



SNC•LAVALIN
Morrow Environmental

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**PHASE 1 AND 2
ENVIRONMENTAL SITE ASSESSMENT**

**Lupin Mine Site
Nunavut Territory**

Volume 2 of 2

Prepared for: Kinross Gold Corp.

**Attention: Mr. Michael Tansey
Reclamation Manager**

**A053017
January 11, 2006**



APPENDIX IV

Test Pit and Borehole Logs



Client :
Kinross Gold USA, Inc

Borehole No. : 05-01

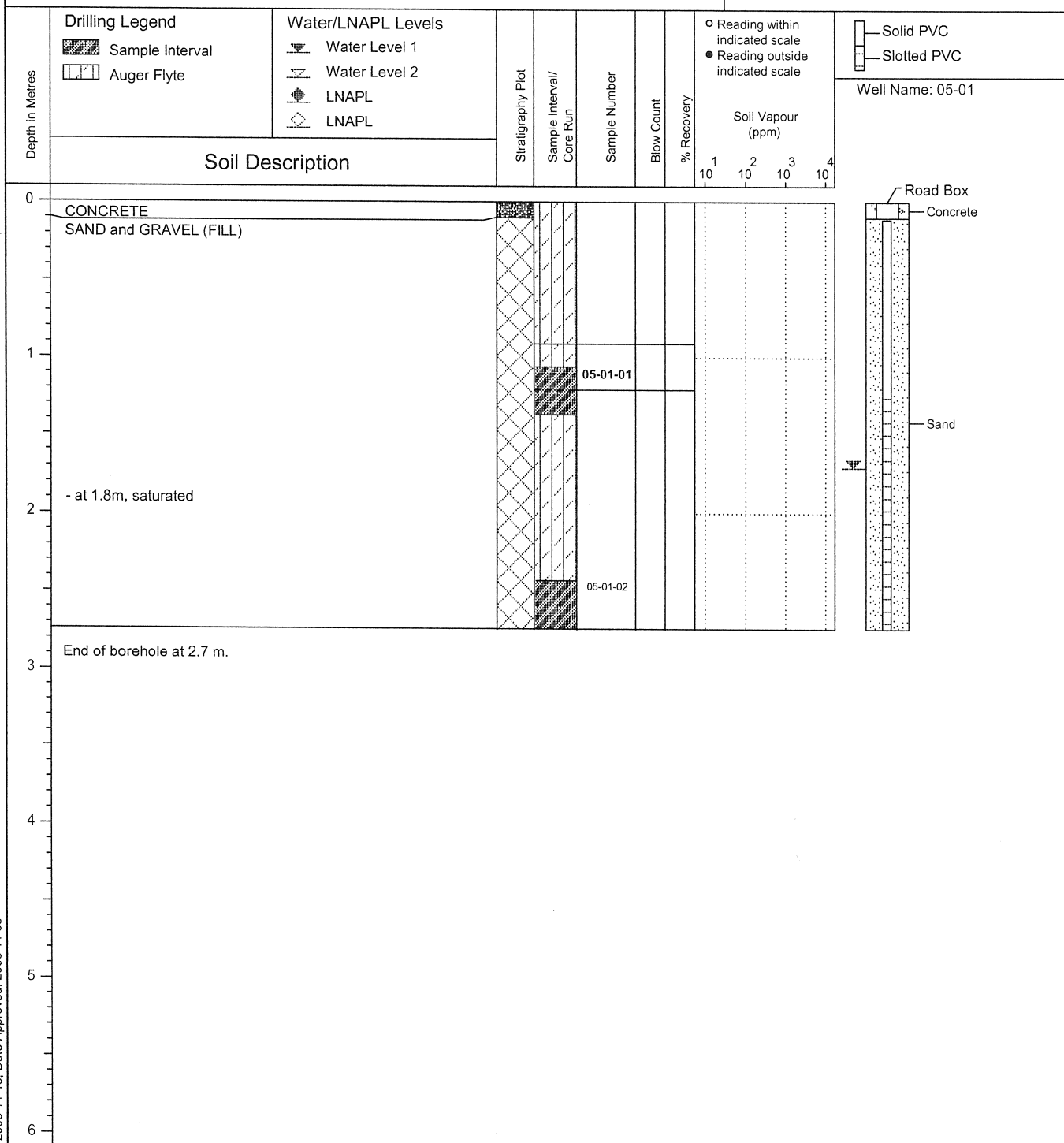
Location :
Lupin Gold Mine, Nunavut

(Page 1 of 1)

Drilling Contractor: Kinross
Drilling Method : Tamrock Drill
Borehole Dia. (m) : 0.08
Pipe/Slotted Pipe Dia. (m): 0.05, 0.05

Date Monitored : 2005 07 22
Ground Surf Elev. (m) : 503.5
Top of Casing Elev. (m) : 503.4

Project Number : A053017
Borehole Logged By : MJT
Date Drilled : 2005 07 16
Log Typed By : CLW



Notes:

Bolded sample denotes sample analyzed.
* denotes blind field duplicate.

Drilling method prevented detailed observation of soil conditions.



Client :
Kinross Gold USA, Inc

Borehole No. : 05-02

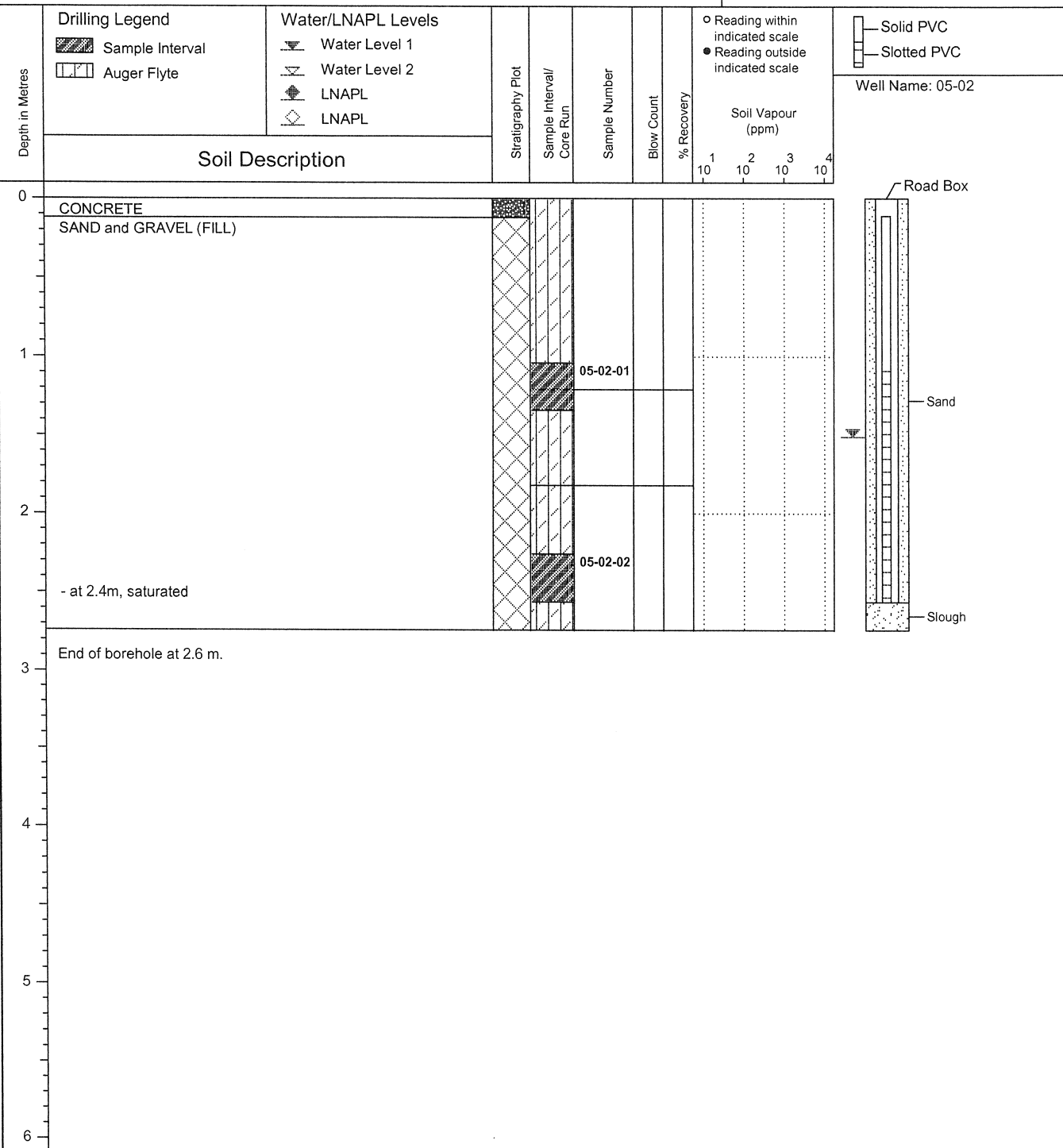
Location :
Lupin Gold Mine, Nunavut

(Page 1 of 1)

Drilling Contractor: Kinross
Drilling Method : Tamrock Drill
Borehole Dia. (m) : 0.08
Pipe/Slotted Pipe Dia. (m): 0.05, 0.05

Date Monitored :2005 07 22
Ground Surf Elev. (m) :503.5
Top of Casing Elev. (m) :503.4

Project Number :A053017
Borehole Logged By :MJT
Date Drilled :2005 07 16
Log Typed By :CLW



Notes:

Bolded sample denotes sample analyzed.
* denotes blind field duplicate.

Drilling method prevented detailed observation of soil conditions.



Client :
Kinross Gold USA, Inc

Borehole No. : 05-03

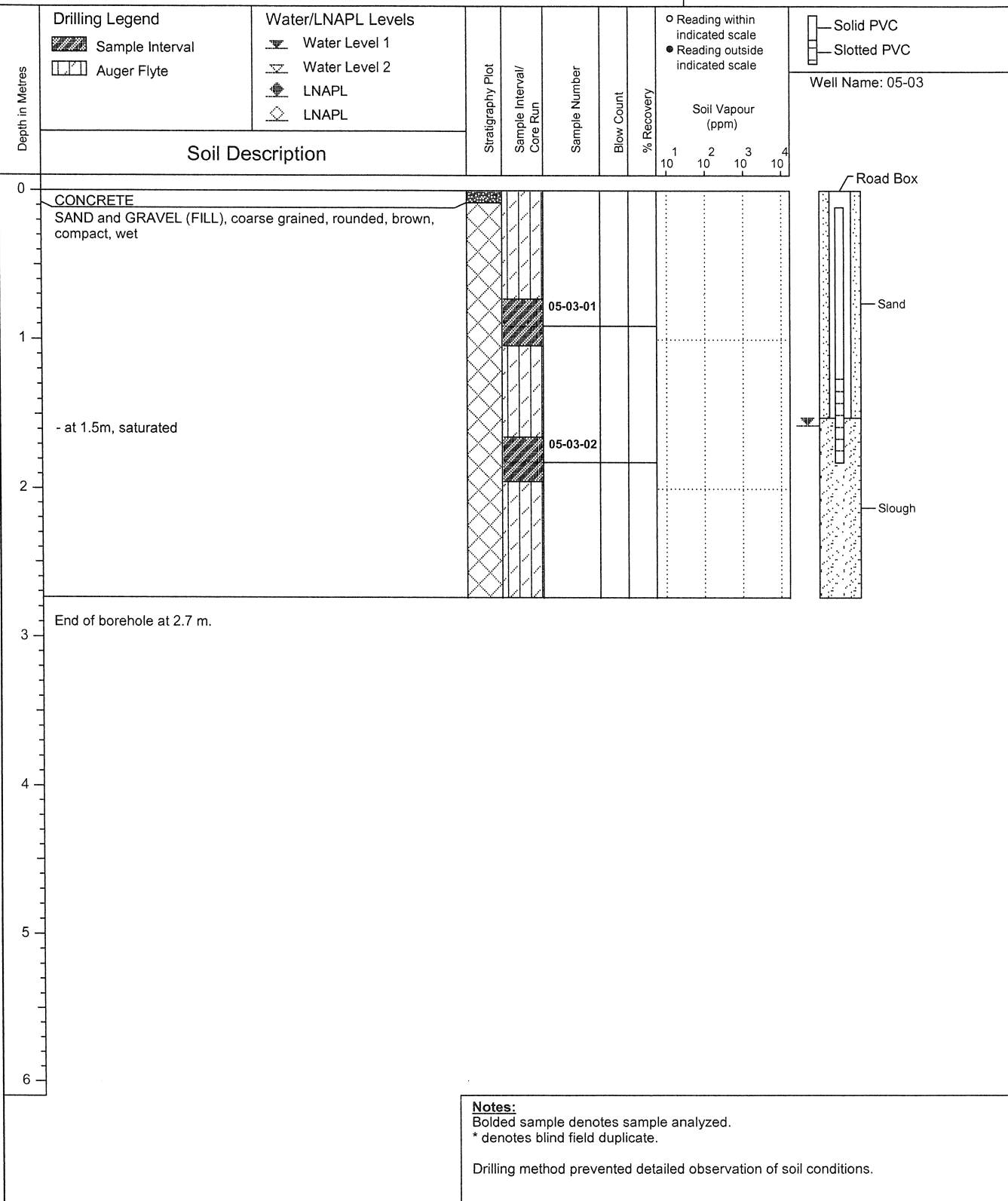
Location :
Lupin Gold Mine, Nunavut

(Page 1 of 1)

Drilling Contractor: Kinross
Drilling Method : Tamrock Drill
Borehole Dia. (m) : 0.08
Pipe/Slotted Pipe Dia. (m): 0.04, 0.04

Date Monitored :2005 07 22
Ground Surf Elev. (m) :503.5
Top of Casing Elev. (m) :503.4

Project Number :A053017
Borehole Logged By :MJT
Date Drilled :2005 07 16
Log Typed By :CLW



Notes:

Bolded sample denotes sample analyzed.
* denotes blind field duplicate.

Drilling method prevented detailed observation of soil conditions.



Client :
Kinross Gold USA, Inc

Borehole No. : 05-04

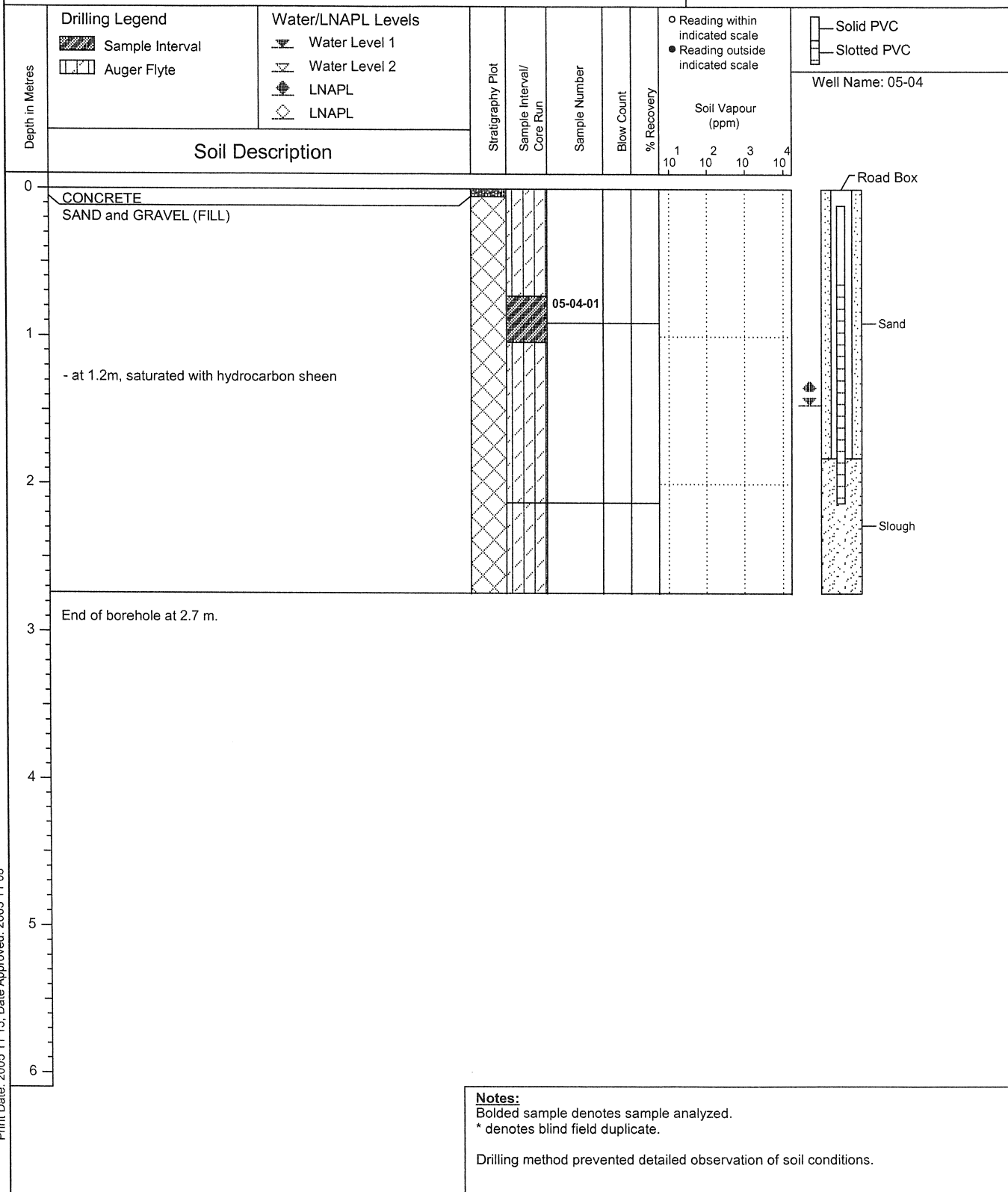
Location :
Lupin Gold Mine, Nunavut

(Page 1 of 1)

Drilling Contractor: Kinross
Drilling Method : Tamrock Drill
Borehole Dia. (m) : 0.08
Pipe/Slotted Pipe Dia. (m): 0.05, 0.05

Date Monitored :2005 07 22
Ground Surf Elev. (m) :503.5
Top of Casing Elev. (m) :503.4

Project Number :A053017
Borehole Logged By :MJT
Date Drilled :2005 07 16
Log Typed By :CLW





Client :
Kinross Gold USA, Inc

Borehole No. : 05-05

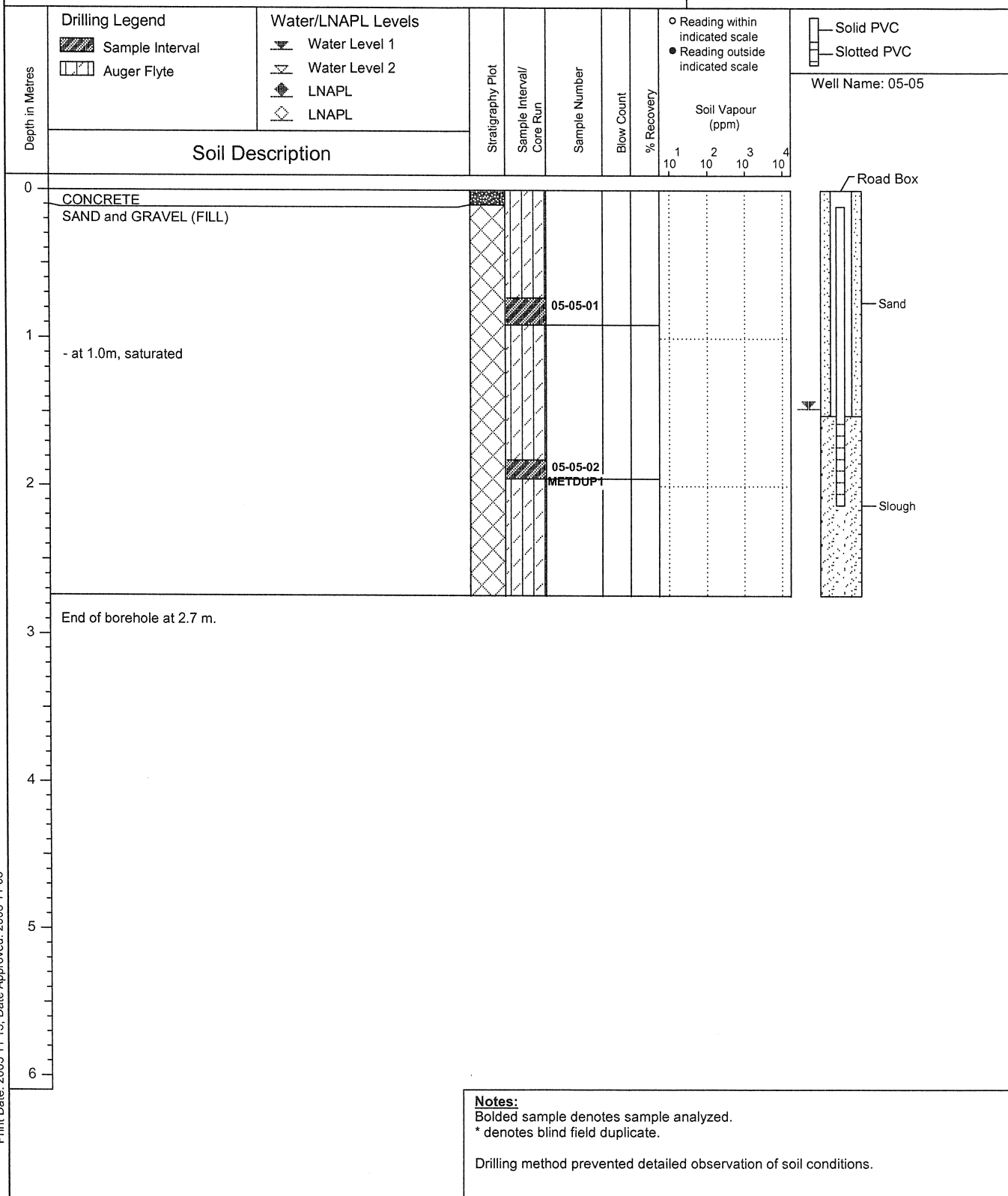
Location :
Lupin Gold Mine, Nunavut

(Page 1 of 1)

Drilling Contractor: Kinross
Drilling Method : Tamrock Drill
Borehole Dia. (m) : 0.08
Pipe/Slotted Pipe Dia. (m): 0.04, 0.04

Date Monitored :2005 07 22
Ground Surf Elev. (m) :503.5
Top of Casing Elev. (m) :503.4

Project Number :A053017
Borehole Logged By :MJT
Date Drilled :2005 07 17
Log Typed By :CLW



Notes:

Bolded sample denotes sample analyzed.
* denotes blind field duplicate.

Drilling method prevented detailed observation of soil conditions.



Client :
Kinross Gold USA, Inc

Borehole No. : 05-06

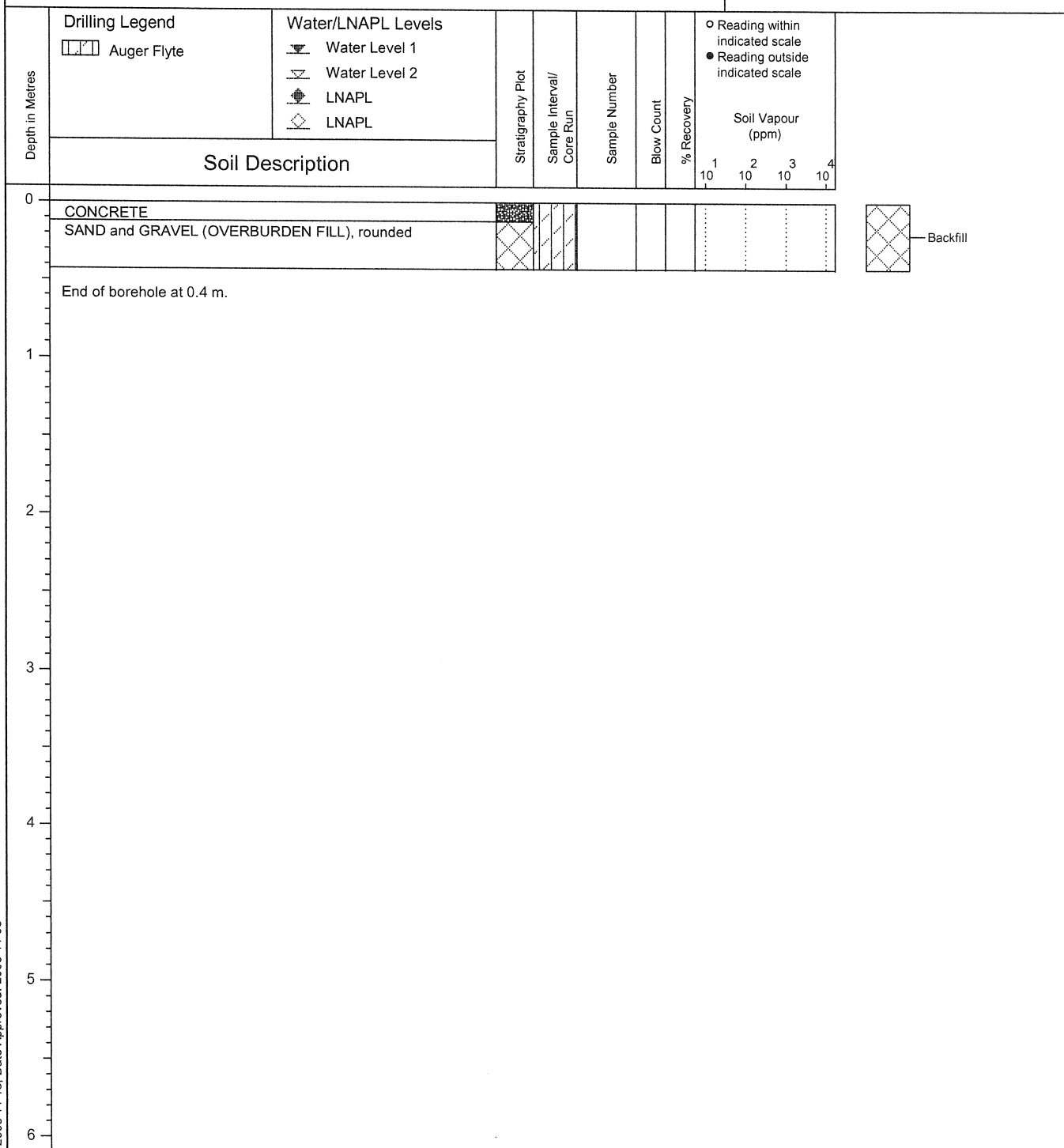
Location :
Lupin Gold Mine, Nunavut

(Page 1 of 1)

Drilling Contractor: Kinross
Drilling Method : Tamrock Drill
Borehole Dia. (m) : 0.08

Ground Surf Elev. (m) : 503.5

Project Number : A053017
Borehole Logged By : MJT
Date Drilled : 2005 07 17
Log Typed By : CLW



Notes:

Bolded sample denotes sample analyzed.
* denotes blind field duplicate.

Drilling method prevented detailed observation of soil conditions.



Client :
Kinross Gold USA, Inc

Borehole No. : 05-07

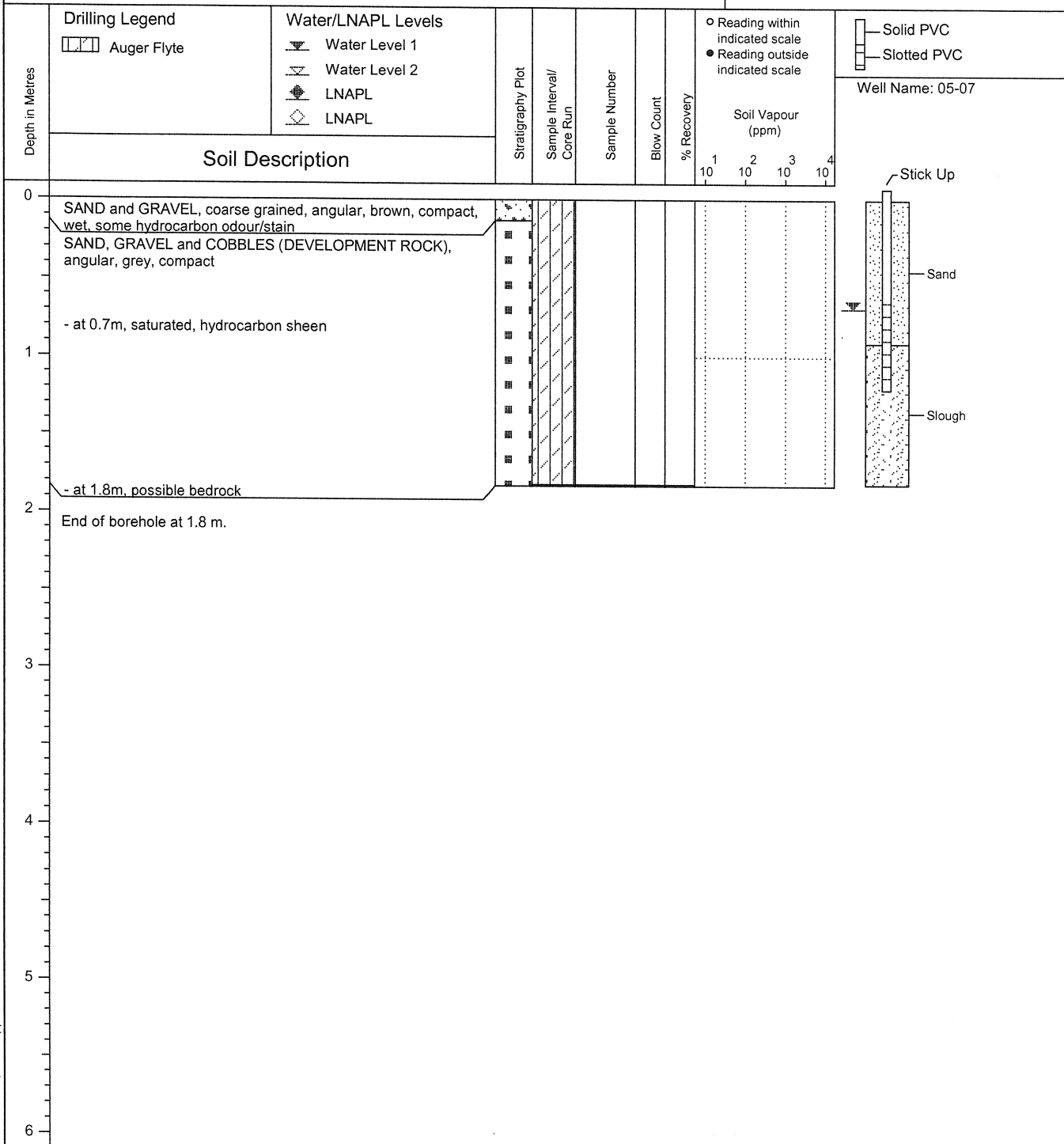
Location :
Lupin Gold Mine, Nunavut

(Page 1 of 1)

Drilling Contractor: Kinross
Drilling Method : Tamrock Drill
Borehole Dia. (m) : 0.08
Pipe/Slotted Pipe Dia. (m): 0.04, 0.04

Date Monitored :2005 07 22
Ground Surf Elev. (m) :499.15
Top of Casing Elev. (m) :500.19

Project Number :A053017
Borehole Logged By :MJT
Date Drilled :2005 07 17
Log Typed By :CLW



Notes:

Bolded sample denotes sample analyzed.
* denotes blind field duplicate.

Drilling method prevented detailed observation of soil conditions.



Client :
Kinross Gold USA, Inc

Borehole No. : 05-08

Location :
Lupin Gold Mine, Nunavut

(Page 1 of 1)

Drilling Contractor: Kinross
Drilling Method : Tamrock Drill
Borehole Dia. (m) : 0.08
Pipe/Slotted Pipe Dia. (m): 0.04, 0.04

Date Monitored :2005 07 22
Ground Surf Elev. (m) :501.69
Top of Casing Elev. (m) :502.7

Project Number :A053017
Borehole Logged By :MJT
Date Drilled :2005 07 17
Log Typed By :CLW

Depth in Metres	Drilling Legend	Water/LNAPL Levels Water Level 1 Water Level 2 LNAPL LNAPL	Stratigraphy Plot	Sample Interval/ Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm)	☐ Reading within indicated scale ☒ Reading outside indicated scale	Solid PVC Slotted PVC	Well Name: 05-08
0	SAND and GRAVEL and COBBLES (DEVELOPMENT ROCK), angular, grey, compact - at 0.6m, saturated										
1											
2	End of borehole at 1.8 m.										
3											
4											
5											
6											

Stick Up

Sand

Slough

Notes:

Bolded sample denotes sample analyzed.
* denotes blind field duplicate.

Drilling method prevented detailed observation of soil conditions.



Client :
Kinross Gold USA, Inc

Borehole No. : 05-09

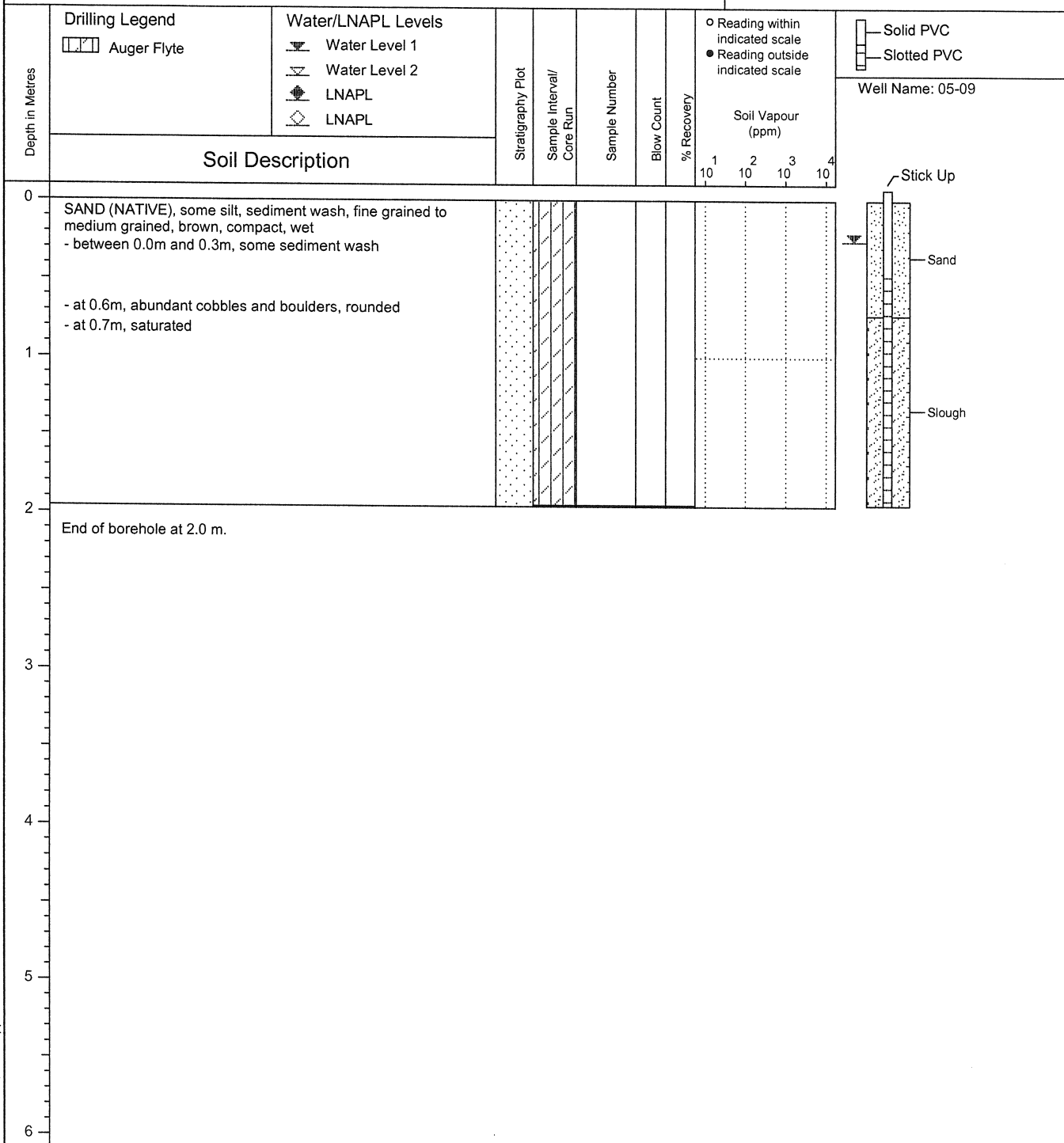
Location :
Lupin Gold Mine, Nunavut

(Page 1 of 1)

Drilling Contractor: Kinross
Drilling Method : Tamrock Drill
Borehole Dia. (m) : 0.08
Pipe/Slotted Pipe Dia. (m): 0.05, 0.05

Date Monitored :2005 07 22
Ground Surf Elev. (m) :479.64
Top of Casing Elev. (m) :480.58

Project Number :A053017
Borehole Logged By :MJT
Date Drilled :2005 07 17
Log Typed By :CLW



Notes:

Bolded sample denotes sample analyzed.
* denotes blind field duplicate.

Drilling method prevented detailed observation of soil conditions.



Client :
Kinross Gold USA, Inc

Borehole No. : 05-10

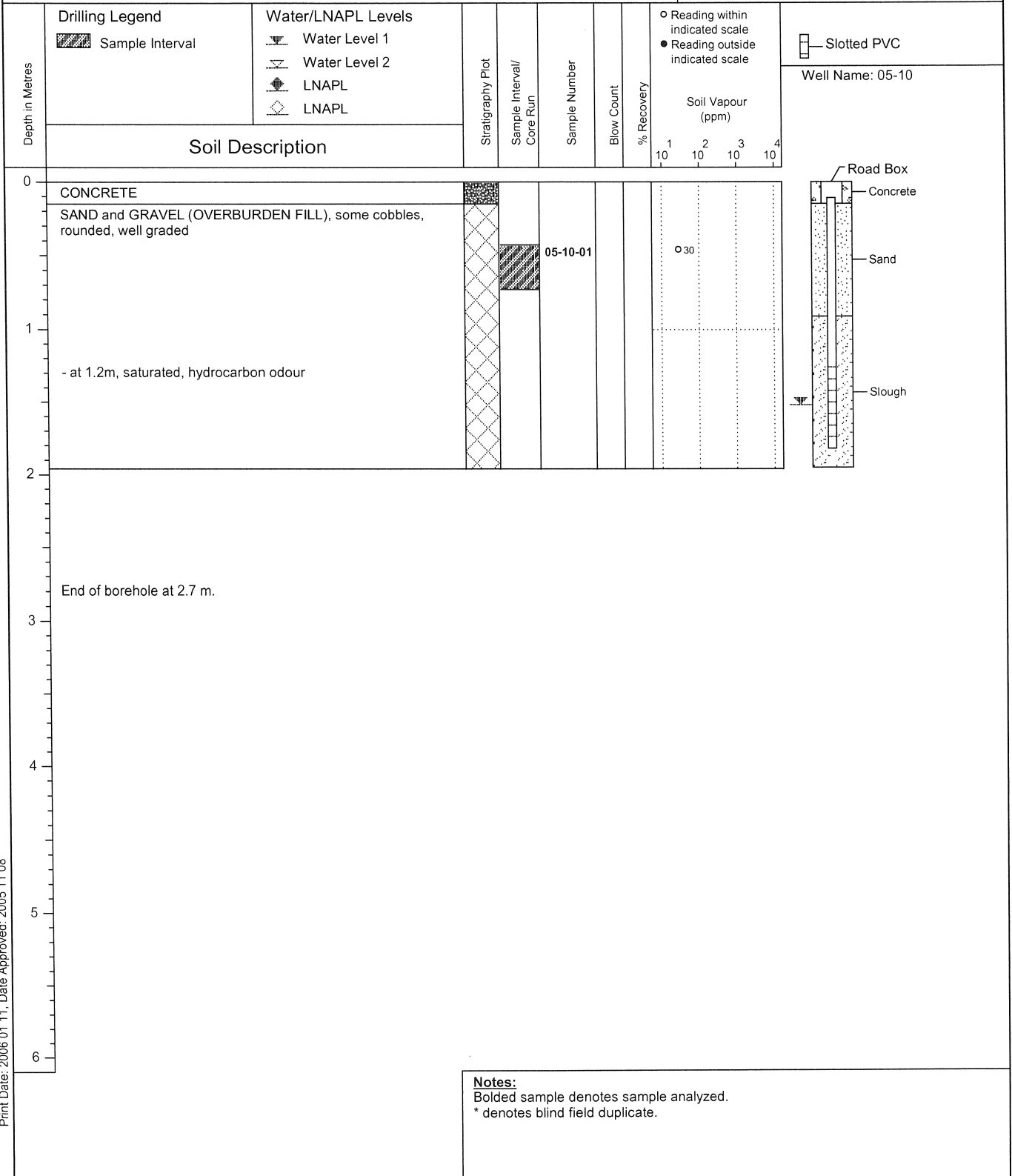
Location :
Lupin Gold Mine, Nunavut

(Page 1 of 1)

Drilling Contractor: Kinross
Drilling Method : Hand Auger
Borehole Dia. (m) : 0.05
Pipe/Slotted Pipe Dia. (m): 0.03, 0.03

Date Monitored :2005 07 22
Ground Surf Elev. (m) :503.5
Top of Casing Elev. (m) :503.4

Project Number :A053017
Borehole Logged By :MJT
Date Drilled :2005 07 18
Log Typed By :CLW



Notes:
Bolded sample denotes sample analyzed.
* denotes blind field duplicate.



