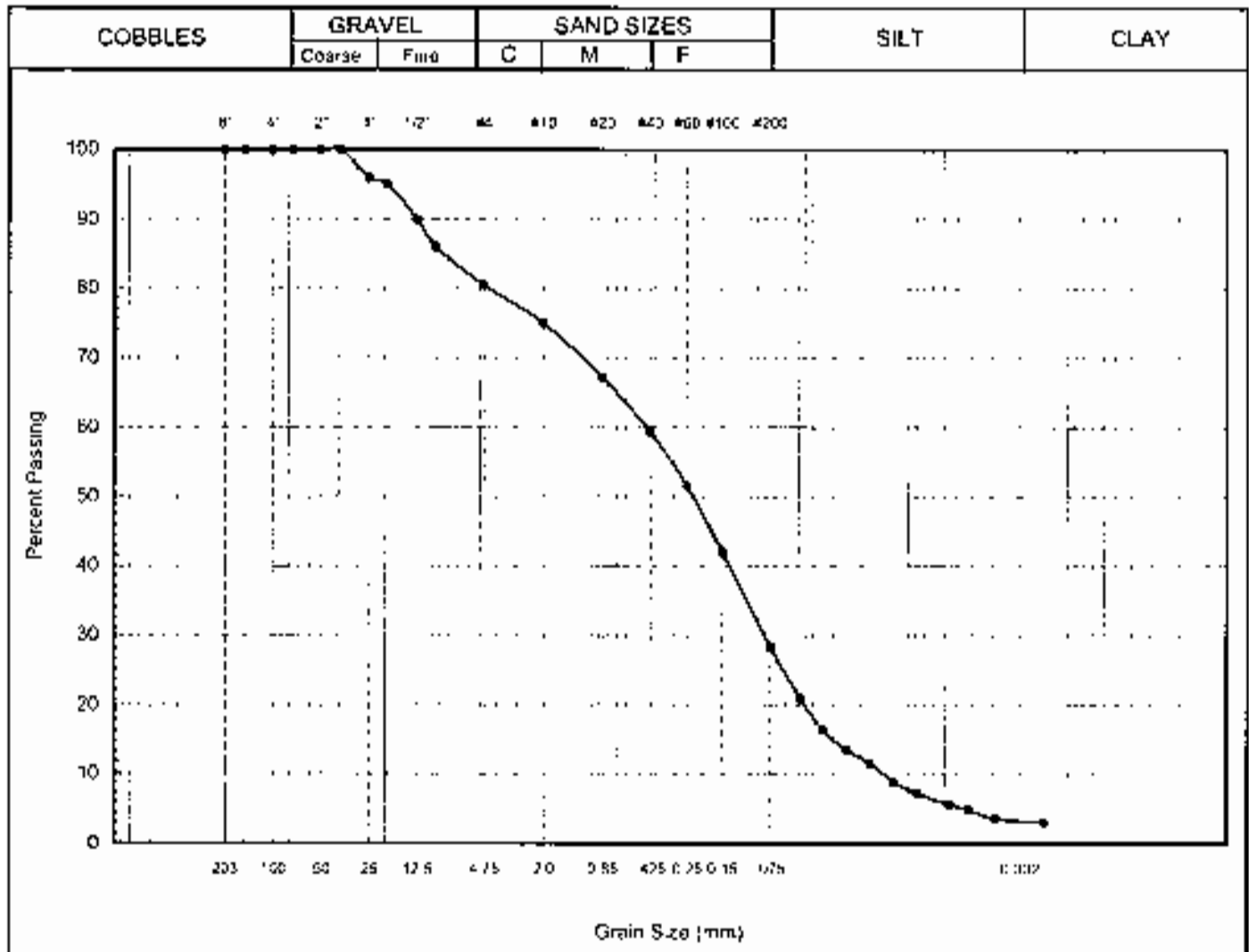
Source: MPV-04-194, Sample 2
Sample Description: 1.6 m x 1.7 m
Comments: No specs.

AMEC Earth & Environmental

Per: _____

HYDROMETER TEST

AMEC Earth & Environmental



Remarks:

Atterberg Limits = Non plastic

Summary

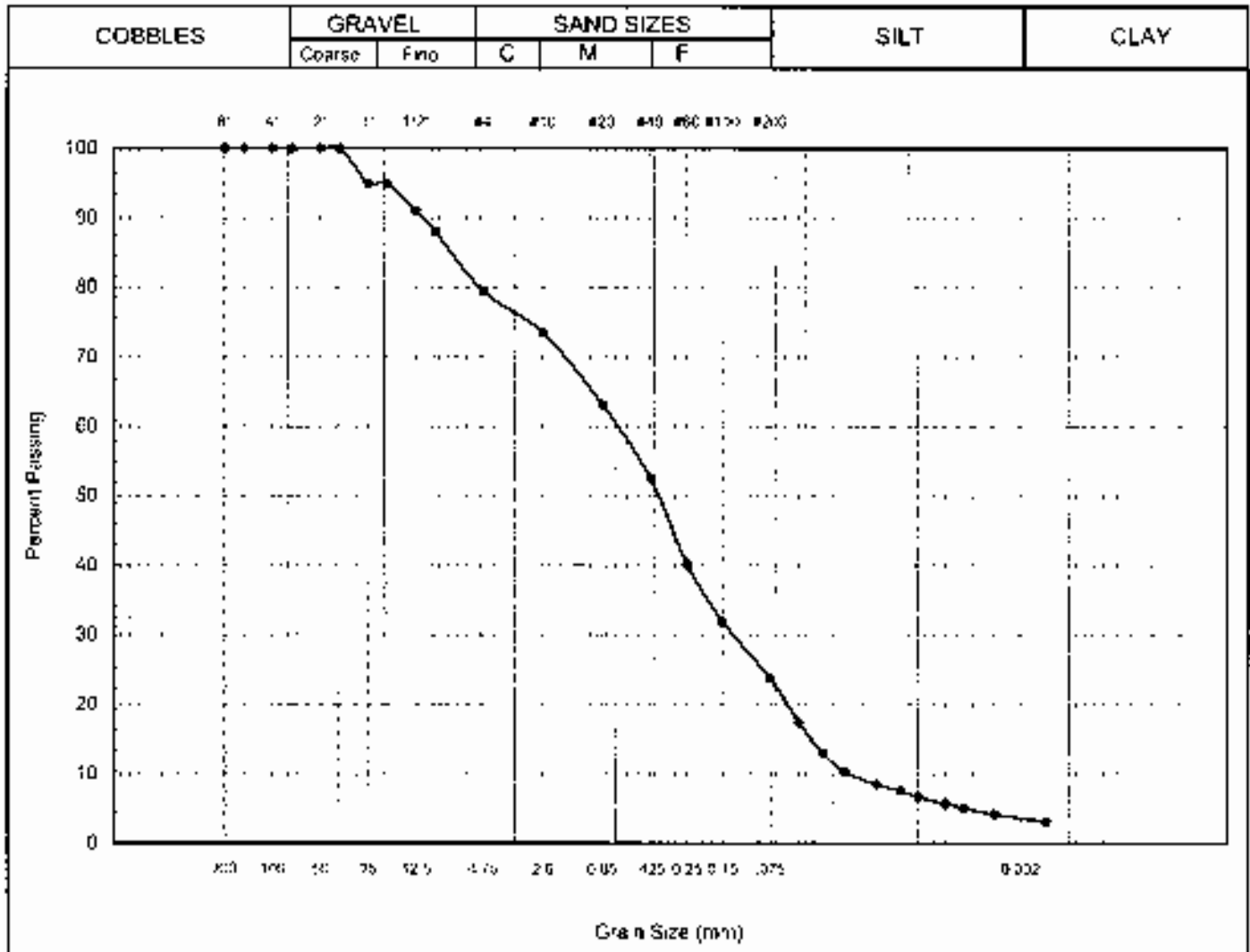
D10 = 0.0147 mm	Gravel	20	%
D30 = 0.0840 mm	Sand	52	%
D60 = 0.4653 mm	Silt	25	%
Cu = 31.76	Clay	3	%
Cc = 1.03			

Project No: VM00351
Hole No: MPV-04-195
Depth (m): 0.65-0.75

Location: Gahcho Kue Diamond Project
Sample: SA 1
Technician: LR

Date: 16-Jul-04

HYDROMETER TEST
AMEC Earth & Environmental



Remarks:

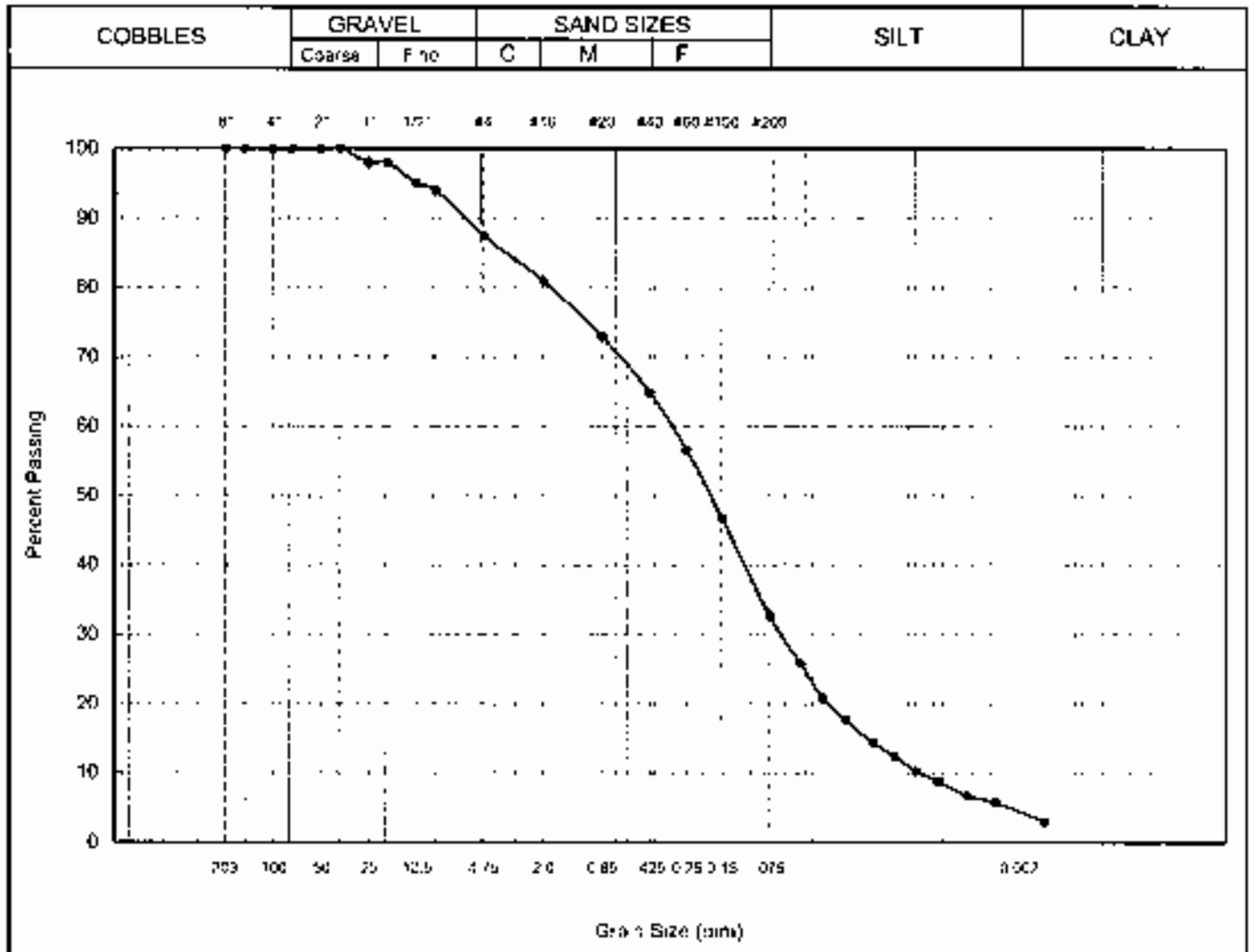
Summary			
D ₁₀ =	0.0240 mm	Gravel	21 %
D ₃₀ =	0.1322 mm	Sand	56 %
D ₆₀ =	0.7209 mm	Silt	19 %
C _u =	30.02	Clay	4 %
C _c =	1.01		