Client :
Kinross Gold USA, Inc

Test Pit No. : 05-11

Location :
Lupin Gold Mine, Nunavut

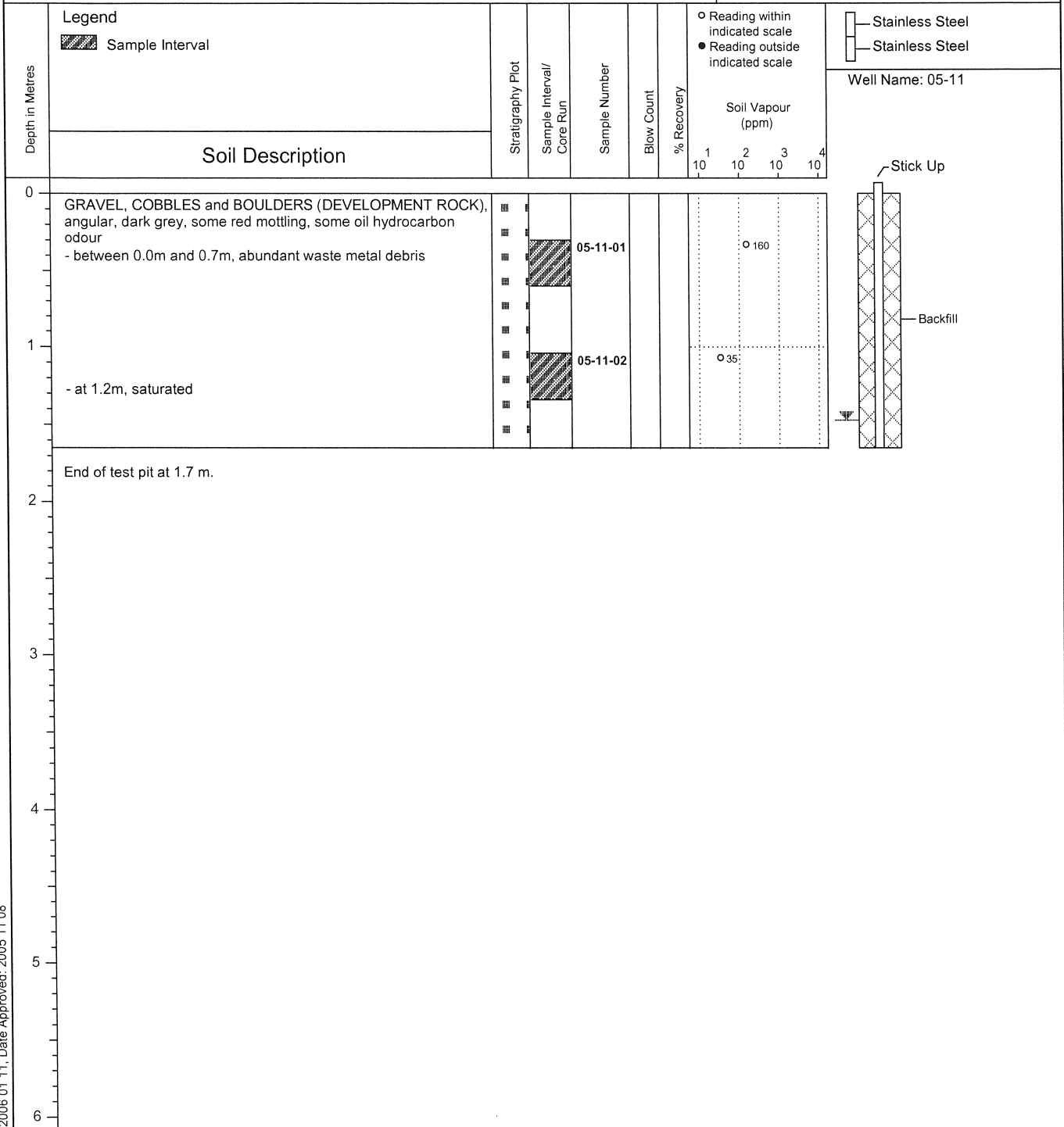
(Page 1 of 1)

Contractor : Kinross
Method : Backhoe

Date Monitored : 2005 07 22
Ground Surf Elev. (m) : 485.55
Top of Casing Elev. (m) : 486.23

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 18
Log Typed By : CLW

Pipe/Slotted Pipe Dia. (m): 0.05, 0.05



Notes:
Bolded sample denotes sample analyzed.
* denotes blind field duplicate.



Client :
Kinross Gold USA, Inc

Test Pit No. : 05-12

Location :
Lupin Gold Mine, Nunavut

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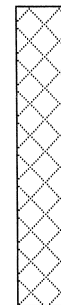
Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 485.51

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 18
Log Typed By : CLW

Depth in Metres	Legend	Stratigraphy Plot	Sample Interval/ Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm)				
	Sample Interval ○ Reading within indicated scale ● Reading outside indicated scale						1	2	3	4	
Soil Description											
0	SAND and GRAVEL (FILL), some cobbles, angular and rounded, mottled dark grey and orange, compact, moist, abundant metal debris, possible hydrocarbon staining			05-12-01				○ 100			Backfill
	SAND and GRAVEL (OVERBURDEN FILL), rounded										
1	- at 1.2m, wet			05-12-02					○ 50		
	- at 1.5m, frozen (permafrost)										
	End of test pit at 1.5 m.										
2											
3											
4											
5											
6											

Notes:
Bolted sample denotes sample analyzed.
* denotes blind field duplicate.



Backfill

Notes:
Bolded sample denotes sample analyzed.
* denotes blind field duplicate.



Client :
Kinross Gold USA, Inc

Test Pit No. : 05-13

Location :
Lupin Gold Mine, Nunavut

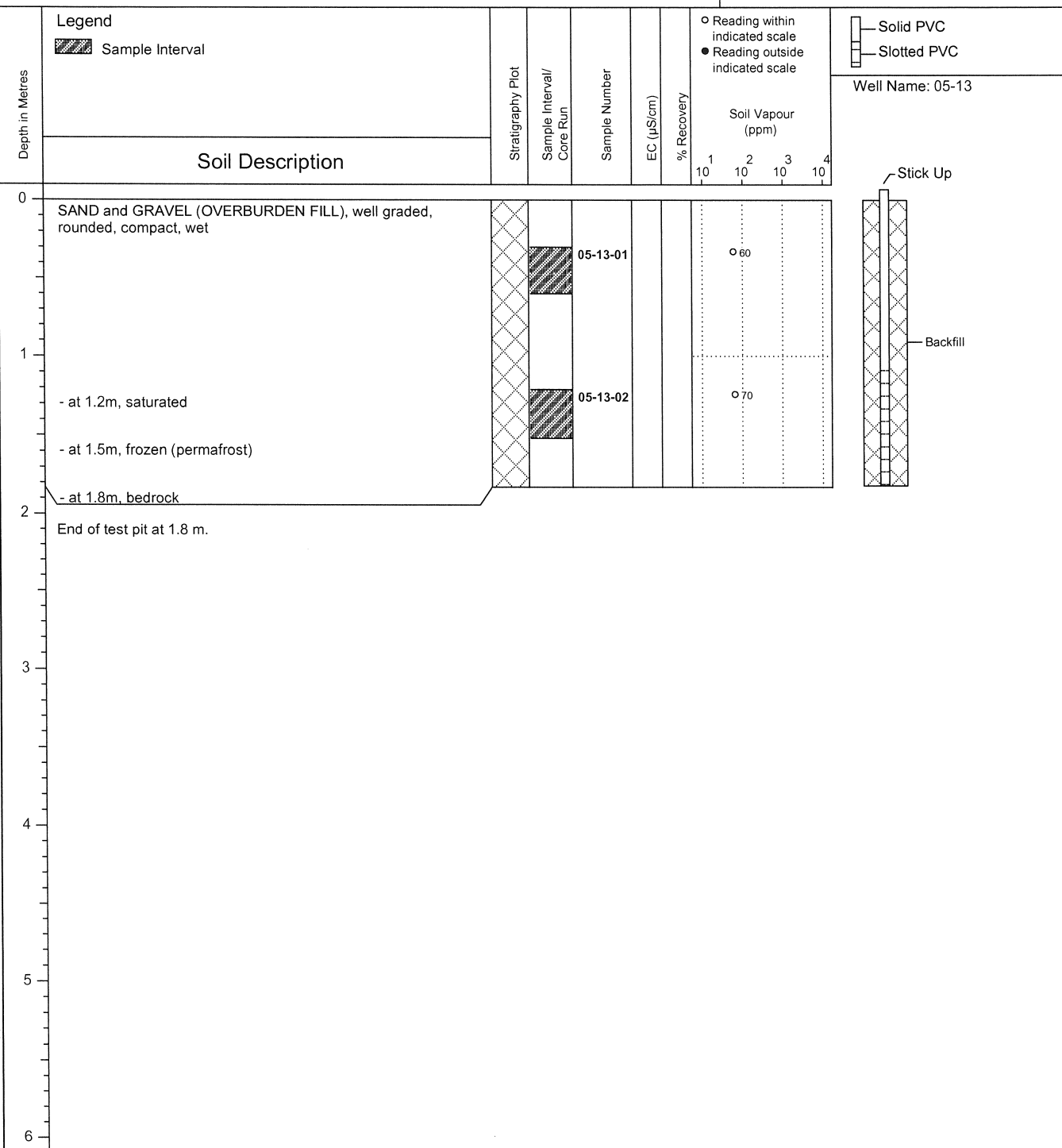
(Page 1 of 1)

Contractor : Kinross
Method : Backhoe

Date Monitored : 2005 07 22
Ground Surf Elev. (m) : 482.6
Top of Casing Elev. (m) : 483.45

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 18
Log Typed By : CLW

Pipe/Slotted Pipe Dia. (m): 0.05, 0.05



Notes:
 Bolded sample denotes sample analyzed.
 * denotes blind field duplicate.



Client :
Kinross Gold USA, Inc

Test Pit No. : 05-14

Location :
Lupin Gold Mine, Nunavut

(Page 1 of 1)

Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 485.89

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 18
Log Typed By : CLW

Depth in Metres	Legend	Stratigraphy Plot	Sample Interval/ Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm)						
	 Sample Interval						1	2	3	4			
	Soil Description						10	10	10	10			
0	SAND, GRAVEL and COBBLES (FILL), rounded and angular, compact, moist, abundant ash and metal debris, stained grey, strong organic odour			05-14-01								 Backfill	
	- at 0.7m, becoming brown, less metal debris										620		
1	- at 1.2m, wet			05-14-02							420		
	- at 1.5m, frozen (permafrost)												
	End of test pit at 1.7 m.												
2													
3													
4													
5													
6													

Notes:
Bolded sample denotes sample analyzed.
* denotes blind field duplicate.

Notes:
Bolded sample denotes sample analyzed.
* denotes blind field duplicate.



Client :
Kinross Gold USA, Inc

Test Pit No. : 05-15

Location :
Lupin Gold Mine, Nunavut

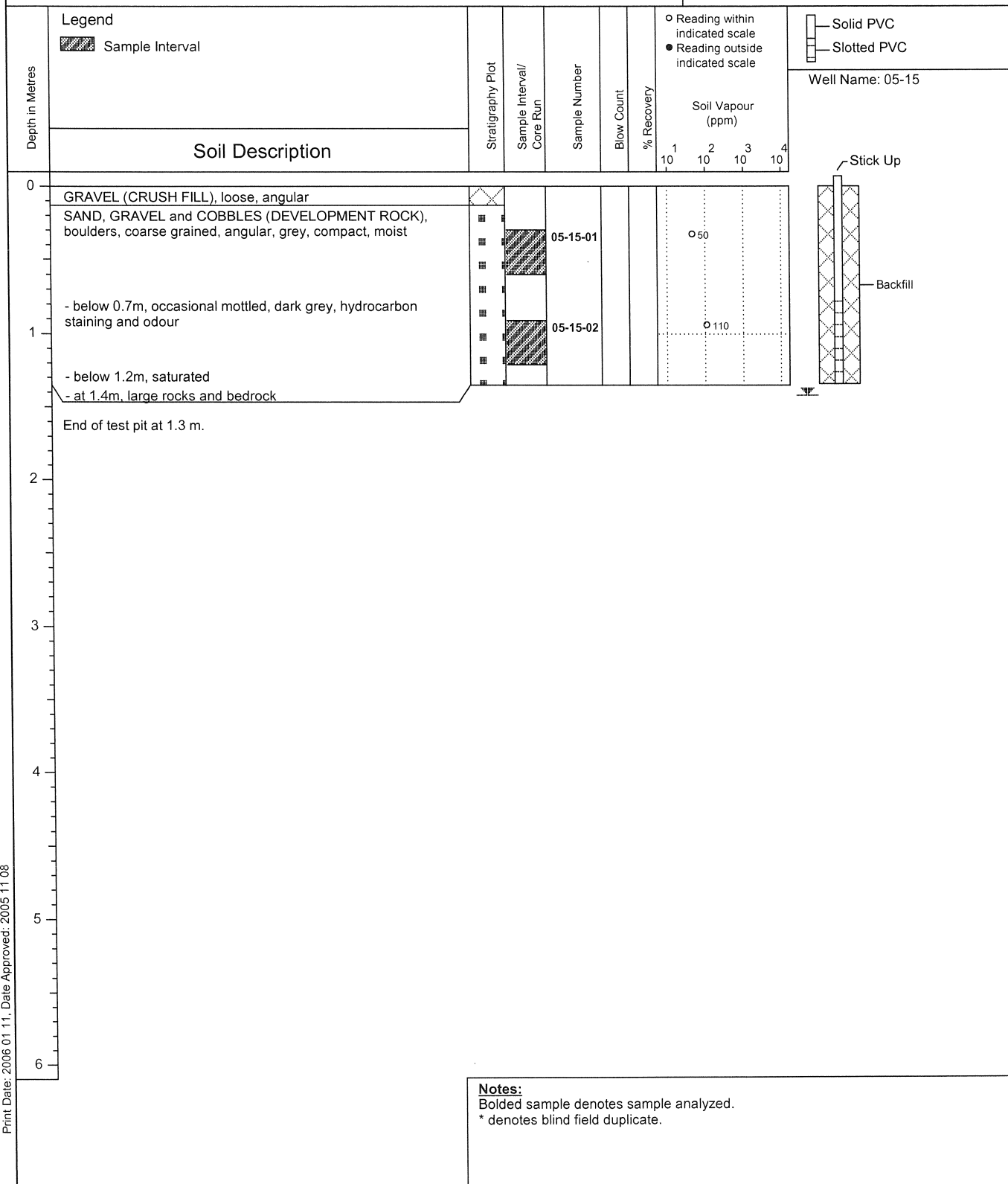
(Page 1 of 1)

Contractor : Kinross
Method : Backhoe

Date Monitored : 2005 07 22
Ground Surf Elev. (m) : 503.44
Top of Casing Elev. (m) : 504.14

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 18
Log Typed By : CLW

Pipe/Slotted Pipe Dia. (m): 0.04, 0.04





Client :
Kinross Gold USA, Inc

Test Pit No. : 05-16

Location :
Lupin Gold Mine, Nunavut

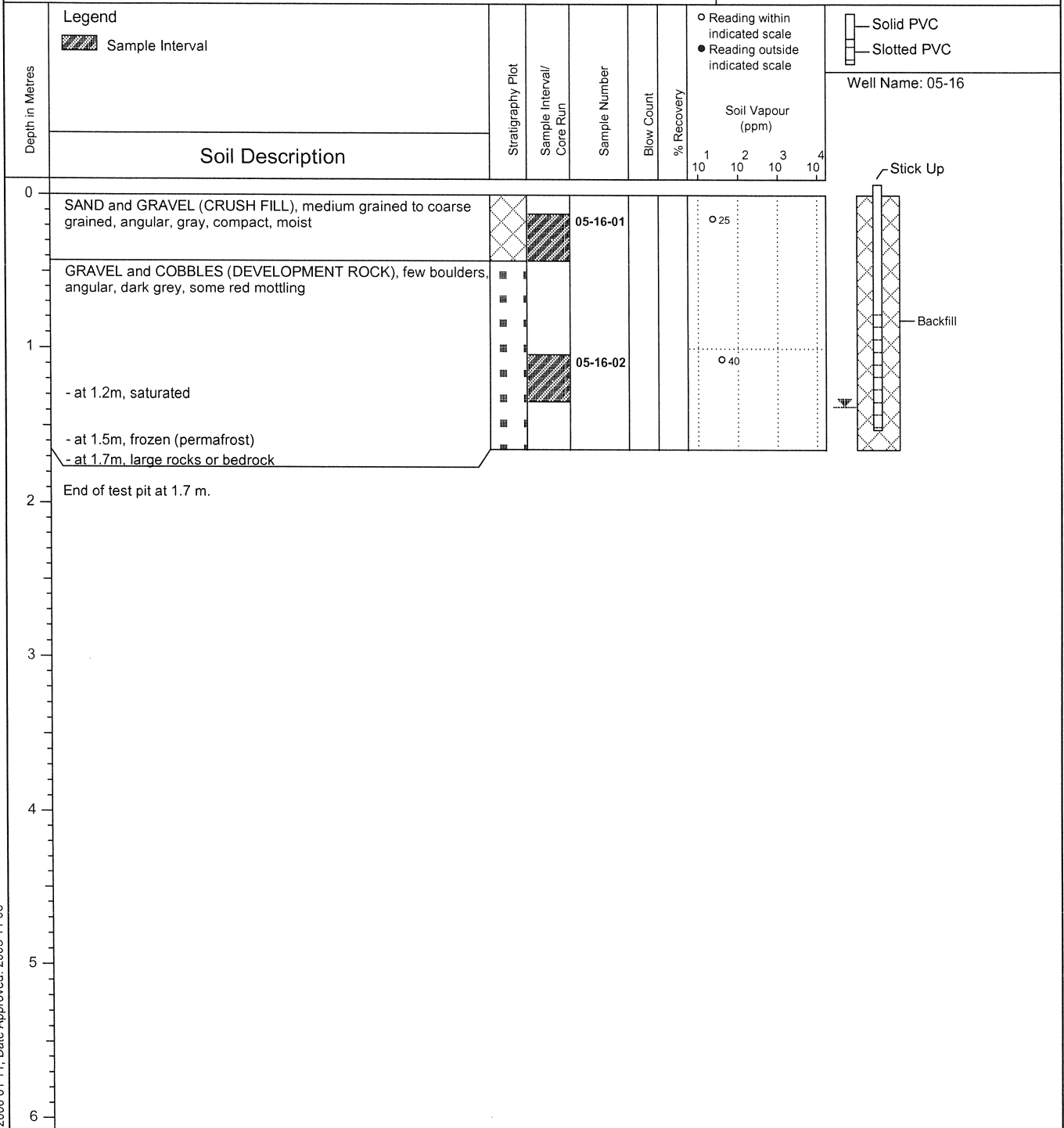
(Page 1 of 1)

Contractor : Kinross
Method : Backhoe

Date Monitored : 2005 07 22
Ground Surf Elev. (m) : 504.08
Top of Casing Elev. (m) : 504.89

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 19
Log Typed By : CLW

Pipe/Slotted Pipe Dia. (m): 0.05, 0.05



Notes:

Bolded sample denotes sample analyzed.
* denotes blind field duplicate.



Client :
Kinross Gold USA, Inc

Test Pit No. : 05-17

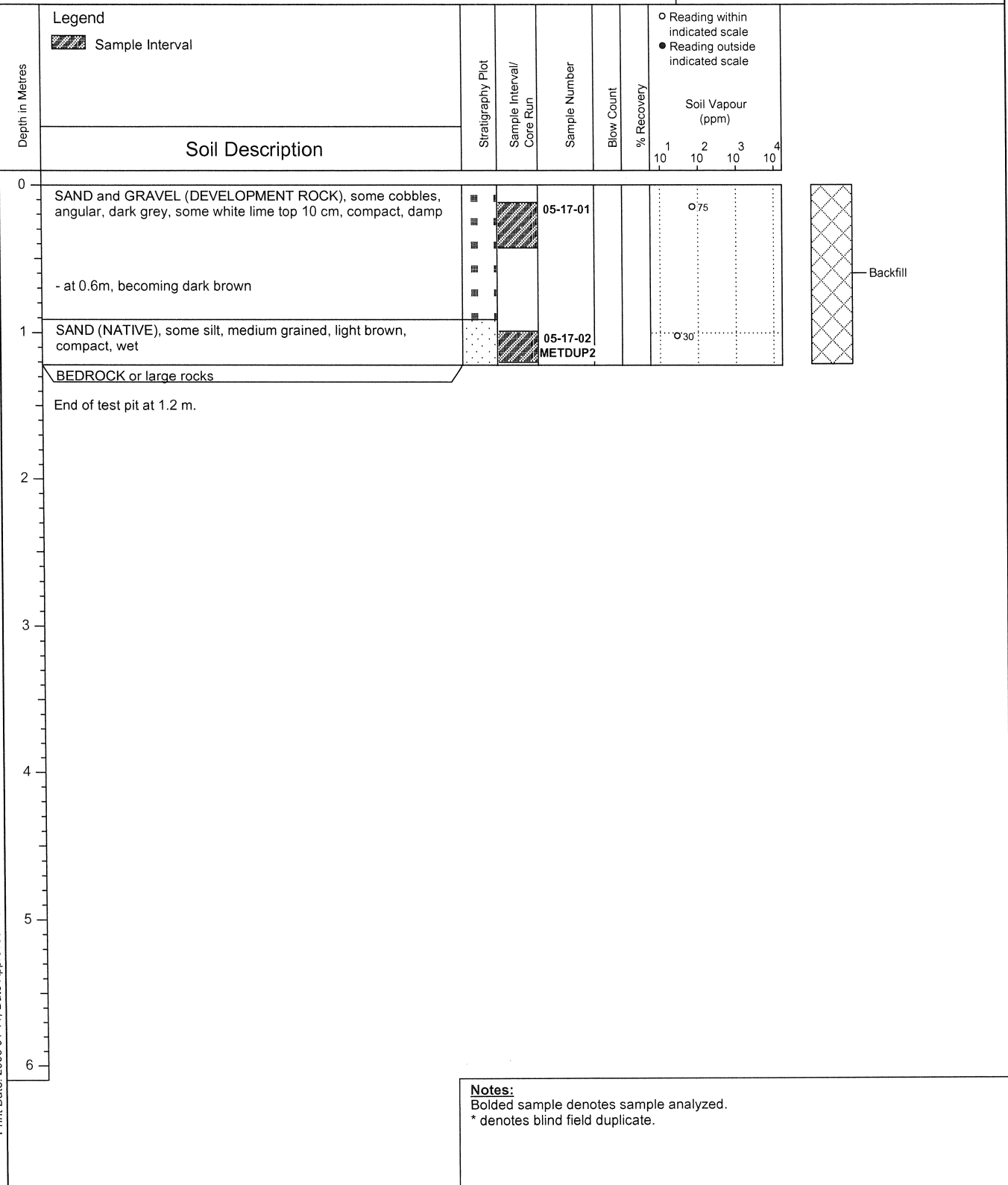
Location :
Lupin Gold Mine, Nunavut

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Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 504

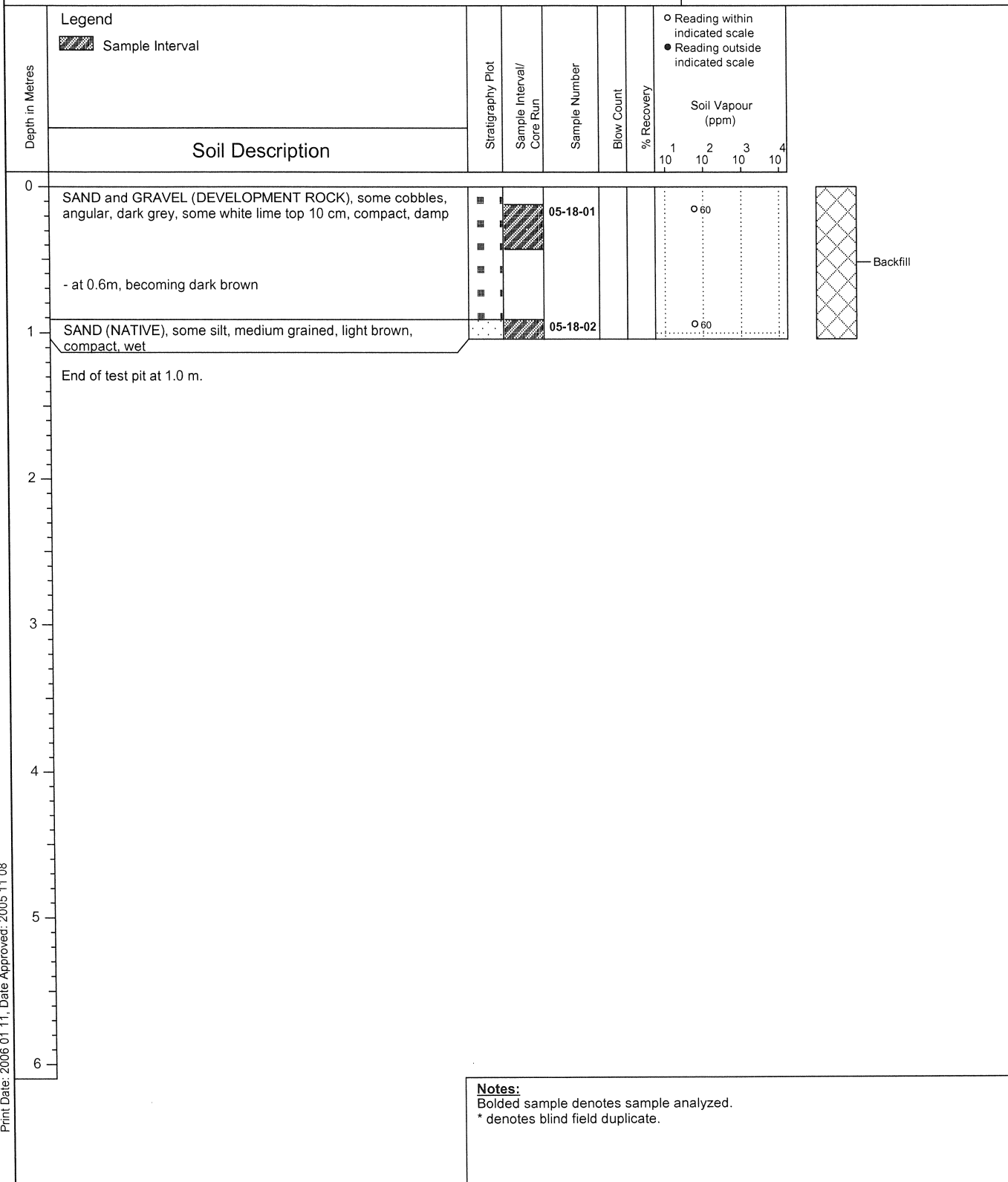
Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 18
Log Typed By : CLW



Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 504

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 18
Log Typed By : CLW





Client :
Kinross Gold USA, Inc

Test Pit No. : 05-19

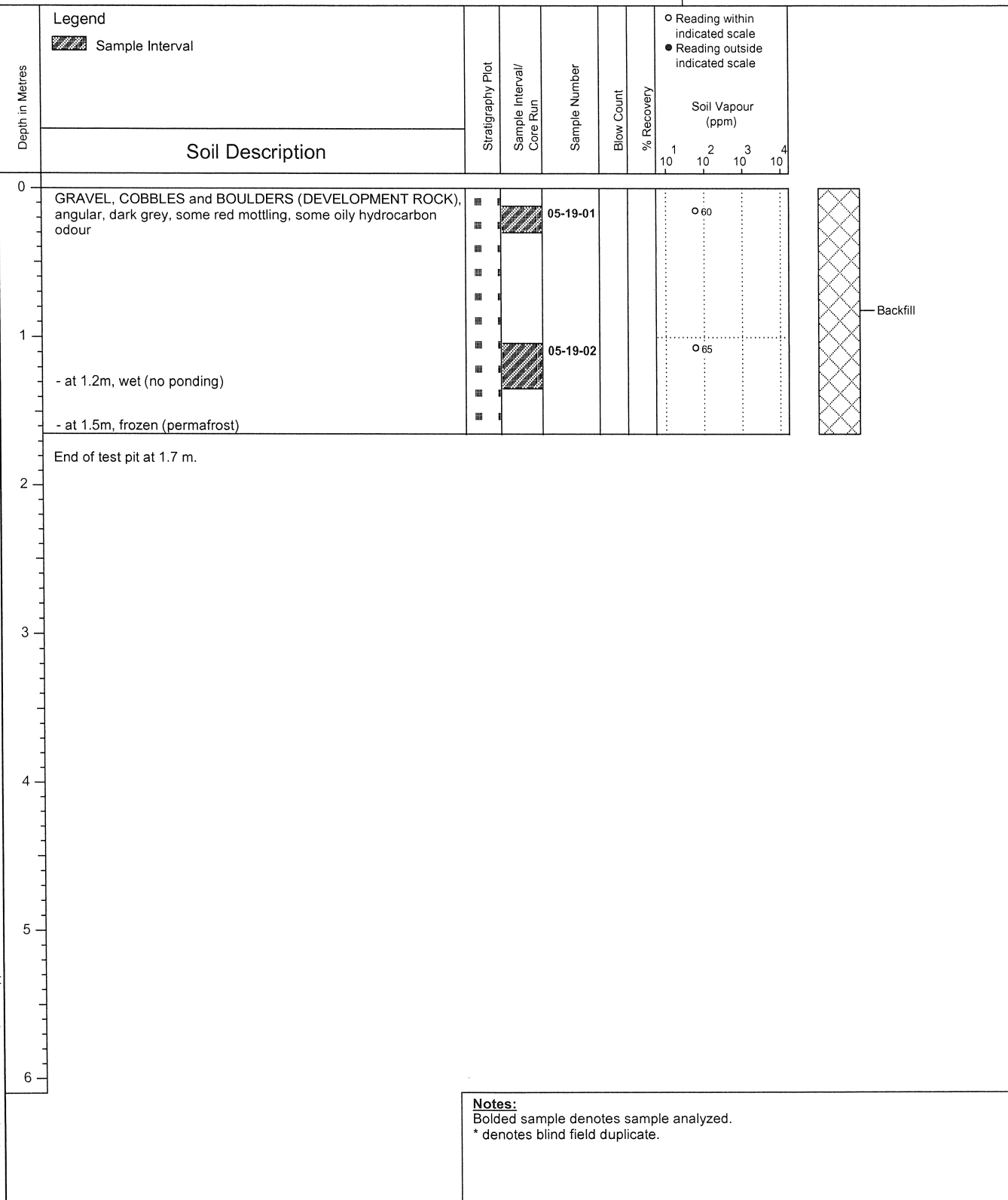
Location :
Lupin Gold Mine, Nunavut

(Page 1 of 1)

Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 500.16

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 19
Log Typed By : CLW





Client :
Kinross Gold USA, Inc

Test Pit No. : 05-20

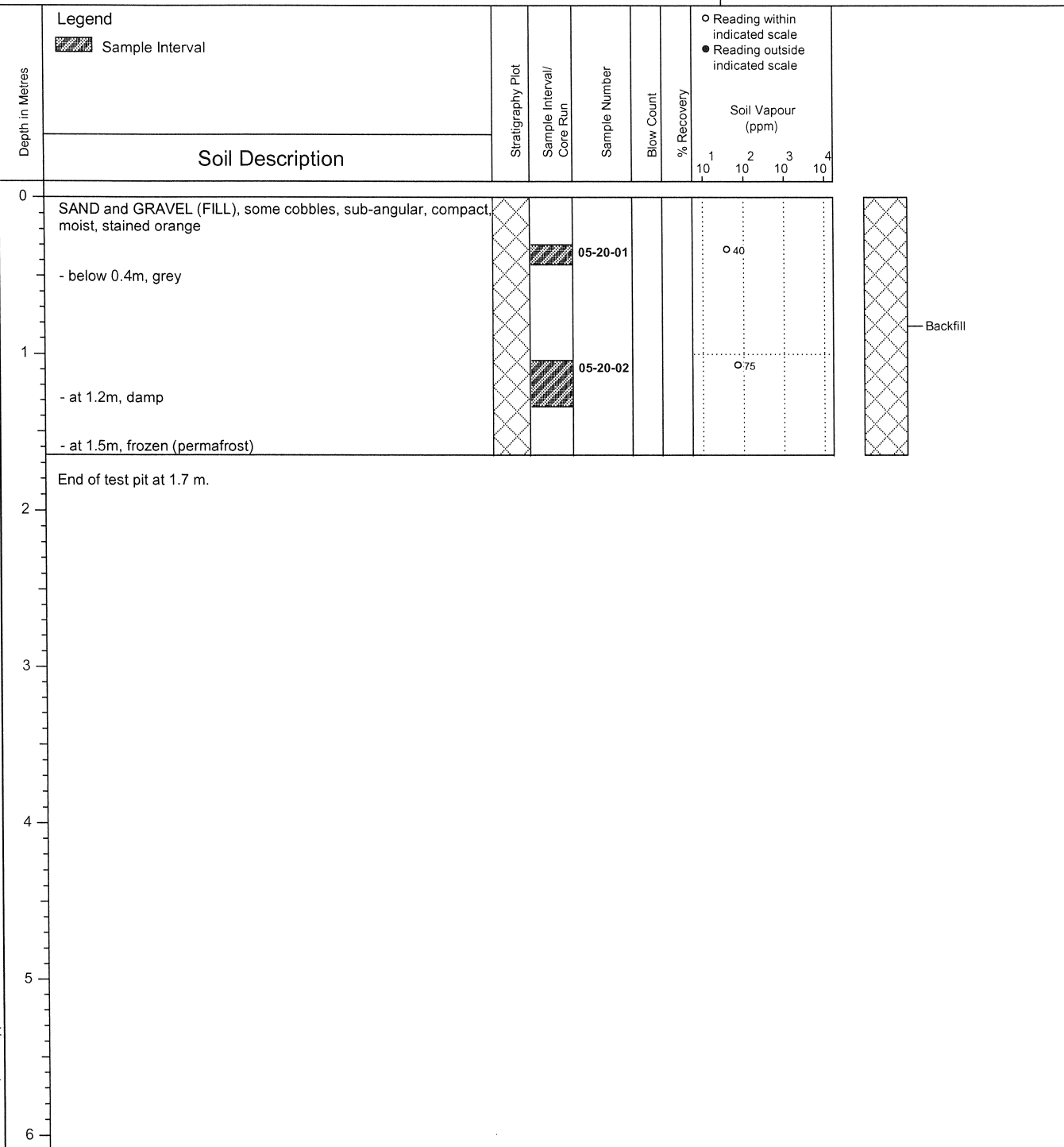
Location :
Lupin Gold Mine, Nunavut

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Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 498.38

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 19
Log Typed By : CLW



Notes:
Bolded sample denotes sample analyzed.
* denotes blind field duplicate.



Client :
Kinross Gold USA, Inc

Test Pit No. : 05-21

Location :
Lupin Gold Mine, Nunavut

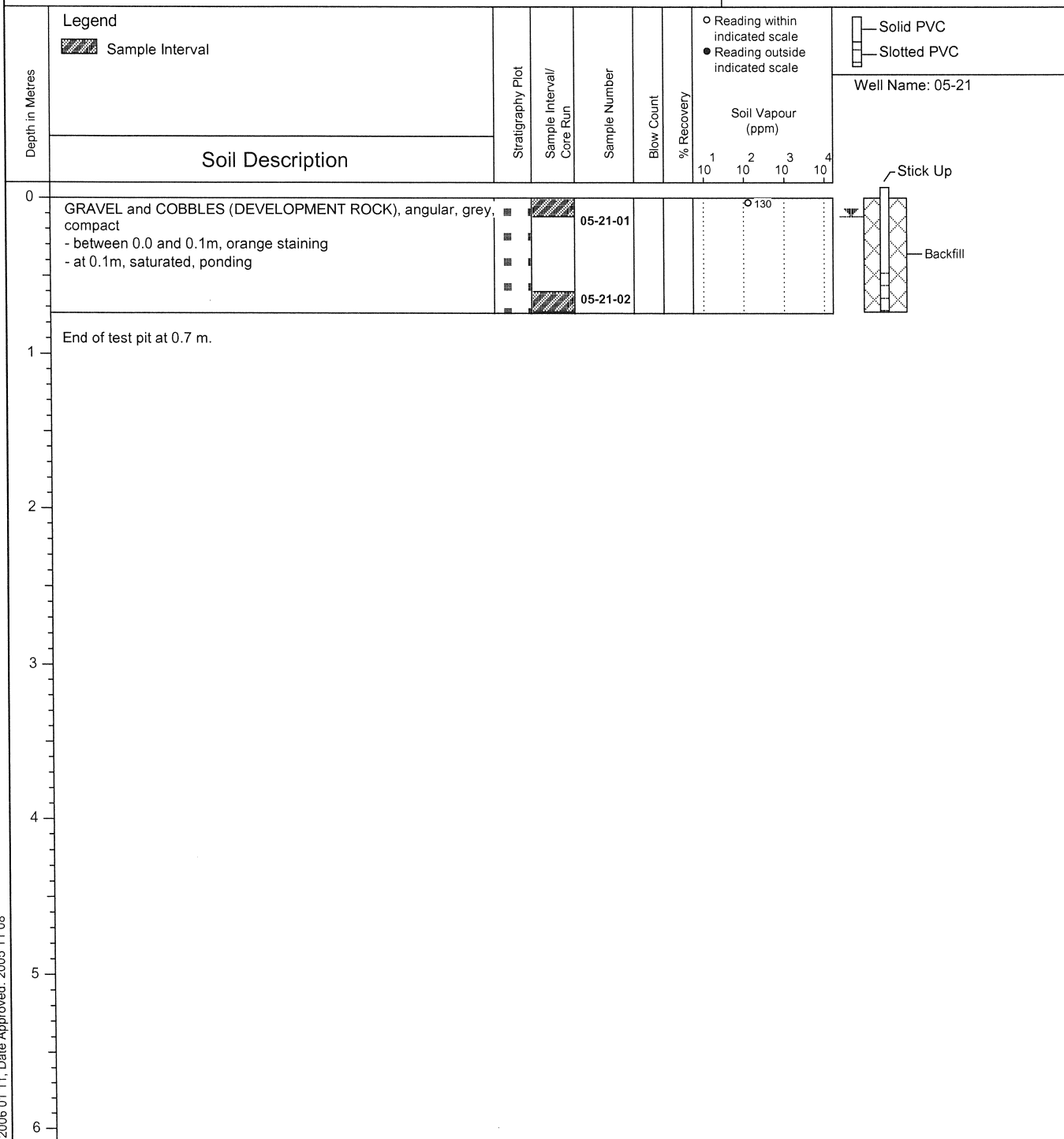
(Page 1 of 1)

Contractor : Kinross
Method : Backhoe

Date Monitored : 2005 07 22
Ground Surf Elev. (m) : 500.16
Top of Casing Elev. (m) : 501.28

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 19
Log Typed By : CLW

Pipe/Slotted Pipe Dia. (m): 0.05, 0.05



Notes:
 Bolded sample denotes sample analyzed.
 * denotes blind field duplicate.