Project No: VM00351
Hole No: MPV-04-195
Depth (m): 0.9-1.0

Location: Gahcho Kue Diamond Project
Sample: SA 2
Technician: LR

Date: 16-Jul-04

HYDROMETER TEST
AMEC Earth & Environmental



SIEVE ANALYSIS REPORT

AMEC Earth & Environmental



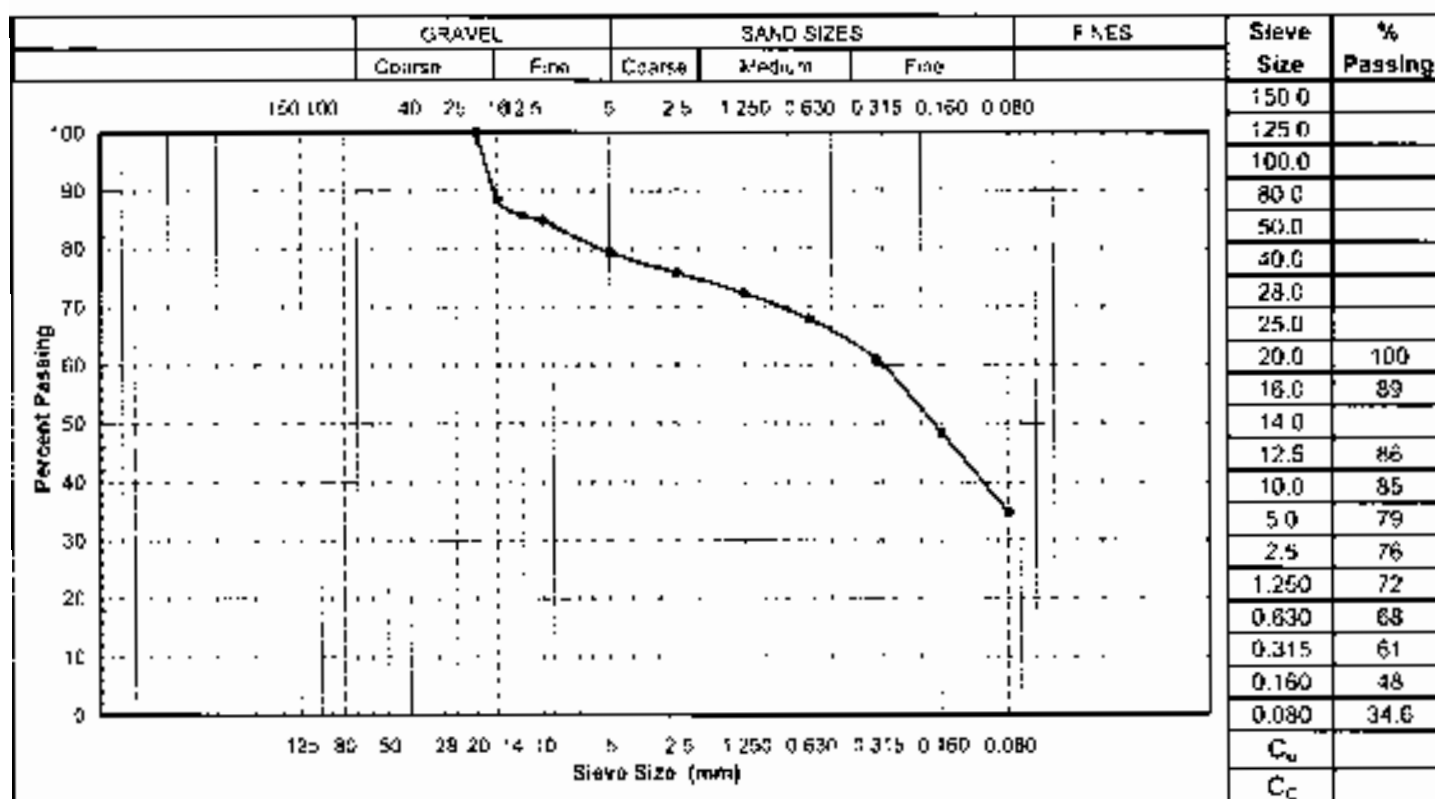
To: AMEC E & C Services Ltd.
400 111 Dunsmuir Street
Vancouver, B.C. V6B 5W3

Office : Calgary
Project No: VM00351
Client : AMEC E & C Services Ltd.
Copies to :

Attn: Todd Martin

Project: Gahcho Kue Diamond Project

Sample ID: MPV-04-197, SA 1 Sample Type: Sampled By: AMEC
Date Sampled: 11-Apr-04 Date Received: Date Tested: 08-Jul-04



Source: MPV-04-197, Sample 1
Sample Description: 1.08 m - 1.45 m
Comments: No specs.

AMEC Earth & Environmental

Per: _____

AMEC Earth & Environmental

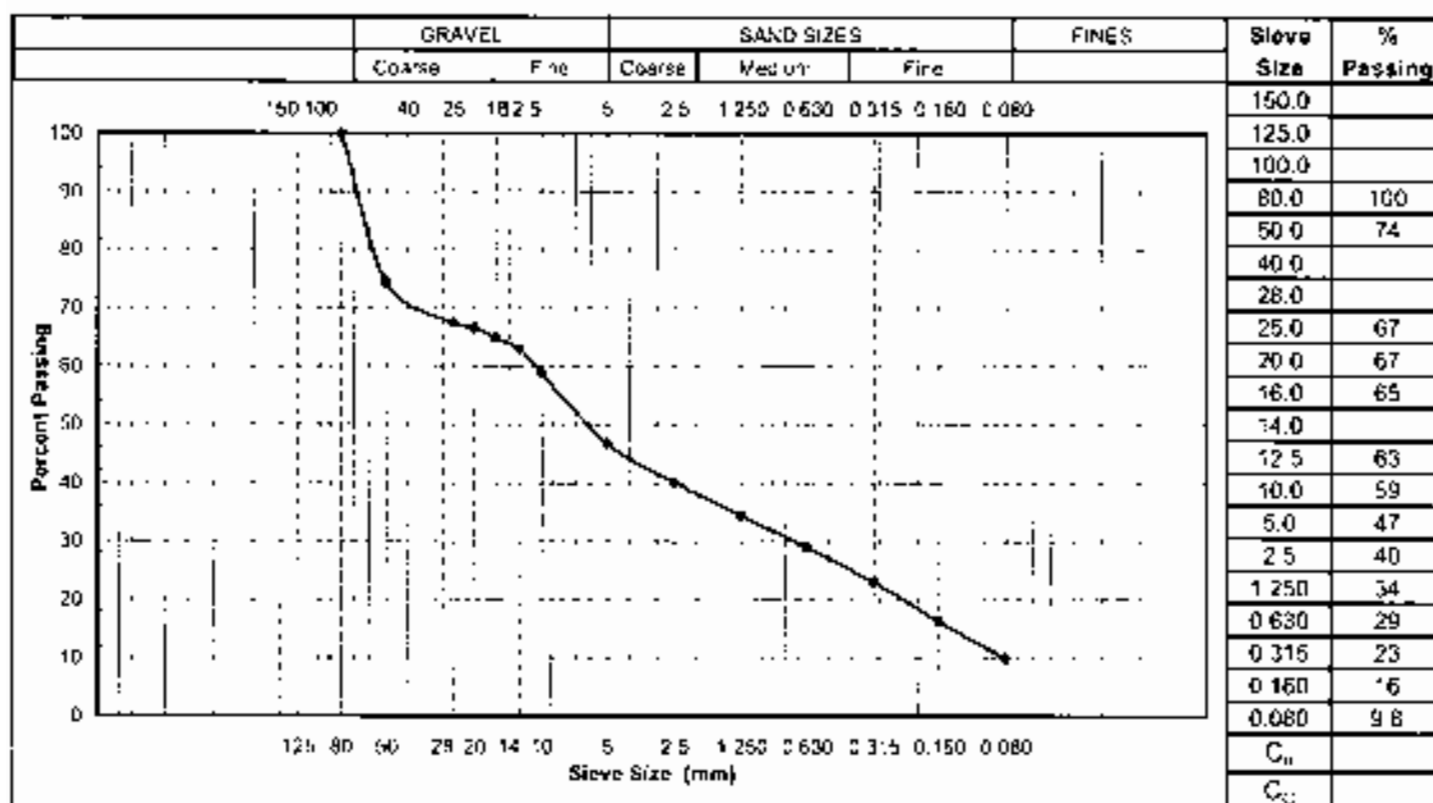


Office : Calgary
Project No: VM00351
Client : AMEC E & C Services Ltd.
Copies to :