Client :
Kinross Gold USA, Inc

Test Pit No. : 05-22

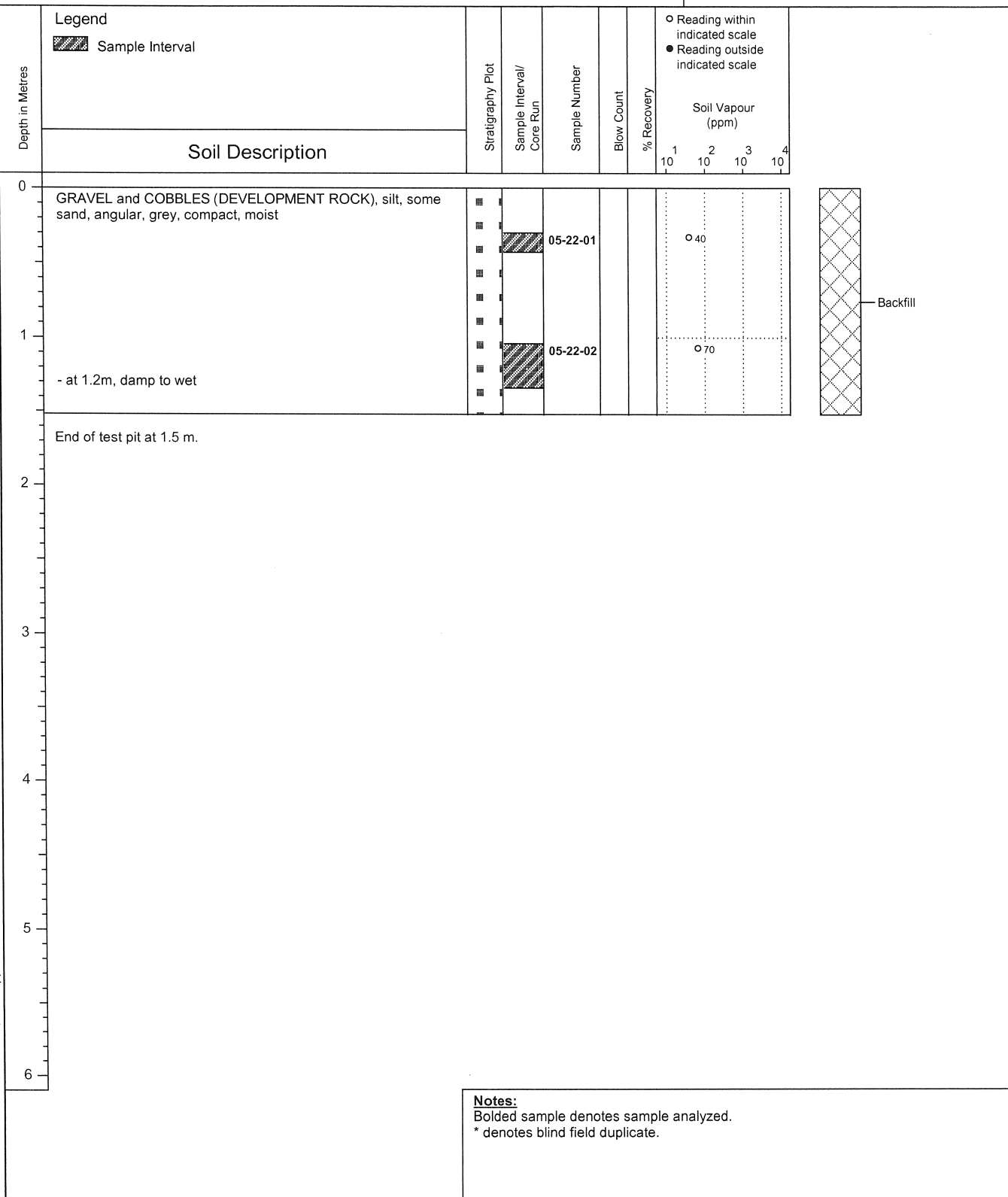
Location :
Lupin Gold Mine, Nunavut

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Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 503.5

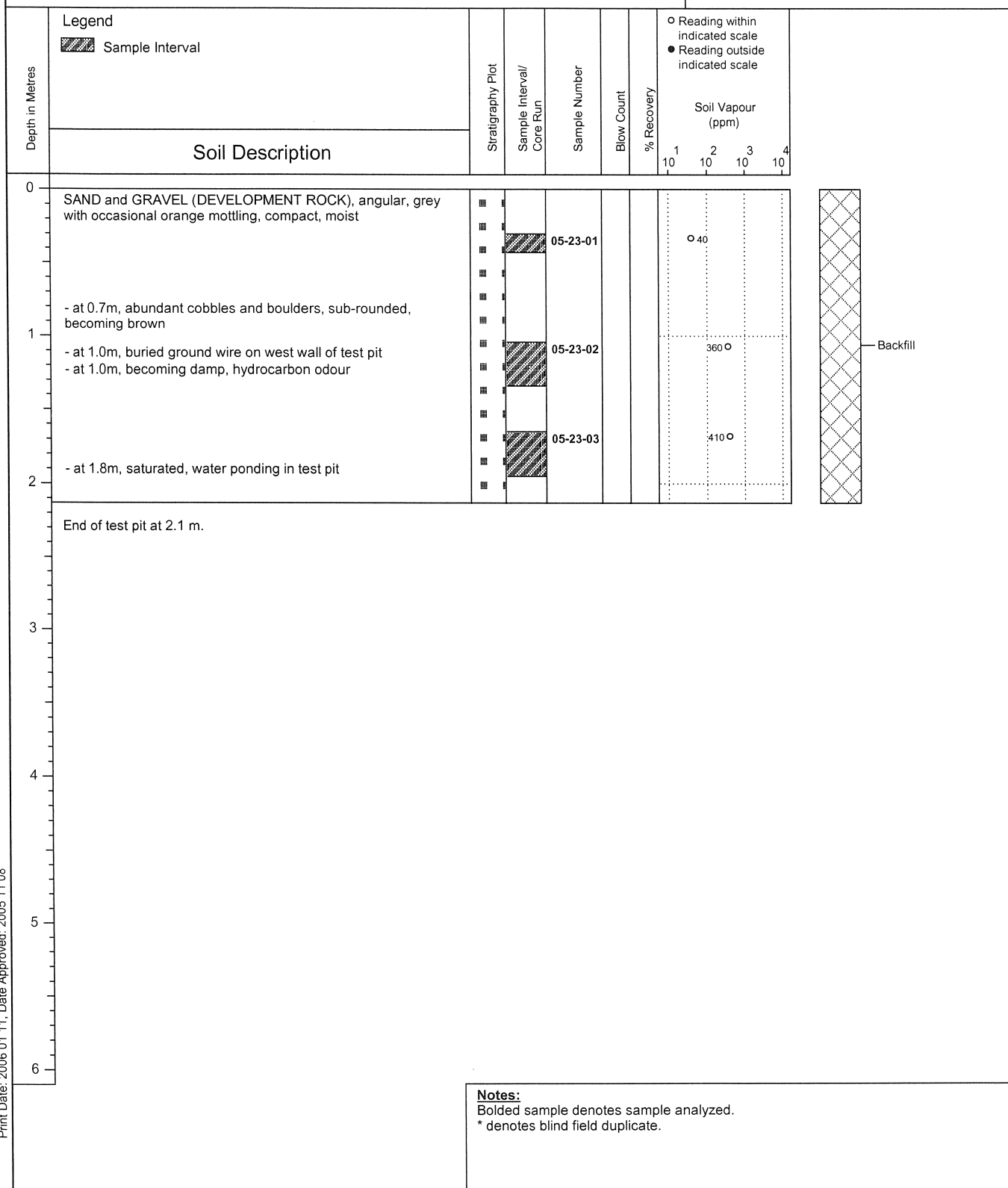
Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 19
Log Typed By : CLW



Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 529.25

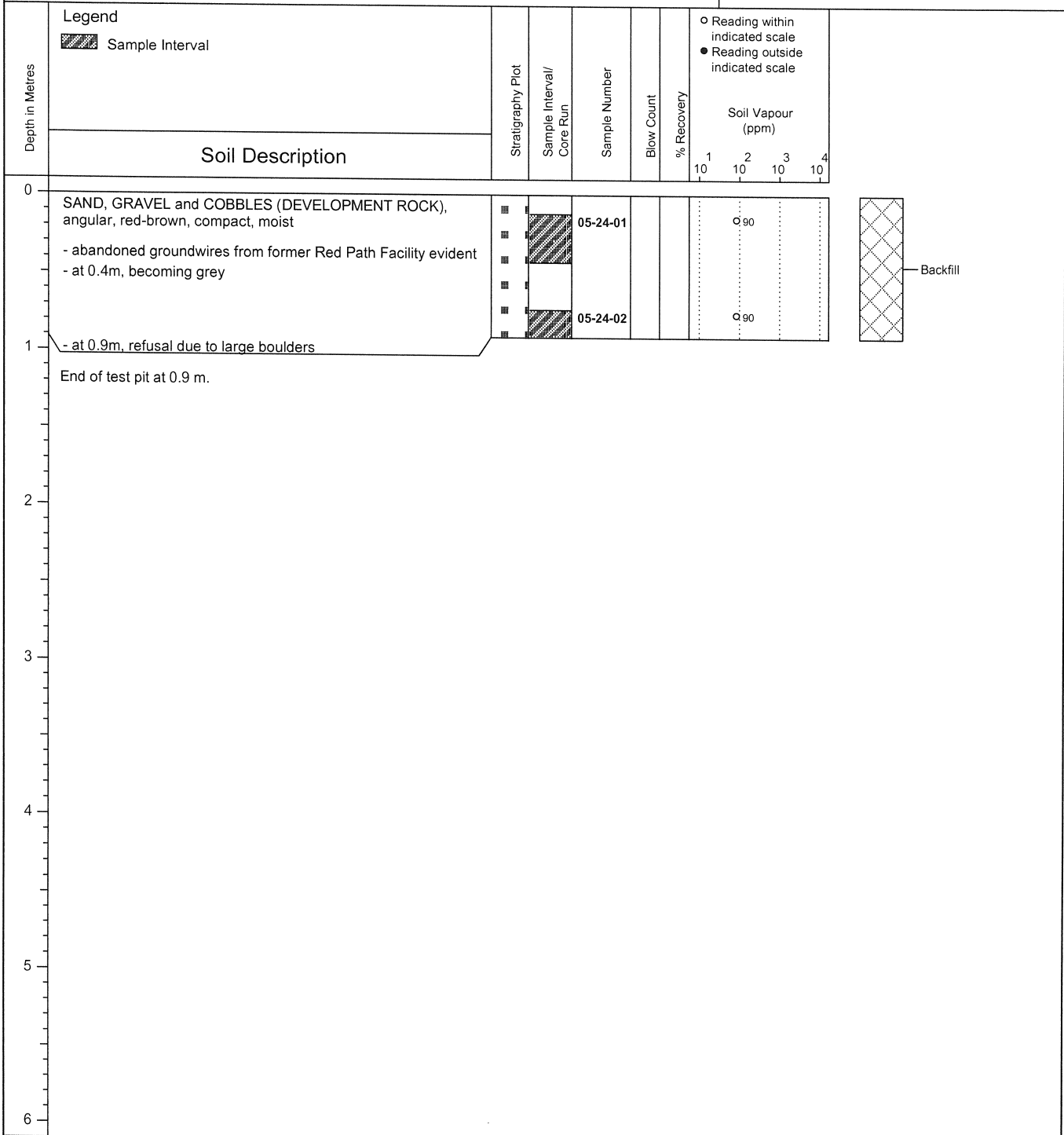
Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 19
Log Typed By : CLW



Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 504.11

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 19
Log Typed By : CLW



Notes:

Bolded sample denotes sample analyzed.
* denotes blind field duplicate.



Client :
Kinross Gold USA, Inc

Test Pit No. : 05-25

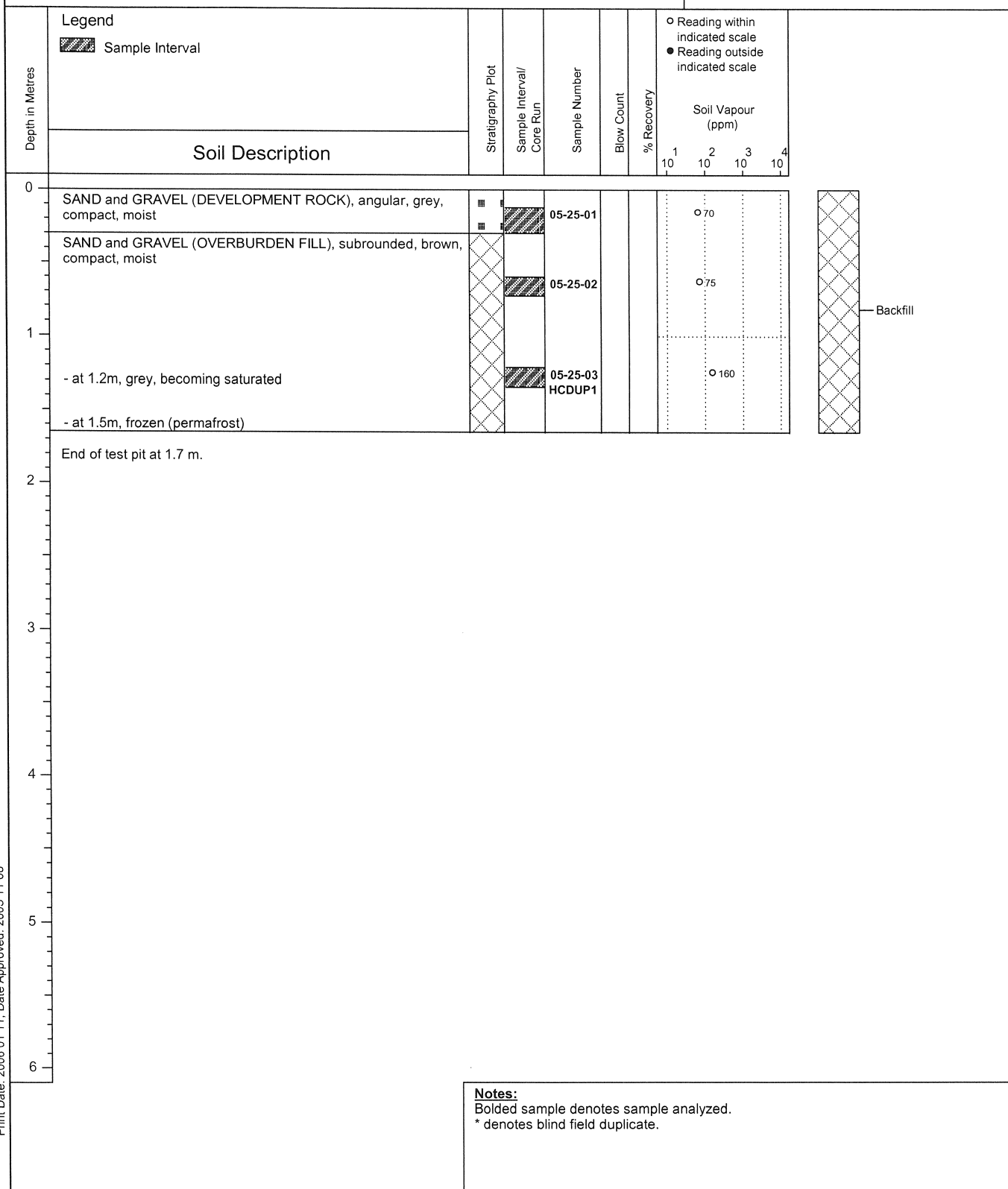
Location :
Lupin Gold Mine, Nunavut

(Page 1 of 1)

Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 503.26

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 19
Log Typed By : CLW





Client :
Kinross Gold USA, Inc

Test Pit No. : 05-26

Location :
Lupin Gold Mine, Nunavut

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Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 503.66

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 19
Log Typed By : CLW

Depth in Metres	Legend	Stratigraphy Plot	Sample Interval/ Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm)			
	Sample Interval						1	2	3	4
	Soil Description						10	10	10	10
0	SAND, GRAVEL and COBBLES (DEVELOPMENT ROCK), angular, red-brown, compact, moist - at 0.3m, grey			05-26-01			○ 40			
				05-26-02			○ 35			
1	SAND, GRAVEL and COBBLES (OVERBURDEN FILL), rounded, brown, compact, damp - at 1.2m, saturated - at 1.5m, frozen (permafrost)			05-26-03			○ 40			
2	End of test pit at 1.7 m.									
3										
4										
5										
6										

Backfill

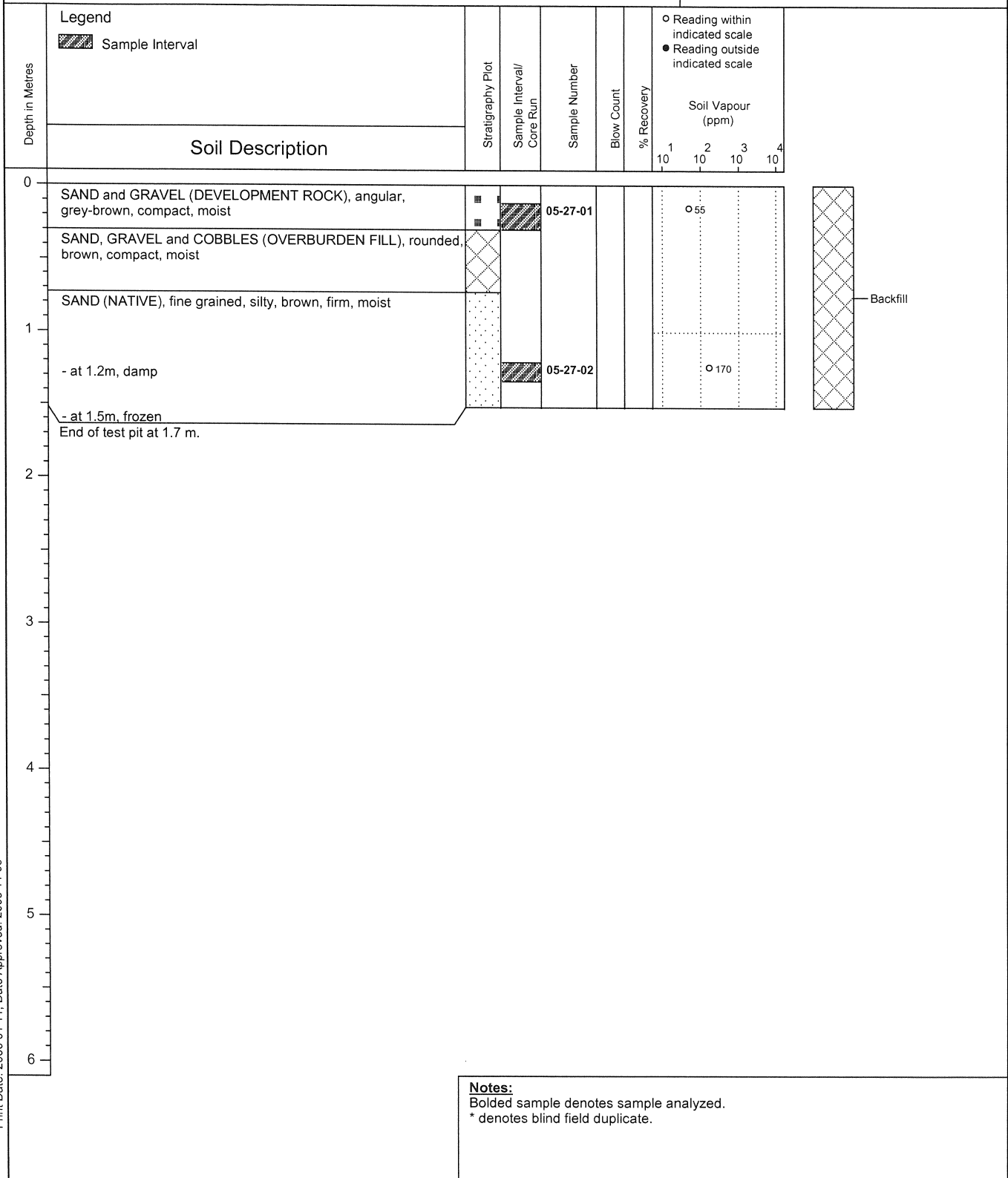
Notes:

Bolded sample denotes sample analyzed.
* denotes blind field duplicate.

Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 503.52

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 19
Log Typed By : CLW



Notes:
 Bolded sample denotes sample analyzed.
 * denotes blind field duplicate.



Client :
Kinross Gold USA, Inc

Test Pit No. : 05-28

Location :
Lupin Gold Mine, Nunavut

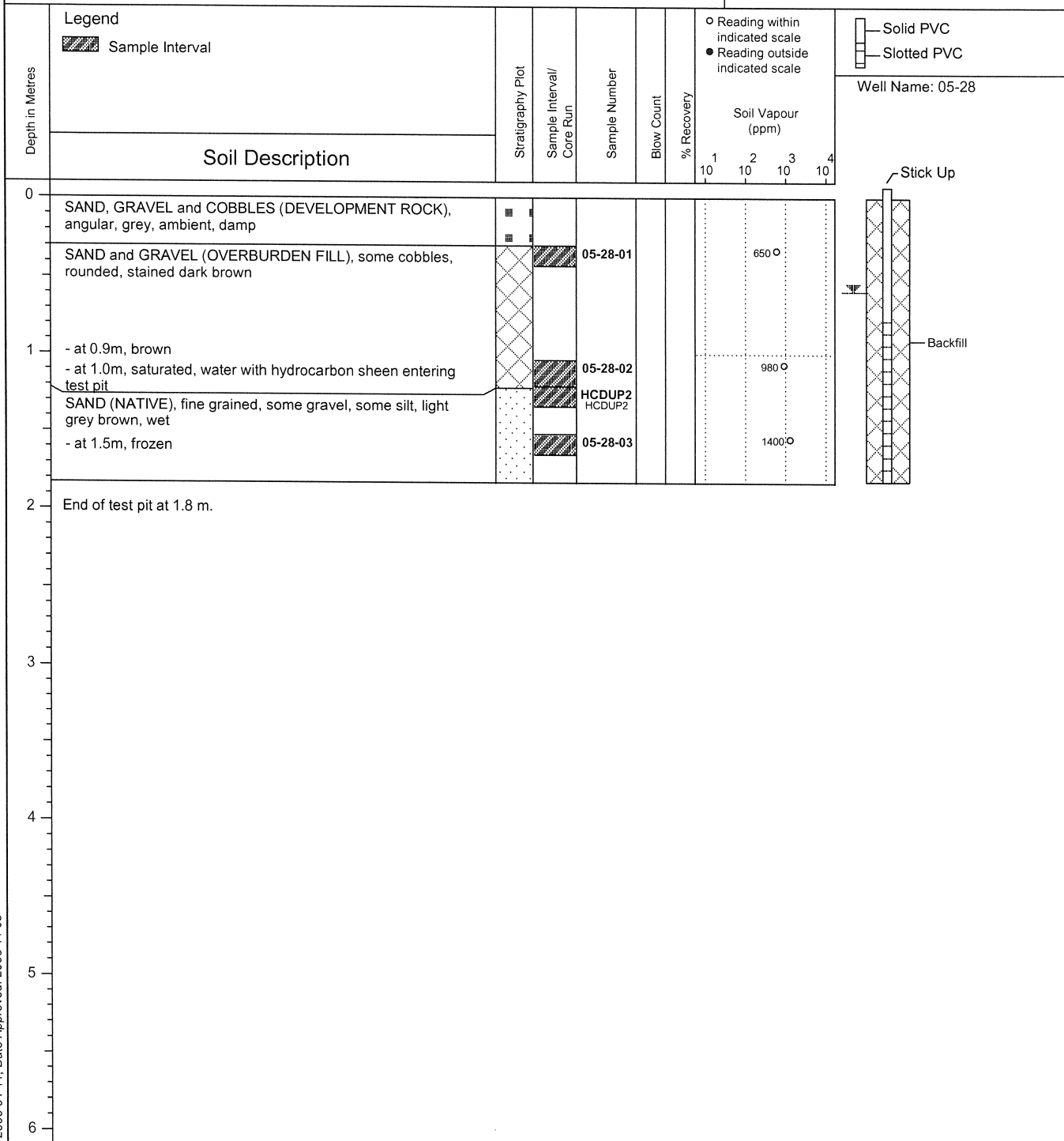
(Page 1 of 1)

Contractor : Kinross
Method : Backhoe

Date Monitored : 2005 07 22
Ground Surf Elev. (m) : 501.63
Top of Casing Elev. (m) : 502.66

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 19
Log Typed By : CLW

Pipe/Slotted Pipe Dia. (m): 0.05, 0.05



Notes:

Bolded sample denotes sample analyzed.
* denotes blind field duplicate.



Client :
Kinross Gold USA, Inc

Test Pit No. : 05-29

Location :
Lupin Gold Mine, Nunavut

(Page 1 of 1)

Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) :502.4

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 19
Log Typed By : CLW

Depth in Metres	Legend	Stratigraphy Plot	Sample Interval/ Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm)			
	Soil Description						1	2	3	4
0	SAND and GRAVEL (DEVELOPMENT ROCK) angular, grey, compact, damp			05-29-01				500		
	SAND and GRAVEL (OVERBURDEN FILL), rounded, brown, compact, wet			05-29-02				600		
1	SAND (NATIVE), fine grained, some sand some silt, some cobbles, rounded, light grey brown, wet - at 1.5m, frozen			05-29-03				500		
2	End of test pit at 1.7 m.									
3										
4										
5										
6										



Backfill

Notes:

Bolded sample denotes sample analyzed.
* denotes blind field duplicate.



Client :
Kinross Gold USA, Inc

Test Pit No. : 05-30

Location :
Lupin Gold Mine, Nunavut

(Page 1 of 1)

Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 502.62

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 19
Log Typed By : CLW

Depth in Metres	Legend	Stratigraphy Plot	Sample Interval/ Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm)	
	Soil Description							
0	Sample Interval						○ Reading within indicated scale ● Reading outside indicated scale	
							10 10 10 10	
0	SAND, GRAVEL and COBBLES (OVERBURDEN FILL), rounded, brown, compact, moist							
	SAND (NATIVE), fine grained, some silt, light grey brown, damp			05-30-01			○ 170	
1				05-30-02			○ 190	
	- at 1.2m. frozen, dense							
	End of test pit at 1.5 m.							
2								
3								
4								
5								
6								

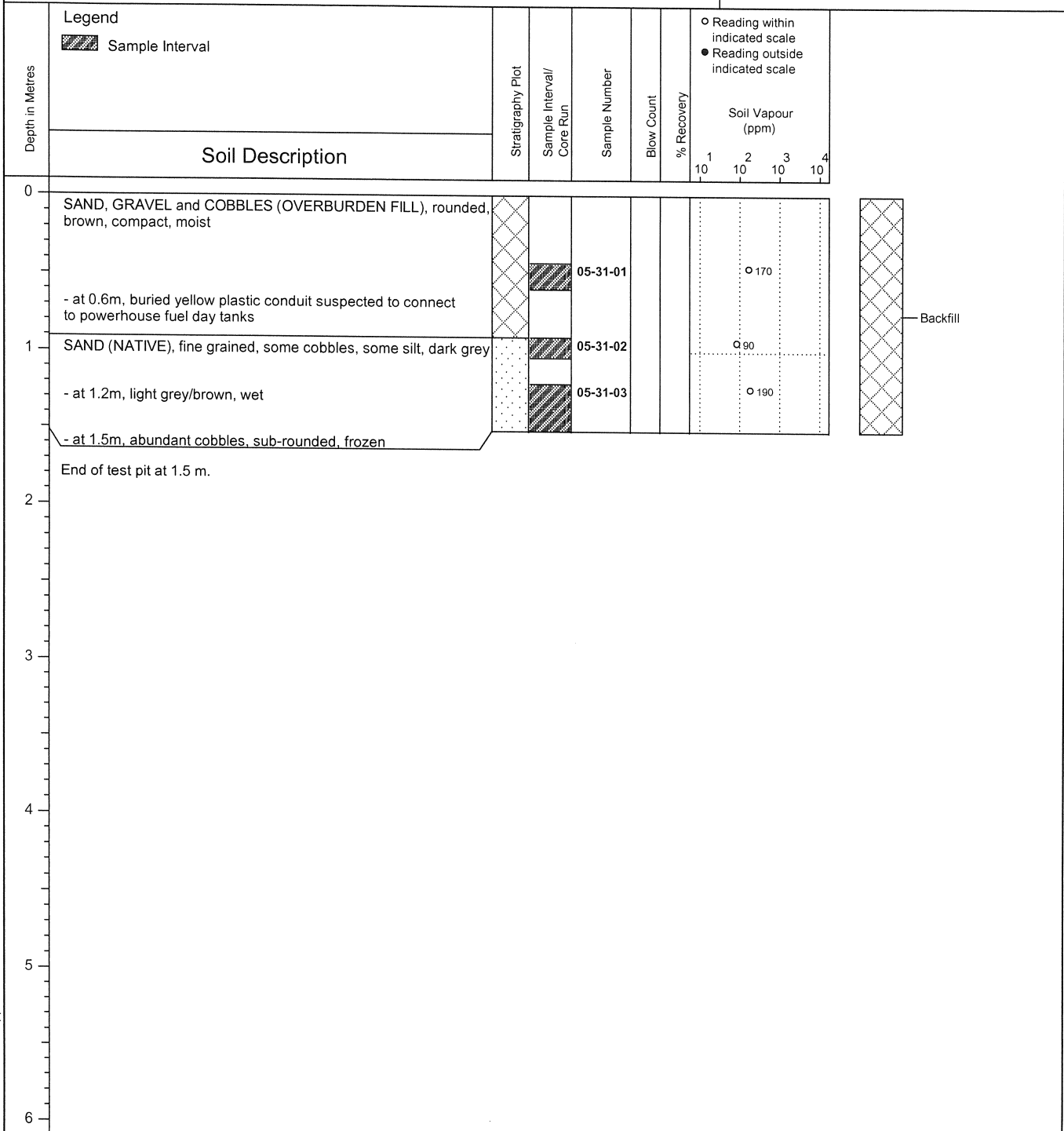
Backfill

Notes:
 Bolded sample denotes sample analyzed.
 * denotes blind field duplicate.

Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 502.94

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 19
Log Typed By : CLW



Notes:

Bolded sample denotes sample analyzed.
* denotes blind field duplicate.



Client :
Kinross Gold USA, Inc

Test Pit No. : 05-32

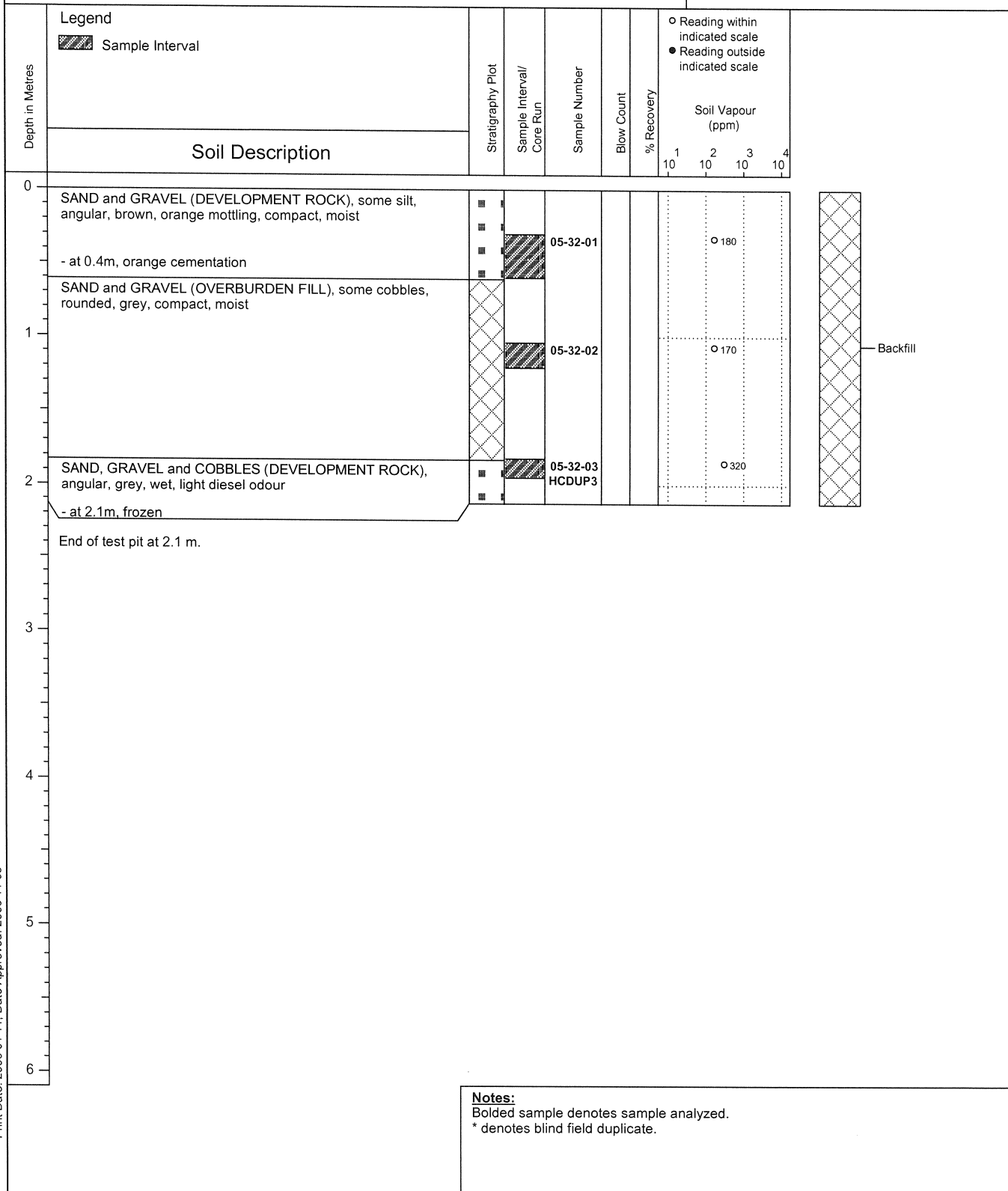
Location :
Lupin Gold Mine, Nunavut

(Page 1 of 1)

Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 504.57

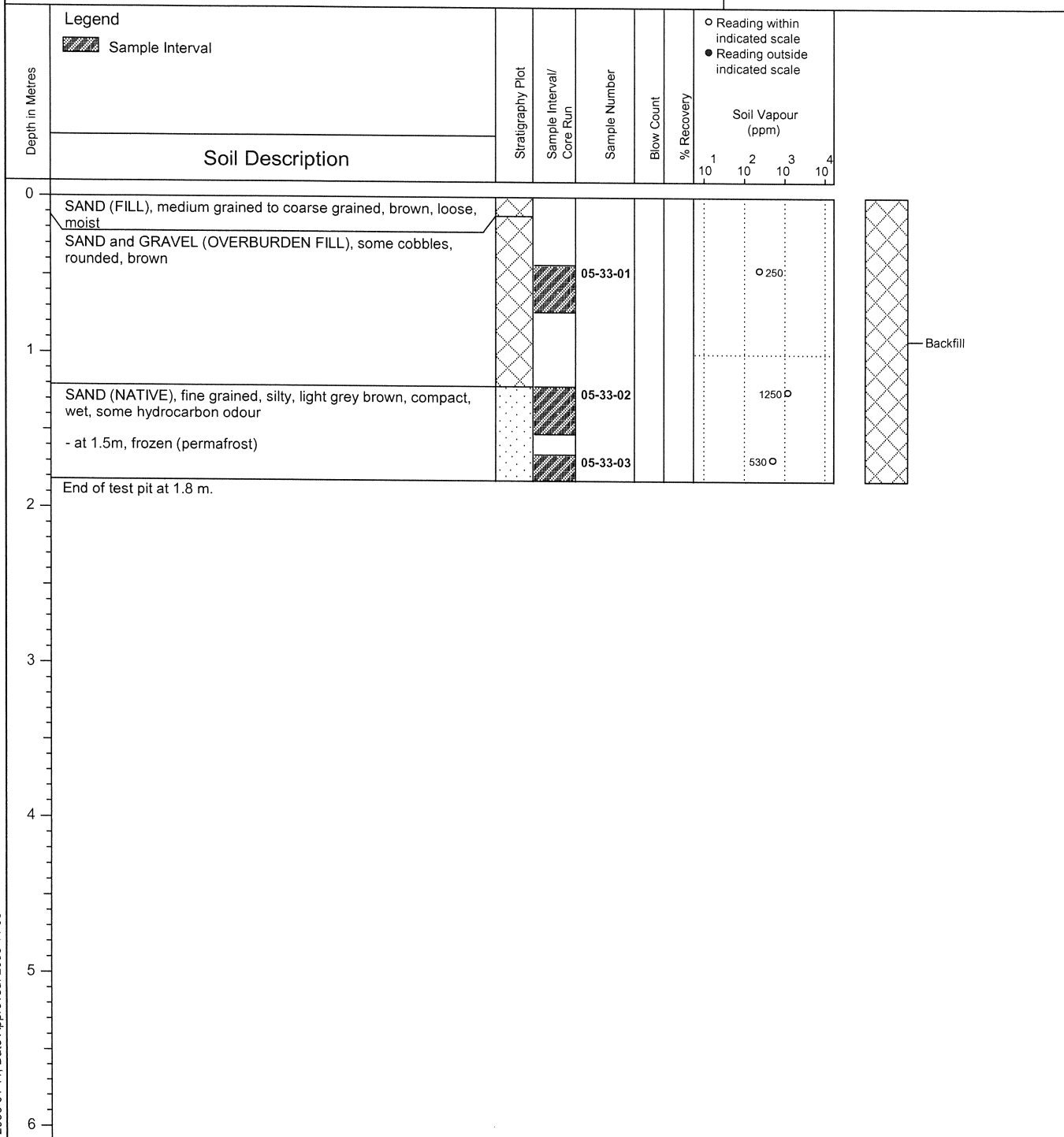
Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 19
Log Typed By : CLW



Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 503.4

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 19
Log Typed By : CLW



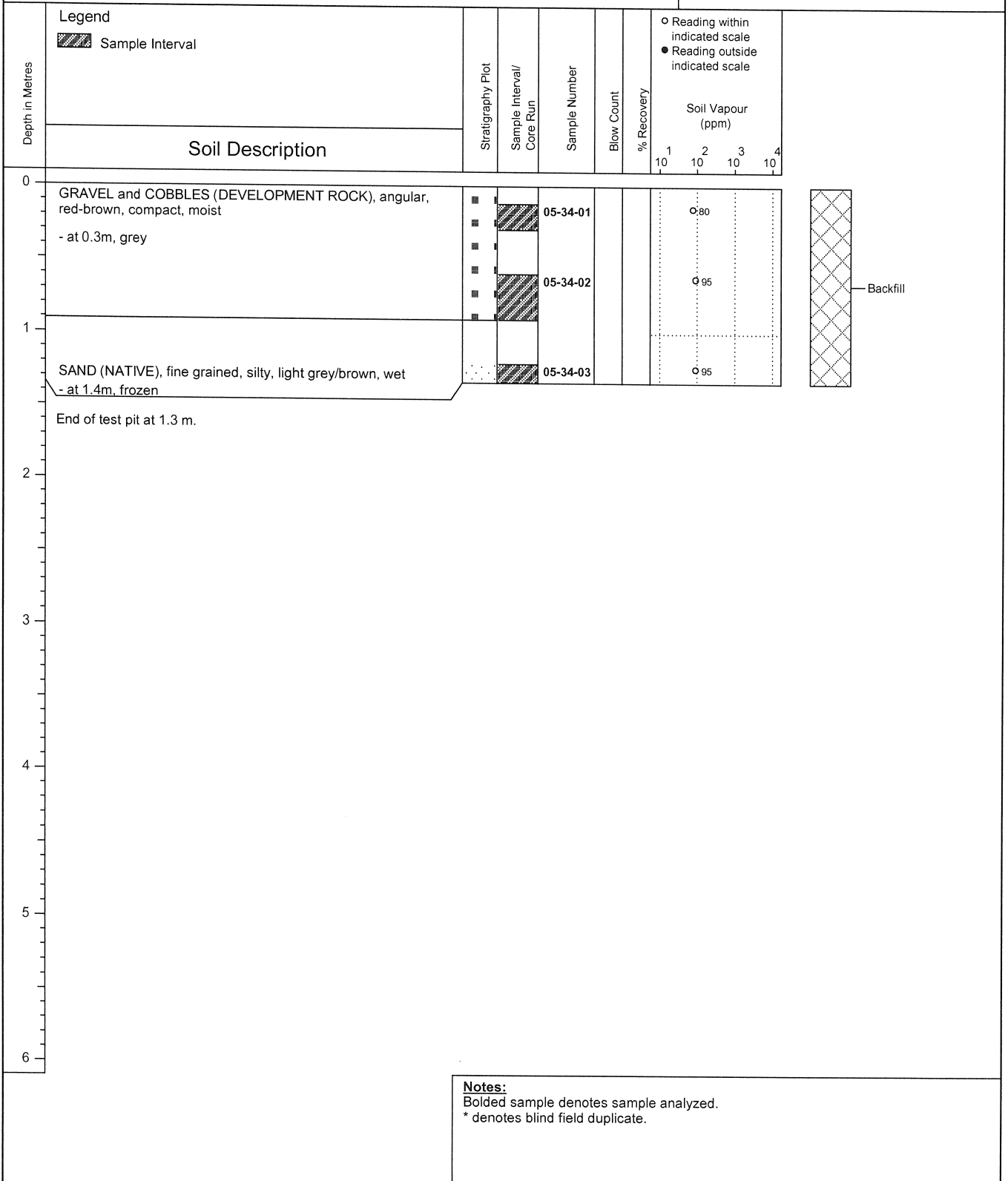
Notes:

Bolded sample denotes sample analyzed.
* denotes blind field duplicate.

Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 501.6

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 19
Log Typed By : CLW





Client :
Kinross Gold USA, Inc

Test Pit No. : 05-35

Location :
Lupin Gold Mine, Nunavut

(Page 1 of 1)

Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 498.95

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 19
Log Typed By : CLW

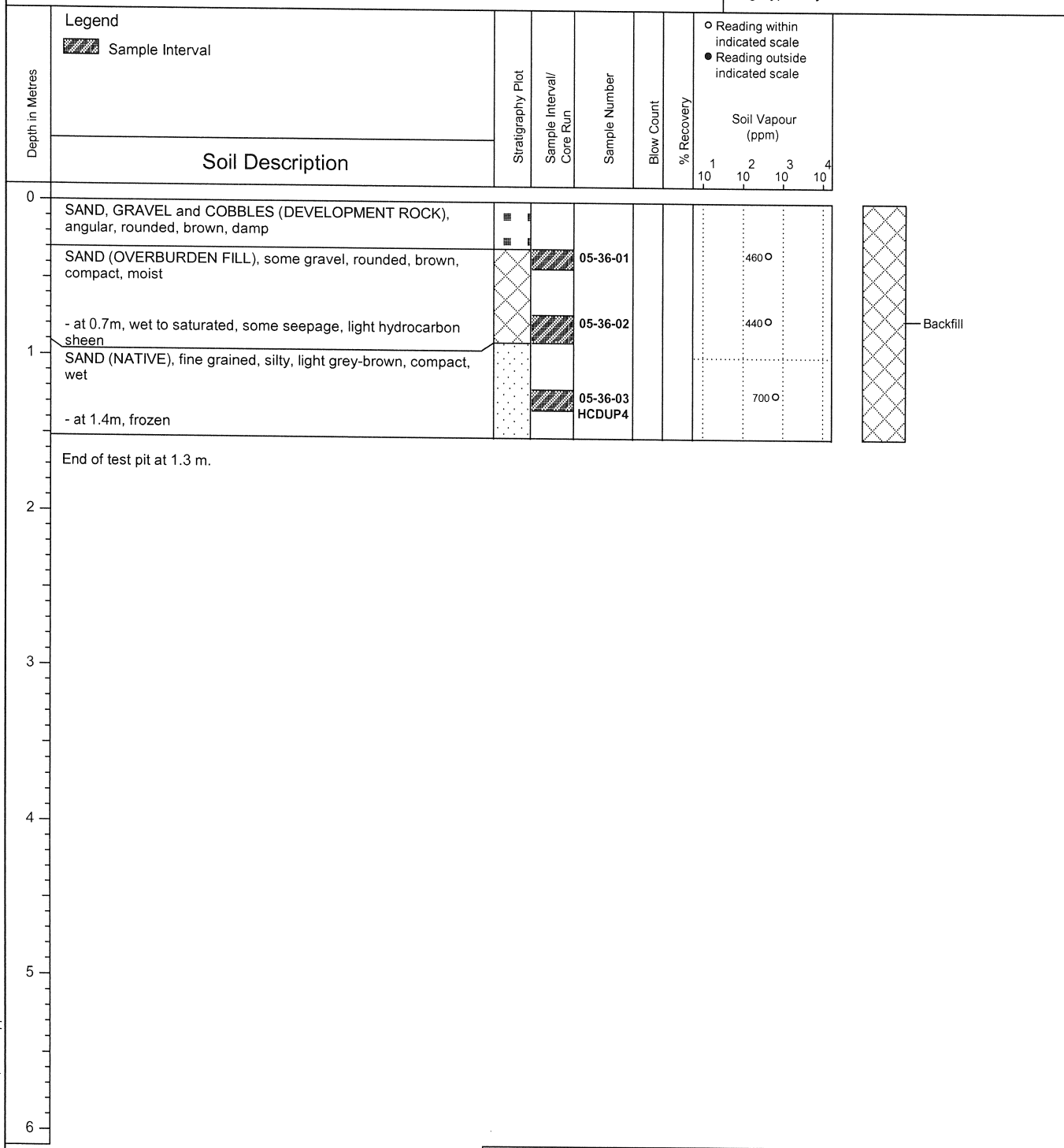
Depth in Metres	Legend	Stratigraphy Plot	Sample Interval/ Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm)				
	Sample Interval Soil Description						1	2	3	4	
0	SAND (FILL), medium grained to coarse grained, rounded			05-35-01			○ 40				Backfill
	SAND, GRAVEL, COBBLES and BOULDERS (DEVELOPMENT ROCK), angular, grey, compact, moist										
	SAND, some gravel, rounded, brown, compact, damp			05-35-02			○ 40				
1											
	SAND (NATIVE), fine grained, silty, light grey/brown, compact, wet			05-35-03			○ 100				
	End of test pit at 1.5 m.										
2											
3											
4											
5											
6											

Notes:
Bolded sample denotes sample analyzed.
* denotes blind field duplicate.

Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 499.13

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 19
Log Typed By : CLW



Notes:

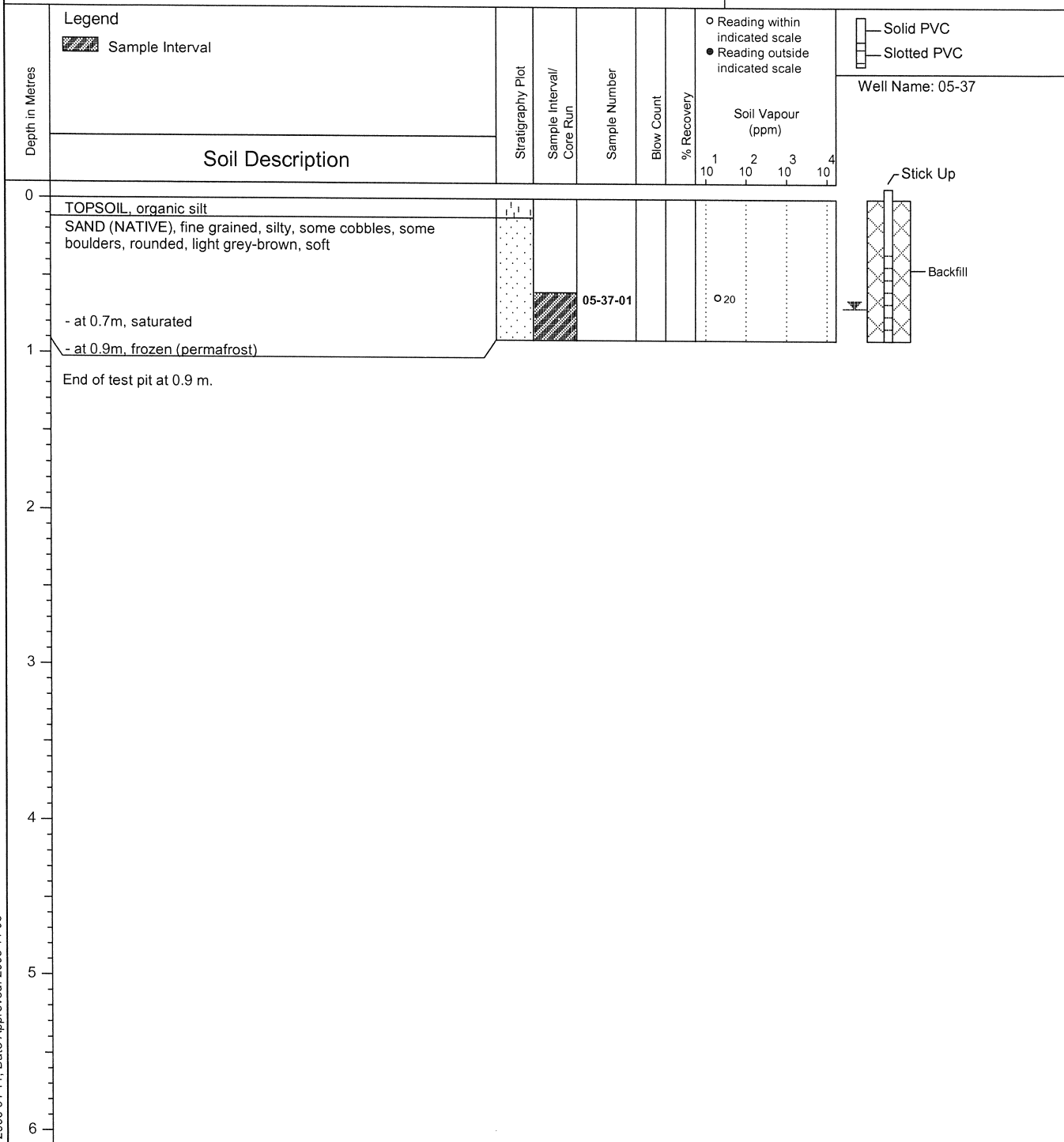
Bolded sample denotes sample analyzed.
* denotes blind field duplicate.

Contractor : Kinross
Method : Backhoe

Date Monitored : 2005 07 22
Ground Surf Elev. (m) : 492.31
Top of Casing Elev. (m) : 493.68

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 19
Log Typed By : CLW

Pipe/Slotted Pipe Dia. (m): 0.04, 0.04



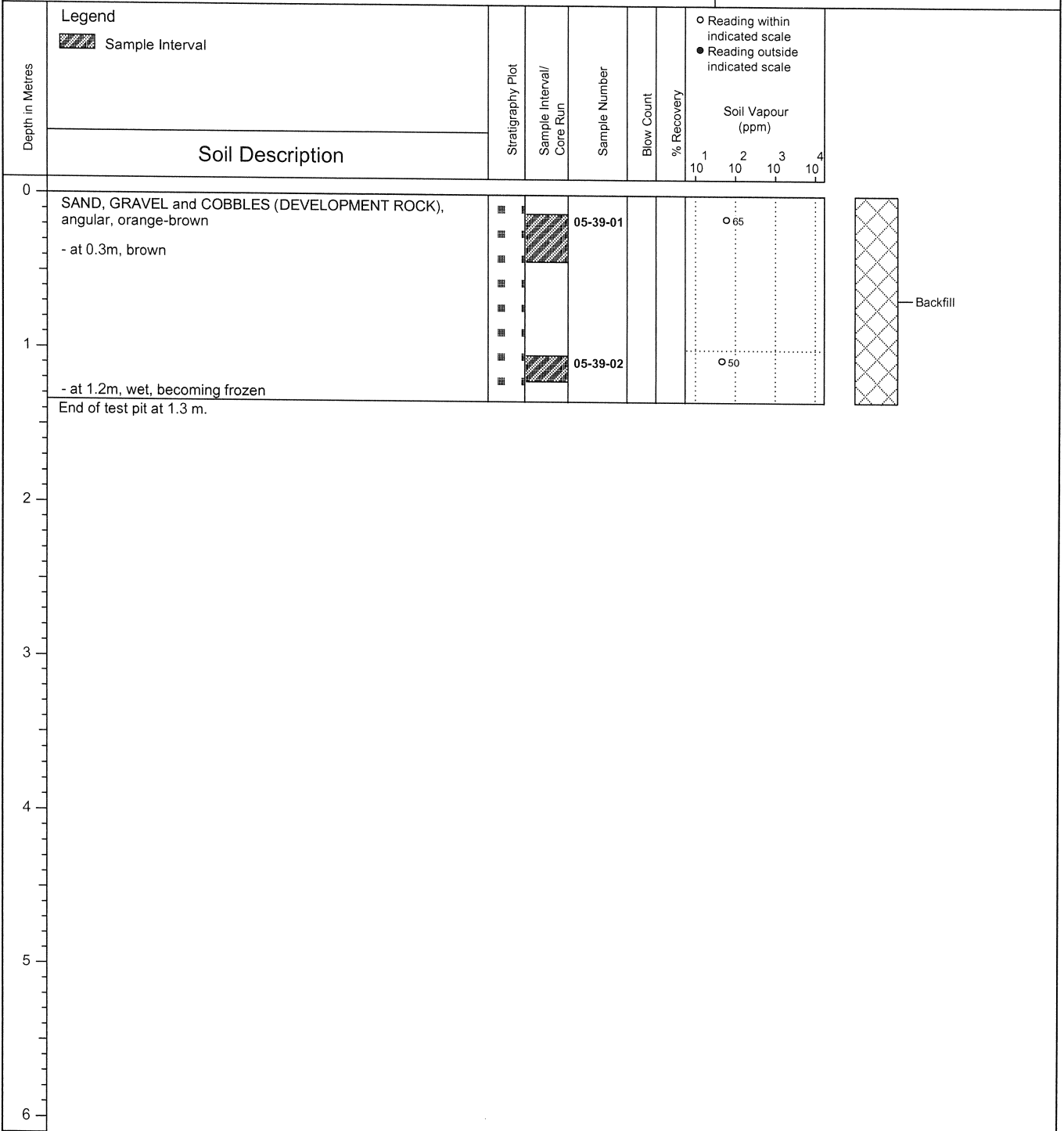
Notes:

Bolded sample denotes sample analyzed.
* denotes blind field duplicate.

Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 494.91

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 19
Log Typed By : CLW

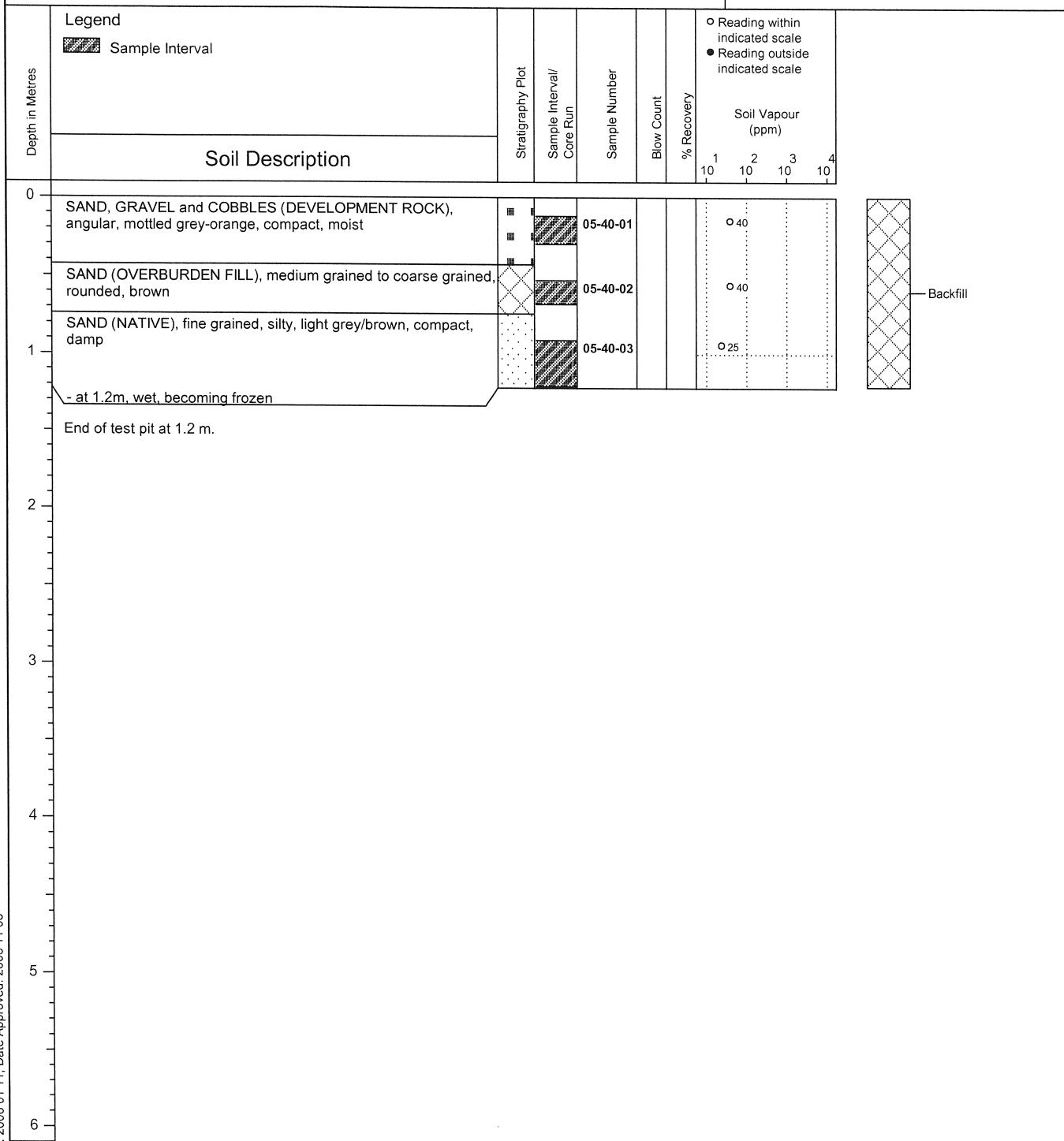


Notes:
 Bolded sample denotes sample analyzed.
 * denotes blind field duplicate.

Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 494.62

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 19
Log Typed By : CLW



Notes:

Bolded sample denotes sample analyzed.
* denotes blind field duplicate.



Client :
Kinross Gold USA, Inc

Test Pit No. : 05-41

Location :
Lupin Gold Mine, Nunavut

(Page 1 of 1)

Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) :493.69

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 19
Log Typed By : CLW

Depth in Metres	Legend	Stratigraphy Plot	Sample Interval/ Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm)			
	Soil Description						1	2	3	4
0	Sample Interval									
1	SAND, GRAVEL and COBBLES (DEVELOPMENT ROCK), angular, grey, compact, moist - at 1.0m, saturated - at 1.2m, frozen, wet, lenses visible End of test pit at 1.2 m.		05-41-01							
2										
3										
4										
5										
6										

Backfill

Notes:
 Bolded sample denotes sample analyzed.
 * denotes blind field duplicate.



Client :
Kinross Gold USA, Inc

Test Pit No. : 05-43

Location :
Lupin Gold Mine, Nunavut

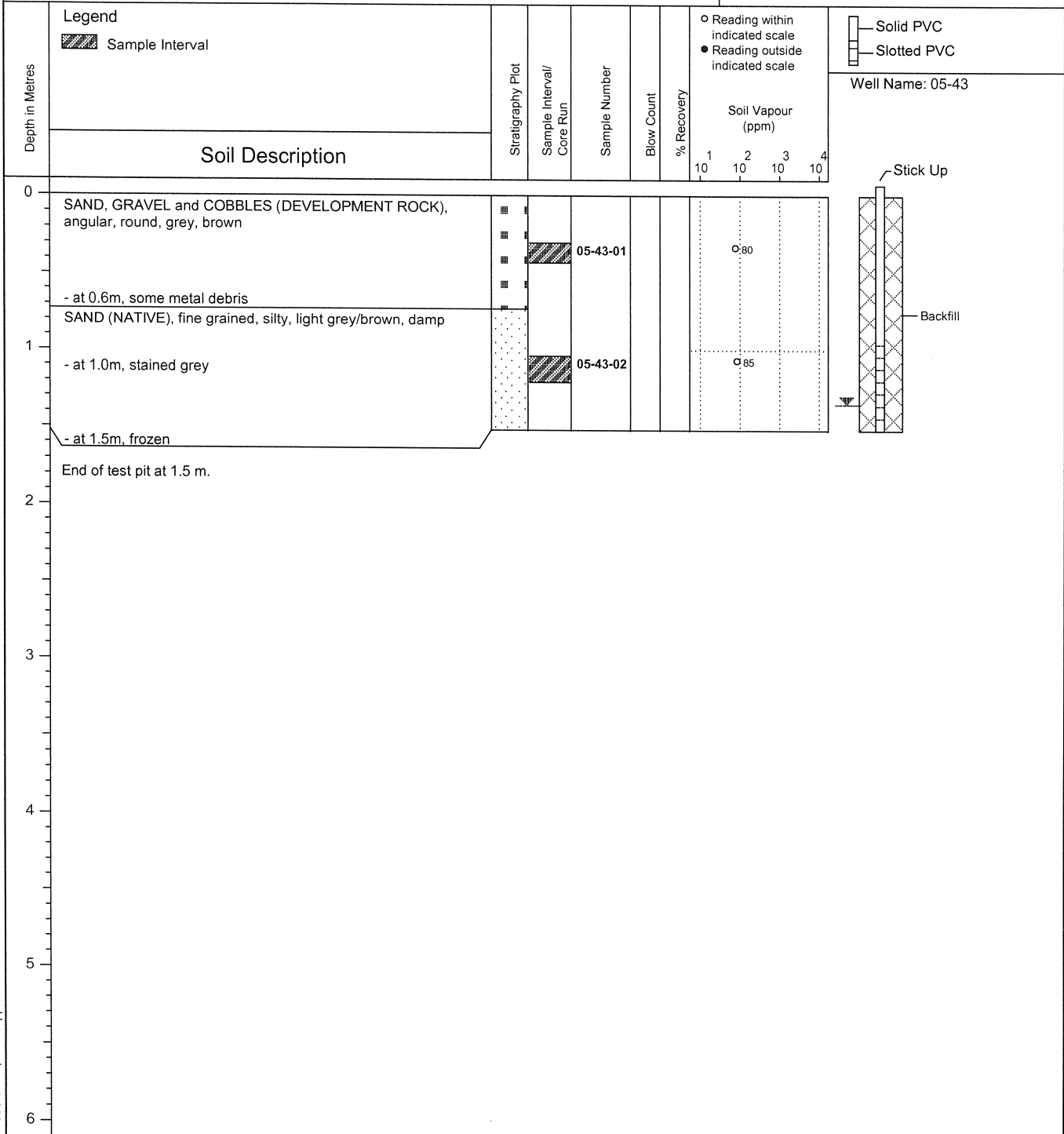
(Page 1 of 1)

Contractor : Kinross
Method : Backhoe

Date Monitored : 2005 07 22
Ground Surf Elev. (m) : 494.46
Top of Casing Elev. (m) : 495.23

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 21
Log Typed By : CLW

Pipe/Slotted Pipe Dia. (m): 0.05, 0.05



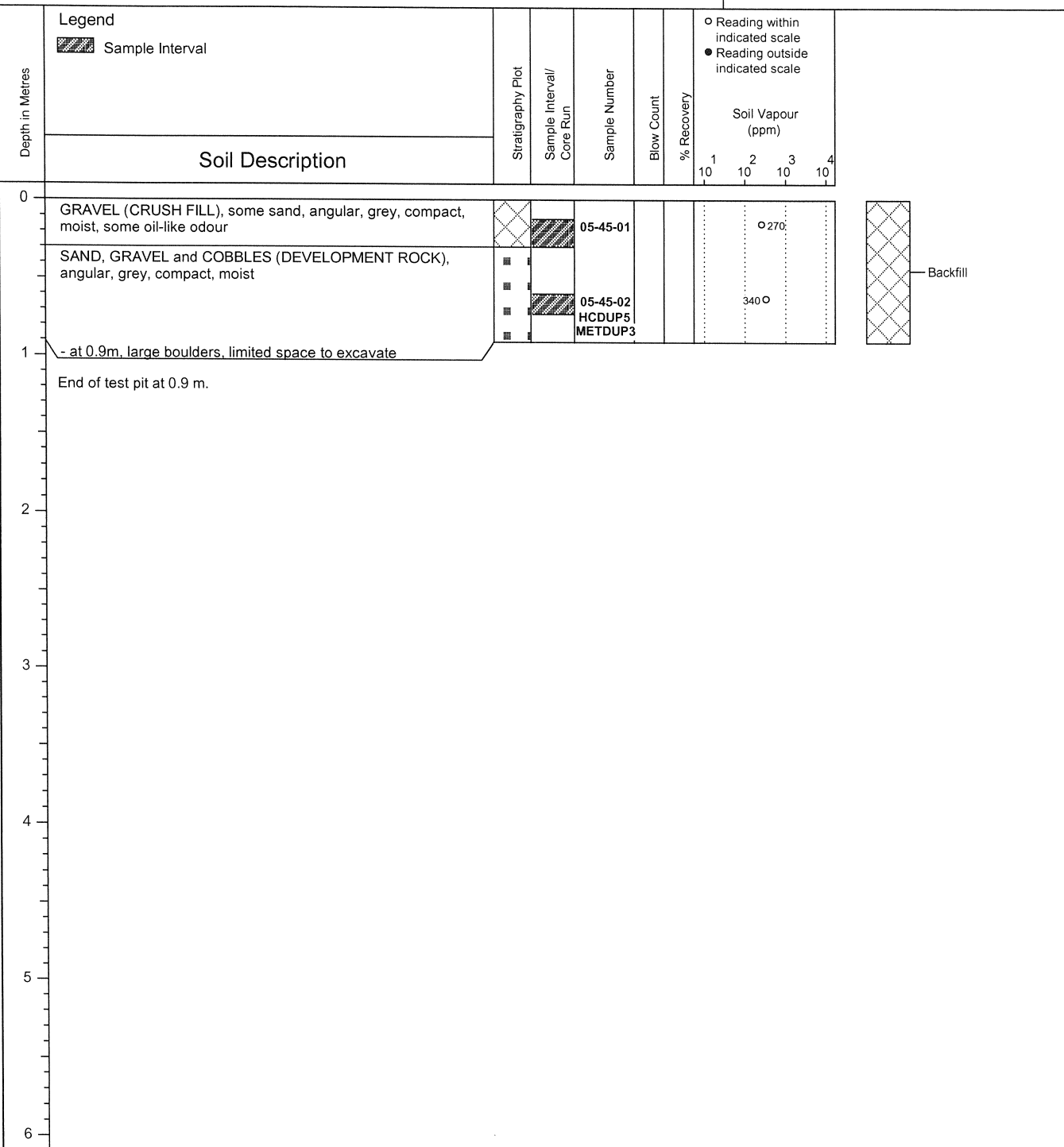
Notes:

Bolded sample denotes sample analyzed.
* denotes blind field duplicate.

Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 496

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 21
Log Typed By : CLW



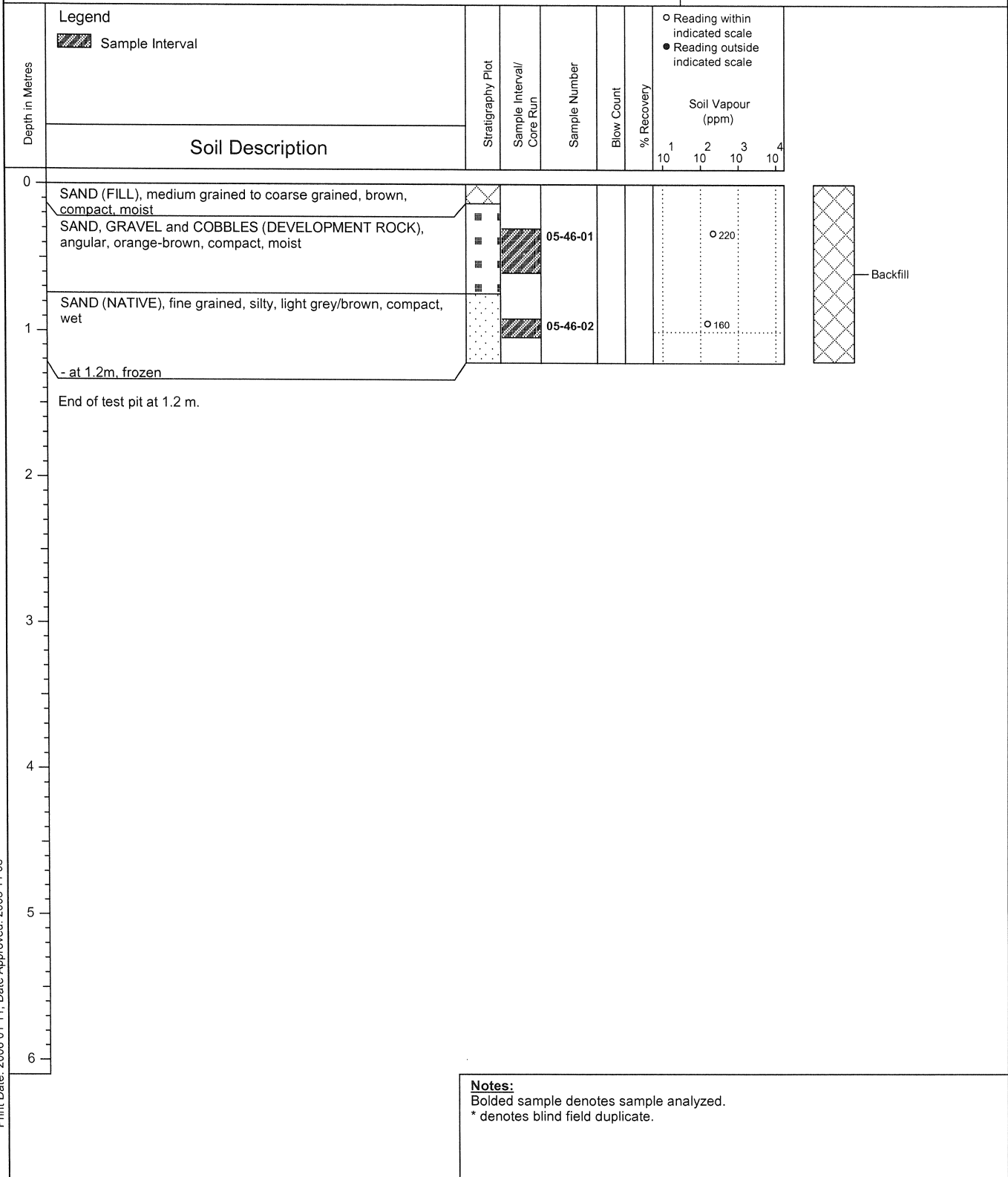
Notes:

Bolded sample denotes sample analyzed.
* denotes blind field duplicate.

Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 492.91

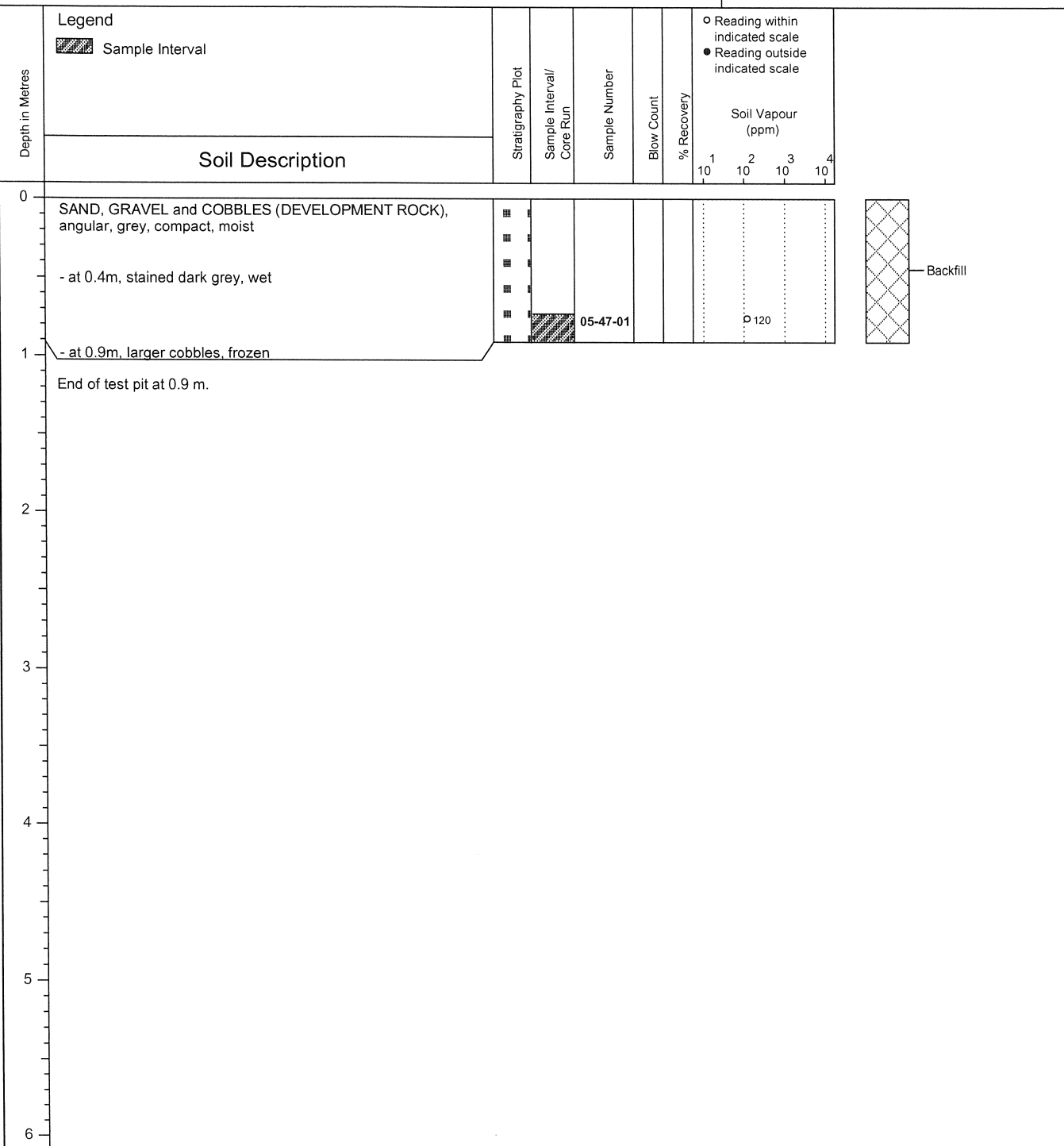
Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 21
Log Typed By : CLW



Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 483.67

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 21
Log Typed By : CLW

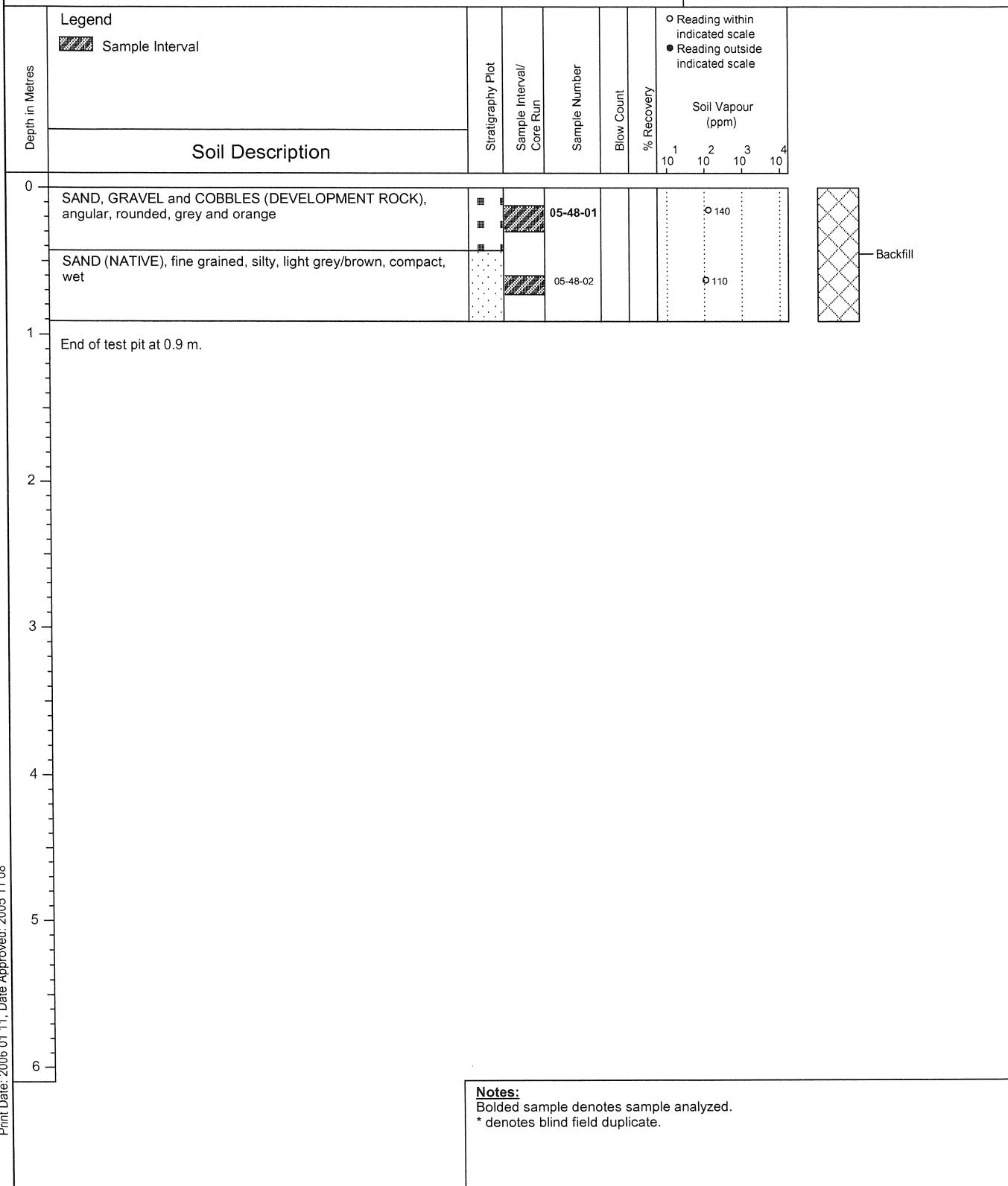


Notes:
Bolded sample denotes sample analyzed.
* denotes blind field duplicate.

Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 486.14

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 21
Log Typed By : CLW





Client :
Kinross Gold USA, Inc

Test Pit No. : 05-49

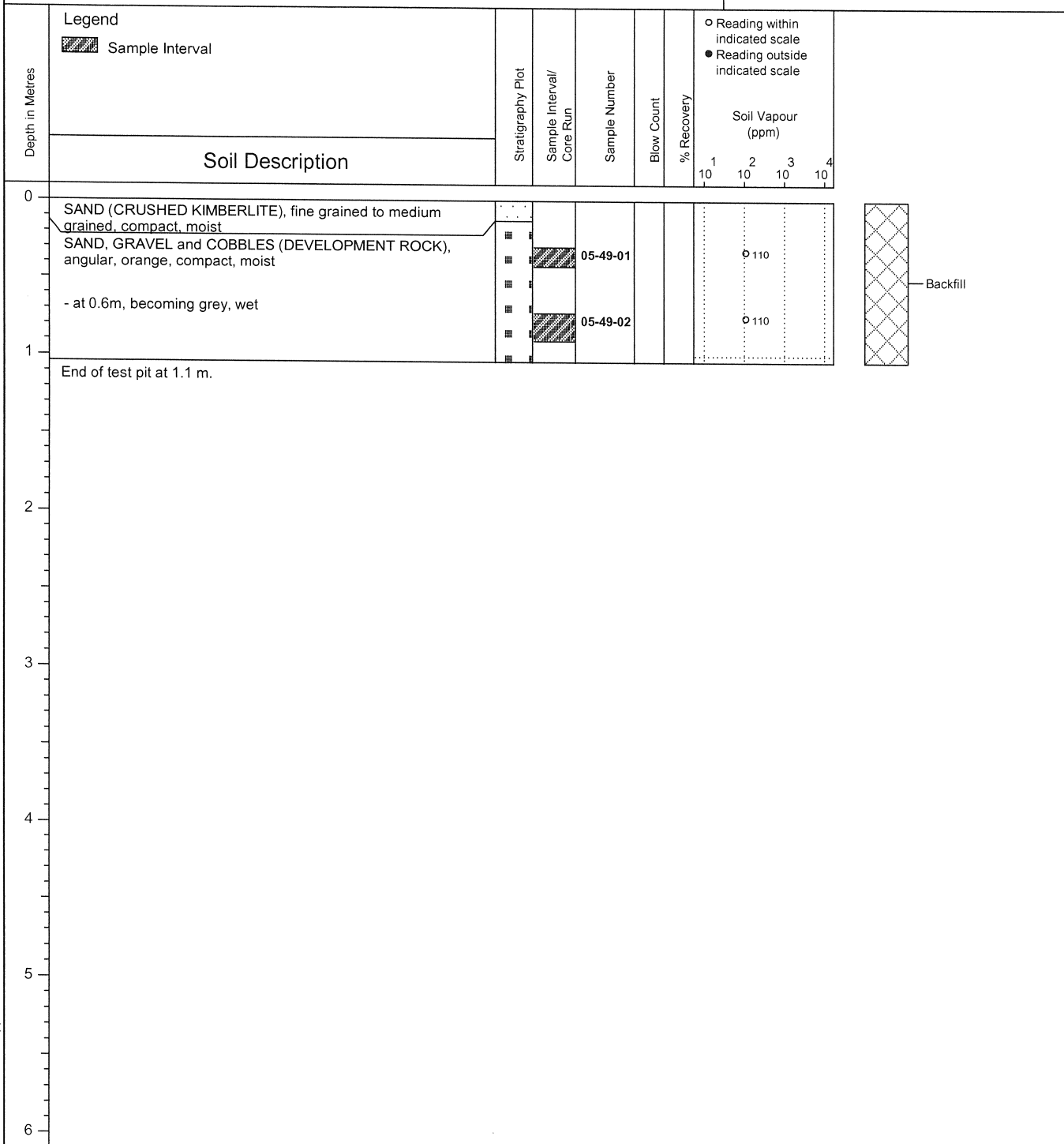
Location :
Lupin Gold Mine, Nunavut

(Page 1 of 1)

Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 480.17

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 21
Log Typed By : CLW



Notes:

Bolded sample denotes sample analyzed.
* denotes blind field duplicate.



Client :
Kinross Gold USA, Inc

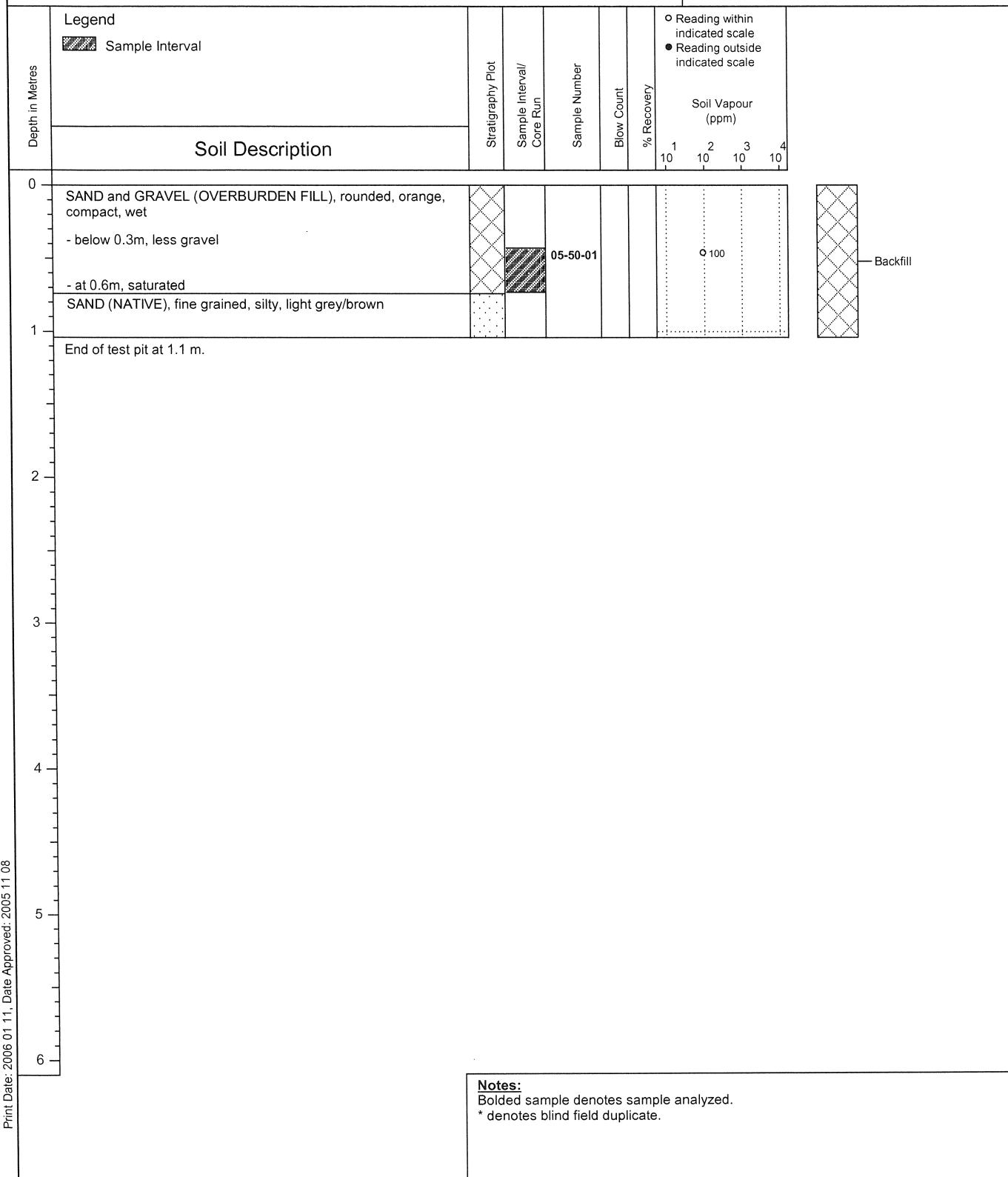
Test Pit No. : 05-50

Location :
Lupin Gold Mine, Nunavut

(Page 1 of 1)

Contractor : Kinross
Method : Backhoe

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 21
Log Typed By : CLW



Contractor : Kinross
Method : Backhoe

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 21
Log Typed By : CLW

Depth in Metres	Legend	Stratigraphy Plot	Sample Interval/ Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm)			
	Soil Description						1	2	3	4
0	 Sample Interval ○ Reading within indicated scale ● Reading outside indicated scale									
	SAND and GRAVEL (DEVELOPMENT ROCK), angular, grey, compact, damp - at 0.1m, some silt, rounded, brown - at 0.4m, large boulders End of test pit at 0.5 m.									
1				05-51-01						
2										
3										
4										
5										
6										

 Backfill

Notes:
 Bolded sample denotes sample analyzed.
 * denotes blind field duplicate.



Client :
Kinross Gold USA, Inc

Test Pit No. : 05-52

Location :
Lupin Gold Mine, Nunavut

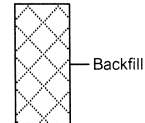
(Page 1 of 1)

Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 490.98

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 21
Log Typed By : CLW

Depth in Metres	Legend	Stratigraphy Plot	Sample Interval/ Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm)			
	Soil Description						1	2	3	4
0	SAND, GRAVEL and COBBLES (DEVELOPMENT ROCK), angular, orange-grey, moist		05-52-01				85			
	SAND (NATIVE), fine grained, silty, light grey-brown, compact, damp									
1	End of test pit at 0.6 m.									
2										
3										
4										
5										
6										



Notes:
Bolded sample denotes sample analyzed.
* denotes blind field duplicate.



Client :
Kinross Gold USA, Inc

Test Pit No. : 05-54

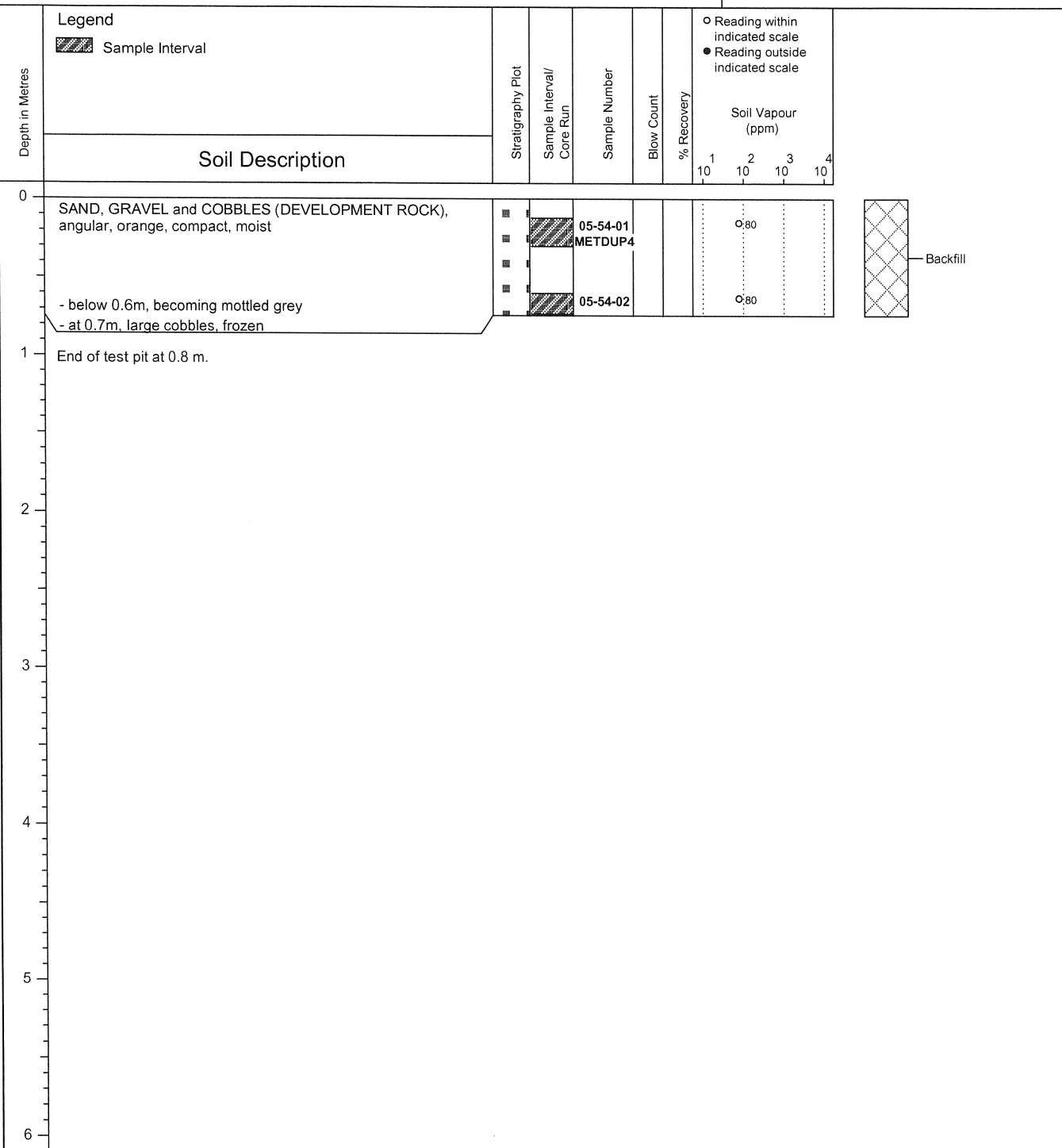
Location :
Lupin Gold Mine, Nunavut

(Page 1 of 1)

Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 499.54

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 21
Log Typed By : CLW



Notes:
 Bolded sample denotes sample analyzed.
 * denotes blind field duplicate.



Client :
Kinross Gold USA, Inc

Test Pit No. : 05-55

Location :
Lupin Gold Mine, Nunavut

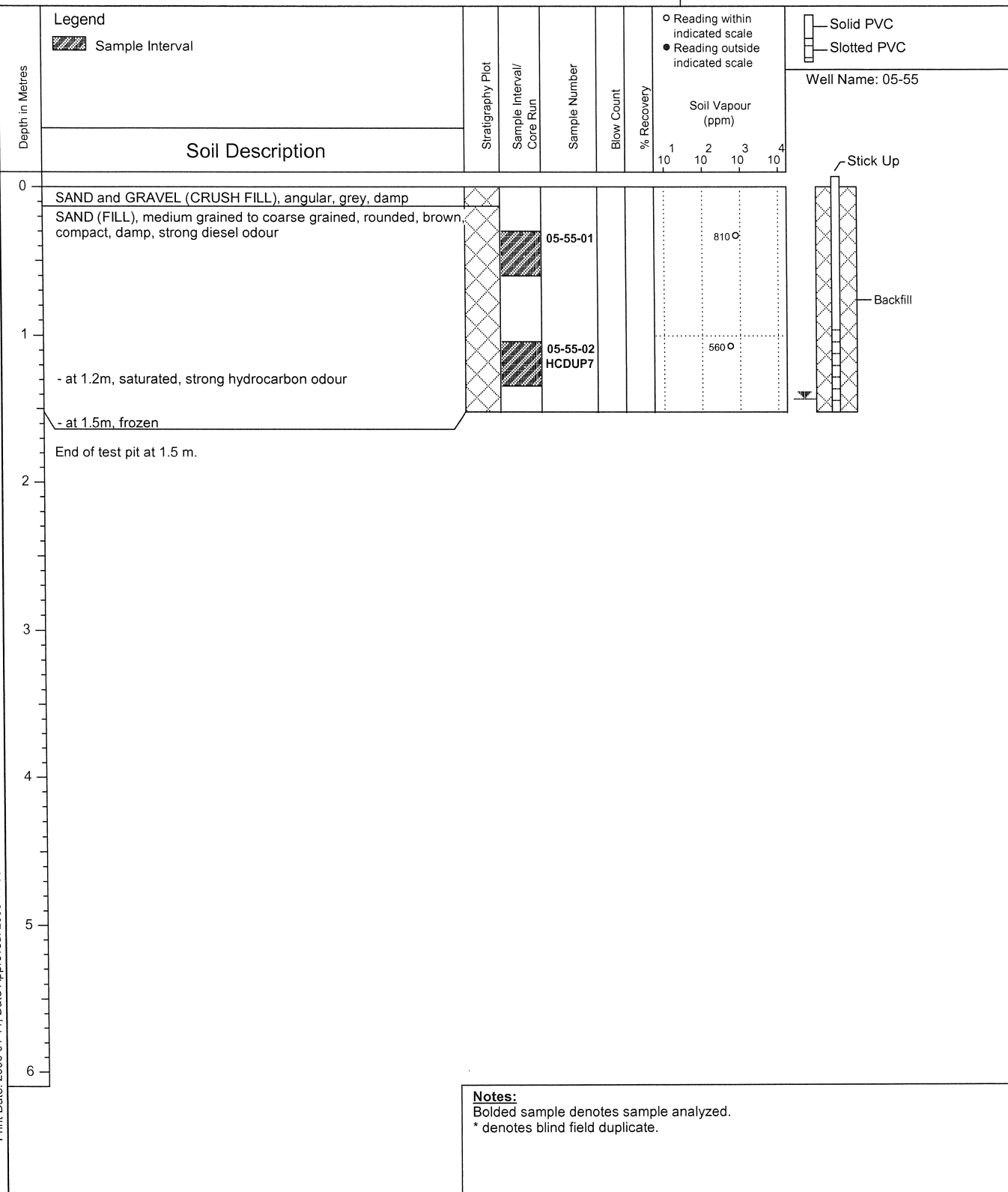
(Page 1 of 1)

Contractor : Kinross
Method : Backhoe

Date Monitored : 2005 07 22
Ground Surf Elev. (m) : 504.16
Top of Casing Elev. (m) : 504.6

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 21
Log Typed By : CLW

Pipe/Slotted Pipe Dia. (m): 0.05, 0.05



Notes:
Bolded sample denotes sample analyzed.
* denotes blind field duplicate.

Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 503.5

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 21
Log Typed By : CLW

Depth in Metres	Legend	Stratigraphy Plot	Sample Interval/ Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm)			
	Soil Description						1	2	3	4
0	SAND and GRAVEL (CRUSH FILL), angular, orange, cemented			05-56-01			○ 65			
	SAND (FILL), fine grained to medium grained, orange/grey, compact, damp			METDUP5						
1	- at 0.9m, light grey, wet			05-56-02			○ 70			
	SAND, GRAVEL and COBBLES (DEVELOPMENT ROCK), angular, grey, compact, wet, frozen			05-56-03			○ 90			
	End of test pit at 1.7 m.									
2										
3										
4										
5										
6										



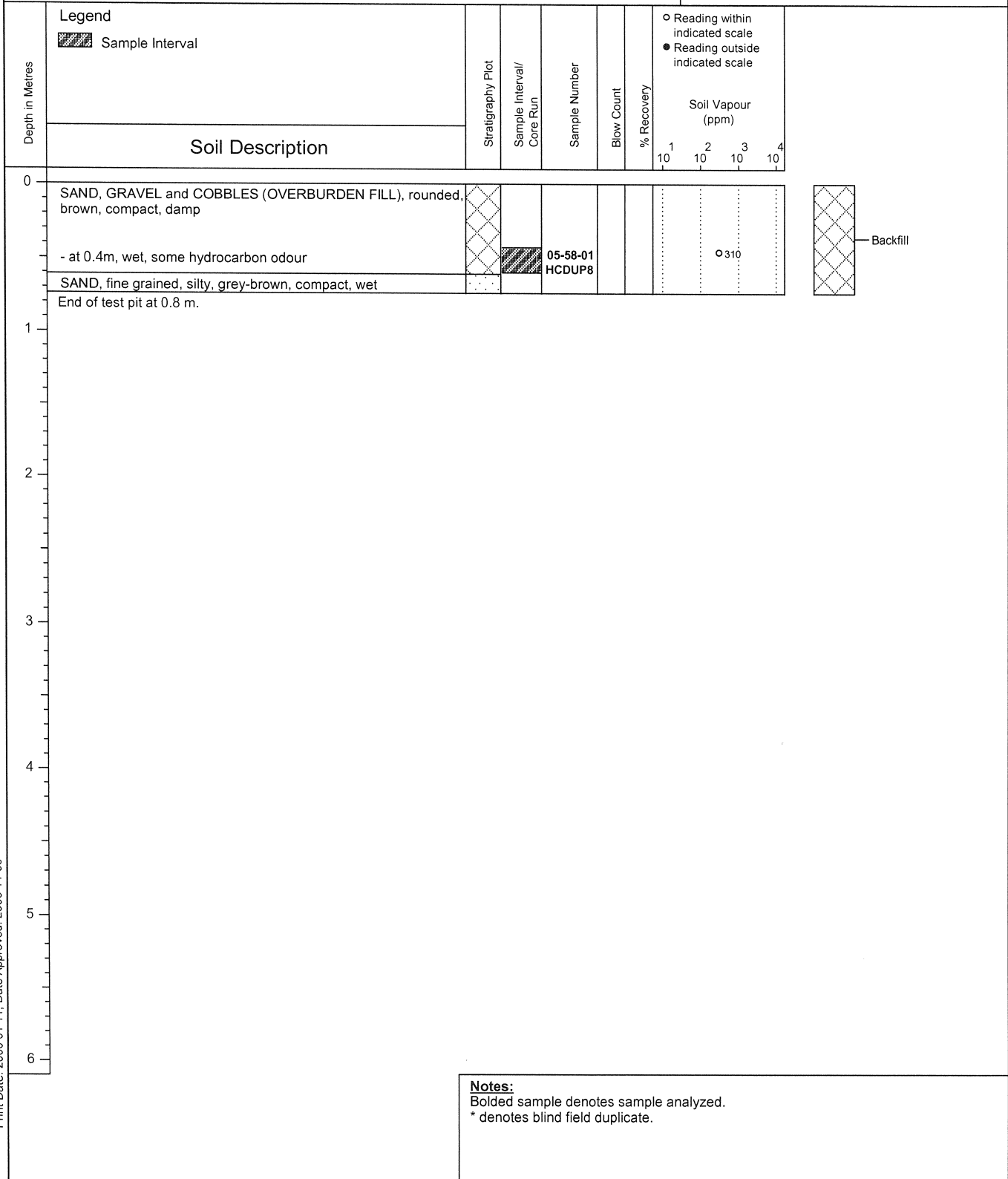
Backfill

Notes:
Bolded sample denotes sample analyzed.
* denotes blind field duplicate.

Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) :503.96

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 21
Log Typed By : CLW





Client :
Kinross Gold USA, Inc

Test Pit No. : 05-59

Location :
Lupin Gold Mine, Nunavut

(Page 1 of 1)

Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 506.87

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 21
Log Typed By : CLW

Depth in Metres	Legend	Stratigraphy Plot	Sample Interval/ Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm)	
	Soil Description							
0	Sample Interval ○ Reading within indicated scale ● Reading outside indicated scale							
0	SAND, GRAVEL and COBBLES (DEVELOPMENT ROCK), angular, orange, compact, moist - below 0.4m, becoming grey		05-59-01				65	Backfill
1	End of test pit at 0.9 m.							
2								
3								
4								
5								
6								

Notes:
 Bolded sample denotes sample analyzed.
 * denotes blind field duplicate.



Client :
Kinross Gold USA, Inc

Test Pit No. : 05-60

Location :
Lupin Gold Mine, Nunavut

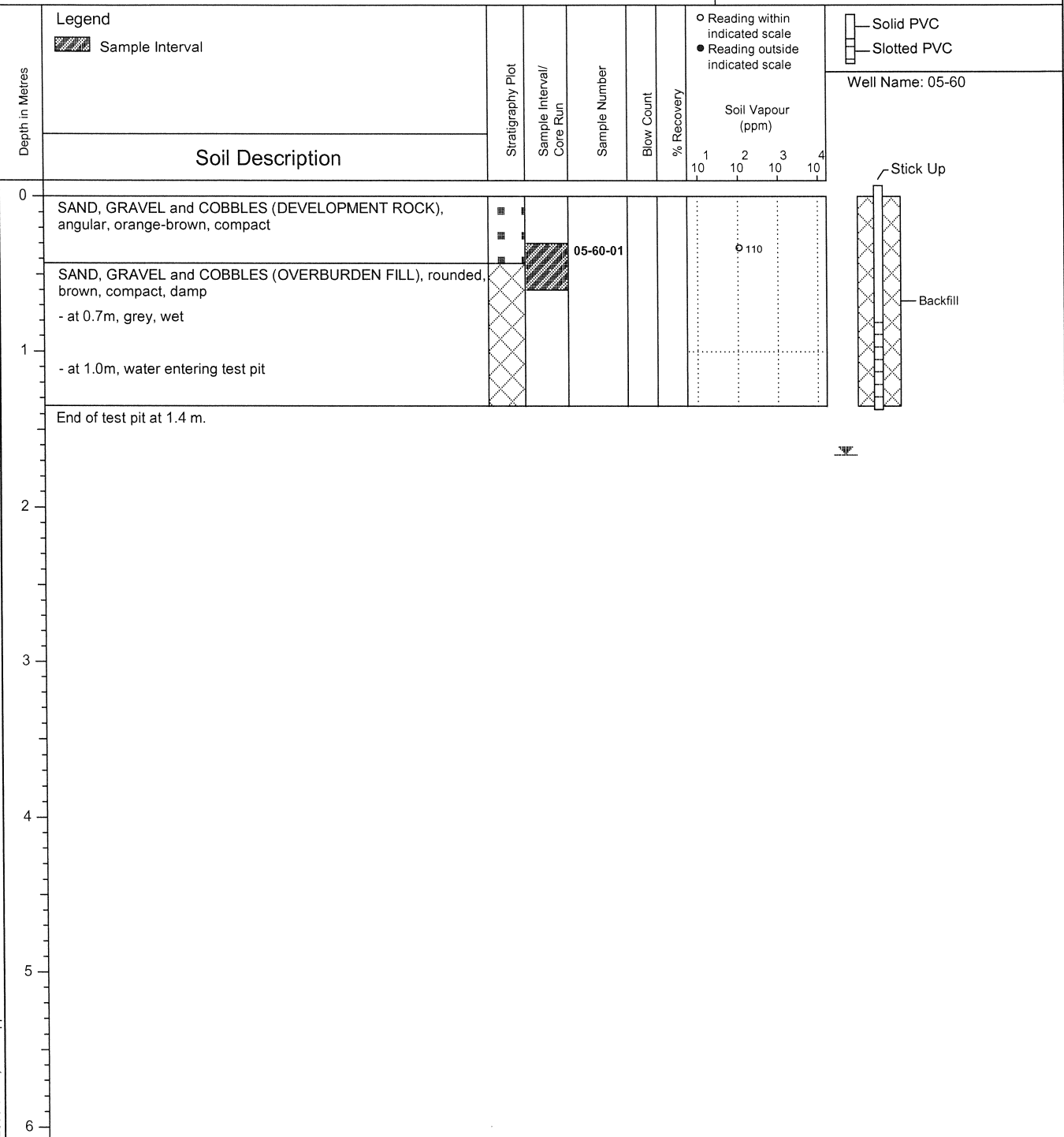
(Page 1 of 1)

Contractor : Kinross
Method : Backhoe

Date Monitored : 2005 07 22
Ground Surf Elev. (m) : 503.88
Top of Casing Elev. (m) : 504.28

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 21
Log Typed By : CLW

Pipe/Slotted Pipe Dia. (m): 0.05, 0.05



Notes:
Bolded sample denotes sample analyzed.
* denotes blind field duplicate.



Client :
Kinross Gold USA, Inc

Test Pit No. : 05-61

Location :
Lupin Gold Mine, Nunavut

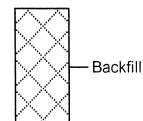
(Page 1 of 1)

Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 503.79

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 21
Log Typed By : CLW

Depth in Metres	Legend	Stratigraphy Plot	Sample Interval/ Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm)			
	 Sample Interval						1	2	3	4
	Soil Description						10	10	10	10
0	SAND and GRAVEL (CRUSH FILL), angular, orange, compact, damp SAND, GRAVEL and COBBLES (OVERBURDEN FILL), rounded, orange/brown BEDROCK, grey, dense End of test pit at 0.6 m.	 		05-61-01				110		
1										
2										
3										
4										
5										
6										



Notes:
Bolded sample denotes sample analyzed.
* denotes blind field duplicate.

Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 500.18

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 21
Log Typed By : CLW

Depth in Metres	Legend	Stratigraphy Plot	Sample Interval/ Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm)				
	 Sample Interval						1	2	3	4	
	Soil Description						10	10	10	10	
0	SAND, GRAVEL and COBBLES (DEVELOPMENT ROCK), angular, orange, compact, damp - at 0.4m, becoming grey			05-77-01			○ 25				 Backfill
1	SAND and GRAVEL (OVERBURDEN FILL), well graded, rounded, brown, compact, wet, hydrocarbon odour			05-77-02				750 ○			
	SAND (NATIVE), fine grained, silty, dark grey, firm, saturated			05-77-03			○ 100				
	End of test pit at 1.5 m.										
2											
3											
4											
5											
6											

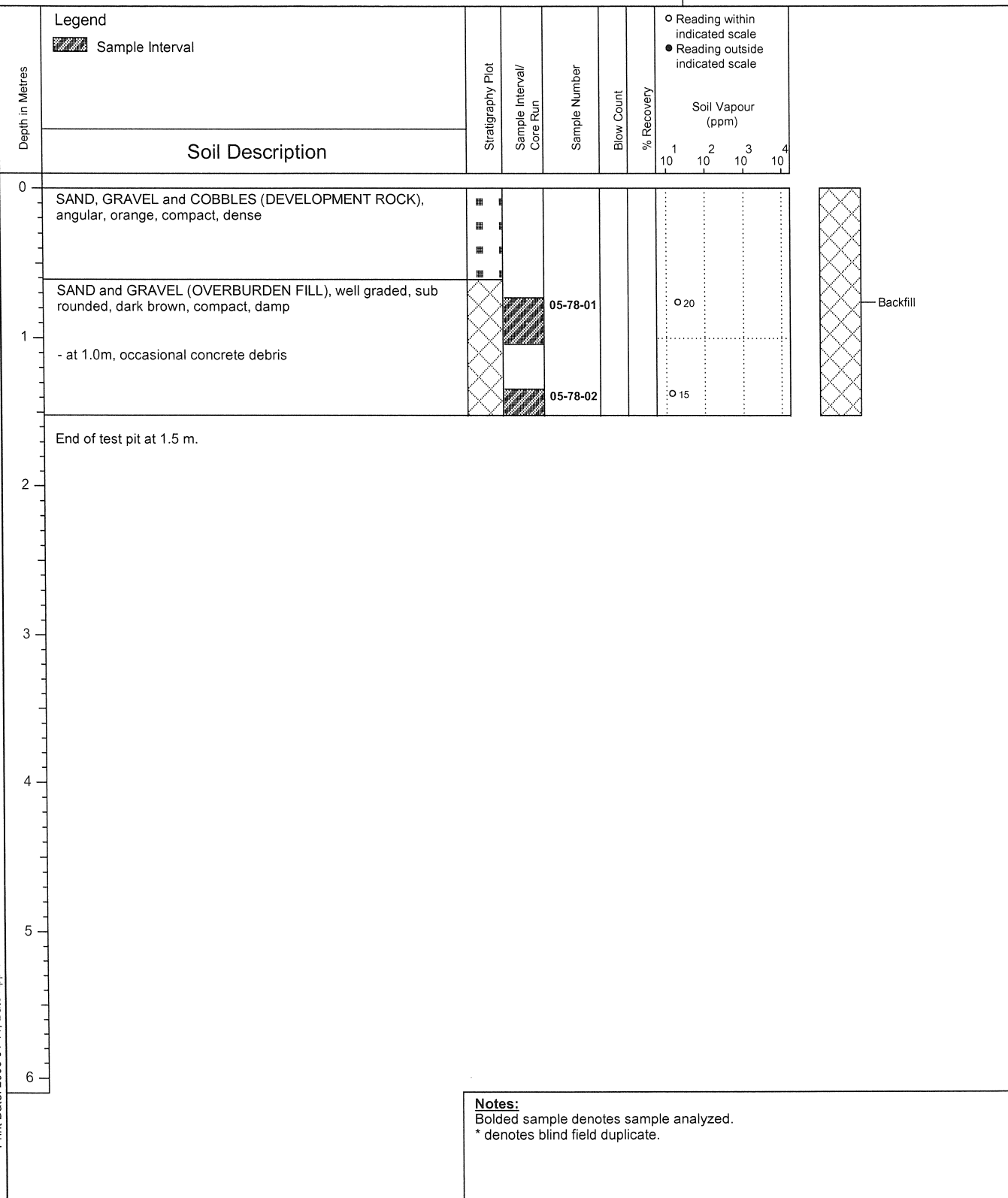
Notes:

Bolded sample denotes sample analyzed.
* denotes blind field duplicate.

Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 501.85

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 21
Log Typed By : CLW

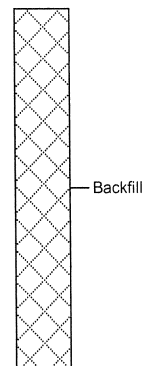


Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 503.68

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 25
Log Typed By : CLW

Depth in Metres	Legend	Stratigraphy Plot	Sample Interval/ Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm)			
	 Sample Interval						1	2	3	4
	Soil Description						10	10	10	10
0	SAND and GRAVEL (FILL), some cobbles, angular and sub angular, brown, compact, moist			05-79-01			Q 10			
1	SAND, GRAVEL and COBBLES (DEVELOPMENT ROCK), angular, grey, compact, damp			05-79-02			Q 10			
	SAND (NATIVE), fine grained, silty, dark grey, firm, saturated			05-79-03			Q 10			
2	End of test pit at 1.8 m.									
3										
4										
5										
6										



Notes:
Bolded sample denotes sample analyzed.
* denotes blind field duplicate.



Client :
Kinross Gold USA, Inc

Test Pit No. : 05-80

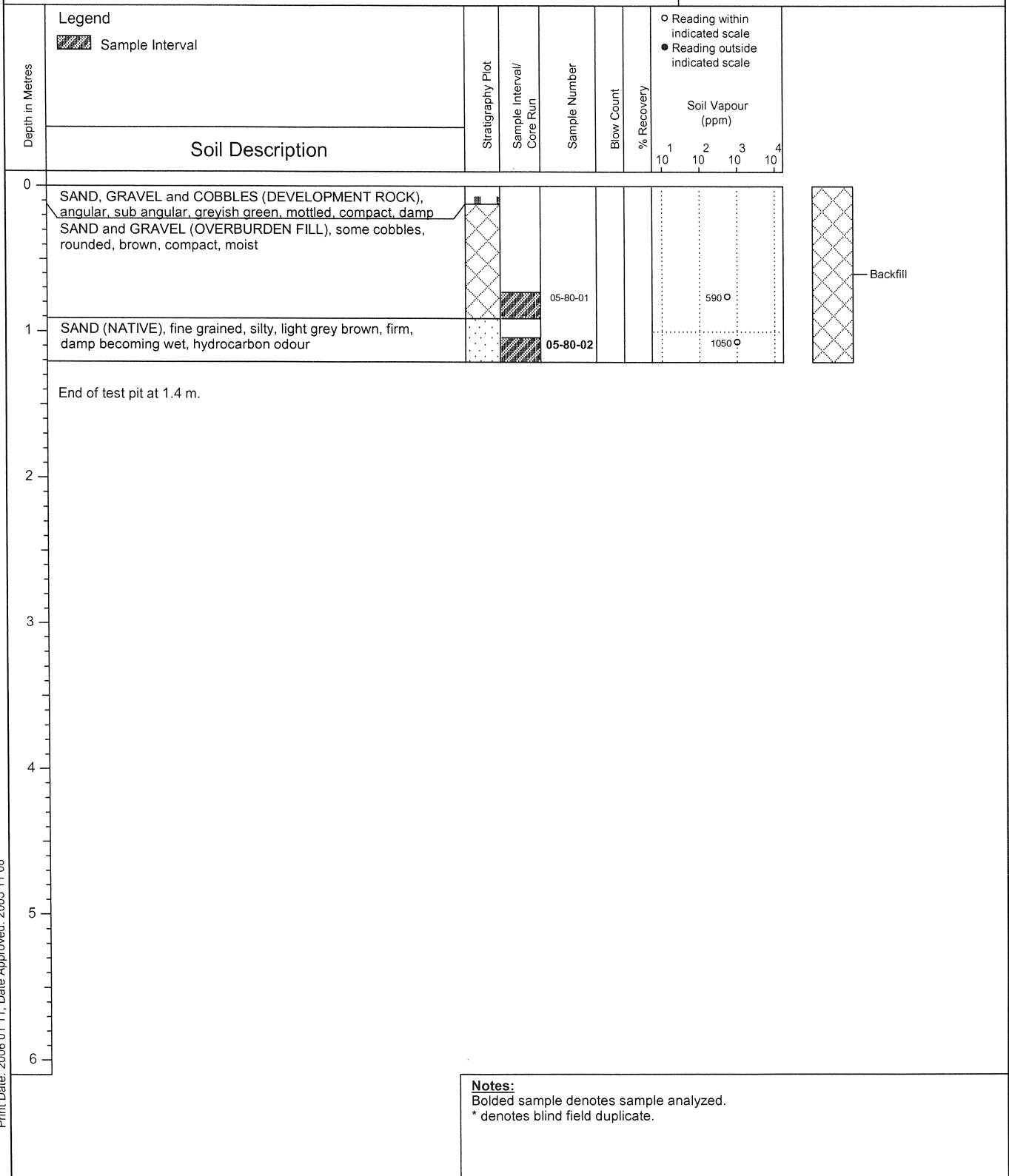
Location :
Lupin Gold Mine, Nunavut

(Page 1 of 1)

Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 503.72

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 25
Log Typed By : CLW

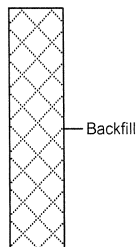


Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 503.05

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 25
Log Typed By : CLW

Depth in Metres	Legend	Stratigraphy Plot	Sample Interval/ Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm)			
	 Sample Interval Soil Description						1	2	3	4
0	SAND, GRAVEL and COBBLES (DEVELOPMENT ROCK), angular, light brown, grey, compact, dry SAND, GRAVEL and COBBLES (OVERBURDEN FILL), well graded, orange, compact, damp SAND (FILL), rounded, brown, compact, becoming wet SAND (NATIVE), fine grained, silty, light brown/grey, firm, saturated		05-81-01 05-81-02				○ 10 ○ 10			
1										
2										
3										
4										
5										
6										



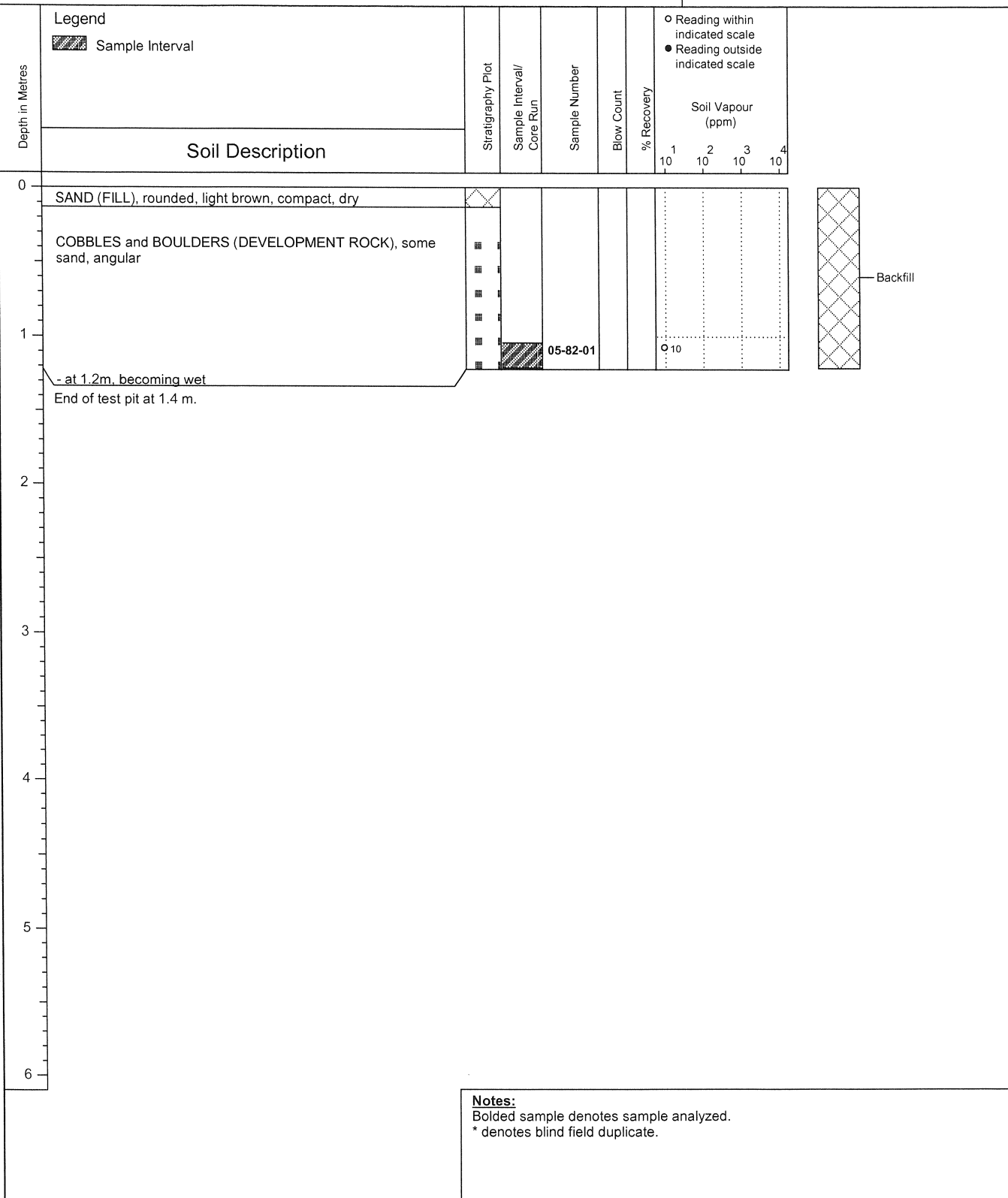
End of test pit at 1.4 m.

Notes:
 Bolded sample denotes sample analyzed.
 * denotes blind field duplicate.

Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 485.28

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 25
Log Typed By : CLW





Client :
Kinross Gold USA, Inc

Test Pit No. : 05-83

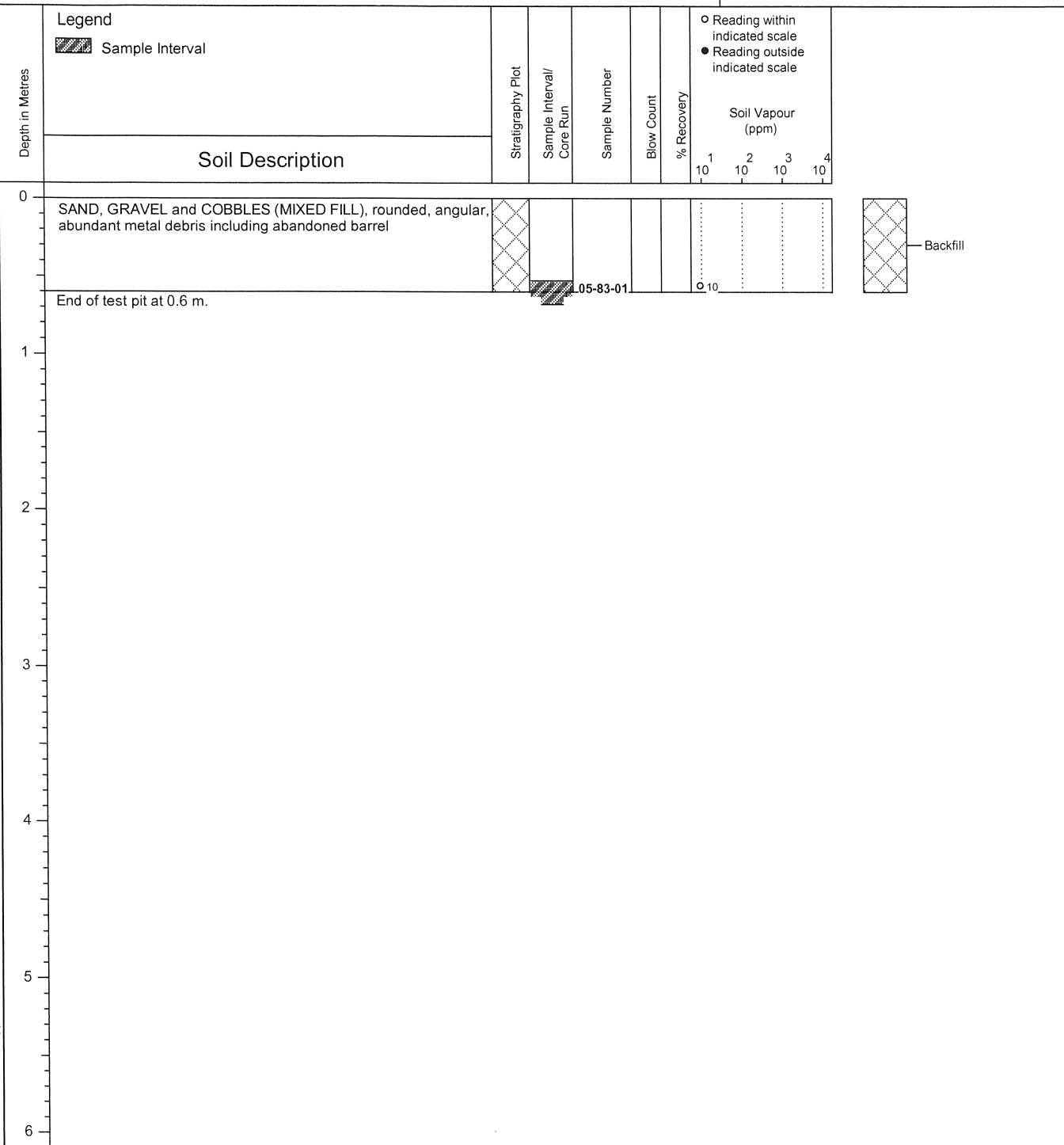
Location :
Lupin Gold Mine, Nunavut

(Page 1 of 1)

Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 485.74

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 25
Log Typed By : CLW



Notes:
 Bolded sample denotes sample analyzed.
 * denotes blind field duplicate.



Client :
Kinross Gold USA, Inc

Test Pit No. : 05-84

Location :
Lupin Gold Mine, Nunavut

(Page 1 of 1)

Contractor : Kinross
Method : Backhoe

Ground Surf Elev. (m) : 502.85

Project Number : A053017
Test Pit Logged By : MJT
Date Excavated : 2005 07 25
Log Typed By : CLW

Depth in Metres	Legend	Stratigraphy Plot	Sample Interval/ Core Run	Sample Number	Blow Count	% Recovery	Soil Vapour (ppm)			
	Soil Description						1	2	3	4
0	SAND, GRAVEL and COBBLES (OVERBURDEN FILL), rounded, light brown, compact, moist									
1	- at 0.9m, becoming saturated, orange staining									
	SAND (NATIVE), fine grained, silty, firm, saturated, stained black			05-84-01						
	- below 1.7m, grey			05-84-02						
2	End of test pit at 1.7 m.									
3										
4										
5										
6										

Backfill

Notes:
 Bolded sample denotes sample analyzed.
 * denotes blind field duplicate.



APPENDIX V

Monitoring Report



MONITORING REPORT

Project No.: A053017

Kinross Gold USA, Inc
Lupin Gold Mine
Nunavut

Date: July 22, 2005
Observer: Tinholt/Wold
Weather: 12°C, Cloudy
Time: n/a

Approved by: 

Monitoring Well No.	Reference Elevation ¹ (m)	Depth to NAPL ² (m)	Apparent NAPL ² Thickness (mm)	Depth to Water (m)	Potential Metric Elevation ³ (m)	Depth to Bottom (m)	Vapour Conc. (ppm)	Comments
05-01	503.400	-	0	1.600	501.800	2.57	170	
05-02	503.400	-	0	1.405	501.995	2.46	100	
05-03	503.400	-	0	1.460	501.940	1.75	10	
05-04	503.400	1.288	68	1.356	502.098	2.20	470	
05-05	503.400	-	0	1.365	502.035	2.13	95	
05-07	500.190	-	0	1.736	498.454	2.12	710	
05-08	502.700	-	0	1.330	501.370	2.10	180	
05-09	480.580	-	0	1.191	479.389	2.35	200	
05-10	503.400	-	0	1.415	501.985	1.67	110	
05-11	486.230	-	0	2.157	484.073	2.27	80	
05-13	483.450	-	0	0.051	483.399	2.17	70	
05-15	504.140	-	0	2.110	502.030	2.13	5	
05-16	504.890	-	0	2.180	502.710	2.28	0	
05-21	501.280	-	0	1.237	500.043	1.87	0	
05-28	502.660	-	0	1.622	501.038	2.52	200	
05-37	493.680	-	0	2.071	491.609	2.12	0	
05-43	495.230	-	0	2.124	493.106	2.31	0	
05-55	504.600	-	0	1.861	502.739	2.19	140	
05-60	504.280	-	0	2.051	502.229	2.12	0	

¹ Reference Elevation is a mark on rim of the monitoring well standpipe surveyed with respect to geodetic datum.

² Non-Aqueous Phase Liquid.

³ NAPL specific gravity assumed to be 0.80.