ALLN: Todd Martin

Project: Gahcho Kue Diamond Project

Sample ID:	MPV-04-204, SA 4	Sample Type:		Sampled By:	AMEC
Date Sampled:		Date Received:		Date Tested:	16-Jul-04



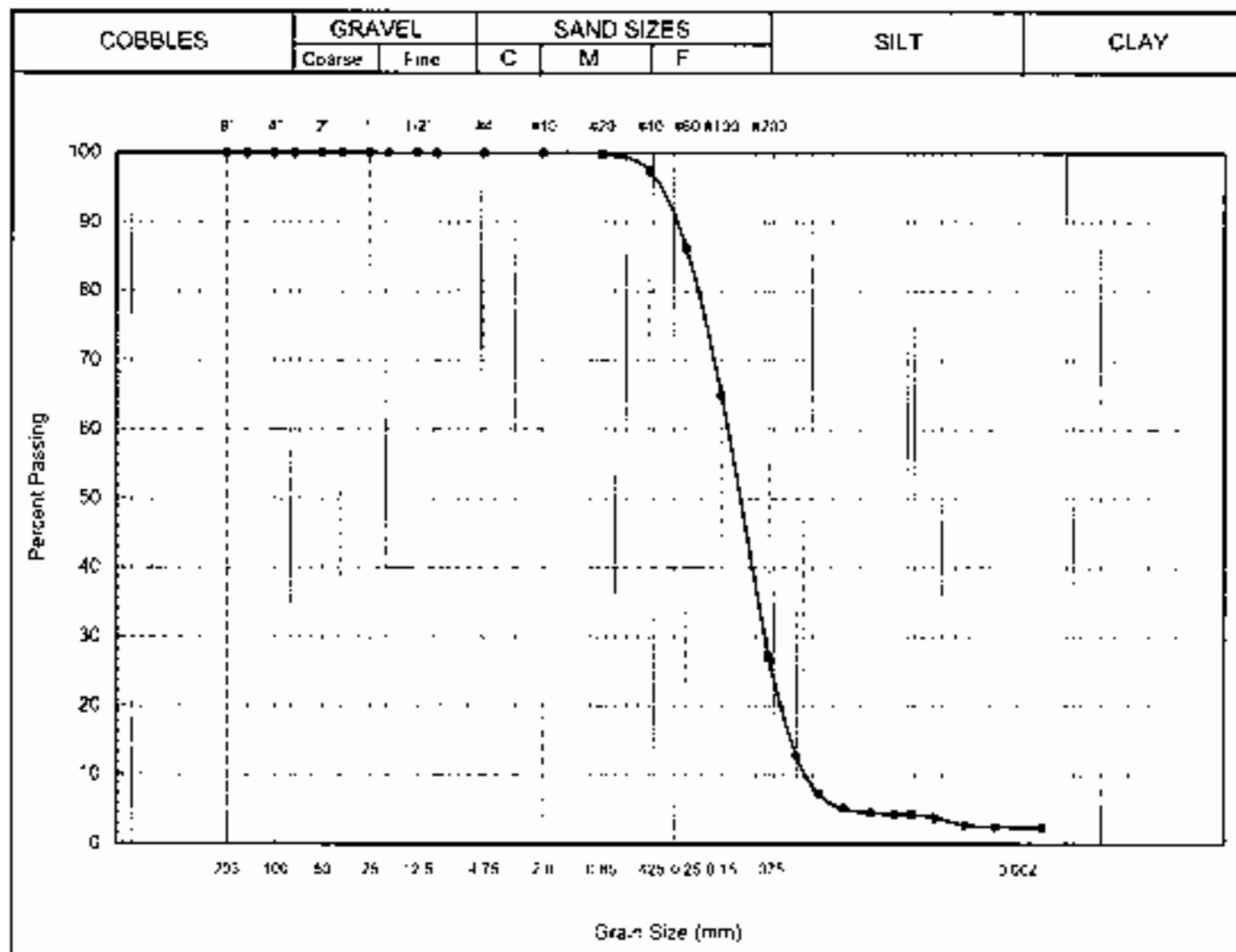
Source: MPV-04-204, Sample 4
Sample Description: 4.0 m - 4.17 m
Comments: No specs.

AMEC Earth & Environmental

Per: _____

HYDROMETER TEST

AMEC Earth & Environmental



Remarks:

Atterberg Limits = non-plastic.

Summary

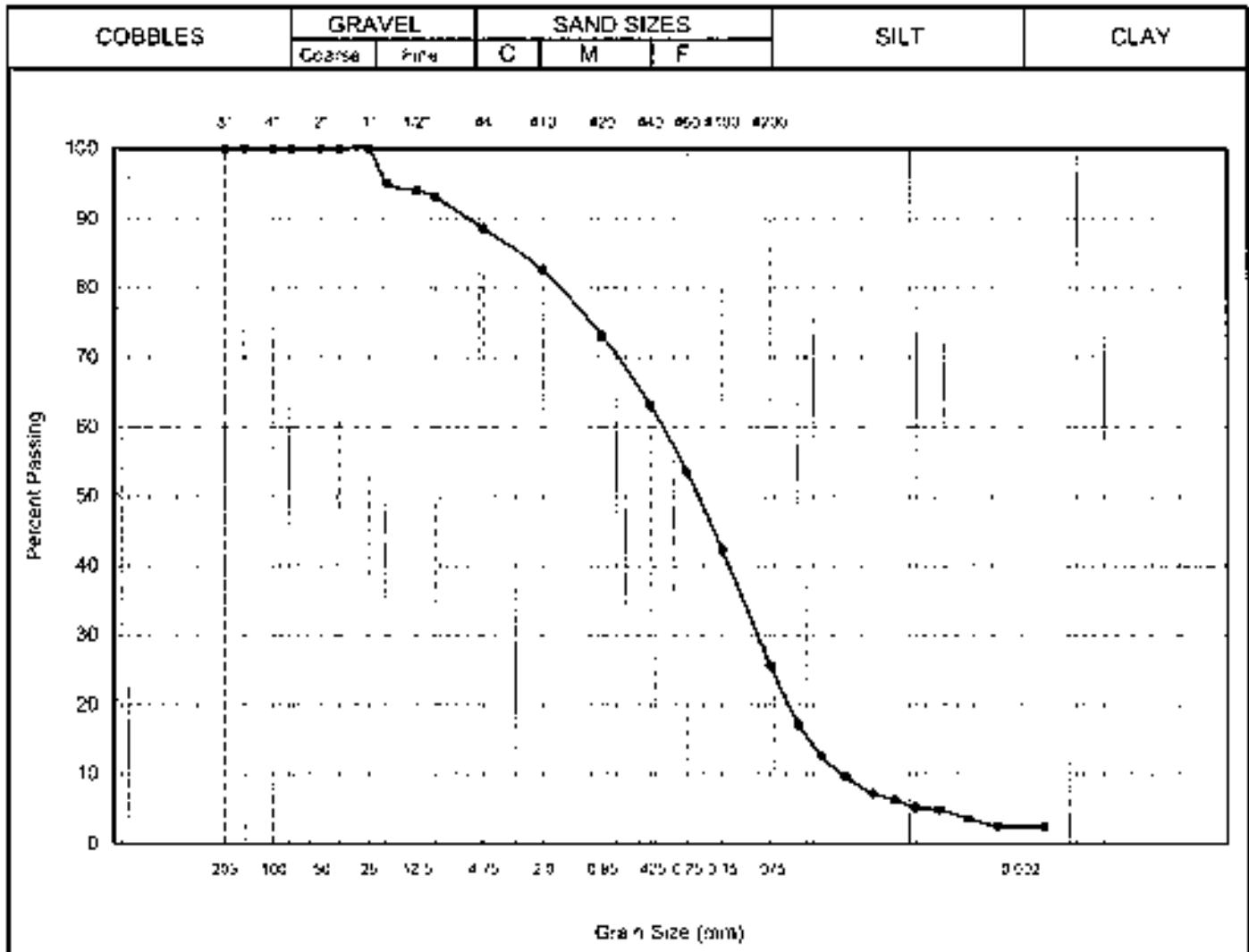
D10 = 0.0431 mm	Gravel	0	%
D30 = 0.0807 mm	Sand	73	%
D60 = 0.1402 mm	Silt	25	%
Cu = 3.25	Clay	2	%
Cc = 1.08			

Project No: VM00351
Hole No: MPV-04-204
Depth (m): 4.3-4.4

Location: Gahcho Kue Diamond Project
Sample: SA 5
Technician: LR

Date: 16-Jul-04

HYDROMETER TEST
AMEC Earth & Environmental



Remarks:

Atterberg Limits = non-plastic

Summary

D10 = 0.0267 mm	Gravel	12	%
D30 = 0.0948 mm	Sand	63	%
D60 = 0.3689 mm	Silt	22	%
Cu = 13.81	Clay	3	%
Cc = 0.91			