APPENDIX VI

Rising Head Test Interpretation

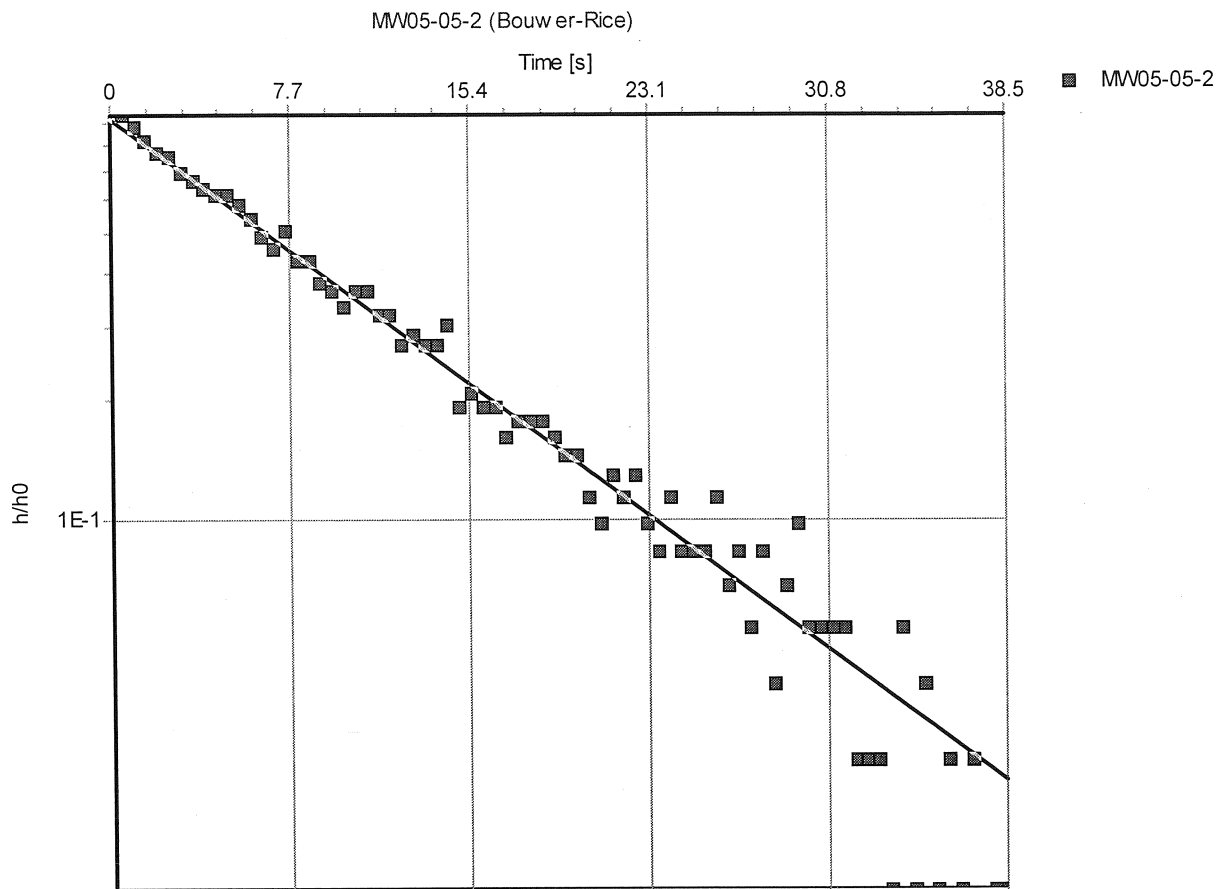


Morrow Environmental

#112, 1212 1st Street SE
Calgary, Alberta, Canada
Phone: +1 403 253-4333

Bail Test Analysis Report

Project: Lupin Mine
No: A053017
Client: Kinross



Test name: MW05-05-2

Analysis method: Bouwer-Rice

Analysis results:

Conductivity: 6.60E-5 [m/s]

Test parameters:

Test well: MW05-05-2
Casing radius: 0.037 [m]
Screen length: 0.79 [m]
Screen radius: 0.018 [m]

r(eff): 0.024 [m]

Aquifer thickness: 2 [m]
Gravel pack Porosity (%) 25

Comments:

Evaluated by: TMW
Date: 8/16/2005

**Morrow Environmental**

#112, 1212 1st Street SE

Calgary, Alberta, Canada

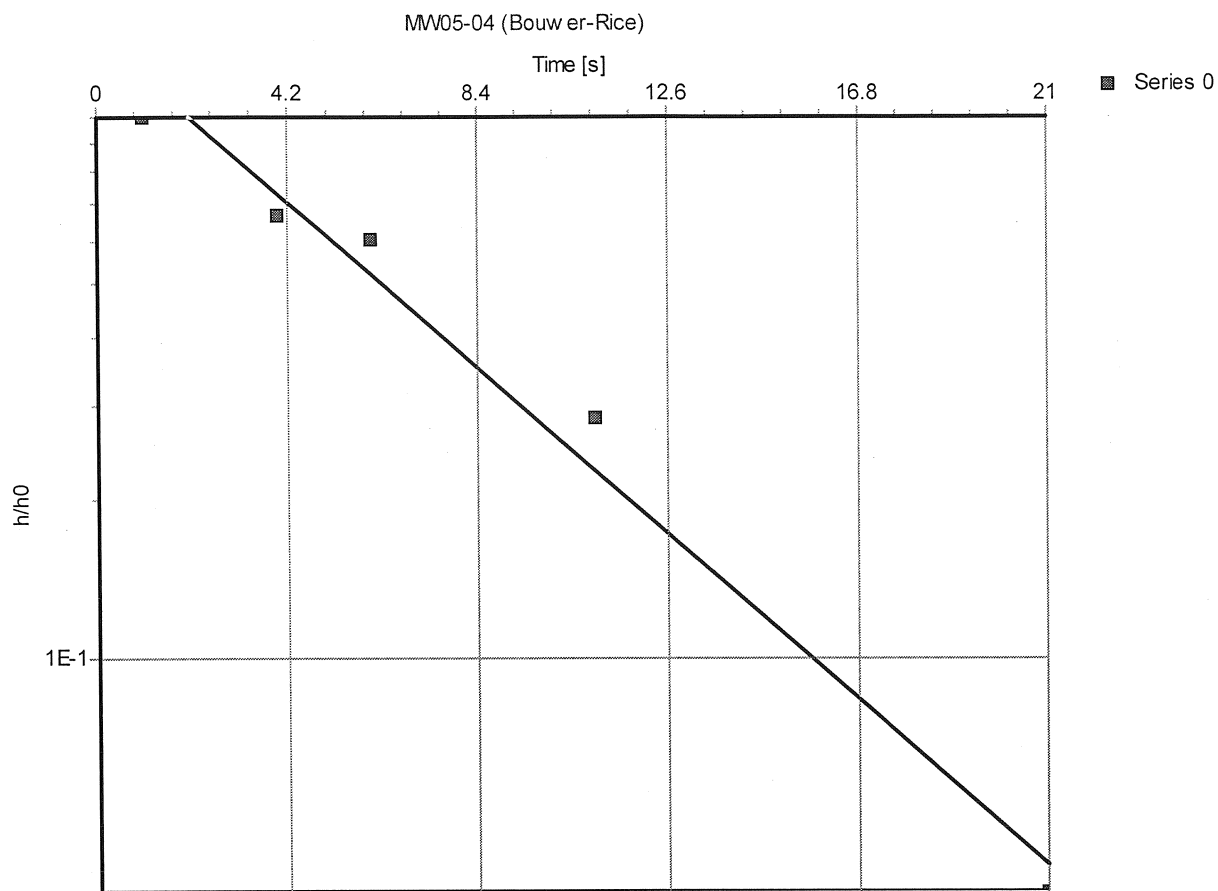
Phone: +1 403 253-4333

Bail Test Analysis Report

Project: Lupin Mine

No: A053017

Client: Kinross

Test name: **MW05-04**Analysis method: **Bouwer-Rice**Analysis results:

Conductivity: 1.62E-4 [m/s]

<u>Test parameters:</u>	Test well:	MW05-04	Aquifer thickness:	2 [m]
	Casing radius:	0.0375 [m]	Gravel pack Porosity (%)	25
	Screen length:	0.8 [m]		
	Screen radius:	0.025 [m]		
	r(eff):	0.029 [m]		

Comments:

Evaluated by: TMW

Date: 8/16/2005



Morrow Environmental

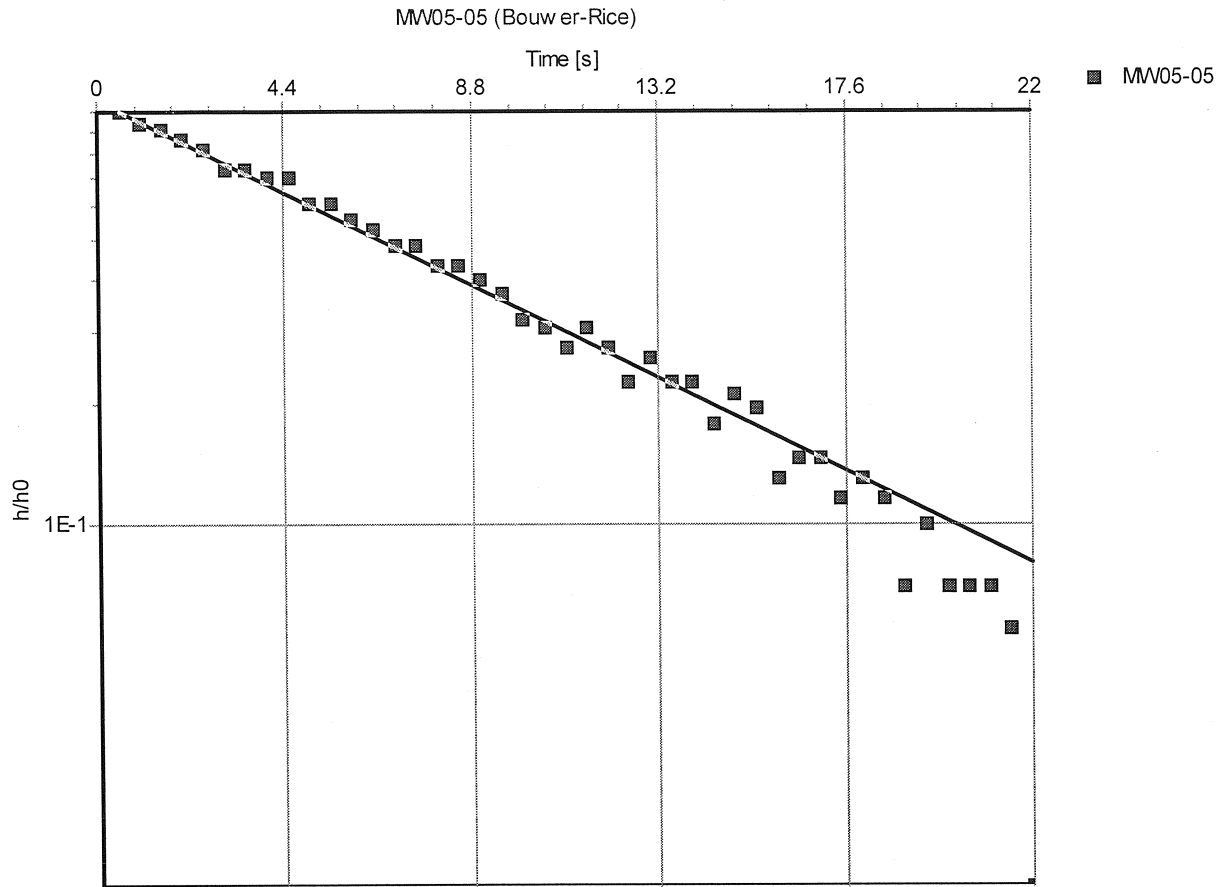
#112, 1212 1st Street SE
Calgary, Alberta, Canada
Phone: +1 403 253-4333

Bail Test Analysis Report

Project: Lupin Mine

No: A053017

Client: Kinross



Test name: MW05-05

Analysis method: Bouwer-Rice

Analysis results:

Conductivity: 8.15E-5 [m/s]

<u>Test parameters:</u>	Test well:	MW05-05	Aquifer thickness:	2 [m]
	Casing radius:	0.037 [m]	Gravel pack Porosity (%)	25
	Screen length:	0.79 [m]		
	Screen radius:	0.018 [m]		
	r(eff):	0.024 [m]		

Comments:

Evaluated by: TMW

Date: 10/24/20



Morrow Environmental

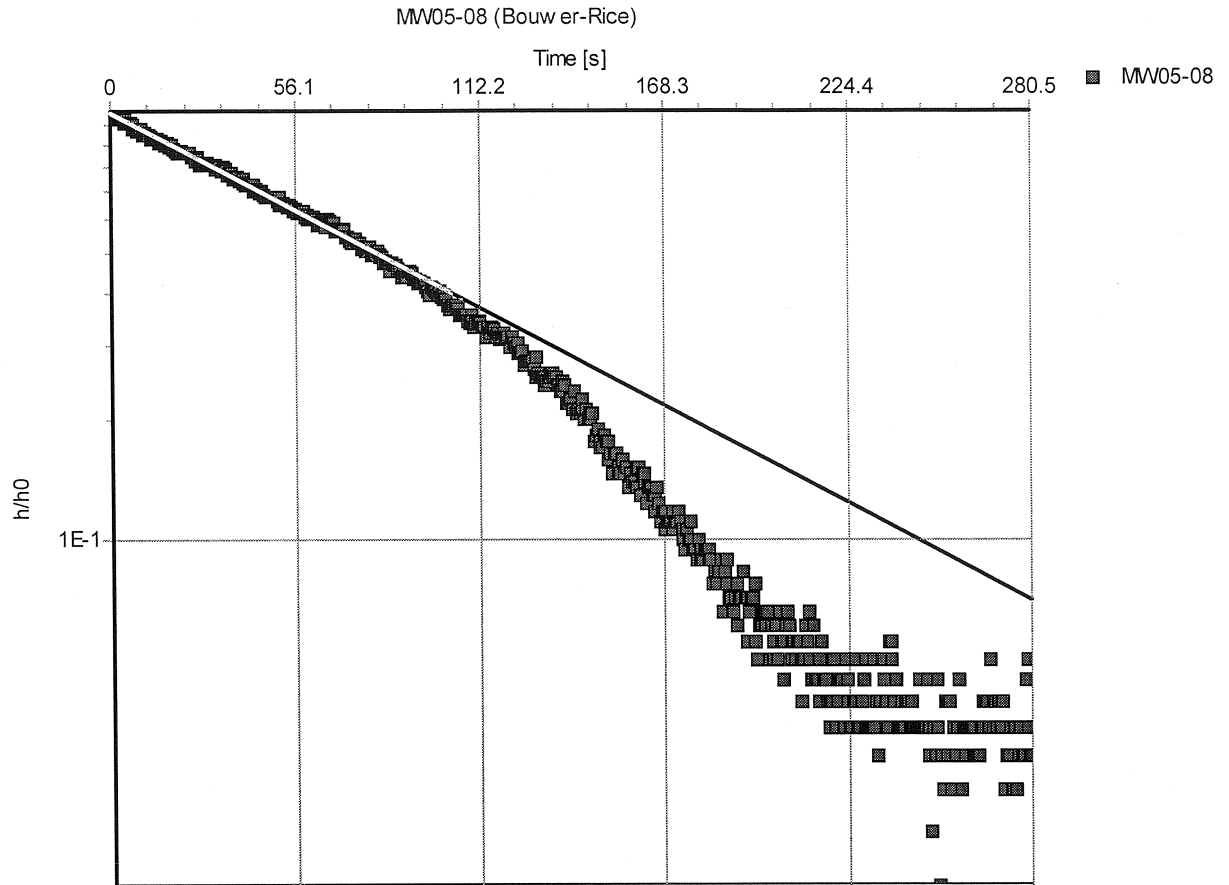
#112, 1212 1st Street SE
Calgary, Alberta, Canada
Phone: +1 403 253-4333

Bail Test Analysis Report

Project: Lupin Mine

No: A053017

Client: Kinross



Test name: MW05-08

Analysis method: Bouwer-Rice

Analysis results:

Conductivity:

6.60E-6 [m/s]

Test parameters:

Test well:

MW05-08

Aquifer thickness:

2 [m]

Casing radius:

0.037 [m]

Gravel pack Porosity (%)

25

Screen length:

0.81 [m]

Screen radius:

0.018 [m]

r(eff):

0.024 [m]

Comments:

Evaluated by: TMW

Date: 8/16/2005



Morrow Environmental

#112, 1212 1st Street SE

Calgary, Alberta, Canada

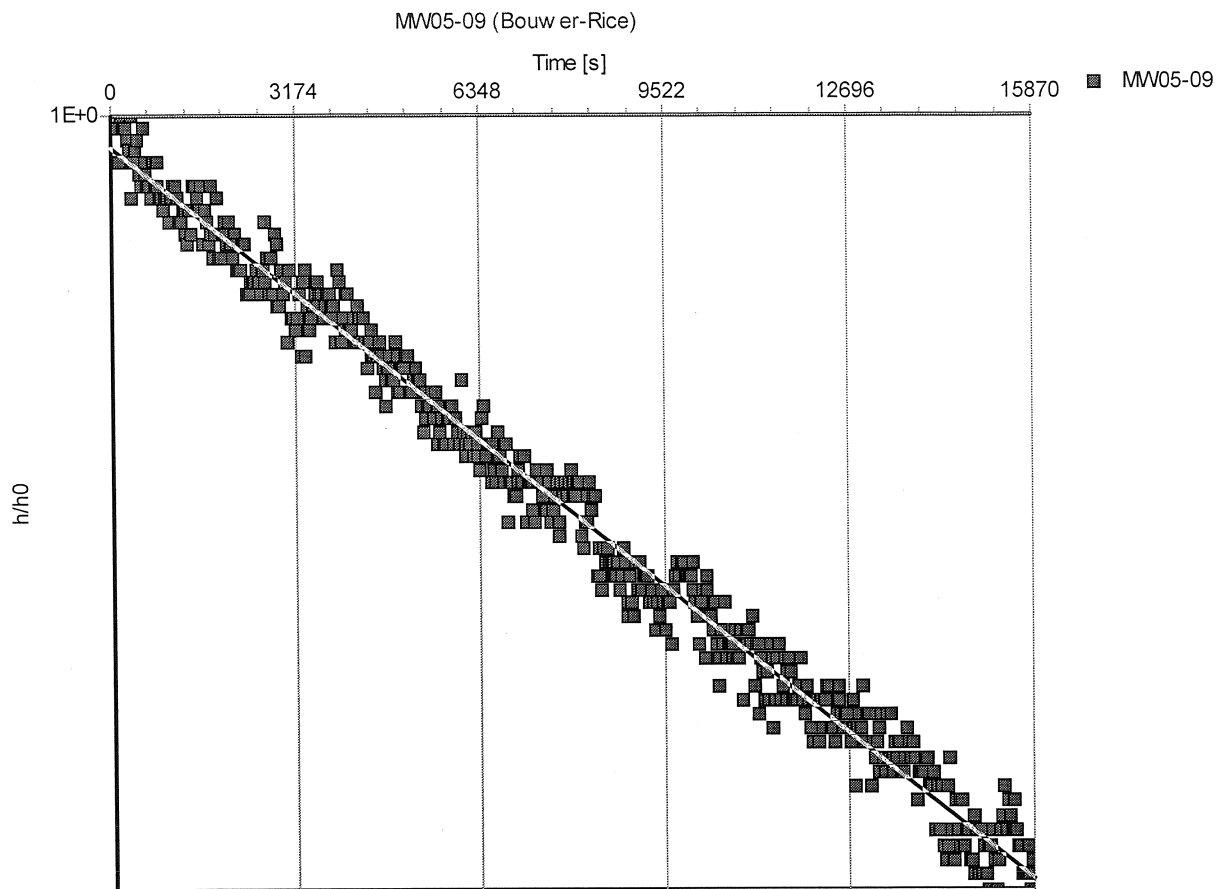
Phone: +1 403 253-4333

Bail Test Analysis Report

Project: Lupin Mine

No: A053017

Client: Kinross



Test name: MW05-09

Analysis method: Bouwer-Rice

Analysis results:

Conductivity: 2.07E-8 [m/s]

<u>Test parameters:</u>	Test well:	MW05-09	Aquifer thickness:	2 [m]
	Casing radius:	0.037 [m]	Gravel pack Porosity (%)	25
	Screen length:	0.51 [m]		
	Screen radius:	0.025 [m]		
	r(eff):	0.028 [m]		

Comments:

Evaluated by: TMW

Date: 8/16/2005



APPENDIX VII

Detailed Analytical Reports



CERTIFICATE OF ANALYSIS

Date: August 29, 2005

ALS File No. CC500004

Report On: Lupin A053017
BH05

Report To: **SNC Lavalin, Morrow Environmental**
#112, 1212 - 1st Street SE
Calgary, AB
T2G 2H8

Attention: **Mr. Neil Sandstrom**

Received: July 29, 2005

ALS ENVIRONMENTAL

per:

Monica Gibson

Monica Gibson, M.Sc. - Project Chemist
Brent Whitehead, B.Sc. - Operations Supervisor

File No. CC500004



REMARKS

Some Sulphide detection limits were increased for the samples presented in this report. These increases were required due to analytical interferences.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	BH05-01-01	BH05-02-01	BH05-02-02	BH05-03-01	BH05-04-01
Sample Date	05-07-16	05-07-16	05-07-16	05-07-16	05-07-16
ALS ID	1	2	3	4	5

Physical Tests

Moisture	%	-	1.65	<0.10	2.26	-
pH		12.5	10.6	8.67	12.0	12.5

Cyanides

Total Cyanide	CN	-	<3.0	<3.0	<3.0	-
---------------	----	---	------	------	------	---

Total Metals

Antimony	T-Sb	<10	<10	<10	<10	<10
Arsenic	T-As	1690	26.8	13.4	39.9	113
Barium	T-Ba	144	63.5	80.1	47.8	123
Beryllium	T-Be	<0.50	<0.50	<0.50	<0.50	<0.50
Cadmium	T-Cd	<0.50	<0.50	<0.50	<0.50	<0.50
Chromium	T-Cr	77.4	60.2	76.0	31.2	57.4
Cobalt	T-Co	10.2	8.3	8.6	5.5	9.8
Copper	T-Cu	32.2	26.2	24.3	13.6	31.7
Lead	T-Pb	<30	<30	<30	<30	<30
Mercury	T-Hg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum	T-Mo	18.0	7.3	22.8	<4.0	6.2
Nickel	T-Ni	41.6	32.7	39.0	16.5	33.7
Selenium	T-Se	<2.0	<2.0	<2.0	<2.0	<2.0
Silver	T-Ag	<2.0	<2.0	<2.0	<2.0	<2.0
Thallium	T-Tl	<1.0	<1.0	<1.0	<1.0	<1.0
Tin	T-Sn	<5.0	<5.0	<5.0	<5.0	<5.0
Vanadium	T-V	42.8	36.6	38.3	25.1	39.7
Zinc	T-Zn	48.6	36.5	35.5	34.7	58.8

Inorganic Parameters

Sulphide	S	<3.3	<0.20	<0.33	<0.21	<0.51
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Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligram per dry kilogram unless otherwise noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	BH05-05-01	BH05-05-02	BH05-10-01	BH05-03-02
Sample Date	05-07-16	05-07-16	05-07-16	05-07-16
ALS ID	6	7	8	9

Physical Tests

Moisture	%	-	-	4.95	0.17
pH		12.5	10.6	8.06	10.6

Cyanides

Total Cyanide	CN	-	-	-	21.9
---------------	----	---	---	---	------

Total Metals

Antimony	T-Sb	<10	<10	<10	<10
Arsenic	T-As	144	50.2	10.0	5.9
Barium	T-Ba	142	55.7	47.8	35.2
Beryllium	T-Be	<0.50	<0.50	<0.50	<0.50
Cadmium	T-Cd	<0.50	<0.50	<0.50	<0.50
Chromium	T-Cr	56.8	46.7	54.1	29.0
Cobalt	T-Co	7.6	5.5	8.1	4.2
Copper	T-Cu	24.7	16.1	30.6	11.0
Lead	T-Pb	<30	<30	<30	<30
Mercury	T-Hg	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum	T-Mo	10.0	11.2	<4.0	<4.0
Nickel	T-Ni	29.8	24.6	29.6	15.5
Selenium	T-Se	<2.0	<2.0	<2.0	<2.0
Silver	T-Ag	<2.0	<2.0	<2.0	<2.0
Thallium	T-Tl	<1.0	<1.0	<1.0	<1.0
Tin	T-Sn	<5.0	<5.0	<5.0	<5.0
Vanadium	T-V	35.8	23.8	28.4	19.8
Zinc	T-Zn	41.7	26.4	33.9	23.3

Inorganic Parameters

Sulphide	S	1.0	<0.20	<5.0	0.72
----------	---	-----	-------	------	------

Non-Halogenated Volatiles

Benzene	-	-	<0.040	-
Ethylbenzene	-	-	<0.050	-
Toluene	-	-	<0.10	-
meta- & para-Xylene	-	-	<0.050	-
ortho-Xylene	-	-	<0.050	-
Total Xylenes	-	-	<0.075	-

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligram per dry kilogram unless otherwise noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID BH05-10-01

Sample Date 05-07-16
ALS ID 8

CCME Hydrocarbon Fractions

F1 (C6-C10)	<10
F1-BTEX	<10
F2 (C10-C16)	67
F3 (C16-C34)	241
F4 (C34-C50)	<50

F4G-SG Required (yes/no)	no
--------------------------	----

Glycols

Diethylene Glycol	<10
Ethylene Glycol	<10
1,2-Propylene Glycol	<10
Triethylene Glycol	<10

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.040
Acenaphthylene	<0.050
Anthracene	<0.050
Benz(a)anthracene	<0.050
Benzo(a)pyrene	<0.050

Benzo(b)fluoranthene	<0.050
Benzo(g,h,i)perylene	<0.050
Benzo(k)fluoranthene	<0.050
Chrysene	<0.050
Dibenz(a,h)anthracene	<0.050

Fluoranthene	<0.050
Fluorene	<0.050
Indeno(1,2,3-c,d)pyrene	<0.050
Naphthalene	<0.050
Phenanthrene	<0.050

Pyrene	<0.050
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Remarks regarding the analyses appear at the beginning of this report.
Results are expressed as milligram per dry kilogram unless otherwise noted.
< = Less than the detection limit indicated.

**Appendix 1 - QUALITY CONTROL - Replicates**

Sediment/Soil		BH05-10-01 05-07-16	BH05-10-01 QC # 22486	BH05-10-01 QC # 23466
Physical Tests				
Moisture	%	4.95	4.55	4.55
pH		8.06	7.92	7.92
Total Metals				
Antimony	T-Sb	<10	<10	<10
Arsenic	T-As	10.0	11.8	11.8
Barium	T-Ba	47.8	45.7	45.7
Beryllium	T-Be	<0.50	<0.50	<0.50
Cadmium	T-Cd	<0.50	<0.50	<0.50
Chromium	T-Cr	54.1	52.5	52.5
Cobalt	T-Co	8.1	8.0	8.0
Copper	T-Cu	30.6	25.4	25.4
Lead	T-Pb	<30	<30	<30
Mercury	T-Hg	<0.0050	<0.0050	<0.0050
Molybdenum	T-Mo	<4.0	<4.0	<4.0
Nickel	T-Ni	29.6	29.1	29.1
Selenium	T-Se	<2.0	<2.0	<2.0
Silver	T-Ag	<2.0	<2.0	<2.0
Thallium	T-Tl	<1.0	<1.0	<1.0
Tin	T-Sn	<5.0	<5.0	<5.0
Vanadium	T-V	28.4	28.0	28.0
Zinc	T-Zn	33.9	31.9	31.9
Inorganic Parameters				
Sulphide	S	<5.0	<5.0	<5.0
Glycols				
Diethylene Glycol		<10	<10	<10
Ethylene Glycol		<10	<10	<10
1,2-Propylene Glycol		<10	<10	<10

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligram per dry kilogram unless otherwise noted.
 < = Less than the detection limit indicated.

**Appendix 1 - QUALITY CONTROL - Reference Materials**

Sediment/Soil

		Result	Target	Units	DL	ALSQC#	Method
<i>NIST Montana Soil, 2711</i>							
<u>Total Metals</u>							
Antimony	T-Sb	14	19	mg/kg	10	22491	a
Antimony	T-Sb	14	19	mg/kg	10	23471	a
Arsenic	T-As	104	105	mg/kg	5	22491	a
Arsenic	T-As	104	105	mg/kg	5	23471	a
Barium	T-Ba	209	726	mg/kg	1	22491	a
Barium	T-Ba	209	726	mg/kg	1	23471	a
Beryllium	T-Be	1.04	0.98	mg/kg	0.5	22491	a
Beryllium	T-Be	1.04	0.98	mg/kg	0.5	23471	a
Cadmium	T-Cd	41.4	41.7	mg/kg	0.5	22491	a
Cadmium	T-Cd	41.4	41.7	mg/kg	0.5	23471	a
Chromium	T-Cr	22.8	47.0	mg/kg	2	22491	a
Chromium	T-Cr	22.8	47.0	mg/kg	2	23471	a
Cobalt	T-Co	8.4	10.0	mg/kg	2	22491	a
Cobalt	T-Co	8.4	10.0	mg/kg	2	23471	a
Copper	T-Cu	117	114	mg/kg	1	22491	a
Copper	T-Cu	117	114	mg/kg	1	23471	a
Lead	T-Pb	1180	1160	mg/kg	50	22491	a
Lead	T-Pb	1180	1160	mg/kg	50	23471	a
Mercury	T-Hg	6.17	6.25	mg/kg	0.05	22498	b
Mercury	T-Hg	6.17	6.25	mg/kg	0.05	23478	b
Molybdenum	T-Mo	<4.0	<4.0	mg/kg	4	22491	a
Molybdenum	T-Mo	<4.0	<4.0	mg/kg	4	23471	a
Nickel	T-Ni	16.5	20.6	mg/kg	5	22491	a
Nickel	T-Ni	16.5	20.6	mg/kg	5	23471	a
Selenium	T-Se	<2.0	<2.0	mg/kg	2	22491	a
Selenium	T-Se	<2.0	<2.0	mg/kg	2	23471	a
Silver	T-Ag	4.3	4.6	mg/kg	2	22491	a
Silver	T-Ag	4.3	4.6	mg/kg	2	23471	a
Thallium	T-Tl	<10	<10	mg/kg	10	22491	a
Thallium	T-Tl	2.0	2.5	mg/kg	1	22495	c
Thallium	T-Tl	<10	<10	mg/kg	10	23471	a
Thallium	T-Tl	2.0	2.5	mg/kg	1	23475	c
Tin	T-Sn	<10	<10	mg/kg	10	22491	a
Tin	T-Sn	<10	<10	mg/kg	10	23471	a

Methods:a = CSR/HCl-HNO₃/ICPOESb = CSR/HCl-HNO₃/CVAFS

c = SM__CSR_ICPMS

**Appendix 1 - QUALITY CONTROL - Reference Materials**

Sediment/Soil

		Result	Target	Units	DL	ALSQC#	Method
<i>NIST Montana Soil, 2711</i>							
<u>Total Metals</u>							
Vanadium	T-V	52.2	81.6	mg/kg	2	22491	a
Vanadium	T-V	52.2	81.6	mg/kg	2	23471	a
Zinc	T-Zn	337	350	mg/kg	1	22491	a
Zinc	T-Zn	337	350	mg/kg	1	23471	a
<i>CANMET Till Reference Material, TILL-1</i>							
<u>Total Metals</u>							
Antimony	T-Sb	<10	<10	mg/kg	10	22492	a
Antimony	T-Sb	<10	<10	mg/kg	10	23472	a
Arsenic	T-As	17.2	18.0	mg/kg	5	22492	a
Arsenic	T-As	17.2	18.0	mg/kg	5	23472	a
Barium	T-Ba	88.9	702	mg/kg	1	22492	a
Barium	T-Ba	88.9	702	mg/kg	1	23472	a
Beryllium	T-Be	0.53	2.40	mg/kg	0.5	22492	a
Beryllium	T-Be	0.53	2.40	mg/kg	0.5	23472	a
Cadmium	T-Cd	<0.50	<0.50	mg/kg	0.5	22492	a
Cadmium	T-Cd	<0.50	<0.50	mg/kg	0.5	23472	a
Chromium	T-Cr	29.8	65.0	mg/kg	2	22492	a
Chromium	T-Cr	29.8	65.0	mg/kg	2	23472	a
Cobalt	T-Co	13.2	18.0	mg/kg	2	22492	a
Cobalt	T-Co	13.2	18.0	mg/kg	2	23472	a
Copper	T-Cu	49.5	47.0	mg/kg	1	22492	a
Copper	T-Cu	49.5	47.0	mg/kg	1	23472	a
Lead	T-Pb	<50	<50	mg/kg	50	22492	a
Lead	T-Pb	<50	<50	mg/kg	50	23472	a
Mercury	T-Hg	0.103	0.095	mg/kg	0.05	22499	b
Mercury	T-Hg	0.103	0.095	mg/kg	0.05	23479	b
Molybdenum	T-Mo	<4.0	<4.0	mg/kg	4	22492	a
Molybdenum	T-Mo	<4.0	<4.0	mg/kg	4	23472	a
Nickel	T-Ni	18.2	24.0	mg/kg	5	22492	a
Nickel	T-Ni	18.2	24.0	mg/kg	5	23472	a
Selenium	T-Se	<2.0	2.0	mg/kg	2	22492	a
Selenium	T-Se	<2.0	2.0	mg/kg	2	23472	a

Methods:a = CSR/HCl-HNO₃/ICPOESb = CSR/HCl-HNO₃/CVAFS

**Appendix 1 - QUALITY CONTROL - Reference Materials**

Sediment/Soil

		Result	Target	Units	DL	ALSQC#	Method
<i>CANMET Till Reference Material, TILL-1</i>							
<u>Total Metals</u>							
Silver	T-Ag	<2.0	<2.0	mg/kg	2	22492	a
Silver	T-Ag	<2.0	<2.0	mg/kg	2	23472	a
Thallium	T-Tl	<10	10	mg/kg	10	22492	a
Thallium	T-Tl	<10	10	mg/kg	10	23472	a
Tin	T-Sn	<5.0	5.0	mg/kg	5	22492	a
Tin	T-Sn	<5.0	5.0	mg/kg	5	23472	a
Vanadium	T-V	64.8	99.0	mg/kg	2	22492	a
Vanadium	T-V	64.8	99.0	mg/kg	2	23472	a
Zinc	T-Zn	73.8	98.0	mg/kg	1	22492	a
Zinc	T-Zn	73.8	98.0	mg/kg	1	23472	a
<i>ALS Environmental RM Soil, ARM-1</i>							
<u>CCME Hydrocarbon Fractions</u>							
F2 (C10-C16)		3170	2410	mg/kg	30	22096	b
F3 (C16-C34)		5000	3420	mg/kg	50	22096	b
F4 (C34-C50)		1420	1280	mg/kg	50	22096	b

Methods:a = CSR/HCl-HNO₃/ICPOES

b = Soxhlet/GC-FID

Appendix 1 - QUALITY CONTROL - Spikes

Sediment/Soil

	Result	Target	Units	DL	ALSQC#	Method
<u>Cyanides</u>						
Total Cyanide CN	107	100	mg/kg	3	23487	a
<u>Non-Halogenated Volatiles</u>						
Benzene	1.88	2.00	mg/kg	0.04	22155	b
Ethylbenzene	2.12	2.00	mg/kg	0.04	22155	b
Toluene	2.00	2.00	mg/kg	0.1	22155	b
meta- & para-Xylene	2.15	2.00	mg/kg	0.04	22155	b
ortho-Xylene	2.27	2.00	mg/kg	0.04	22155	b
<u>CCME Hydrocarbon Fractions</u>						
F1 (C6-C10)	29	29	mg/kg	10	22157	c
F2 (C10-C16)	637	720	mg/kg	30	22230	d
F3 (C16-C34)	1410	1650	mg/kg	50	22230	d
F4 (C34-C50)	583	700	mg/kg	50	22230	d
<u>Glycols</u>						
Diethylene Glycol	78	50	mg/kg	10	22488	e
Diethylene Glycol	78	50	mg/kg	10	23468	e
Ethylene Glycol	69	50	mg/kg	10	22488	e
Ethylene Glycol	69	50	mg/kg	10	23468	e
1,2-Propylene Glycol	66	50	mg/kg	10	22488	e
1,2-Propylene Glycol	66	50	mg/kg	10	23468	e

Methods:

a = Colourimetry
 b = Purge&Trap/GC-MS
 c = Purge&Trap/GC-FID
 d = Soxhlet/GC-FID
 e = GC-FID

Appendix 1 - QUALITY CONTROL - Blanks

Sediment/Soil

		Result	Target	Units	DL	ALSQC#	Method
<u>Cyanides</u>							
Total Cyanide	CN	<3	<3	mg/kg	3	23485	a
<u>Total Metals</u>							
Antimony	T-Sb	<10	<10	mg/kg	10	22489	b
Antimony	T-Sb	<10	<10	mg/kg	10	22490	b
Antimony	T-Sb	<10	<10	mg/kg	10	23469	b
Antimony	T-Sb	<10	<10	mg/kg	10	23470	b
Arsenic	T-As	<5.0	<5.0	mg/kg	5	22489	b
Arsenic	T-As	<5.0	<5.0	mg/kg	5	22490	b
Arsenic	T-As	<5.0	<5.0	mg/kg	5	23469	b
Arsenic	T-As	<5.0	<5.0	mg/kg	5	23470	b
Barium	T-Ba	<1.0	<1.0	mg/kg	1	22489	b
Barium	T-Ba	<1.0	<1.0	mg/kg	1	22490	b
Barium	T-Ba	<1.0	<1.0	mg/kg	1	23469	b
Barium	T-Ba	<1.0	<1.0	mg/kg	1	23470	b
Beryllium	T-Be	<0.50	<0.50	mg/kg	0.5	22489	b
Beryllium	T-Be	<0.50	<0.50	mg/kg	0.5	22490	b
Beryllium	T-Be	<0.50	<0.50	mg/kg	0.5	23469	b
Beryllium	T-Be	<0.50	<0.50	mg/kg	0.5	23470	b
Cadmium	T-Cd	<0.50	<0.50	mg/kg	0.5	22489	b
Cadmium	T-Cd	<0.50	<0.50	mg/kg	0.5	22490	b
Cadmium	T-Cd	<0.50	<0.50	mg/kg	0.5	23469	b
Cadmium	T-Cd	<0.50	<0.50	mg/kg	0.5	23470	b
Chromium	T-Cr	<2.0	<2.0	mg/kg	2	22489	b
Chromium	T-Cr	<2.0	<2.0	mg/kg	2	22490	b
Chromium	T-Cr	<2.0	<2.0	mg/kg	2	23469	b
Chromium	T-Cr	<2.0	<2.0	mg/kg	2	23470	b
Cobalt	T-Co	<2.0	<2.0	mg/kg	2	22489	b
Cobalt	T-Co	<2.0	<2.0	mg/kg	2	22490	b
Cobalt	T-Co	<2.0	<2.0	mg/kg	2	23469	b
Cobalt	T-Co	<2.0	<2.0	mg/kg	2	23470	b
Copper	T-Cu	<1.0	<1.0	mg/kg	1	22489	b
Copper	T-Cu	<1.0	<1.0	mg/kg	1	22490	b
Copper	T-Cu	<1.0	<1.0	mg/kg	1	23469	b
Copper	T-Cu	<1.0	<1.0	mg/kg	1	23470	b
Lead	T-Pb	<50	<50	mg/kg	50	22489	b

Methods:

a = Colourimetry

b = CSR/HCl-HNO₃/ICPOES

**Appendix 1 - QUALITY CONTROL - Blanks**

Sediment/Soil

		Result	Target	Units	DL	ALSQC#	Method
Total Metals							
Lead	T-Pb	<50	<50	mg/kg	50	22490	a
Lead	T-Pb	<50	<50	mg/kg	50	23469	a
Lead	T-Pb	<50	<50	mg/kg	50	23470	a
Mercury	T-Hg	<0.050	<0.050	mg/kg	0.05	22496	b
Mercury	T-Hg	<0.050	<0.050	mg/kg	0.05	22497	b
Mercury	T-Hg	<0.050	<0.050	mg/kg	0.05	23476	b
Mercury	T-Hg	<0.050	<0.050	mg/kg	0.05	23477	b
Molybdenum	T-Mo	<4.0	<4.0	mg/kg	4	22489	a
Molybdenum	T-Mo	<4.0	<4.0	mg/kg	4	22490	a
Molybdenum	T-Mo	<4.0	<4.0	mg/kg	4	23469	a
Molybdenum	T-Mo	<4.0	<4.0	mg/kg	4	23470	a
Nickel	T-Ni	<5.0	<5.0	mg/kg	5	22489	a
Nickel	T-Ni	<5.0	<5.0	mg/kg	5	22490	a
Nickel	T-Ni	<5.0	<5.0	mg/kg	5	23469	a
Nickel	T-Ni	<5.0	<5.0	mg/kg	5	23470	a
Selenium	T-Se	<2.0	<2.0	mg/kg	2	22489	a
Selenium	T-Se	<2.0	<2.0	mg/kg	2	22490	a
Selenium	T-Se	<2.0	<2.0	mg/kg	2	23469	a
Selenium	T-Se	<2.0	<2.0	mg/kg	2	23470	a
Silver	T-Ag	<2.0	<2.0	mg/kg	2	22489	a
Silver	T-Ag	<2.0	<2.0	mg/kg	2	22490	a
Silver	T-Ag	<2.0	<2.0	mg/kg	2	23469	a
Silver	T-Ag	<2.0	<2.0	mg/kg	2	23470	a
Thallium	T-Tl	<10	<10	mg/kg	10	22489	a
Thallium	T-Tl	<10	<10	mg/kg	10	22490	a
Thallium	T-Tl	<1.0	<1.0	mg/kg	1	22493	c
Thallium	T-Tl	<1.0	<1.0	mg/kg	1	22494	c
Thallium	T-Tl	<10	<10	mg/kg	10	23469	a
Thallium	T-Tl	<10	<10	mg/kg	10	23470	a
Thallium	T-Tl	<1.0	<1.0	mg/kg	1	23473	c
Thallium	T-Tl	<1.0	<1.0	mg/kg	1	23474	c
Tin	T-Sn	<5.0	<5.0	mg/kg	5	22489	a
Tin	T-Sn	<5.0	<5.0	mg/kg	5	22490	a
Tin	T-Sn	<5.0	<5.0	mg/kg	5	23469	a
Tin	T-Sn	<5.0	<5.0	mg/kg	5	23470	a
Vanadium	T-V	<2.0	<2.0	mg/kg	2	22489	a

Methods:a = CSR/HCl-HNO₃/ICPOESb = CSR/HCl-HNO₃/CVAFS

c = SM_CSR_ICPMS

**Appendix 1 - QUALITY CONTROL - Blanks**

Sediment/Soil

		Result	Target	Units	DL	ALSQC#	Method
<u>Total Metals</u>							
Vanadium	T-V	<2.0	<2.0	mg/kg	2	22490	a
Vanadium	T-V	<2.0	<2.0	mg/kg	2	23469	a
Vanadium	T-V	<2.0	<2.0	mg/kg	2	23470	a
Zinc	T-Zn	<1.0	<1.0	mg/kg	1	22489	a
Zinc	T-Zn	<1.0	<1.0	mg/kg	1	22490	a
Zinc	T-Zn	<1.0	<1.0	mg/kg	1	23469	a
Zinc	T-Zn	<1.0	<1.0	mg/kg	1	23470	a
<u>Non-Halogenated Volatiles</u>							
Benzene		<0.040	<0.040	mg/kg	0.04	22156	b
Ethylbenzene		<0.050	<0.050	mg/kg	0.05	22156	b
Toluene		<0.100	<0.100	mg/kg	0.1	22156	b
meta- & para-Xylene		<0.050	<0.050	mg/kg	0.05	22156	b
ortho-Xylene		<0.050	<0.050	mg/kg	0.05	22156	b
<u>CCME Hydrocarbon Fractions</u>							
F1 (C6-C10)		<10	<10	mg/kg	10	22156	c
<u>Glycols</u>							
Diethylene Glycol		<10	<10	mg/kg	10	22487	d
Diethylene Glycol		<10	<10	mg/kg	10	23467	d
Ethylene Glycol		<10	<10	mg/kg	10	22487	d
Ethylene Glycol		<10	<10	mg/kg	10	23467	d
1,2-Propylene Glycol		<10	<10	mg/kg	10	22487	d
1,2-Propylene Glycol		<10	<10	mg/kg	10	23467	d
<u>Polycyclic Aromatic Hydrocarbons</u>							
Acenaphthene		<0.050	<0.050	mg/kg	0.05	22129	e
Acenaphthylene		<0.050	<0.050	mg/kg	0.05	22129	e
Anthracene		<0.050	<0.050	mg/kg	0.05	22129	e
Benz(a)anthracene		<0.050	<0.050	mg/kg	0.05	22129	e
Benzo(a)pyrene		<0.050	<0.050	mg/kg	0.05	22129	e
Benzo(b)fluoranthene		<0.050	<0.050	mg/kg	0.05	22129	e
Benzo(g,h,i)perylene		<0.050	<0.050	mg/kg	0.05	22129	e
Benzo(k)fluoranthene		<0.050	<0.050	mg/kg	0.05	22129	e
Chrysene		<0.050	<0.050	mg/kg	0.05	22129	e
Dibenz(a,h)anthracene		<0.050	<0.050	mg/kg	0.05	22129	e
Fluoranthene		<0.050	<0.050	mg/kg	0.05	22129	e

Methods:a = CSR/HCl-HNO₃/ICPOES

b = Purge&Trap/GC-MS

c = Purge&Trap/GC-FID

d = GC-FID

e = Soxhlet/GC-MS

Appendix 1 - QUALITY CONTROL - Blanks

Sediment/Soil

	Result	Target	Units	DL	ALSQC#	Method
<u>Polycyclic Aromatic Hydrocarbons</u>						
Fluorene	<0.050	<0.050	mg/kg	0.05	22129	a
Indeno(1,2,3-c,d)pyrene	<0.050	<0.050	mg/kg	0.05	22129	a
Naphthalene	<0.050	<0.050	mg/kg	0.05	22129	a
Phenanthrene	<0.050	<0.050	mg/kg	0.05	22129	a
Pyrene	<0.050	<0.050	mg/kg	0.05	22129	a
<u>Extractable Hydrocarbons</u>						
F2 (C10-C16)	<30	<30	mg/kg	30	21982	b
F2 (C10-C16)	<30	<30	mg/kg	30	22095	b
F3 (C16-C34)	<50	<50	mg/kg	50	21982	b
F3 (C16-C34)	<50	<50	mg/kg	50	22095	b
F4 (C34-C50)	<50	<50	mg/kg	50	21982	b
F4 (C34-C50)	<50	<50	mg/kg	50	22095	b

Methods:

a = Soxhlet/GC-MS

b = Soxhlet/GC-FID

Bold Targets indicate uncertified targets



Appendix 2 - METHODOLOGY

Outlines of the methodologies utilized for the analysis of the samples submitted are as follows

pH in Soil

This analysis is carried out in accordance with U.S. EPA Method 9045 (Publ. # SW-846 3rd ed., Washington, DC 20460). The procedure involves mixing the soil in a one to one ratio with deionized/distilled water or calcium chloride solution, depending on whether the soil is considered calcareous or noncalcareous. The pH of the resulting solution is then measured with a standard pH probe.

Laboratory Location: ALS Environmental, Vancouver

Metals in Sediment/Soil

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B or Method 3051, United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by either hotplate or block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by atomic absorption/fluorescence spectrophotometry (EPA Method 7000 series), inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B), and/or inductively coupled plasma - mass spectrometry (EPA Method 6020).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

Recommended Holding Time:

Sample: 6 months (Hg = 28 days)

Extract: 6 months (Hg = 28 days, Sb & Sn = 7 days)

Reference: BCMELP

Laboratory Location: ALS Environmental, Vancouver

Sulphide in Sediment/Soil

This analysis is carried out on a leachable basis. The procedure involves mixing the sample with a sodium hydroxide solution in a one to ten ratio and leaching for several hours. The leachate is then centrifuged and analyzed colorimetrically.

Laboratory Location: ALS Environmental, Vancouver

Appendix 2 - METHODOLOGY - Continued



Moisture in Sediment/Soil

This analysis is carried out gravimetrically by drying the sample at 103 C for a minimum of six hours.

Recommended Holding Time:

Sample: 14 days

Reference: Puget

Laboratory Location: ALS Environmental, Vancouver

Cyanide in Sediment/Soil

Method Revised and Replace: 1997 02 01 This analysis is carried out in accordance with U.S. EPA Method 9010 (Publ. # SW-846 3rd ed., Washington, DC 20460) Specifically, subsamples are distilled using an acid reflux distillation. Liberated hydrogen cyanide gas is trapped in a weak NaOH solution. The extracts are then analysed colorimetrically.