Project No: VM00351
Hole No: MPV-04-205
Depth (m): 0.85-0.90

Location: Gahcho Kue Diamond Project
Sample: SA 1
Technician: LR

Date: 16-Jul-04

SIEVE ANALYSIS REPORT

AMEC Earth & Environmental



To: AMEC E & C Services Ltd.
400 111 Dunsmuir Street
Vancouver, B.C. V6B 5W3

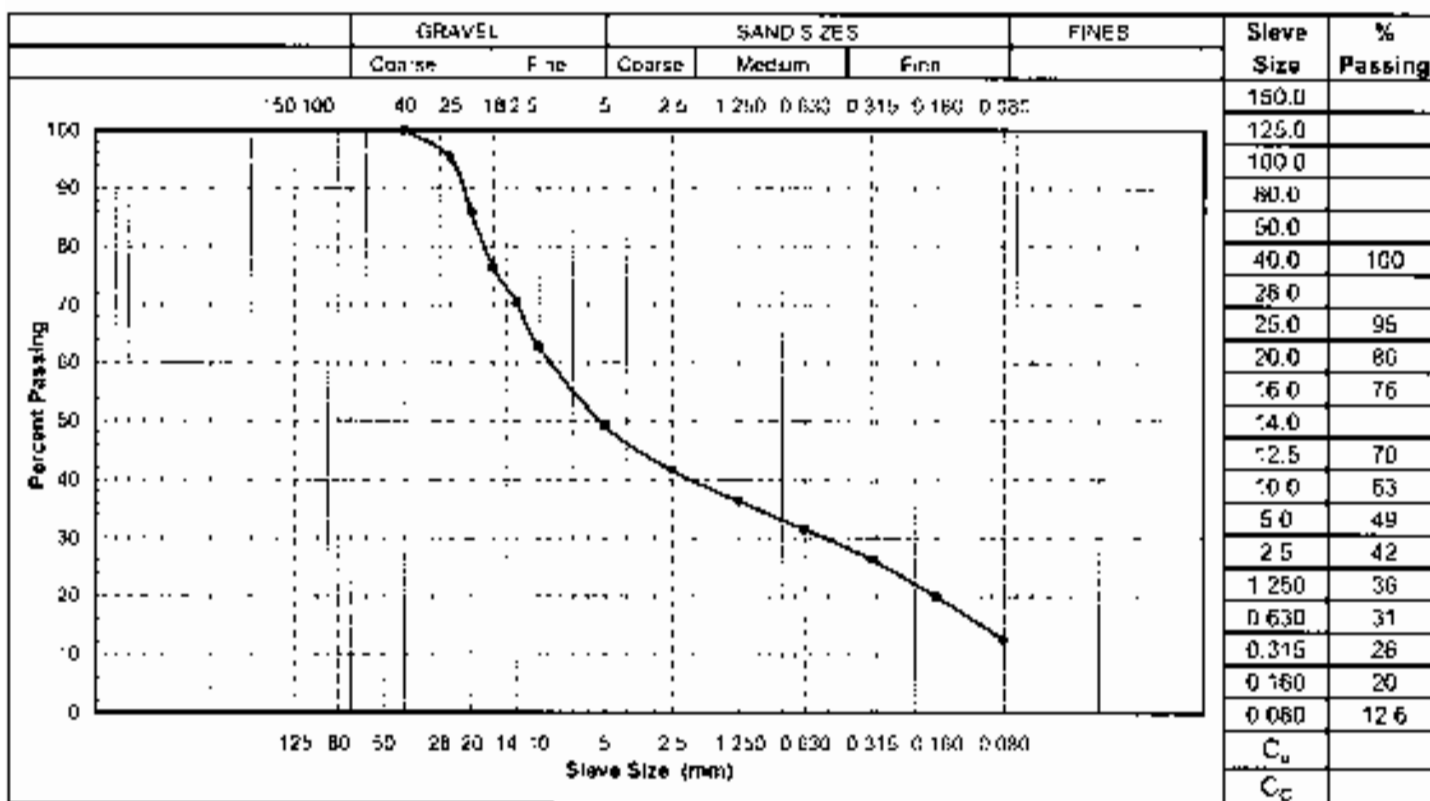
Office : Calgary
Project No: VM00351
Client : AMEC E & C Services Ltd.
Copies to :

Attn: Todd Martin

Project: Gahcho Kue Diamond Project

Sample ID: MPV-04-205, SA 2 Sample Type: Sampled By: AMEC

Date Sampled: 01-May-04 Date Received: Date Tested: 08-Jul-04



Source: MPV-04-205, Sample 2

Sample Description: 2.25 m x 2.30 m

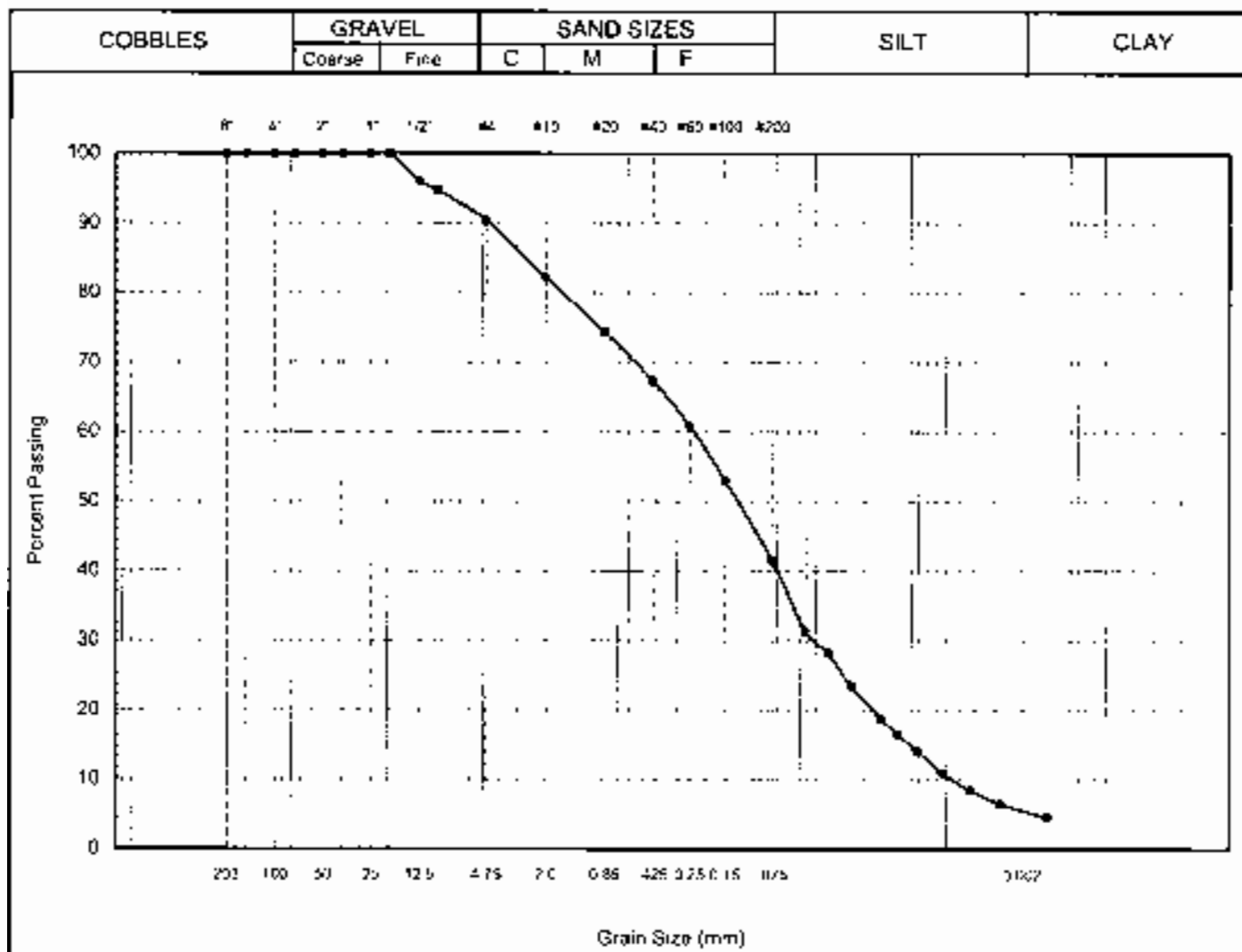
Comments: No specs.

AMEC Earth & Environmental

Per: _____

HYDROMETER TEST

AMEC Earth & Environmental



Remarks:

Atterberg Limits = non-plastic.

Summary

D10 = 0.0055 mm	Gravel	10	%
D30 = 0.0411 mm	Sand	49	%
D60 = 0.2395 mm	Silt	36	%
Cu = 43.23	Clay	5	%
Cc = 1.27			

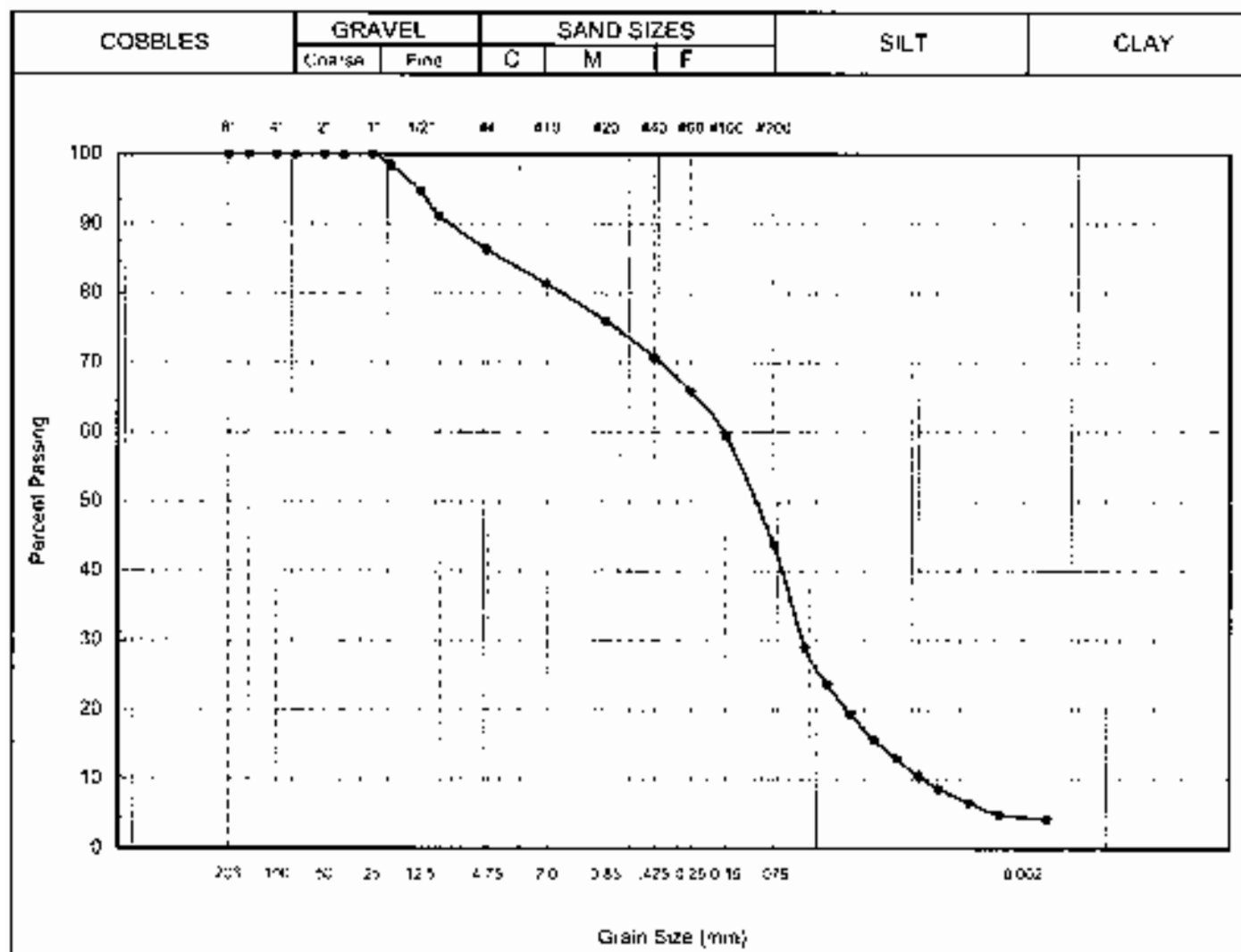
Project No: VM00351
Hole No: MPV-04-206
Depth (m): 2.05-2.1

Location: Gahcho Kue Diamond Project
Sample: SA 3
Technician: LR

Date: 16-Jul-04

HYDROMETER TEST

AMEC Earth & Environmental



Remarks:

Atterberg Limits = non-plastic

Summary

D10 = 0.0085 mm	Gravel	14	%
D30 = 0.0494 mm	Sand	43	%
D60 = 0.1580 mm	Silt	39	%
Cu = 18.48	Clay	4	%
Cc = 1.81			

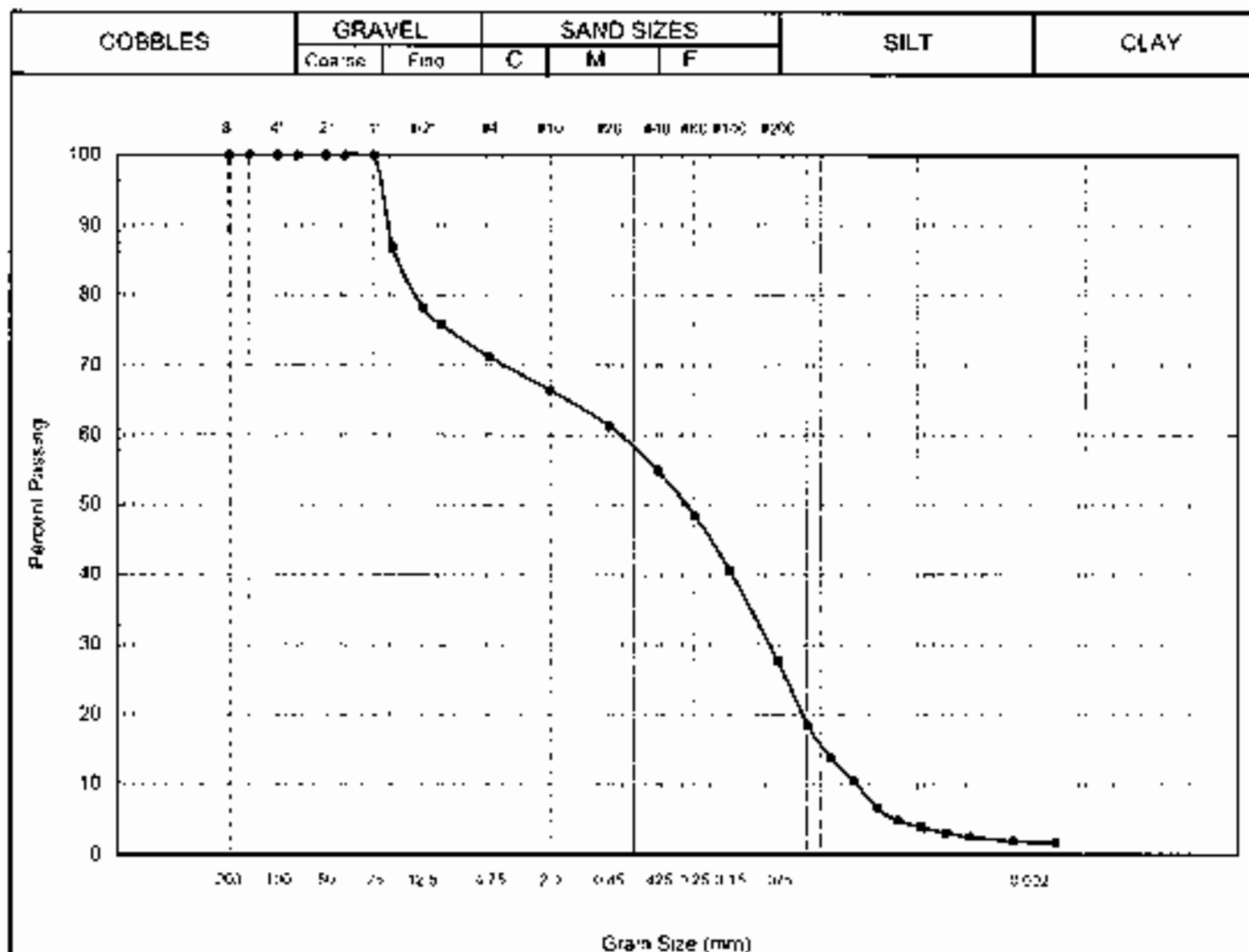
Project No: VM00351
Hole No: MPV-04-206
Depth (m): 2.65-2.75

Location: Gahcho Kue Diamond Project
Sample: SA 4
Technician: LR

Date: 16-Jul-04

HYDROMETER TEST

AMEC Earth & Environmental



Remarks:

Atterberg Limits = non-plastic.

Summary

D10 = 0.0240 mm	Gravel	29	%
D30 = 0.0886 mm	Sand	43	%
D60 = 0.7646 mm	Silt	26	%
Cu = 31.91	Clay	2	%
Cc = 0.43			

Project No: VM00351
Hole No: MPV-04-206
Depth (m): 3.15-3.25

Location: Gahcho Kue Diamond Project
Sample: SA 5
Technician: LR

Date: 16-Jul-04

SIEVE ANALYSIS REPORT

AMEC Earth & Environmental



To: AMEC E & C Services Ltd.
400 111 Dunsmuir Street
Vancouver, B.C. V6B 5W3

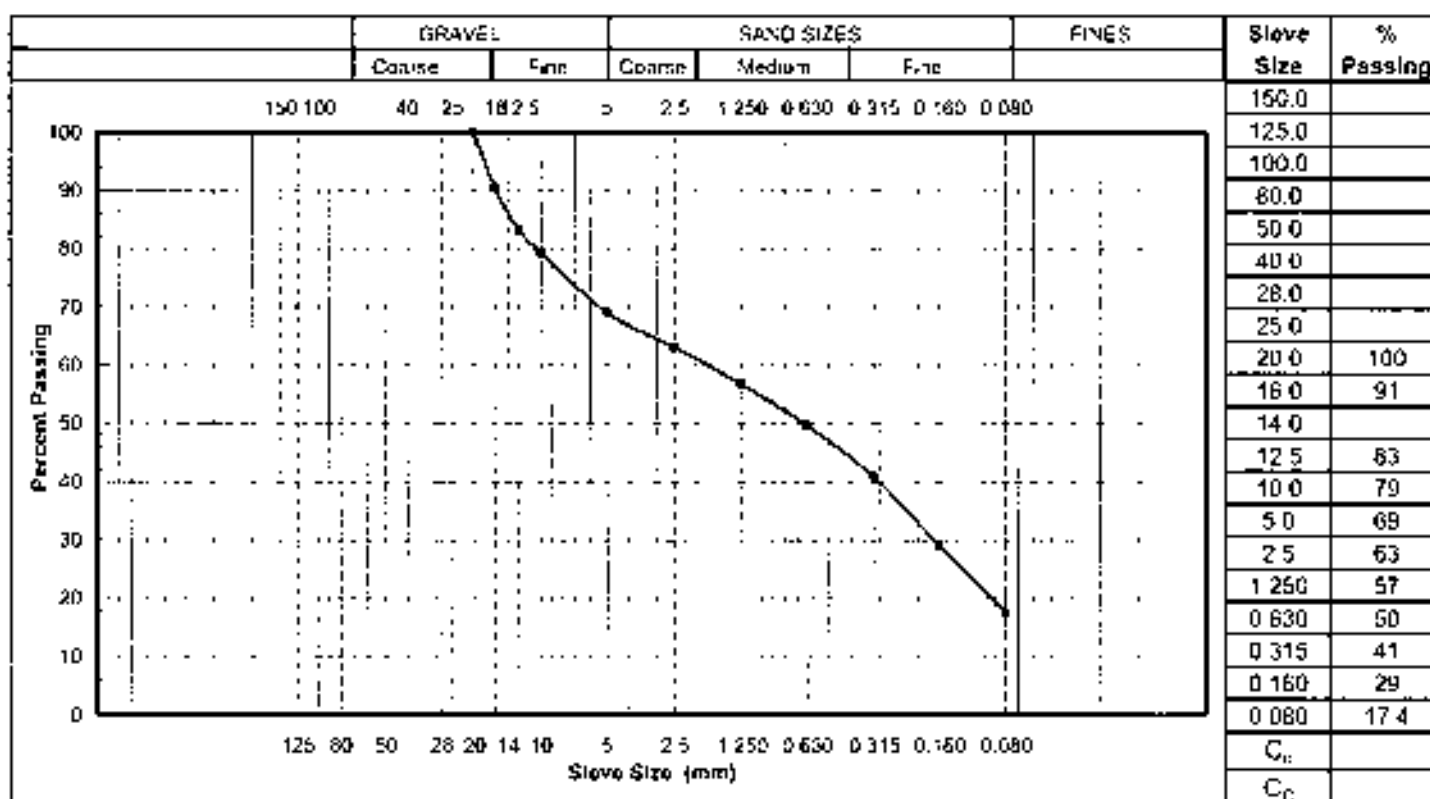
Office : Calgary
Project No: VM00351
Client : AMEC E & C Services Ltd.
Copies to :