Laboratory Location: ALS Environmental, Vancouver

Moisture in Sediment/Soil

This analysis is carried out gravimetrically by drying the sample at 103 C for a minimum of six hours.

Recommended Holding Time:

Sample: 14 days

Reference: Puget

Laboratory Location: ALS Environmental, Calgary

Volatile Organic Compounds in Sediment/Soil

This analysis involves the extraction of a subsample of the sediment/soil with methanol. Aliquots of the methanol extract are then analyzed for specific Volatile Organic Compounds (VOC) by capillary column gas chromatography with mass spectrometric detection (GC/MS). The VOC analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 8260, published by the United States Environmental Protection Agency (EPA).

Recommended Holding Time:

Sample: 7 days

Extract: 40 days

Reference: EPA

Laboratory Location: ALS Environmental, Calgary

Appendix 2 - METHODOLOGY - Continued



Calculation of Total Xylenes

Total Xylenes is the sum of the concentrations of the ortho, meta, and para Xylene isomers. Results below detection limit (DL) are treated as zero. The DL for Total Xylenes is set to a value no less than the square root of the sum of the squares of the DLs of the individual Xylenes.

Laboratory Location: ALS Environmental, Vancouver

Petroleum Hydrocarbons in Sediment/Soil (Canada-Wide Standard)

This analysis is carried out in accordance with the "Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method, Canadian Council of Ministers of the Environment, December 2000." The various extraction fractions are analysed as follows:

CWS Fractions 1 and 1-BTEX:

This procedure involves the extraction of a subsample of the sediment/soil with methanol. Aliquots of the methanol extract are then analysed by capillary column gas chromatography with flame-ionization detection (GC/FID) for CWS Fraction 1, and by capillary column gas chromatography with mass spectrometric detection (GC/MS) for the BTEX compounds.

Reported results may include any or all of the following:

CWS Fraction 1 (C6-10):

sum of all petroleum hydrocarbon compounds that elute between nC6 and nC10 obtained by GC/FID analysis

CWS Fraction 1-BTEX:

CWS Fraction 1 (C6-10), minus BTEX compounds

Recommended Holding Time:

Sample: 7 days for CWS Fraction 1

Extract: 7 days for all CWS Fractions

Reference: CCME

Laboratory Location: ALS Environmental, Calgary

Petroleum Hydrocarbons in Sediment/Soil (Canada-Wide Standard)

This analysis is carried out in accordance with the "Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method, Canadian Council of Ministers of the Environment, December 2000." The various extraction fractions are analysed as follows:



Appendix 2 - METHODOLOGY - Continued

CWS Fractions 2, 2-PAH, 3, 3-PAH, 4 and 4G-SG:

The procedure uses an automated system at high temperature and pressure (Accelerated Solvent Extractor - ASE) or a Soxhlet system to extract a subsample of the sediment/soil with a 1:1 mixture of hexane and acetone. The extract is concentrated and undergoes a silica-gel clean-up to remove polar material. The final extract is analysed by high temperature capillary column gas chromatography with flame ionization detection (GC/FID). CWS Fractions 4G and 4G-SG (Gravimetric Heavy Hydrocarbons) are analysed gravimetrically.

Reported results may include any or all of the following:

CWS Fraction 2 (C10-16):

sum of all petroleum hydrocarbon compounds that elute between nC10 and nC16 obtained by GC/FID analysis

CWS Fraction 2-PAH:

CWS Fraction 2 (C10-16), minus selected PAH compounds (Naphthalene)

CWS Fraction 3 (C16-34):

sum of all petroleum hydrocarbon compounds that elute between nC16 and nC34 obtained by GC/FID analysis

CWS Fraction 3-PAH:

CWS Fraction 3 (C16-34), minus selected PAH compounds

CWS Fraction 4 (C34-50):

sum of all petroleum hydrocarbon compounds that elute between nC34 and nC50 obtained by GC/FID analysis

CWS Fraction 4G (GHH):

Results obtained by gravimetric analysis.

CWS Fraction 4G-SG (GHH + SG):

Results obtained by gravimetric analysis after silica gel clean-up

Recommended Holding Time:

Sample: 14 days for CWS Fractions 2, 3, 4, 4G & 4G-SG

Extract: 7 days for all CWS Fractions

Reference: CCME

Laboratory Location: ALS Environmental, Calgary

Glycols in Sediment/Soil

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 8015B, published by the United States Environmental Protection Agency (EPA). The procedure involves extraction of a subsample of the sediment/soil with deionized water, followed by treatment of the extract with a strong base (NaOH) and benzoyl chloride to form the corresponding benzoate esters. The benzoate esters are then extracted with hexane and the extract is analyzed by capillary column gas chromatography with flame ionization detection (FID).

Recommended Holding Time:



Appendix 2 - METHODOLOGY - Continued

Sample: 14 days
Reference: EPA

Extract: 40 days

Laboratory Location: ALS Environmental, Vancouver

Polycyclic Aromatic Hydrocarbons in Sediment/Soil

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3630 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure uses a Soxhlet system to extract a subsample of the sediment/soil with a 1:1 mixture of hexane and acetone. The extract is then solvent exchanged to toluene and undergoes a silica gel clean-up to remove sample components that could potentially interfere with the analysis. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS).

Recommended Holding Time:

Sample: 14 days
Reference: EPA

Extract: 40 days

Laboratory Location: ALS Environmental, Calgary

Results contained within this certificate relate only to the samples as submitted.

This Certificate Of Analysis shall only be reproduced in full, except with the written approval of ALS Environmental.

End of Report



CERTIFICATE OF ANALYSIS

Date: November 8, 2005

ALS File No. R3059

Report On: A053017

Report To: **SNC Lavalin, Morrow Environmental**
#112, 1212 - 1st Street SE
Calgary, AB
T2G 2H8

Attention: **Mr. Neil Sandstrom**

Received: July 29, 2005

ALS ENVIRONMENTAL

per:

Monica Gibson

Monica Gibson, M.Sc. - Project Chemist
Brent Whitehead, B.Sc. - Operations Supervisor

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-11-01	TP05-11-02	TP05-12-01	TP05-12-02	TP05-13-01
Sample Date	05-07-18	05-07-18	05-07-18	05-07-18	05-07-18
ALS ID	1	2	3	4	5

Physical Tests

Conductivity (dS/m)	-	-	-	-	-
Moisture %	4.88	5.47	8.25	10.4	9.93
pH	8.14	7.75	7.81	5.61	6.72
Sodium Adsorption Ratio (SAR)	-	-	-	-	-
Saturation Percentage %	-	-	-	-	-
TGR (tonnes/hectare)	-	-	-	-	-

Cyanides

Total Cyanide CN	-	<3.0	-	<3.0	-
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Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-11-01	TP05-11-02	TP05-12-01	TP05-12-02	TP05-13-01
Sample Date	05-07-18	05-07-18	05-07-18	05-07-18	05-07-18
ALS ID	1	2	3	4	5

Total Metals

Antimony	T-Sb	<10	<10	<10	<10	<10
Arsenic	T-As	1510	2420	72.8	20.8	<5.0
Barium	T-Ba	212	189	45.4	42.2	30.9
Beryllium	T-Be	<0.50	<0.50	<0.50	<0.50	<0.50
Cadmium	T-Cd	1.18	<0.50	<0.50	<0.50	<0.50
Chromium	T-Cr	77.0	75.5	32.6	26.1	18.5
Cobalt	T-Co	19.8	18.6	5.6	5.1	3.5
Copper	T-Cu	157	171	46.0	14.8	6.7
Lead	T-Pb	40	<30	37	<30	<30
Mercury	T-Hg	0.0064	<0.0050	0.0054	<0.0050	<0.0050
Molybdenum	T-Mo	<4.0	<4.0	4.6	<4.0	<4.0
Nickel	T-Ni	57.9	51.5	31.9	14.2	9.4
Selenium	T-Se	<2.0	<2.0	<2.0	<2.0	<2.0
Silver	T-Ag	<2.0	<2.0	<2.0	<2.0	<2.0
Thallium	T-Tl	<1.0	<1.0	<1.0	<1.0	<1.0
Tin	T-Sn	<5.0	<5.0	9.3	<5.0	<5.0
Vanadium	T-V	55.2	48.5	25.0	23.6	18.6
Zinc	T-Zn	329	163	75.8	25.3	19.5

Inorganic Parameters

Sulphide	S	<1.0	1.2	1.37	-	-
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Non-Halogenated Volatiles

Benzene	<0.040	<0.040	<0.040	<0.040	<0.040
Ethylbenzene	<0.050	<0.050	<0.050	<0.050	<0.050
Toluene	<0.10	<0.10	<0.10	<0.10	<0.10
meta- & para-Xylene	<0.050	<0.050	<0.050	<0.050	<0.050
ortho-Xylene	<0.050	<0.050	<0.050	<0.050	<0.050
Total Xylenes	<0.075	<0.075	<0.075	<0.075	<0.075

CCME Hydrocarbon Fractions

F1 (C6-C10)	<10	<10	62	46	<10
F1-BTEX	<10	<10	62	46	<10
F2 (C10-C16)	105	52	1680	<30	<30
F3 (C16-C34)	351	375	1040	<50	<50
F4 (C34-C50)	<50	<50	213	<50	<50
F4G-sg	-	-	-	-	-
F4G-SG Required (yes/no)	no	no	no	no	no

Results are expressed as milligram per dry kilogram unless otherwise noted.

Results are expressed as milligrams per dry kilogram except where noted.

< = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-11-01	TP05-11-02	TP05-12-01
Sample Date	05-07-18	05-07-18	05-07-18
ALS ID	1	2	3

Glycols

Diethylene Glycol	-	<10	-
Ethylene Glycol	-	<10	-
1,2-Propylene Glycol	-	<10	-
Triethylene Glycol	-	<10	-

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.040	-	0.094
Acenaphthylene	<0.050	-	<0.050
Anthracene	<0.050	-	0.212
Benz(a)anthracene	<0.050	-	<0.050
Benzo(a)pyrene	<0.050	-	<0.050
Benzo(b)fluoranthene	<0.050	-	<0.050
Benzo(g,h,i)perylene	<0.050	-	<0.050
Benzo(k)fluoranthene	<0.050	-	<0.050
Chrysene	<0.050	-	<0.050
Dibenz(a,h)anthracene	<0.050	-	<0.050
Fluoranthene	<0.050	-	<0.050
Fluorene	<0.050	-	0.294
Indeno(1,2,3-c,d)pyrene	<0.050	-	<0.050
Naphthalene	0.370	-	0.211
Phenanthrene	<0.050	-	0.115
Pyrene	<0.050	-	<0.050

Results are expressed as milligram per dry kilogram unless otherwise noted.
Results are expressed as milligrams per dry kilogram except where noted.
< = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-13-02	TP05-14-01	TP05-14-02	TP05-15-01	TP05-15-02
Sample Date	05-07-18	05-07-18	05-07-18	05-07-18	05-07-18
ALS ID	6	7	8	9	10

Physical Tests

Conductivity (dS/m)	-	-	-	-	-
Moisture %	7.84	7.74	8.46	6.77	10.3
pH	7.14	7.53	7.79	3.47	7.63
Sodium Adsorption Ratio (SAR)	-	-	-	-	-
Saturation Percentage %	-	-	-	-	-
TGR (tonnes/hectare)	-	-	-	-	-

Cyanides

Total Cyanide CN	<3.0	-	<3.0	-	-
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Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-13-02	TP05-14-01	TP05-14-02	TP05-15-01	TP05-15-02
Sample Date	05-07-18	05-07-18	05-07-18	05-07-18	05-07-18
ALS ID	6	7	8	9	10

Total Metals

Antimony	T-Sb	<10	171	14	<10	<10
Arsenic	T-As	<5.0	1690	14.7	2110	619
Barium	T-Ba	42.6	249	61.0	189	101
Beryllium	T-Be	<0.50	<0.50	<0.50	<0.50	<0.50
Cadmium	T-Cd	<0.50	6.38	0.60	<0.50	<0.50
Chromium	T-Cr	25.7	74.4	30.0	79.8	45.6
Cobalt	T-Co	4.2	12.9	4.0	7.8	11.0
Copper	T-Cu	11.9	429	33.5	42.4	30.3
Lead	T-Pb	<30	3410	1570	<30	<30
Mercury	T-Hg	<0.0050	0.0549	<0.0050	<0.0050	0.0076
Molybdenum	T-Mo	<4.0	10.6	<4.0	<4.0	<4.0
Nickel	T-Ni	13.4	42.5	14.0	33.6	35.4
Selenium	T-Se	<2.0	<2.0	<2.0	<2.0	<2.0
Silver	T-Ag	<2.0	<2.0	<2.0	<2.0	<2.0
Thallium	T-Tl	<1.0	<1.0	<1.0	<1.0	<1.0
Tin	T-Sn	<5.0	7.2	<5.0	<5.0	<5.0
Vanadium	T-V	22.2	40.0	19.8	52.6	35.8
Zinc	T-Zn	30.9	1570	257	59.4	56.5

Inorganic Parameters

Sulphide	S	-	<1.0	1.2	21.9	<3.3
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Non-Halogenated Volatiles

Benzene	<0.040	0.201	0.332	<0.040	<0.040
Ethylbenzene	<0.050	0.341	0.093	<0.050	<0.050
Toluene	<0.10	0.89	1.03	<0.10	<0.10
meta- & para-Xylene	<0.050	1.63	1.22	<0.050	0.115
ortho-Xylene	<0.050	2.02	0.817	<0.050	0.063
Total Xylenes	<0.075	3.65	2.04	<0.075	0.178

CCME Hydrocarbon Fractions

F1 (C6-C10)	<10	275	144	35	40
F1-BTEX	<10	270	141	35	39
F2 (C10-C16)	<30	3700	2600	<30	2560
F3 (C16-C34)	<50	4050	1300	157	798
F4 (C34-C50)	<50	1790	363	56	<50
F4G-sg	-	7200	1790	-	-
F4G-SG Required (yes/no)	no	yes	yes	no	no

Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-13-02	TP05-14-02	TP05-15-02
Sample Date	05-07-18	05-07-18	05-07-18
ALS ID	6	8	10

Glycols

Diethylene Glycol	-	<10	-
Ethylene Glycol	-	<10	-
1,2-Propylene Glycol	-	<10	-
Triethylene Glycol	-	<10	-

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.040	-	<0.40
Acenaphthylene	<0.050	-	<0.50
Anthracene	<0.050	-	<0.50
Benz(a)anthracene	<0.050	-	<0.050
Benzo(a)pyrene	<0.050	-	<0.050
Benzo(b)fluoranthene	<0.050	-	<0.050
Benzo(g,h,i)perylene	<0.050	-	<0.050
Benzo(k)fluoranthene	<0.050	-	<0.050
Chrysene	<0.050	-	<0.050
Dibenz(a,h)anthracene	<0.050	-	<0.050
Fluoranthene	<0.050	-	<0.050
Fluorene	<0.050	-	<0.50
Indeno(1,2,3-c,d)pyrene	<0.050	-	<0.050
Naphthalene	<0.050	-	<0.50
Phenanthrene	<0.050	-	<0.50
Pyrene	<0.050	-	0.111

Results are expressed as milligram per dry kilogram unless otherwise noted.
Results are expressed as milligrams per dry kilogram except where noted.
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**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-16-01	TP05-16-02	TP05-17-01	TP05-17-02	TP05-18-01
Sample Date	05-07-18	05-07-18	05-07-18	05-07-18	05-07-18
ALS ID	11	12	13	14	15

Physical Tests

Conductivity (dS/m)	-	-	-	-	-
Moisture %	5.42	6.02	8.19	10.5	6.66
pH	8.09	8.53	9.36	7.75	8.38
Sodium Adsorption Ratio (SAR)	-	-	-	-	-
Saturation Percentage %	-	-	-	-	-
TGR (tonnes/hectare)	-	-	-	-	-

Cyanides

Total Cyanide CN	<3.0	<3.0	-	-	-
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Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-16-01	TP05-16-02	TP05-17-01	TP05-17-02	TP05-18-01
Sample Date	05-07-18	05-07-18	05-07-18	05-07-18	05-07-18
ALS ID	11	12	13	14	15

Total Metals

Antimony	T-Sb	<10	<10	<10	<10	<10
Arsenic	T-As	1060	556	122	8.9	511
Barium	T-Ba	189	147	194	37.8	239
Beryllium	T-Be	<0.50	<0.50	<0.50	<0.50	<0.50
Cadmium	T-Cd	<0.50	<0.50	<0.50	<0.50	<0.50
Chromium	T-Cr	87.3	66.4	84.7	29.0	91.5
Cobalt	T-Co	20.5	16.5	20.7	5.5	20.6
Copper	T-Cu	44.6	40.8	45.9	12.8	53.4
Lead	T-Pb	88	84	<30	<30	<30
Mercury	T-Hg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum	T-Mo	<4.0	<4.0	<4.0	<4.0	<4.0
Nickel	T-Ni	62.9	51.1	64.0	17.6	59.7
Selenium	T-Se	<2.0	<2.0	<2.0	<2.0	<2.0
Silver	T-Ag	<2.0	<2.0	<2.0	<2.0	<2.0
Thallium	T-Tl	<1.0	<1.0	<1.0	<1.0	<1.0
Tin	T-Sn	<5.0	<5.0	<5.0	<5.0	<5.0
Vanadium	T-V	58.9	44.9	58.0	22.5	63.7
Zinc	T-Zn	70.9	70.3	75.6	30.3	80.2

Inorganic Parameters

Sulphide	S	1.3	0.68	<1.0	<1.0	1.2
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Non-Halogenated Volatiles

Benzene	-	-	-	-	<0.040
Ethylbenzene	-	-	-	-	<0.050
Toluene	-	-	-	-	<0.10
meta- & para-Xylene	-	-	-	-	<0.050
ortho-Xylene	-	-	-	-	<0.050
Total Xylenes	-	-	-	-	<0.075

CCME Hydrocarbon Fractions

F1 (C6-C10)	-	-	-	-	31
F1-BTEX	-	-	-	-	31
F2 (C10-C16)	-	-	-	-	<30
F3 (C16-C34)	-	-	-	-	117
F4 (C34-C50)	-	-	-	-	<50
F4G-sg	-	-	-	-	-
F4G-SG Required (yes/no)	-	-	-	-	no

Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-18-02	TP05-19-01	TP05-19-02	TP05-20-01	TP05-20-02
Sample Date	05-07-18	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	16	17	18	19	20

Physical Tests

Conductivity (dS/m)	-	-	-	-	-
Moisture %	9.80	3.64	5.14	-	-
pH	7.61	3.82	7.59	3.89	5.58
Sodium Adsorption Ratio (SAR)	-	-	-	-	-
Saturation Percentage %	-	-	-	-	-
TGR (tonnes/hectare)	-	-	-	-	-

Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-18-02	TP05-19-01	TP05-19-02	TP05-20-01	TP05-20-02
Sample Date	05-07-18	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	16	17	18	19	20

Total Metals

Antimony	T-Sb	<10	<10	<10	<10	<10
Arsenic	T-As	12.0	1110	1340	479	10.4
Barium	T-Ba	47.3	177	142	81.9	35.2
Beryllium	T-Be	<0.50	<0.50	<0.50	<0.50	<0.50
Cadmium	T-Cd	<0.50	<0.50	<0.50	<0.50	<0.50
Chromium	T-Cr	32.7	74.8	61.1	40.5	25.6
Cobalt	T-Co	5.5	11.6	13.9	7.1	5.0
Copper	T-Cu	15.0	33.5	34.7	26.2	16.4
Lead	T-Pb	<30	<30	<30	<30	<30
Mercury	T-Hg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum	T-Mo	<4.0	<4.0	<4.0	<4.0	<4.0
Nickel	T-Ni	18.0	40.9	41.9	22.4	15.6
Selenium	T-Se	<2.0	<2.0	<2.0	<2.0	<2.0
Silver	T-Ag	<2.0	<2.0	<2.0	<2.0	<2.0
Thallium	T-Tl	<1.0	<1.0	<1.0	<1.0	<1.0
Tin	T-Sn	<5.0	<5.0	<5.0	<5.0	<5.0
Vanadium	T-V	27.6	53.5	41.3	34.9	24.0
Zinc	T-Zn	28.1	55.7	53.9	35.5	23.4

Inorganic Parameters

Sulphide	S	-	<5.0	<5.0	-	-
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Non-Halogenated Volatiles

Benzene	<0.040	<0.040	<0.040	-	-
Ethylbenzene	<0.050	<0.050	<0.050	-	-
Toluene	<0.10	<0.10	<0.10	-	-
meta- & para-Xylene	<0.050	<0.050	<0.050	-	-
ortho-Xylene	<0.050	<0.050	<0.050	-	-
Total Xylenes	<0.075	<0.075	<0.075	-	-

CCME Hydrocarbon Fractions

F1 (C6-C10)	<10	<10	<10	-	-
F1-BTEX	<10	<10	<10	-	-
F2 (C10-C16)	<30	<30	<30	-	-
F3 (C16-C34)	<50	81	57	-	-
F4 (C34-C50)	<50	<50	<50	-	-
F4G-sg	-	-	-	-	-
F4G-SG Required (yes/no)	no	no	no	-	-

Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Sediment/Soil

Sample ID	TP05-21-01	TP05-21-02	TP05-22-01	TP05-22-02	TP05-23-01
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	21	22	23	24	25

Physical Tests

Conductivity (dS/m)	-	-	-	-	-
Moisture %	9.43	6.25	0.14	15.4	6.21
pH	6.00	7.73	7.59	7.70	8.04
Sodium Adsorption Ratio (SAR)	-	-	-	-	-
Saturation Percentage %	-	-	-	-	-
TGR (tonnes/hectare)	-	-	-	-	-

Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-21-01	TP05-21-02	TP05-22-01	TP05-22-02	TP05-23-01
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	21	22	23	24	25

Total Metals

Antimony	T-Sb	<10	<10	<10	<10	<10
Arsenic	T-As	1600	3660	1190	1760	1130
Barium	T-Ba	75.4	166	232	239	236
Beryllium	T-Be	<0.50	<0.50	<0.50	<0.50	<0.50
Cadmium	T-Cd	<0.50	<0.50	<0.50	<0.50	<0.50
Chromium	T-Cr	50.6	63.5	83.5	83.3	85.0
Cobalt	T-Co	5.8	15.0	17.7	18.8	18.0
Copper	T-Cu	20.6	44.0	41.9	48.8	42.7
Lead	T-Pb	<30	<30	<30	<30	<30
Mercury	T-Hg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum	T-Mo	<4.0	<4.0	<4.0	<4.0	<4.0
Nickel	T-Ni	22.7	45.4	60.5	61.1	61.6
Selenium	T-Se	<2.0	<2.0	<2.0	<2.0	<2.0
Silver	T-Ag	<2.0	<2.0	<2.0	<2.0	<2.0
Thallium	T-Tl	<1.0	<1.0	<1.0	<1.0	<1.0
Tin	T-Sn	<5.0	<5.0	<5.0	<5.0	<5.0
Vanadium	T-V	35.9	45.8	65.6	62.3	62.3
Zinc	T-Zn	35.1	55.7	70.4	71.1	75.6

Inorganic Parameters

Sulphide	S	-	<5.0	<5.0	2.2	<5.0
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Non-Halogenated Volatiles

Benzene	<0.040	<0.040	-	-	<0.040
Ethylbenzene	<0.050	<0.050	-	-	<0.050
Toluene	<0.10	<0.10	-	-	<0.10
meta- & para-Xylene	<0.050	<0.050	-	-	<0.050
ortho-Xylene	<0.050	<0.050	-	-	<0.050
Total Xylenes	<0.075	<0.075	-	-	<0.075

CCME Hydrocarbon Fractions

F1 (C6-C10)	<10	<10	-	-	<10
F1-BTEX	<10	<10	-	-	<10
F2 (C10-C16)	<30	<30	-	-	<30
F3 (C16-C34)	175	202	-	-	120
F4 (C34-C50)	<50	<50	-	-	<50
F4G-sg	-	-	-	-	-
F4G-SG Required (yes/no)	no	no	-	-	no

Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-21-01	TP05-21-02
Sample Date	05-07-19	05-07-19
ALS ID	21	22

Glycols

Diethylene Glycol	-	<10
Ethylene Glycol	-	<10
1,2-Propylene Glycol	-	<10
Triethylene Glycol	-	<10

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.040	-
Acenaphthylene	<0.050	-
Anthracene	<0.050	-
Benz(a)anthracene	<0.050	-
Benzo(a)pyrene	<0.050	-
Benzo(b)fluoranthene	<0.050	-
Benzo(g,h,i)perylene	<0.050	-
Benzo(k)fluoranthene	<0.050	-
Chrysene	<0.050	-
Dibenz(a,h)anthracene	<0.050	-
Fluoranthene	<0.050	-
Fluorene	<0.050	-
Indeno(1,2,3-c,d)pyrene	<0.050	-
Naphthalene	<0.050	-
Phenanthrene	<0.050	-
Pyrene	<0.050	-

Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-23-02	TP05-23-03	TP05-24-01	TP05-24-02	TP05-25-01
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	26	27	28	29	30

Physical Tests

Conductivity (dS/m)	-	-	-	-	-
Moisture %	4.86	12.8	6.24	5.09	7.69
pH	-	7.15	4.05	7.99	7.91
Sodium Adsorption Ratio (SAR)	-	-	-	-	-
Saturation Percentage %	-	-	-	-	-
TGR (tonnes/hectare)	-	-	-	-	-

Cyanides

Total Cyanide CN	-	<3.0	-	-	-
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Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Sediment/Soil

Sample ID	TP05-23-02	TP05-23-03	TP05-24-01	TP05-24-02	TP05-25-01
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	26	27	28	29	30

Total Metals

Antimony	T-Sb	-	<10	<10	<10	<10
Arsenic	T-As	-	15.7	341	189	3010
Barium	T-Ba	-	42.6	76.4	73.3	150
Beryllium	T-Be	-	<0.50	<0.50	<0.50	<0.50
Cadmium	T-Cd	-	<0.50	<0.50	<0.50	<0.50
Chromium	T-Cr	-	36.5	38.2	51.4	61.6
Cobalt	T-Co	-	6.6	6.8	11.2	12.6
Copper	T-Cu	-	19.5	26.9	47.3	51.5
Lead	T-Pb	-	<30	<30	<30	49
Mercury	T-Hg	-	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum	T-Mo	-	<4.0	<4.0	<4.0	<4.0
Nickel	T-Ni	-	21.9	22.4	35.0	44.5
Selenium	T-Se	-	<2.0	<2.0	<2.0	<2.0
Silver	T-Ag	-	<2.0	<2.0	<2.0	<2.0
Thallium	T-Tl	-	<1.0	<1.0	<1.0	<1.0
Tin	T-Sn	-	<5.0	<5.0	<5.0	<5.0
Vanadium	T-V	-	25.9	27.3	34.3	42.0
Zinc	T-Zn	-	30.8	39.2	45.2	59.2

Inorganic Parameters

Sulphide	S	-	<1.0	<5.0	<0.20	<5.0
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Non-Halogenated Volatiles

Benzene	<0.040	<0.040	<0.040	<0.040	<0.040
Ethylbenzene	<0.050	<0.050	<0.050	<0.050	<0.050
Toluene	<0.10	0.12	<0.10	<0.10	<0.10
meta- & para-Xylene	0.674	3.29	<0.050	<0.050	<0.050
ortho-Xylene	0.552	2.29	<0.050	<0.050	<0.050
Total Xylenes	1.23	5.58	<0.075	<0.075	<0.075

CCME Hydrocarbon Fractions

F1 (C6-C10)	57	210	73	<10	<10
F1-BTEX	56	204	73	<10	<10
F2 (C10-C16)	775	1750	<30	<30	<30
F3 (C16-C34)	224	449	70	77	72
F4 (C34-C50)	<50	<50	<50	<50	70
F4G-sg	-	-	-	-	-
F4G-SG Required (yes/no)	no	no	no	no	no

Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID TP05-23-03

Sample Date 05-07-19
ALS ID 27

Glycols

Diethylene Glycol	<10
Ethylene Glycol	<10
1,2-Propylene Glycol	<10
Triethylene Glycol	<10

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.40
Acenaphthylene	<0.50
Anthracene	<0.50
Benz(a)anthracene	<0.050
Benzo(a)pyrene	<0.050

Benzo(b)fluoranthene	<0.050
Benzo(g,h,i)perylene	<0.050
Benzo(k)fluoranthene	<0.050
Chrysene	<0.050
Dibenz(a,h)anthracene	<0.050

Fluoranthene	<0.050
Fluorene	<0.50
Indeno(1,2,3-c,d)pyrene	<0.050
Naphthalene	<0.50
Phenanthrene	<0.50

Pyrene	<0.050
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Results are expressed as milligram per dry kilogram unless otherwise noted.
Results are expressed as milligrams per dry kilogram except where noted.
< = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-25-02	TP05-25-03	TP05-26-01	TP05-26-02	TP05-26-03
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	31	32	33	34	35

Physical Tests

Conductivity (dS/m)	-	-	-	-	-
Moisture %	3.58	7.30	10.8	5.14	8.24
pH	-	-	3.39	7.94	-
Sodium Adsorption Ratio (SAR)	-	-	-	-	-
Saturation Percentage %	-	-	-	-	-
TGR (tonnes/hectare)	-	-	-	-	-

Cyanides

Total Cyanide CN	-	<3.0	-	-	<3.0
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Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-25-02	TP05-25-03	TP05-26-01	TP05-26-02	TP05-26-03
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	31	32	33	34	35

Total Metals

Antimony	T-Sb	-	-	<10	<10	-
Arsenic	T-As	-	-	1620	1580	-
Barium	T-Ba	-	-	206	207	-
Beryllium	T-Be	-	-	<0.50	<0.50	-
Cadmium	T-Cd	-	-	<0.50	<0.50	-
Chromium	T-Cr	-	-	72.6	89.3	-
Cobalt	T-Co	-	-	9.7	20.4	-
Copper	T-Cu	-	-	46.0	47.1	-
Lead	T-Pb	-	-	712	<30	-
Mercury	T-Hg	-	-	0.0063	<0.0050	-
Molybdenum	T-Mo	-	-	<4.0	<4.0	-
Nickel	T-Ni	-	-	34.0	63.4	-
Selenium	T-Se	-	-	<2.0	<2.0	-
Silver	T-Ag	-	-	<2.0	<2.0	-
Thallium	T-Tl	-	-	<1.0	<1.0	-
Tin	T-Sn	-	-	<5.0	<5.0	-
Vanadium	T-V	-	-	51.4	59.1	-
Zinc	T-Zn	-	-	61.4	75.2	-

Inorganic Parameters

Sulphide	S	-	-	4.3	<1.0	-
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Non-Halogenated Volatiles

Benzene	<0.040	<0.040	<0.040	<0.040	<0.040
Ethylbenzene	<0.050	<0.050	<0.050	<0.050	<0.050
Toluene	<0.10	<0.10	<0.10	<0.10	<0.10
meta- & para-Xylene	<0.050	0.061	<0.050	<0.050	<0.050
ortho-Xylene	<0.050	0.080	<0.050	<0.050	<0.050
Total Xylenes	<0.075	0.141	<0.075	<0.075	<0.075

CCME Hydrocarbon Fractions

F1 (C6-C10)	<10	19	<10	<10	<10
F1-BTEX	<10	19	<10	<10	<10
F2 (C10-C16)	<30	291	<30	<30	740
F3 (C16-C34)	<50	213	123	101	450
F4 (C34-C50)	<50	<50	<50	<50	<50
F4G-sg	-	-	-	-	-
F4G-SG Required (yes/no)	no	no	no	no	no

Results are expressed as milligram per dry kilogram unless otherwise noted.
Results are expressed as milligrams per dry kilogram except where noted.
< = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID TP05-25-03

Sample Date 05-07-19
ALS ID 32

Glycols

Diethylene Glycol	<10
Ethylene Glycol	<10
1,2-Propylene Glycol	<10
Triethylene Glycol	<10

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.040
Acenaphthylene	<0.050
Anthracene	<0.050
Benz(a)anthracene	<0.050
Benzo(a)pyrene	<0.050

Benzo(b)fluoranthene	<0.050
Benzo(g,h,i)perylene	<0.050
Benzo(k)fluoranthene	<0.050
Chrysene	<0.050
Dibenz(a,h)anthracene	<0.050

Fluoranthene	<0.050
Fluorene	0.100
Indeno(1,2,3-c,d)pyrene	<0.050
Naphthalene	<0.050
Phenanthrene	<0.050

Pyrene	<0.050
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Results are expressed as milligram per dry kilogram unless otherwise noted.
Results are expressed as milligrams per dry kilogram except where noted.
< = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Sediment/Soil

Sample ID	TP05-27-01	TP05-27-02	TP05-28-01	TP05-28-02	TP05-28-03
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	36	37	38	39	40

Physical Tests

Conductivity (dS/m)	-	-	-	-	-
Moisture %	5.65	8.43	6.90	13.1	8.36
pH	7.42	5.75	-	-	-
Sodium Adsorption Ratio (SAR)	-	-	-	-	-
Saturation Percentage %	-	-	-	-	-
TGR (tonnes/hectare)	-	-	-	-	-

Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-27-01	TP05-27-02	TP05-28-01	TP05-28-02	TP05-28-03
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	36	37	38	39	40

Total Metals

Antimony	T-Sb	<10	<10	-	-	-
Arsenic	T-As	1440	14.6	-	-	-
Barium	T-Ba	152	41.4	-	-	-
Beryllium	T-Be	<0.50	<0.50	-	-	-
Cadmium	T-Cd	<0.50	<0.50	-	-	-
Chromium	T-Cr	62.8	25.3	-	-	-
Cobalt	T-Co	13.2	5.0	-	-	-
Copper	T-Cu	33.5	14.0	-	-	-
Lead	T-Pb	<30	<30	-	-	-
Mercury	T-Hg	0.0093	<0.0050	-	-	-
Molybdenum	T-Mo	<4.0	<4.0	-	-	-
Nickel	T-Ni	41.7	13.7	-	-	-
Selenium	T-Se	<2.0	<2.0	-	-	-
Silver	T-Ag	<2.0	<2.0	-	-	-
Thallium	T-Tl	<1.0	<1.0	-	-	-
Tin	T-Sn	<5.0	<5.0	-	-	-
Vanadium	T-V	44.2	21.5	-	-	-
Zinc	T-Zn	64.8	22.8	-	-	-

Inorganic Parameters

Sulphide	S	1.1	<2.0	-	-	-
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Non-Halogenated Volatiles

Benzene	-	-	<0.080	0.49	<0.80
Ethylbenzene	-	-	<0.10	4.62	7.8
Toluene	-	-	<0.20	4.9	8.1
meta- & para-Xylene	-	-	4.77	28.3	49.0
ortho-Xylene	-	-	10.2	18.6	29.4
Total Xylenes	-	-	14.9	46.9	78.4

CCME Hydrocarbon Fractions

F1 (C6-C10)	-	-	1040	1730	2740
F1-BTEX	-	-	1030	1670	2650
F2 (C10-C16)	-	-	5440	8610	9130
F3 (C16-C34)	-	-	1530	2980	2410
F4 (C34-C50)	-	-	<50	<50	<50
F4G-sg	-	-	-	-	-
F4G-SG Required (yes/no)	-	-	no	no	no

Results are expressed as milligram per dry kilogram unless otherwise noted.
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< = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Sediment/Soil

Sample ID TP05-28-03

Sample Date 05-07-19
ALS ID 40

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.80
Acenaphthylene	<1.0
Anthracene	<1.0
Benz(a)anthracene	<0.050
Benzo(a)pyrene	<0.050
Benzo(b)fluoranthene	<0.050
Benzo(g,h,i)perylene	<0.050
Benzo(k)fluoranthene	<0.050
Chrysene	<0.050
Dibenz(a,h)anthracene	<0.050
Fluoranthene	0.096
Fluorene	<1.0
Indeno(1,2,3-c,d)pyrene	<0.050
Naphthalene	8.4
Phenanthrene	<1.0
Pyrene	0.258

Results are expressed as milligram per dry kilogram unless otherwise noted.
Results are expressed as milligrams per dry kilogram except where noted.
< = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-29-01	TP05-29-02	TP05-29-03	TP05-30-01	TP05-30-02
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	41	42	43	44	45

Physical Tests

Conductivity (dS/m)	-	-	-	-	-
Moisture %	4.45	9.93	10.2	4.58	7.49
pH	8.04	-	5.90	5.61	-
Sodium Adsorption Ratio (SAR)	-	-	-	-	-
Saturation Percentage %	-	-	-	-	-
TGR (tonnes/hectare)	-	-	-	-	-

Cyanides

Total Cyanide CN	-	-	-	-	<3.0
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Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-29-01	TP05-29-02	TP05-29-03	TP05-30-01	TP05-30-02
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	41	42	43	44	45

Total Metals

Antimony	T-Sb	<10	-	<10	<10	-
Arsenic	T-As	940	-	14.7	9.9	-
Barium	T-Ba	159	-	41.0	37.4	-
Beryllium	T-Be	<0.50	-	<0.50	<0.50	-
Cadmium	T-Cd	<0.50	-	<0.50	<0.50	-
Chromium	T-Cr	65.3	-	27.8	27.4	-
Cobalt	T-Co	13.7	-	4.6	4.5	-
Copper	T-Cu	34.2	-	11.7	12.9	-
Lead	T-Pb	<30	-	<30	<30	-
Mercury	T-Hg	<0.0050	-	<0.0050	<0.0050	-
Molybdenum	T-Mo	<4.0	-	<4.0	<4.0	-
Nickel	T-Ni	43.4	-	13.7	15.2	-
Selenium	T-Se	<2.0	-	<2.0	<2.0	-
Silver	T-Ag	<2.0	-	<2.0	<2.0	-
Thallium	T-Tl	<1.0	-	<1.0	<1.0	-
Tin	T-Sn	<5.0	-	<5.0	<5.0	-
Vanadium	T-V	44.7	-	27.3	19.9	-
Zinc	T-Zn	64.2	-	23.8	20.9	-

Inorganic Parameters

Sulphide	S	<2.0	-	-	-	-
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Non-Halogenated Volatiles

Benzene	<0.040	<0.040	<0.040	-	-
Ethylbenzene	<0.050	<0.050	0.120	-	-
Toluene	<0.10	<0.10	0.26	-	-
meta- & para-Xylene	0.276	<0.050	0.578	-	-
ortho-Xylene	0.826	0.080	0.283	-	-
Total Xylenes	1.10	0.080	0.861	-	-

CCME Hydrocarbon Fractions

F1 (C6-C10)	52	<10	<10	-	-
F1-BTEX	51	<10	<10	-	-
F2 (C10-C16)	2290	52	<30	<30	<30
F3 (C16-C34)	1170	<50	<50	<50	<50
F4 (C34-C50)	142	<50	<50	<50	<50
F4G-sg	-	-	-	-	-
F4G-SG Required (yes/no)	no	no	no	no	no

Results are expressed as milligram per dry kilogram unless otherwise noted.
Results are expressed as milligrams per dry kilogram except where noted.
< = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-29-03	TP05-30-02
Sample Date	05-07-19	05-07-19
ALS ID	43	45

Glycols

Diethylene Glycol	-	<10
Ethylene Glycol	-	<10
1,2-Propylene Glycol	-	<10
Triethylene Glycol	-	<10

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.040	-
Acenaphthylene	<0.050	-
Anthracene	<0.050	-
Benz(a)anthracene	<0.050	-
Benzo(a)pyrene	<0.050	-
Benzo(b)fluoranthene	<0.050	-
Benzo(g,h,i)perylene	<0.050	-
Benzo(k)fluoranthene	<0.050	-
Chrysene	<0.050	-
Dibenz(a,h)anthracene	<0.050	-
Fluoranthene	<0.050	-
Fluorene	<0.050	-
Indeno(1,2,3-c,d)pyrene	<0.050	-
Naphthalene	<0.050	-
Phenanthrene	<0.050	-
Pyrene	<0.050	-

Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-31-01	TP05-31-02	TP05-31-03	TP05-32-01	TP05-32-02
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	46	47	48	49	50

Physical Tests

Conductivity (dS/m)	-	-	-	-	-
Moisture %	13.2	7.64	7.56	6.07	2.51
pH	7.55	-	-	3.35	-
Sodium Adsorption Ratio (SAR)	-	-	-	-	-
Saturation Percentage %	-	-	-	-	-
TGR (tonnes/hectare)	-	-	-	-	-

Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-31-01	TP05-31-02	TP05-31-03	TP05-32-01	TP05-32-02
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	46	47	48	49	50

Total Metals

Antimony	T-Sb	<10	-	-	<10	-
Arsenic	T-As	81.3	-	-	3700	-
Barium	T-Ba	48.0	-	-	216	-
Beryllium	T-Be	<0.50	-	-	<0.50	-
Cadmium	T-Cd	<0.50	-	-	<0.50	-
Chromium	T-Cr	34.3	-	-	70.0	-
Cobalt	T-Co	6.8	-	-	9.8	-
Copper	T-Cu	16.2	-	-	34.3	-
Lead	T-Pb	<30	-	-	<30	-
Mercury	T-Hg	<0.0050	-	-	<0.0050	-
Molybdenum	T-Mo	<4.0	-	-	<4.0	-
Nickel	T-Ni	21.5	-	-	34.3	-
Selenium	T-Se	<2.0	-	-	<2.0	-
Silver	T-Ag	<2.0	-	-	<2.0	-
Thallium	T-Tl	<1.0	-	-	<1.0	-
Tin	T-Sn	<5.0	-	-	<5.0	-
Vanadium	T-V	23.8	-	-	46.7	-
Zinc	T-Zn	28.8	-	-	49.3	-

Inorganic Parameters

Sulphide	S	-	-	-	<2.0	-
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Non-Halogenated Volatiles

Benzene	-	-	-	<0.040	<0.040
Ethylbenzene	-	-	-	<0.050	<0.050
Toluene	-	-	-	<0.10	<0.10
meta- & para-Xylene	-	-	-	<0.050	<0.050
ortho-Xylene	-	-	-	<0.050	<0.050
Total Xylenes	-	-	-	<0.075	<0.075

CCME Hydrocarbon Fractions

F1 (C6-C10)	-	-	-	<10	<10
F1-BTEX	-	-	-	<10	<10
F2 (C10-C16)	<30	<30	<30	31	33
F3 (C16-C34)	127	<50	58	84	<50
F4 (C34-C50)	61	<50	<50	<50	<50
F4G-sg	-	-	-	-	-
F4G-SG Required (yes/no)	no	no	no	no	no

Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-31-01	TP05-31-02	TP05-31-03	TP05-32-01
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	46	47	48	49

Glycols

Diethylene Glycol	-	-	-	<10
Ethylene Glycol	-	-	-	<10
1,2-Propylene Glycol	-	-	-	<10
Triethylene Glycol	-	-	-	<10