Attn: Todd Martin

Project: Gahcho Kue Diamond Project

Sample ID: MPV-04-206, SA 6 Sample Type: Sampled By: AMEC

Date Sampled: 03-May-04 Date Received: Date Tested: 08-Jul-04



Source: MPV-04-206, Sample 6

Sample Description: 5.3 m x 5.4 m

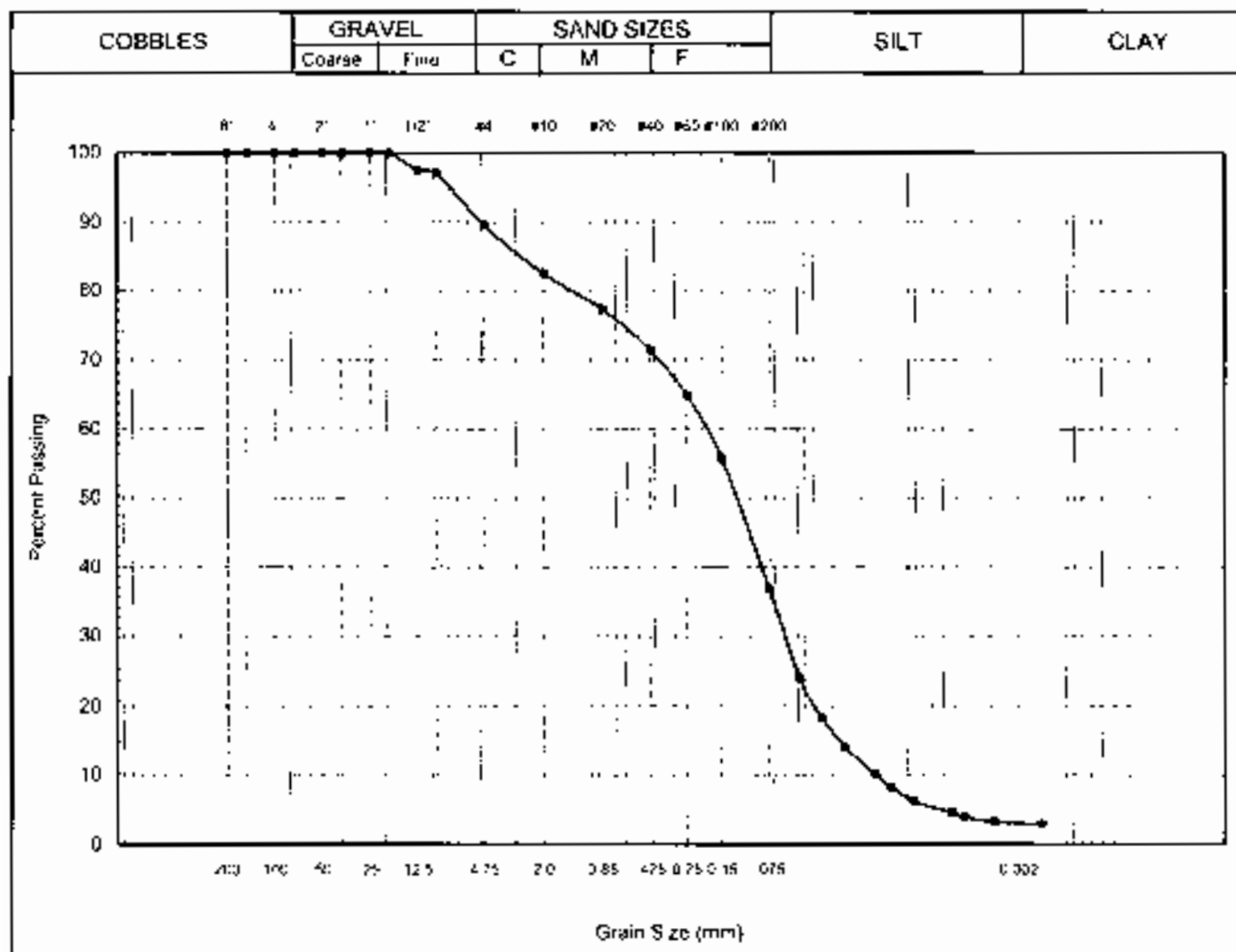
Comments: No specs.

AMEC Earth & Environmental

Per: _____

HYDROMETER TEST

AMEC Earth & Environmental





HYDROMETER TEST

Project	Gaucho Kue		
Lab Order	VM00351 Task E4		
Sample			
Location			
Hole	Loon Ooze	Depth	Bucket #1 & #2
Technician	LK	Date	20-Apr-04

Hydrometer No. 799 Hydrometer Type 151 Graduate No. 1
 Air Dried Wt. of Soil Tested 35.89 g Dry Wt. of Soil Tested 35.89

Moisture Content

Tare 1. g Wet + Tare Dry + Tare M.C. 0.00%

Composite Correction Factors

0 intercept 8.70 Slope -0.174 Specific Gravity G_s 2.09

Dispersant

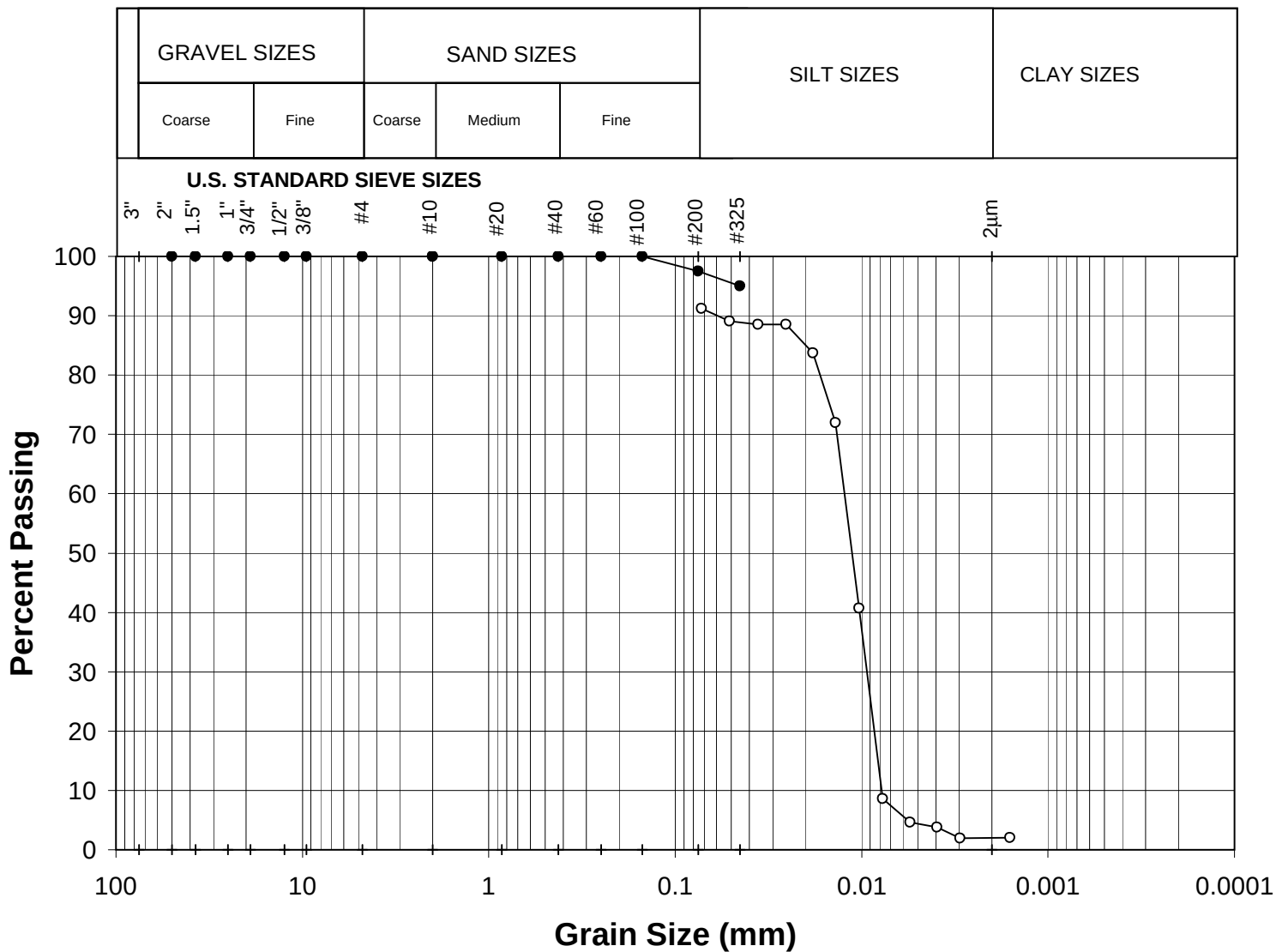
Type 10 % Sodium Hexametaphosphate Amount 125 Date Mixed & Jug No.

Mechanical Sieve Results

Total Wt of Sample Dry					Hydrometer Test				
+ # 10					(Adjusted for + # 10 Material)				
- # 10					Total Dry Wt. 35.89 g				
Sieve Size	Particle Size (mm)	Weight Retained (g)	Weight Passing (g)	Percent Finer Than	Sieve #	Particle Size (mm)	Weight Retained (g)	Weight Passing (g)	Percent Finer Than
2 in.	50.0		0.00	100.0	10	2.000		35.89	100
1 1/2 in.	37.5		0.00	100.0	20	0.850		35.89	100
1 in.	25.0		0.00	100.0	40	0.425		35.89	100
3/4 in.	19.0		0.00	100.0	60	0.250		35.89	100
1/2 in.	12.5		0.00	100.0	100	0.150		35.89	100
3/8 in.	9.5		0.00	100.0	200	0.075	0.912	34.98	97
4	4.75		0.00	100.0	325	0.045	0.883	34.10	95
10	2.00		0.00	100.0	pan				

Hydrometer Results

Date	Time	Elapsed Time (min)	R'_h	Temp. °C	Effective Length (cm)	Comp. Corr.	Corrected Reading	Diam. (mm)	% Soil in Susp.
04/20/2004	8:42:00	0							
04/20/2004	8:42:30	0.5	22.5	18.8	10.5	5.42202	17.07798	0.0721	91
04/20/2004	8:43:00	1	22.1	18.8	10.5	5.42202	16.67798	0.0510	89
04/20/2004	8:44:00	2	22	18.8	10.5	5.42202	16.57798	0.0360	89
04/20/2004	8:46:00	4	22	18.8	10.5	5.42202	16.57798	0.0255	89
04/20/2004	8:50:00	8	21.1	18.8	10.7	5.42202	15.67798	0.0182	84
04/20/2004	8:57:00	15	18.9	18.8	11.5	5.42202	13.47798	0.0138	72
04/20/2004	9:12:00	30	13	19	12.9	5.3872	7.6128	0.0103	41
04/20/2004	9:42:00	60	7	19	14.4	5.3872	1.6128	0.0077	9
04/20/2004	10:42:00	120	6.2	19.3	14.7	5.33497	0.86503	0.0055	5
04/20/2004	12:42:00	240	5.9	20.1	15	5.19569	0.70431	0.0039	4
04/20/2004	16:42:00	420	5.5	20.4	15	5.14346	0.35654	0.0030	2
04/21/2004	8:14:00	1412	6	17.7	14.7	5.61353	0.38647	0.0016	2



Remarks

SUMMARY

D ₁₀ =	0.008	Gravel	0.0 %
D ₃₀ =	0.009	Sand	2.5 %
D ₅₀ =	0.011	Silt Sizes	95.4 %
D ₆₀ =	0.012	Clay Sizes	2.0 %
C _u =	#N/A		
C _c =	#N/A		

Results of Other Testing

WL	%
WP	%
IP	%



Grain Size Distribution

Project	Gaucho Kue		
Lab Order	VM00351 Task E4		
Sample	0		
Location	Less consistent - Upper Sediments		
Hole	Loon Ooze	Depth	Bucket #1 & #2
Technician	LK	Date	20-Apr-04

SETTLING TEST

Project:

De Beers Canada - Gaucho Kue

Project No:

VM00351 Task 4

Lab No:

S-8590

Sample:

Upper Lake Sediments (Ooze)

Location:

Bucket #1 & #2

Date:

20-Apr-04

Technologist:

LK

TEST DATA

[illegible]

Volume of Slurry (ml)	1000

Weight of Slurry (g)	1026.8

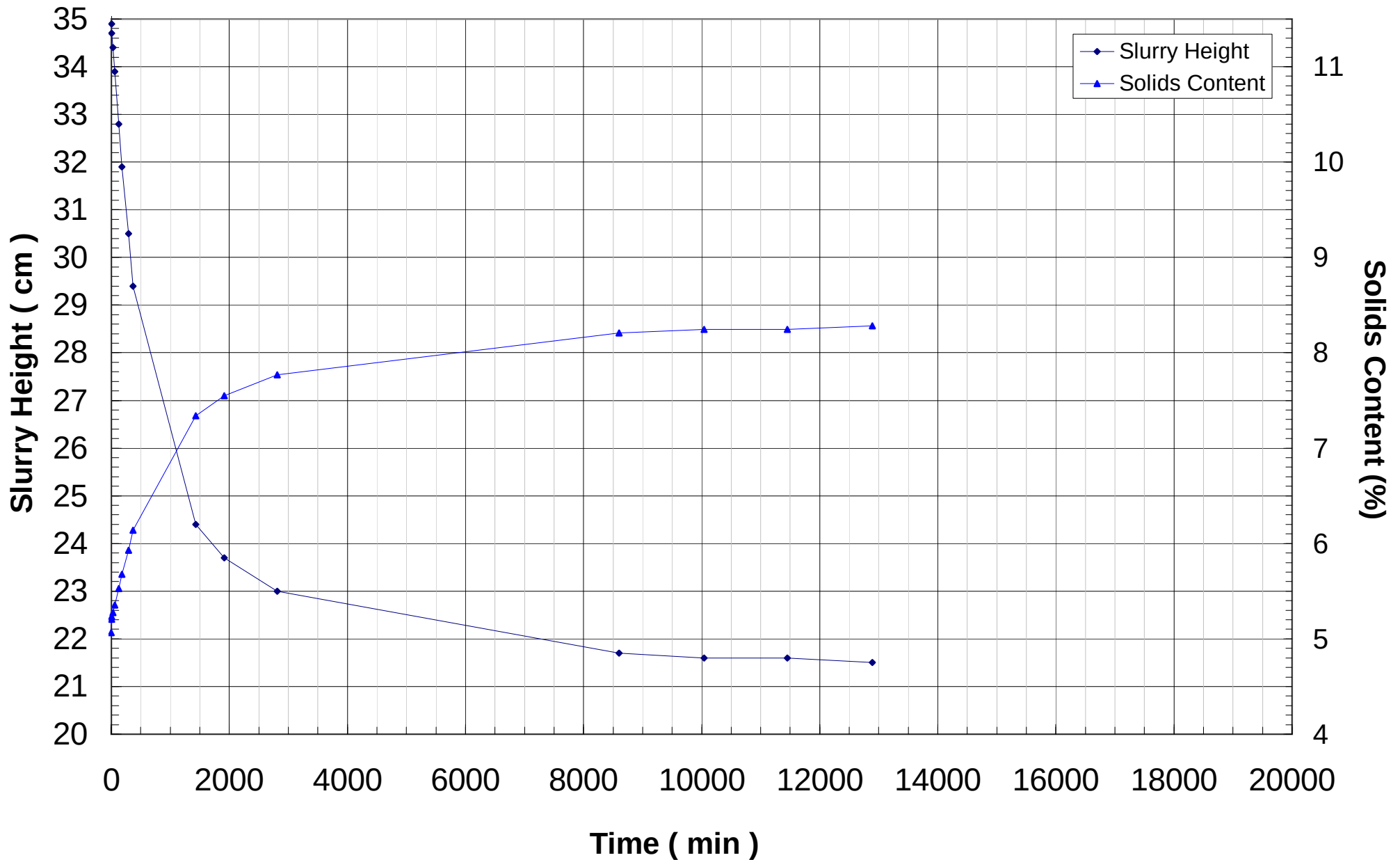
Weight of Dry Solids (g)	51.34

Initial Solids Content (%)	5.0

NOTE: Water above the settled material remained murky for the entire test.

Gaicho Kue
Project No. VM00351 Task E4
Sediment From Bucket 1 and 2

Elapsed Time vs. Slurry Height



Gaicho Kue
Lake Sediment From Buckets 1 and 2

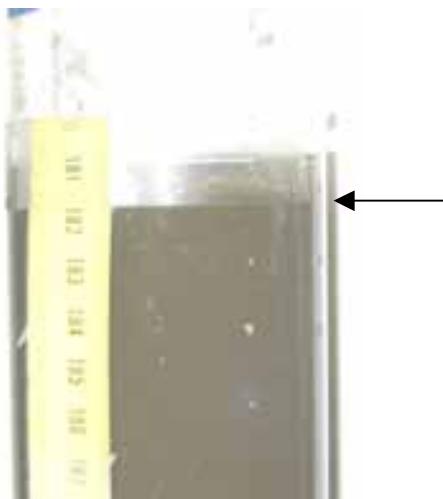


Photo No. 107-0716
Elapsed Time- 5 min



Photo No. 107-0718
Elapsed Time- 10 min

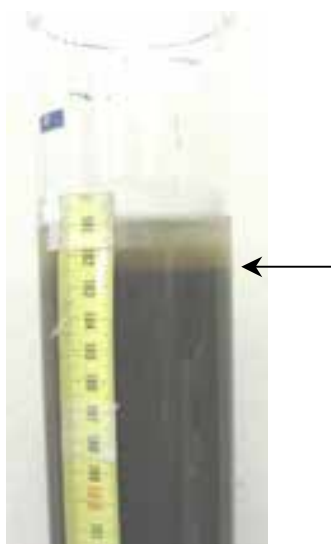


Photo No. 107-0726
Elapsed Time- 60 min



Photo No. 107-0728
Elapsed Time- 131 min



Photo No. 107-0704
Elapsed Time- 180 min

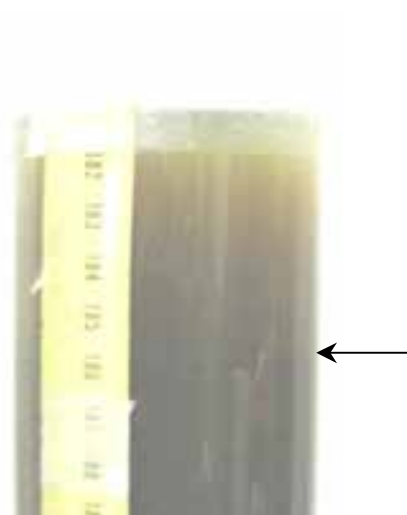


Photo No. 107-0708
Elapsed Time- 291 min

Gaicho Kue
Lake Sediment From Buckets 1 and 2



Photo No. 107-0711
Elapsed Time- 1431 min



Photo No. 107-0719
Elapsed Time- 2811 min (46.9hrs)

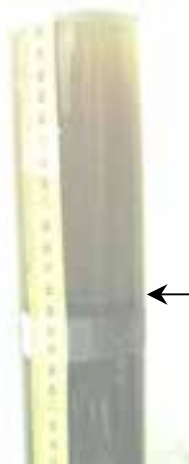


Photo No. 107-0721
Elapsed Time- 8601 min (143.4hrs)



Photo No. 107-0741
Elapsed Time- 12891 min (214.9 hrs)



HYDROMETER TEST

Project	Gaucho Kue		
Lab Order	VM00351 Task E4		
Sample			
Location			
Hole	Loon Ooze	Depth	Bucket #3
Technician	LK	Date	20-Apr-04

Hydrometer No. 799 Hydrometer Type 151 Graduate No. 1
 Air Dried Wt. of Soil Tested 38.5 g Dry Wt. of Soil Tested 38.50

Moisture Content

Tare 1. g Wet + Tare Dry + Tare M.C. 0.00%

Composite Correction Factors

0 intercept 8.70 Slope -0.174 Specific Gravity G_s 2.09

Dispersant

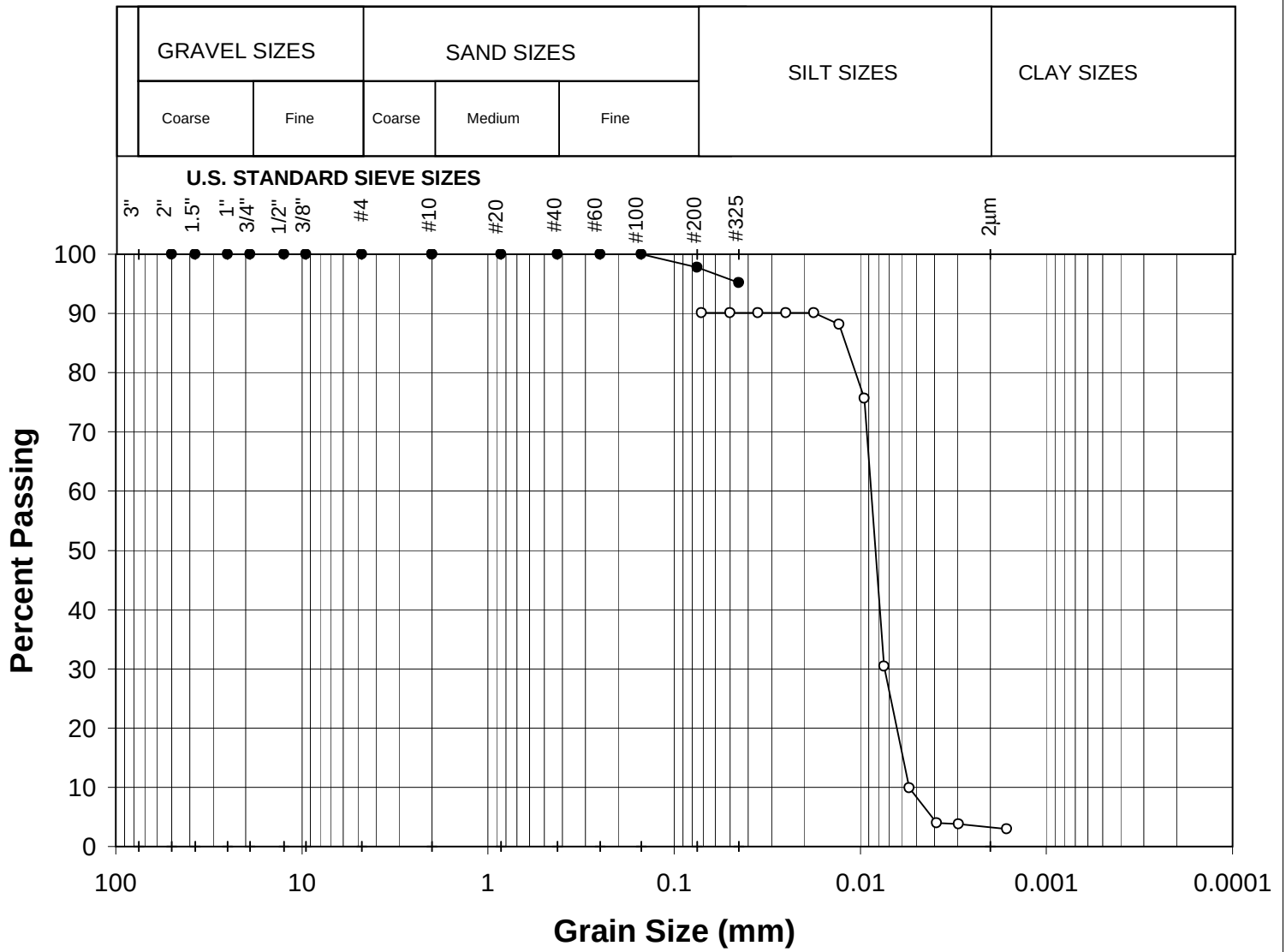
Type 10 % Sodium Hexametaphosphate Amount 125 Date Mixed & Jug No.

Mechanical Sieve Results

Total Wt of Sample Dry					Hydrometer Test				
+ # 10					(Adjusted for + # 10 Material)				
- # 10					Total Dry Wt. 38.50 g				
Sieve Size	Particle Size (mm)	Weight Retained (g)	Weight Passing (g)	Percent Finer Than	Sieve #	Particle Size (mm)	Weight Retained (g)	Weight Passing (g)	Percent Finer Than
2 in.	50.0		0.00	100.0	10	2.000		38.50	100
1 1/2 in.	37.5		0.00	100.0	20	0.850		38.50	100
1 in.	25.0		0.00	100.0	40	0.425		38.50	100
3/4 in.	19.0		0.00	100.0	60	0.250		38.50	100
1/2 in.	12.5		0.00	100.0	100	0.150		38.50	100
3/8 in.	9.5		0.00	100.0	200	0.075	0.844	37.66	98
4	4.75		0.00	100.0	325	0.045	1.002	36.65	95
10	2.00		0.00	100.0	pan				

Hydrometer Results

Date	Time	Elapsed Time (min)	R'_h	Temp. °C	Effective Length (cm)	Comp. Corr.	Corrected Reading	Diam. (mm)	% Soil in Susp.
04/20/2004	8:42:00	0							
04/20/2004	8:42:30	0.5	23.5	18.9	10.2	5.40461	18.09539	0.0710	90
04/20/2004	8:43:00	1	23.5	18.9	10.2	5.40461	18.09539	0.0502	90
04/20/2004	8:44:00	2	23.5	18.9	10.2	5.40461	18.09539	0.0355	90
04/20/2004	8:46:00	4	23.5	18.9	10.2	5.40461	18.09539	0.0251	90
04/20/2004	8:50:00	8	23.5	18.9	10.2	5.40461	18.09539	0.0178	90
04/20/2004	8:57:00	15	23.1	18.9	10.2	5.40461	17.69539	0.0130	88
04/20/2004	9:12:00	30	20.6	18.9	11	5.40461	15.19539	0.0095	76
04/20/2004	9:42:00	60	11.5	19	13.4	5.3872	6.1128	0.0074	30
04/20/2004	10:42:00	120	7.3	19.4	14.4	5.31756	1.98244	0.0054	10
04/20/2004	12:42:00	240	6	20.1	14.7	5.19569	0.80431	0.0039	4
04/20/2004	16:42:00	420	5.9	20.4	15	5.14346	0.75654	0.0030	4
04/21/2004	7:22:00	1360	6.2	17.7	14.7	5.61353	0.58647	0.0016	3



Remarks

SUMMARY

D ₁₀ =	0.005	Gravel	0.0 %
D ₃₀ =	0.007	Sand	2.2 %
D ₅₀ =	0.008	Silt Sizes	94.7 %
D ₆₀ =	0.009	Clay Sizes	3.2 %
C _u =	#N/A		
C _c =	#N/A		

Results of Other Testing

WL	%
WP	%
IP	%



Grain Size Distribution

Project	Gaucho Kue		
Lab Order	VM00351 Task E4		
Sample	0		
Location	more consistant material - Lake Bottom Sediments		
Hole	Loon Ooze	Depth	Bucket #3
Technician	LK	Date	20-Apr-04

SETTLING TEST

Project:

De Beers Canada - Gaucho Kue

Project No:

VM00351 Task 4

Lab No:

S-8590

Sample:

Lower Lake Bottom Sediments

Location:

Bucket #3

Date:

20-Apr-04

Technologist:

LK

TEST DATA

[illegible]

Volume of Slurry (ml)	1000

Weight of Slurry (g)	1027.2

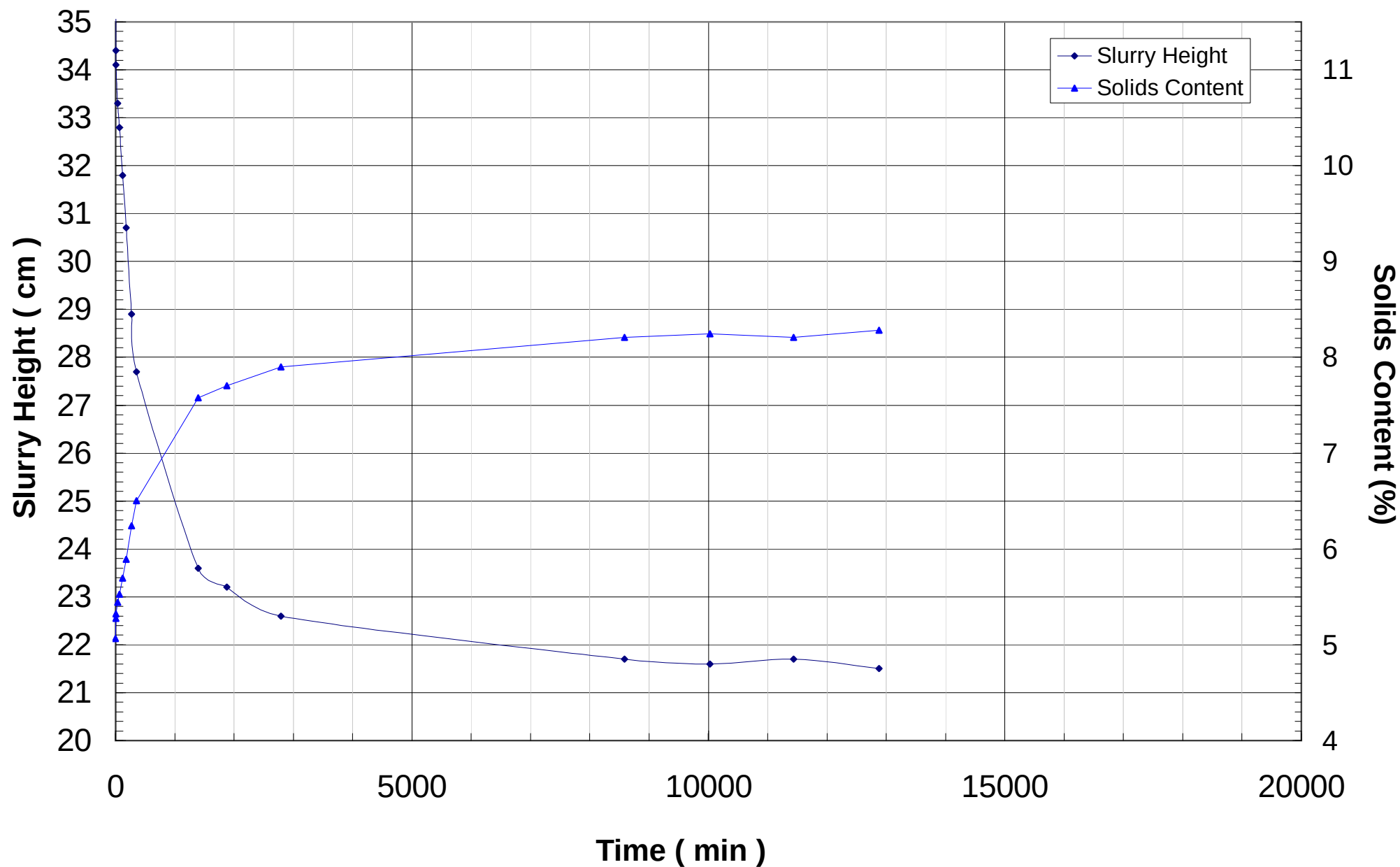
Weight of Dry Solids (g)	51.36

Initial Solids Content (%)	5.0

NOTE: Water above the settled material remained murky for the entire test

Gaicho Kue
VM00351 Task E4
Lake Sediment Bucket #3

Elapsed Time vs. Slurry Height



Gaicho Kue
VM00351 Task E4
Lake Sediment Bucket #3



Photo No. 107-0721
Elapsed Time- 5 min



Photo No. 107-0722
Elapsed Time- 10 min



Photo No. 107-0724
Elapsed Time- 30 min



107-0727
Elapsed Time- 60 min



Photo No. 107-0705
Elapsed Time- 180 min



Photo No. 107-0709
Elapsed Time- 275 min

Gaicho Kue
VM00351 Task E4
Lake Sediment Bucket #3



Photo No. 107-0710
Elapsed Time- 1395 min (23.3 hrs)



Photo No. 107-0720
Elapsed Time- 2795 min (46.6hrs)



Photo No. 107-0722
Elapsed Time- 8586 min (143.1hrs)



Photo No. 107-0742
Elapsed Time- 12876 min (241.6 hrs)