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.040	<0.040	<0.040	-
Acenaphthylene	<0.050	<0.050	<0.050	-
Anthracene	<0.050	<0.050	<0.050	-
Benz(a)anthracene	<0.050	<0.050	<0.050	-
Benzo(a)pyrene	<0.050	<0.050	<0.050	-
Benzo(b)fluoranthene	<0.050	<0.050	<0.050	-
Benzo(g,h,i)perylene	<0.050	<0.050	<0.050	-
Benzo(k)fluoranthene	<0.050	<0.050	<0.050	-
Chrysene	<0.050	<0.050	<0.050	-
Dibenz(a,h)anthracene	<0.050	<0.050	<0.050	-
Fluoranthene	<0.050	<0.050	<0.050	-
Fluorene	<0.050	<0.050	<0.050	-
Indeno(1,2,3-c,d)pyrene	<0.050	<0.050	<0.050	-
Naphthalene	<0.050	<0.050	<0.050	-
Phenanthrene	<0.050	<0.050	<0.050	-
Pyrene	<0.050	<0.050	<0.050	-

Results are expressed as milligram per dry kilogram unless otherwise noted.
Results are expressed as milligrams per dry kilogram except where noted.
< = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-32-03	TP05-33-01	TP05-33-02	TP05-33-03	TP05-34-01
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	51	52	53	54	55

Physical Tests

Conductivity (dS/m)	-	-	-	-	-
Moisture %	6.76	5.22	7.47	9.48	6.33
pH	6.92	-	-	-	3.31
Sodium Adsorption Ratio (SAR)	-	-	-	-	-
Saturation Percentage %	-	-	-	-	-
TGR (tonnes/hectare)	-	-	-	-	-

Cyanides

Total Cyanide CN	-	-	-	<3.0	-
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Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-32-03	TP05-33-01	TP05-33-02	TP05-33-03	TP05-34-01
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	51	52	53	54	55

Total Metals

Antimony	T-Sb	<10	-	-	-	<10
Arsenic	T-As	339	-	-	-	1120
Barium	T-Ba	71.4	-	-	-	181
Beryllium	T-Be	<0.50	-	-	-	<0.50
Cadmium	T-Cd	<0.50	-	-	-	<0.50
Chromium	T-Cr	42.8	-	-	-	82.6
Cobalt	T-Co	8.8	-	-	-	8.2
Copper	T-Cu	20.3	-	-	-	34.3
Lead	T-Pb	<30	-	-	-	<30
Mercury	T-Hg	<0.0050	-	-	-	<0.0050
Molybdenum	T-Mo	<4.0	-	-	-	<4.0
Nickel	T-Ni	29.5	-	-	-	34.1
Selenium	T-Se	<2.0	-	-	-	<2.0
Silver	T-Ag	<2.0	-	-	-	<2.0
Thallium	T-Tl	<1.0	-	-	-	<1.0
Tin	T-Sn	<5.0	-	-	-	<5.0
Vanadium	T-V	27.6	-	-	-	49.9
Zinc	T-Zn	42.9	-	-	-	54.0

Inorganic Parameters

Sulphide	S	<2.0	-	-	-	<5.0
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Non-Halogenated Volatiles

Benzene	<0.040	<0.040	<0.040	<0.20	-
Ethylbenzene	<0.050	<0.050	0.242	3.86	-
Toluene	<0.10	<0.10	0.35	2.66	-
meta- & para-Xylene	0.221	0.070	11.1	19.4	-
ortho-Xylene	0.261	0.231	12.9	11.7	-
Total Xylenes	0.482	0.301	24.0	31.2	-

CCME Hydrocarbon Fractions

F1 (C6-C10)	11	26	470	1010	-
F1-BTEX	11	26	445	977	-
F2 (C10-C16)	2590	2590	7030	6220	-
F3 (C16-C34)	1870	1870	1380	1120	-
F4 (C34-C50)	437	437	<50	<50	-
F4G-sg	-	-	-	-	-
F4G-SG Required (yes/no)	no	no	no	no	-

Results are expressed as milligram per dry kilogram unless otherwise noted.
Results are expressed as milligrams per dry kilogram except where noted.
< = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-32-03	TP05-33-03
Sample Date	05-07-19	05-07-19
ALS ID	51	54

Glycols

Diethylene Glycol	<10	<10
Ethylene Glycol	<10	<10
1,2-Propylene Glycol	<10	<10
Triethylene Glycol	<10	<10

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.40	<0.75
Acenaphthylene	<0.50	<0.50
Anthracene	<0.50	<0.50
Benz(a)anthracene	<0.050	<0.050
Benzo(a)pyrene	<0.050	<0.050
Benzo(b)fluoranthene	<0.050	<0.050
Benzo(g,h,i)perylene	<0.050	<0.050
Benzo(k)fluoranthene	<0.050	<0.050
Chrysene	<0.050	<0.050
Dibenz(a,h)anthracene	<0.050	<0.050
Fluoranthene	<0.050	<0.050
Fluorene	<0.50	<1.9
Indeno(1,2,3-c,d)pyrene	<0.050	<0.050
Naphthalene	<0.50	6.91
Phenanthrene	<0.50	1.36
Pyrene	<0.050	<0.050

Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Sediment/Soil

Sample ID	TP05-34-02	TP05-34-03	TP05-35-01	TP05-35-02	TP05-35-03
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	56	57	58	59	60

Physical Tests

Conductivity (dS/m)	-	-	-	-	-
Moisture %	6.26	-	5.55	2.52	11.6
pH	6.66	5.01	8.27	-	-
Sodium Adsorption Ratio (SAR)	-	-	-	-	-
Saturation Percentage %	-	-	-	-	-
TGR (tonnes/hectare)	-	-	-	-	-

Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-34-02	TP05-34-03	TP05-35-01	TP05-35-02	TP05-35-03
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	56	57	58	59	60

Total Metals

Antimony	T-Sb	<10	<10	<10	-	-
Arsenic	T-As	882	29.8	359	-	-
Barium	T-Ba	214	35.8	129	-	-
Beryllium	T-Be	<0.50	<0.50	<0.50	-	-
Cadmium	T-Cd	<0.50	<0.50	<0.50	-	-
Chromium	T-Cr	78.0	22.6	80.7	-	-
Cobalt	T-Co	23.5	4.4	20.6	-	-
Copper	T-Cu	40.5	11.0	49.2	-	-
Lead	T-Pb	92	<30	<30	-	-
Mercury	T-Hg	<0.0050	<0.0050	<0.0050	-	-
Molybdenum	T-Mo	<4.0	<4.0	<4.0	-	-
Nickel	T-Ni	63.8	12.3	58.8	-	-
Selenium	T-Se	<2.0	<2.0	<2.0	-	-
Silver	T-Ag	<2.0	<2.0	<2.0	-	-
Thallium	T-Tl	<1.0	<1.0	<1.0	-	-
Tin	T-Sn	<5.0	<5.0	<5.0	-	-
Vanadium	T-V	49.6	19.0	47.2	-	-
Zinc	T-Zn	77.3	19.9	76.4	-	-

Inorganic Parameters

Sulphide	S	<2.0	-	0.76	-	-
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Non-Halogenated Volatiles

Benzene	-	-	-	-	<0.040
Ethylbenzene	-	-	-	-	<0.050
Toluene	-	-	-	-	<0.10
meta- & para-Xylene	-	-	-	-	0.071
ortho-Xylene	-	-	-	-	<0.050
Total Xylenes	-	-	-	-	<0.075

CCME Hydrocarbon Fractions

F1 (C6-C10)	-	-	-	-	<10
F1-BTEX	-	-	-	-	<10
F2 (C10-C16)	-	-	<30	<30	<30
F3 (C16-C34)	-	-	87	<50	<50
F4 (C34-C50)	-	-	<50	<50	<50
F4G-sg	-	-	-	-	-
F4G-SG Required (yes/no)	-	-	no	no	no

Results are expressed as milligram per dry kilogram unless otherwise noted.

Results are expressed as milligrams per dry kilogram except where noted.

< = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-36-01	TP05-36-02	TP05-36-03	TP05-37-01	TP05-38-01
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	61	62	63	64	65

Physical Tests

Conductivity (dS/m)	-	-	-	-	-
Moisture %	2.93	12.6	9.99	8.95	6.06
pH	6.13	-	-	5.37	5.84
Sodium Adsorption Ratio (SAR)	-	-	-	-	-
Saturation Percentage %	-	-	-	-	-
TGR (tonnes/hectare)	-	-	-	-	-

Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Sediment/Soil

Sample ID	TP05-36-01	TP05-36-02	TP05-36-03	TP05-37-01	TP05-38-01
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	61	62	63	64	65

Total Metals

Antimony	T-Sb	<10	-	-	<10	<10
Arsenic	T-As	9.0	-	-	6.4	12.5
Barium	T-Ba	32.5	-	-	41.9	32.4
Beryllium	T-Be	<0.50	-	-	<0.50	<0.50
Cadmium	T-Cd	<0.50	-	-	<0.50	<0.50
Chromium	T-Cr	29.2	-	-	25.4	27.2
Cobalt	T-Co	4.7	-	-	4.3	5.2
Copper	T-Cu	11.9	-	-	13.6	13.2
Lead	T-Pb	<30	-	-	<30	<30
Mercury	T-Hg	<0.0050	-	-	<0.0050	<0.0050
Molybdenum	T-Mo	<4.0	-	-	<4.0	<4.0
Nickel	T-Ni	16.8	-	-	13.2	14.3
Selenium	T-Se	<2.0	-	-	<2.0	<2.0
Silver	T-Ag	<2.0	-	-	<2.0	<2.0
Thallium	T-Tl	<1.0	-	-	<1.0	<1.0
Tin	T-Sn	<5.0	-	-	<5.0	<5.0
Vanadium	T-V	20.6	-	-	22.1	21.1
Zinc	T-Zn	22.0	-	-	22.7	20.0

Non-Halogenated Volatiles

Benzene	<0.040	<0.040	<0.20	<0.040	-
Ethylbenzene	<0.050	<0.050	2.46	<0.050	-
Toluene	<0.10	<0.10	1.63	<0.10	-
meta- & para-Xylene	0.081	1.85	17.3	<0.050	-
ortho-Xylene	0.067	1.83	13.7	<0.050	-
Total Xylenes	0.148	3.68	30.9	<0.075	-

CCME Hydrocarbon Fractions

F1 (C6-C10)	272	401	1390	<10	-
F1-BTEX	272	398	1360	<10	-
F2 (C10-C16)	2780	4770	8790	33	34
F3 (C16-C34)	638	1480	3320	<50	160
F4 (C34-C50)	<50	<50	<50	<50	<50
F4G-sg	-	-	-	-	-
F4G-SG Required (yes/no)	no	no	no	no	no

Results are expressed as milligram per dry kilogram unless otherwise noted.
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 < = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Sediment/Soil

Sample ID TP05-36-03

Sample Date 05-07-19
ALS ID 63

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<1.5
Acenaphthylene	<0.50
Anthracene	<0.50
Benz(a)anthracene	<0.50
Benzo(a)pyrene	<0.050
Benzo(b)fluoranthene	<0.050
Benzo(g,h,i)perylene	<0.050
Benzo(k)fluoranthene	<0.050
Chrysene	<0.50
Dibenz(a,h)anthracene	<0.050
Fluoranthene	<0.50
Fluorene	<3.1
Indeno(1,2,3-c,d)pyrene	<0.050
Naphthalene	<5.9
Phenanthrene	1.54
Pyrene	<0.50

Results are expressed as milligram per dry kilogram unless otherwise noted.
Results are expressed as milligrams per dry kilogram except where noted.
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**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-38-02	TP05-39-01	TP05-39-02	TP05-40-01	TP05-40-02
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	66	67	68	69	70

Physical Tests

Conductivity (dS/m)	-	-	-	-	-
Moisture %	3.19	4.88	5.09	3.84	3.03
pH	-	3.36	7.79	5.93	7.04
Sodium Adsorption Ratio (SAR)	-	-	-	-	-
Saturation Percentage %	-	-	-	-	-
TGR (tonnes/hectare)	-	-	-	-	-

Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-38-02	TP05-39-01	TP05-39-02	TP05-40-01	TP05-40-02
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	66	67	68	69	70

Total Metals

Antimony	T-Sb	-	<10	<10	<10	<10
Arsenic	T-As	-	1250	372	680	10.8
Barium	T-Ba	-	188	558	141	41.3
Beryllium	T-Be	-	<0.50	<0.50	<0.50	<0.50
Cadmium	T-Cd	-	<0.50	<0.50	<0.50	<0.50
Chromium	T-Cr	-	71.6	94.3	64.5	32.7
Cobalt	T-Co	-	8.8	24.0	12.0	5.8
Copper	T-Cu	-	31.1	49.2	27.7	15.2
Lead	T-Pb	-	<30	<30	<30	<30
Mercury	T-Hg	-	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum	T-Mo	-	<4.0	<4.0	<4.0	<4.0
Nickel	T-Ni	-	32.2	62.6	39.0	17.5
Selenium	T-Se	-	<2.0	<2.0	<2.0	<2.0
Silver	T-Ag	-	<2.0	<2.0	<2.0	<2.0
Thallium	T-Tl	-	<1.0	<1.0	<1.0	<1.0
Tin	T-Sn	-	<5.0	<5.0	<5.0	<5.0
Vanadium	T-V	-	48.3	64.4	41.5	24.5
Zinc	T-Zn	-	50.6	79.5	48.3	27.1

Inorganic Parameters

Sulphide	S	-	<5.0	0.71	<2.0	-
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Non-Halogenated Volatiles

Benzene	<0.040	-	<0.040	-	-
Ethylbenzene	<0.050	-	<0.050	-	-
Toluene	<0.10	-	<0.10	-	-
meta- & para-Xylene	<0.050	-	<0.050	-	-
ortho-Xylene	<0.050	-	<0.050	-	-
Total Xylenes	<0.075	-	<0.075	-	-

CCME Hydrocarbon Fractions

F1 (C6-C10)	<10	-	<10	-	-
F1-BTEX	<10	-	<10	-	-
F2 (C10-C16)	<30	<30	<30	<30	<30
F3 (C16-C34)	<50	111	162	125	<50
F4 (C34-C50)	<50	<50	<50	<50	<50
F4G-sg	-	-	-	-	-
F4G-SG Required (yes/no)	no	no	no	no	no

Results are expressed as milligram per dry kilogram unless otherwise noted.
Results are expressed as milligrams per dry kilogram except where noted.
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**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID TP05-38-02

Sample Date 05-07-19
ALS ID 66

Glycols

Diethylene Glycol	<10
Ethylene Glycol	<10
1,2-Propylene Glycol	<10
Triethylene Glycol	<10

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.040
Acenaphthylene	<0.050
Anthracene	<0.050
Benz(a)anthracene	<0.050
Benzo(a)pyrene	<0.050

Benzo(b)fluoranthene	<0.050
Benzo(g,h,i)perylene	<0.050
Benzo(k)fluoranthene	<0.050
Chrysene	<0.050
Dibenz(a,h)anthracene	<0.050

Fluoranthene	<0.050
Fluorene	<0.050
Indeno(1,2,3-c,d)pyrene	<0.050
Naphthalene	<0.050
Phenanthrene	<0.050

Pyrene	<0.050
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Results are expressed as milligram per dry kilogram unless otherwise noted.
Results are expressed as milligrams per dry kilogram except where noted.
< = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Sediment/Soil

Sample ID	TP05-40-03	TP05-41-01	TP05-42-01	TP05-42-02	TP05-43-01
Sample Date	05-07-19	05-07-19	05-07-19	05-07-21	05-07-21
ALS ID	71	72	73	74	75

Physical Tests

Conductivity (dS/m)	-	0.784	-	-	-
Moisture %	10.7	<0.10	7.95	5.36	5.58
pH	-	7.80	5.93	4.81	7.32
Sodium Adsorption Ratio (SAR)	-	1.25	-	-	-
Saturation Percentage %	-	99.6	-	-	-
TGR (tonnes/hectare)	-	<0.10	-	-	-

Saturated Paste Extractables

Calcium Ca	-	85.8	-	-	-
Chloride Cl	-	57.8	-	-	-
Magnesium Mg	-	10.9	-	-	-
Potassium K	-	40	-	-	-
Sodium Na	-	46	-	-	-
Sulphate SO4	-	229	-	-	-

Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-40-03	TP05-41-01	TP05-42-01	TP05-42-02	TP05-43-01
Sample Date	05-07-19	05-07-19	05-07-19	05-07-21	05-07-21
ALS ID	71	72	73	74	75

Total Metals

Antimony	T-Sb	-	<10	<10	<10	<10
Arsenic	T-As	-	915	1150	9.0	1370
Barium	T-Ba	-	189	146	34.2	217
Beryllium	T-Be	-	<0.50	<0.50	<0.50	<0.50
Cadmium	T-Cd	-	<0.50	<0.50	<0.50	<0.50
Chromium	T-Cr	-	76.7	67.8	24.9	71.5
Cobalt	T-Co	-	19.0	15.3	4.3	16.7
Copper	T-Cu	-	47.4	37.8	13.5	36.8
Lead	T-Pb	-	<30	<30	<30	<30
Mercury	T-Hg	-	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum	T-Mo	-	<4.0	<4.0	<4.0	<4.0
Nickel	T-Ni	-	61.4	46.2	13.7	49.8
Selenium	T-Se	-	<2.0	<2.0	<2.0	<2.0
Silver	T-Ag	-	<2.0	<2.0	<2.0	<2.0
Thallium	T-Tl	-	<1.0	<1.0	<1.0	<1.0
Tin	T-Sn	-	<5.0	<5.0	<5.0	8.8
Vanadium	T-V	-	55.8	45.5	24.4	45.8
Zinc	T-Zn	-	53.9	57.1	21.7	60.6

Inorganic Parameters

Sulphide	S	-	<2.0	<5.0	-	2.9
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Non-Halogenated Volatiles

Benzene	<0.040	-	<0.040	<0.040	<0.040
Ethylbenzene	<0.050	-	<0.050	<0.050	<0.050
Toluene	<0.10	-	<0.10	<0.10	<0.10
meta- & para-Xylene	<0.050	-	<0.050	<0.050	<0.050
ortho-Xylene	<0.050	-	<0.050	<0.050	<0.050
Total Xylenes	<0.075	-	<0.075	<0.075	<0.075

CCME Hydrocarbon Fractions

F1 (C6-C10)	<10	-	<10	<10	<10
F1-BTEX	<10	-	<10	<10	<10
F2 (C10-C16)	<30	-	65	<30	<30
F3 (C16-C34)	<50	-	137	<50	157
F4 (C34-C50)	<50	-	<50	<50	60
F4G-sg	-	-	-	-	-
F4G-SG Required (yes/no)	no	-	no	no	no

Results are expressed as milligram per dry kilogram unless otherwise noted.

Results are expressed as milligrams per dry kilogram except where noted.

< = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-43-02	TP05-44-01	TP05-44-02	TP05-45-01	TP05-45-02
Sample Date	05-07-21	05-07-21	05-07-21	05-07-21	05-07-21
ALS ID	76	77	78	79	80

Physical Tests

Conductivity (dS/m)	-	-	-	-	-
Moisture %	10.1	9.08	10.2	4.98	3.10
pH	5.61	6.60	5.75	7.97	8.11
Sodium Adsorption Ratio (SAR)	-	-	-	-	-
Saturation Percentage %	-	-	-	-	-
TGR (tonnes/hectare)	-	-	-	-	-

Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-43-02	TP05-44-01	TP05-44-02	TP05-45-01	TP05-45-02
Sample Date	05-07-21	05-07-21	05-07-21	05-07-21	05-07-21
ALS ID	76	77	78	79	80

Total Metals

Antimony	T-Sb	<10	<10	<10	<10	<10
Arsenic	T-As	26.2	17.2	7.8	1150	177
Barium	T-Ba	28.7	42.5	32.1	223	174
Beryllium	T-Be	<0.50	<0.50	<0.50	<0.50	<0.50
Cadmium	T-Cd	<0.50	<0.50	<0.50	<0.50	<0.50
Chromium	T-Cr	24.9	48.3	27.4	80.3	70.8
Cobalt	T-Co	4.4	9.8	5.1	18.3	16.7
Copper	T-Cu	15.1	26.5	18.3	59.4	53.7
Lead	T-Pb	<30	<30	<30	<30	<30
Mercury	T-Hg	<0.0050	<0.0050	0.0081	<0.0050	<0.0050
Molybdenum	T-Mo	<4.0	<4.0	<4.0	<4.0	<4.0
Nickel	T-Ni	14.9	33.8	15.4	56.8	51.6
Selenium	T-Se	<2.0	<2.0	<2.0	<2.0	<2.0
Silver	T-Ag	<2.0	<2.0	<2.0	<2.0	<2.0
Thallium	T-Tl	<1.0	<1.0	<1.0	<1.0	<1.0
Tin	T-Sn	<5.0	<5.0	<5.0	<5.0	<5.0
Vanadium	T-V	18.7	28.3	25.0	58.6	51.4
Zinc	T-Zn	22.6	36.5	22.4	67.0	56.7

Inorganic Parameters

Sulphide	S	-	-	-	0.94	<0.50
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Non-Halogenated Volatiles

Benzene	<0.040	<0.040	<0.040	<0.040	<0.040
Ethylbenzene	<0.050	<0.050	<0.050	<0.050	<0.050
Toluene	<0.10	<0.10	<0.10	<0.10	<0.10
meta- & para-Xylene	<0.050	<0.050	<0.050	<0.050	<0.050
ortho-Xylene	<0.050	<0.050	<0.050	<0.050	<0.050
Total Xylenes	<0.075	<0.075	<0.075	<0.075	<0.075

CCME Hydrocarbon Fractions

F1 (C6-C10)	<10	<10	<10	161	173
F1-BTEX	<10	<10	<10	161	173
F2 (C10-C16)	<30	<30	30	4070	5310
F3 (C16-C34)	139	<50	<50	1060	2180
F4 (C34-C50)	<50	<50	<50	53	163
F4G-sg	-	-	-	-	-
F4G-SG Required (yes/no)	no	no	no	no	yes

Results are expressed as milligram per dry kilogram unless otherwise noted.
Results are expressed as milligrams per dry kilogram except where noted.
< = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-43-02	TP05-45-02
Sample Date	05-07-21	05-07-21
ALS ID	76	80

Glycols

Diethylene Glycol	<10	<10
Ethylene Glycol	<10	<10
1,2-Propylene Glycol	<10	<10
Triethylene Glycol	<10	<10

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.040	<0.40
Acenaphthylene	<0.050	<0.50
Anthracene	<0.050	<0.50
Benz(a)anthracene	<0.050	<0.050
Benzo(a)pyrene	<0.050	<0.050
Benzo(b)fluoranthene	<0.050	<0.050
Benzo(g,h,i)perylene	<0.050	<0.050
Benzo(k)fluoranthene	<0.050	<0.050
Chrysene	<0.050	<0.050
Dibenz(a,h)anthracene	<0.050	<0.050
Fluoranthene	<0.050	<0.050
Fluorene	<0.050	<0.50
Indeno(1,2,3-c,d)pyrene	<0.050	<0.050
Naphthalene	<0.050	<0.50
Phenanthrene	<0.050	<0.50
Pyrene	<0.050	<0.050

Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-46-01	TP05-46-02	TP05-47-01	TP05-48-01	TP05-49-01
Sample Date	05-07-21	05-07-21	05-07-21	05-07-21	05-07-21
ALS ID	81	82	83	84	85

Physical Tests

Conductivity (dS/m)	-	-	-	-	-
Moisture %	6.52	8.52	7.99	5.78	0.14
pH	3.97	5.04	7.14	6.61	3.53
Sodium Adsorption Ratio (SAR)	-	-	-	-	-
Saturation Percentage %	-	-	-	-	-
TGR (tonnes/hectare)	-	-	-	-	-

Cyanides

Total Cyanide CN	-	-	<3.0	-	-
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Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-46-01	TP05-46-02	TP05-47-01	TP05-48-01	TP05-49-01
Sample Date	05-07-21	05-07-21	05-07-21	05-07-21	05-07-21
ALS ID	81	82	83	84	85

Total Metals

Antimony	T-Sb	<10	<10	<10	<10	<10
Arsenic	T-As	1010	12.2	1790	60.9	4770
Barium	T-Ba	112	38.7	115	44.1	168
Beryllium	T-Be	<0.50	<0.50	<0.50	<0.50	<0.50
Cadmium	T-Cd	<0.50	<0.50	<0.50	<0.50	<0.50
Chromium	T-Cr	36.0	27.5	67.5	27.1	62.1
Cobalt	T-Co	5.1	4.7	16.2	5.5	10.4
Copper	T-Cu	36.4	14.1	62.9	14.2	39.6
Lead	T-Pb	<30	<30	<30	<30	<30
Mercury	T-Hg	0.0079	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum	T-Mo	<4.0	<4.0	<4.0	<4.0	<4.0
Nickel	T-Ni	16.1	14.7	52.9	16.5	36.2
Selenium	T-Se	<2.0	<2.0	<2.0	<2.0	<2.0
Silver	T-Ag	<2.0	<2.0	<2.0	<2.0	<2.0
Thallium	T-Tl	<1.0	<1.0	<1.0	<1.0	<1.0
Tin	T-Sn	<5.0	<5.0	<5.0	<5.0	<5.0
Vanadium	T-V	23.8	24.4	45.6	23.1	45.8
Zinc	T-Zn	36.0	24.3	67.9	26.7	47.9

Inorganic Parameters

Sulphide	S	<10	1.3	<2.0	<5.0	<10
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Non-Halogenated Volatiles

Benzene	-	<0.040	<0.040	-	-
Ethylbenzene	-	<0.050	<0.050	-	-
Toluene	-	<0.10	<0.10	-	-
meta- & para-Xylene	-	<0.050	<0.050	-	-
ortho-Xylene	-	<0.050	<0.050	-	-
Total Xylenes	-	<0.075	<0.075	-	-

CCME Hydrocarbon Fractions

F1 (C6-C10)	-	<10	<10	-	-
F1-BTEX	-	<10	<10	-	-
F2 (C10-C16)	136	50	139	-	-
F3 (C16-C34)	212	<50	621	-	-
F4 (C34-C50)	<50	<50	121	-	-
F4G-sg	-	-	-	-	-
F4G-SG Required (yes/no)	no	no	yes	-	-

Results are expressed as milligram per dry kilogram unless otherwise noted.

Results are expressed as milligrams per dry kilogram except where noted.

< = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-46-01	TP05-46-02	TP05-47-01
Sample Date	05-07-21	05-07-21	05-07-21
ALS ID	81	82	83

Glycols

Diethylene Glycol	-	<10	<10
Ethylene Glycol	-	<10	<10
1,2-Propylene Glycol	-	<10	<10
Triethylene Glycol	-	<10	<10

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.040	-	<0.040
Acenaphthylene	<0.050	-	<0.050
Anthracene	<0.050	-	<0.050
Benz(a)anthracene	<0.050	-	<0.050
Benzo(a)pyrene	<0.050	-	<0.050
Benzo(b)fluoranthene	<0.050	-	<0.050
Benzo(g,h,i)perylene	<0.050	-	<0.050
Benzo(k)fluoranthene	<0.050	-	<0.050
Chrysene	<0.050	-	<0.050
Dibenz(a,h)anthracene	<0.050	-	<0.050
Fluoranthene	<0.050	-	<0.050
Fluorene	<0.050	-	<0.050
Indeno(1,2,3-c,d)pyrene	<0.050	-	<0.050
Naphthalene	<0.050	-	<0.050
Phenanthrene	<0.050	-	<0.050
Pyrene	<0.050	-	<0.050

Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-49-02	TP05-50-01	TP05-51-01	TP05-52-01	TP05-53-01
Sample Date	05-07-21	05-07-21	05-07-21	05-07-21	05-07-21
ALS ID	86	87	88	89	90

Physical Tests

Conductivity (dS/m)	-	-	-	-	-
Moisture %	7.52	14.6	7.92	<0.10	6.46
pH	7.28	-	4.58	3.18	-
Sodium Adsorption Ratio (SAR)	-	-	-	-	-
Saturation Percentage %	-	-	-	-	-
TGR (tonnes/hectare)	-	-	-	-	-

Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-49-02	TP05-50-01	TP05-51-01	TP05-52-01	TP05-53-01
Sample Date	05-07-21	05-07-21	05-07-21	05-07-21	05-07-21
ALS ID	86	87	88	89	90

Total Metals

Antimony	T-Sb	<10	-	<10	<10	-
Arsenic	T-As	8900	-	8.8	1090	-
Barium	T-Ba	50.5	-	38.2	149	-
Beryllium	T-Be	<0.50	-	<0.50	<0.50	-
Cadmium	T-Cd	<0.50	-	<0.50	<0.50	-
Chromium	T-Cr	30.8	-	28.5	55.7	-
Cobalt	T-Co	8.3	-	4.3	8.4	-
Copper	T-Cu	44.9	-	15.3	33.7	-
Lead	T-Pb	<30	-	<30	<30	-
Mercury	T-Hg	<0.0050	-	0.0084	<0.0050	-
Molybdenum	T-Mo	<4.0	-	<4.0	<4.0	-
Nickel	T-Ni	25.7	-	16.3	29.5	-
Selenium	T-Se	<2.0	-	<2.0	<2.0	-
Silver	T-Ag	<2.0	-	<2.0	<2.0	-
Thallium	T-Tl	<1.0	-	<1.0	<1.0	-
Tin	T-Sn	<5.0	-	<5.0	<5.0	-
Vanadium	T-V	20.8	-	24.7	41.5	-
Zinc	T-Zn	26.4	-	22.4	44.6	-

Inorganic Parameters

Sulphide	S	4.3	-	<10	<5.0	-
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Non-Halogenated Volatiles

Benzene	-	<0.040	<0.040	-	<0.040
Ethylbenzene	-	<0.050	<0.050	-	<0.050
Toluene	-	<0.10	<0.10	-	<0.10
meta- & para-Xylene	-	<0.050	<0.050	-	<0.050
ortho-Xylene	-	<0.050	<0.050	-	<0.050
Total Xylenes	-	<0.075	<0.075	-	<0.075

CCME Hydrocarbon Fractions

F1 (C6-C10)	-	<10	<10	-	133
F1-BTEX	-	<10	<10	-	133
F2 (C10-C16)	-	32	61	-	2480
F3 (C16-C34)	-	<50	233	-	497
F4 (C34-C50)	-	<50	159	-	<50
F4G-sg	-	-	-	-	-
F4G-SG Required (yes/no)	-	no	no	-	no

Results are expressed as milligram per dry kilogram unless otherwise noted.
Results are expressed as milligrams per dry kilogram except where noted.
< = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Sediment/Soil

Sample ID TP05-53-01

Sample Date 05-07-21
ALS ID 90

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.40
Acenaphthylene	<0.50
Anthracene	<0.50
Benz(a)anthracene	<0.050
Benzo(a)pyrene	<0.050
Benzo(b)fluoranthene	<0.050
Benzo(g,h,i)perylene	<0.050
Benzo(k)fluoranthene	<0.050
Chrysene	<0.050
Dibenz(a,h)anthracene	<0.050
Fluoranthene	<0.050
Fluorene	<0.50
Indeno(1,2,3-c,d)pyrene	<0.050
Naphthalene	<0.50
Phenanthrene	<0.50
Pyrene	<0.050

Results are expressed as milligram per dry kilogram unless otherwise noted.
Results are expressed as milligrams per dry kilogram except where noted.
< = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-54-01	TP05-54-02	TP05-55-01	TP05-55-02	TP05-56-01
Sample Date	05-07-21	05-07-21	05-07-21	05-07-21	05-07-21
ALS ID	91	92	93	94	95

Physical Tests

Conductivity (dS/m)	-	-	-	-	-
Moisture %	0.12	<0.10	4.47	9.64	0.38
pH	2.71	3.05	6.26	-	2.70
Sodium Adsorption Ratio (SAR)	-	-	-	-	-
Saturation Percentage %	-	-	-	-	-
TGR (tonnes/hectare)	-	-	-	-	-

Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-54-01	TP05-54-02	TP05-55-01	TP05-55-02	TP05-56-01
Sample Date	05-07-21	05-07-21	05-07-21	05-07-21	05-07-21
ALS ID	91	92	93	94	95

Total Metals

Antimony	T-Sb	<10	<10	<10	-	<10
Arsenic	T-As	1950	910	<5.0	-	9040
Barium	T-Ba	215	130	38.2	-	109
Beryllium	T-Be	<0.50	<0.50	<0.50	-	<0.50
Cadmium	T-Cd	<0.50	<0.50	<0.50	-	<0.50
Chromium	T-Cr	73.6	60.0	28.1	-	47.1
Cobalt	T-Co	8.5	7.8	4.3	-	4.7
Copper	T-Cu	29.1	35.1	13.4	-	109
Lead	T-Pb	<30	<30	<30	-	<30
Mercury	T-Hg	<0.0050	<0.0050	<0.0050	-	0.0057
Molybdenum	T-Mo	<4.0	<4.0	<4.0	-	<4.0
Nickel	T-Ni	30.4	27.9	15.8	-	17.2
Selenium	T-Se	<2.0	<2.0	<2.0	-	<2.0
Silver	T-Ag	<2.0	<2.0	<2.0	-	<2.0
Thallium	T-Tl	<1.0	<1.0	<1.0	-	<1.0
Tin	T-Sn	<5.0	<5.0	<5.0	-	<5.0
Vanadium	T-V	53.7	42.6	21.8	-	31.6
Zinc	T-Zn	49.0	44.2	22.0	-	32.8

Inorganic Parameters

Sulphide	S	10	<10	-	-	<10
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Non-Halogenated Volatiles

Benzene	-	-	<0.040	<0.040	-
Ethylbenzene	-	-	<0.050	<0.050	-
Toluene	-	-	<0.10	<0.10	-
meta- & para-Xylene	-	-	0.081	0.072	-
ortho-Xylene	-	-	0.127	0.105	-
Total Xylenes	-	-	0.207	0.177	-

CCME Hydrocarbon Fractions

F1 (C6-C10)	-	-	180	372	-
F1-BTEX	-	-	179	371	-
F2 (C10-C16)	-	-	2900	2700	-
F3 (C16-C34)	-	-	486	513	-
F4 (C34-C50)	-	-	<50	<50	-
F4G-sg	-	-	-	-	-
F4G-SG Required (yes/no)	-	-	no	no	-

Results are expressed as milligram per dry kilogram unless otherwise noted.

Results are expressed as milligrams per dry kilogram except where noted.

< = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Sediment/Soil

Sample ID TP05-55-02

Sample Date 05-07-21
ALS ID 94

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.40
Acenaphthylene	<0.50
Anthracene	<0.50
Benz(a)anthracene	<0.050
Benzo(a)pyrene	<0.050
Benzo(b)fluoranthene	<0.050
Benzo(g,h,i)perylene	<0.050
Benzo(k)fluoranthene	<0.050
Chrysene	<0.050
Dibenz(a,h)anthracene	<0.050
Fluoranthene	0.056
Fluorene	<0.86
Indeno(1,2,3-c,d)pyrene	<0.050
Naphthalene	<0.81
Phenanthrene	0.84
Pyrene	<0.050

Results are expressed as milligram per dry kilogram unless otherwise noted.
Results are expressed as milligrams per dry kilogram except where noted.
< = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-56-02	TP05-56-03	TP05-57-01	TP05-57-02	TP05-58-01
Sample Date	05-07-21	05-07-21	05-07-21	05-07-21	05-07-21
ALS ID	96	97	98	99	100

Physical Tests

Conductivity (dS/m)	-	-	-	-	-
Moisture %	7.52	6.09	0.18	0.11	3.04
pH	3.16	4.50	2.70	5.09	-
Sodium Adsorption Ratio (SAR)	-	-	-	-	-
Saturation Percentage %	-	-	-	-	-
TGR (tonnes/hectare)	-	-	-	-	-

Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-56-02	TP05-56-03	TP05-57-01	TP05-57-02	TP05-58-01
Sample Date	05-07-21	05-07-21	05-07-21	05-07-21	05-07-21
ALS ID	96	97	98	99	100

Total Metals

Antimony	T-Sb	<10	<10	<10	<10	-
Arsenic	T-As	850	710	4090	2940	-
Barium	T-Ba	48.0	199	193	237	-
Beryllium	T-Be	<0.50	<0.50	<0.50	<0.50	-
Cadmium	T-Cd	<0.50	<0.50	<0.50	<0.50	-
Chromium	T-Cr	27.6	83.1	65.3	74.2	-
Cobalt	T-Co	4.2	16.8	9.5	17.6	-
Copper	T-Cu	17.4	55.4	42.9	46.5	-
Lead	T-Pb	<30	<30	<30	<30	-
Mercury	T-Hg	<0.0050	<0.0050	<0.0050	0.0141	-
Molybdenum	T-Mo	<4.0	<4.0	<4.0	<4.0	-
Nickel	T-Ni	15.2	58.7	33.1	55.5	-
Selenium	T-Se	<2.0	<2.0	<2.0	<2.0	-
Silver	T-Ag	<2.0	<2.0	<2.0	<2.0	-
Thallium	T-Tl	<1.0	<1.0	<1.0	<1.0	-
Tin	T-Sn	<5.0	<5.0	<5.0	<5.0	-
Vanadium	T-V	22.0	60.1	52.7	56.5	-
Zinc	T-Zn	22.7	79.7	48.2	72.3	-

Inorganic Parameters

Sulphide	S	<2.0	0.54	<2.0	2.0	-
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Non-Halogenated Volatiles

Benzene	-	<0.040	-	-	<0.040
Ethylbenzene	-	<0.050	-	-	<0.050
Toluene	-	<0.10	-	-	<0.10
meta- & para-Xylene	-	<0.050	-	-	<0.050
ortho-Xylene	-	<0.050	-	-	<0.050
Total Xylenes	-	<0.075	-	-	<0.075

CCME Hydrocarbon Fractions

F1 (C6-C10)	-	<10	-	-	79
F1-BTEX	-	<10	-	-	79
F2 (C10-C16)	-	<30	-	-	1710
F3 (C16-C34)	-	97	-	-	409
F4 (C34-C50)	-	<50	-	-	<50
F4G-sg	-	-	-	-	-
F4G-SG Required (yes/no)	-	no	-	-	no

Results are expressed as milligram per dry kilogram unless otherwise noted.
Results are expressed as milligrams per dry kilogram except where noted.
< = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-56-03	TP05-58-01
Sample Date	05-07-21	05-07-21
ALS ID	97	100

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.040	<0.40
Acenaphthylene	<0.050	<0.50
Anthracene	<0.050	<0.50
Benz(a)anthracene	<0.050	<0.050
Benzo(a)pyrene	<0.050	<0.050
Benzo(b)fluoranthene	<0.050	<0.050
Benzo(g,h,i)perylene	<0.050	<0.050
Benzo(k)fluoranthene	<0.050	<0.050
Chrysene	<0.050	<0.050
Dibenz(a,h)anthracene	<0.050	<0.050
Fluoranthene	<0.050	<0.050
Fluorene	<0.050	<0.50
Indeno(1,2,3-c,d)pyrene	<0.050	<0.050
Naphthalene	<0.050	<0.50
Phenanthrene	<0.050	<0.50
Pyrene	<0.050	<0.050

Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-59-01	TP05-60-01	TP05-61-01
Sample Date	05-07-21	05-07-21	05-07-21
ALS ID	101	102	103

Physical Tests

Conductivity	(dS/m)	-	1.27	-
Moisture	%	6.84	5.00	6.23
pH		3.11	7.52	3.90
Sodium Adsorption Ratio (SAR)		-	0.46	-
Saturation Percentage %		-	100	-
TGR (tonnes/hectare)		-	<0.10	-

Cyanides

Total Cyanide	CN	-	<3.0	-
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Saturated Paste Extractables

Calcium	Ca	-	236	-
Chloride	Cl	-	36.4	-
Magnesium	Mg	-	12.3	-
Potassium	K	-	25	-
Sodium	Na	-	27	-
Sulphate	SO4	-	618	-

Results are expressed as milligram per dry kilogram unless otherwise noted.
Results are expressed as milligrams per dry kilogram except where noted.
< = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-59-01	TP05-60-01	TP05-61-01
Sample Date	05-07-21	05-07-21	05-07-21
ALS ID	101	102	103

Total Metals

Antimony	T-Sb	<10	<10	<10
Arsenic	T-As	4020	584	472
Barium	T-Ba	173	73.7	95.6
Beryllium	T-Be	<0.50	<0.50	<0.50
Cadmium	T-Cd	<0.50	<0.50	<0.50
Chromium	T-Cr	69.1	42.7	47.8
Cobalt	T-Co	10.1	34.9	6.1
Copper	T-Cu	34.6	24.7	20.5
Lead	T-Pb	<30	<30	<30
Mercury	T-Hg	<0.0050	<0.0050	0.0067
Molybdenum	T-Mo	<4.0	<4.0	<4.0
Nickel	T-Ni	36.9	31.1	22.8
Selenium	T-Se	<2.0	<2.0	<2.0
Silver	T-Ag	<2.0	<2.0	<2.0
Thallium	T-Tl	<1.0	<1.0	<1.0
Tin	T-Sn	<5.0	<5.0	<5.0
Vanadium	T-V	50.8	27.0	35.0
Zinc	T-Zn	49.6	54.4	35.7

Inorganic Parameters

Sulphide	S	<2.0	<2.0	<2.0
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Non-Halogenated Volatiles

Benzene	-	<0.040	<0.040
Ethylbenzene	-	<0.050	<0.050
Toluene	-	<0.10	<0.10
meta- & para-Xylene	-	<0.050	<0.050
ortho-Xylene	-	<0.050	<0.050
Total Xylenes	-	<0.075	<0.075

CCME Hydrocarbon Fractions

F1 (C6-C10)	-	<10	<10
F1-BTEX	-	<10	<10
F2 (C10-C16)	-	151	50
F3 (C16-C34)	-	1900	142
F4 (C34-C50)	-	1030	<50
F4G-sg	-	-	-
F4G-SG Required (yes/no)	-	yes	no

Results are expressed as milligram per dry killogram unless otherwise noted.
 Results are expressed as milligrams per dry killogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID TP05-60-01

Sample Date 05-07-21
ALS ID 102

Glycols

Diethylene Glycol	<10
Ethylene Glycol	<10
1,2-Propylene Glycol	<10
Triethylene Glycol	<10

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.040
Acenaphthylene	<0.050
Anthracene	<0.050
Benz(a)anthracene	<0.050
Benzo(a)pyrene	<0.050

Benzo(b)fluoranthene	<0.050
Benzo(g,h,i)perylene	<0.050
Benzo(k)fluoranthene	<0.050
Chrysene	<0.050
Dibenz(a,h)anthracene	<0.050

Fluoranthene	<0.050
Fluorene	<0.050
Indeno(1,2,3-c,d)pyrene	<0.050
Naphthalene	0.061
Phenanthrene	<0.050

Pyrene	<0.050
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Results are expressed as milligram per dry kilogram unless otherwise noted.
Results are expressed as milligrams per dry kilogram except where noted.
< = Less than the detection limit indicated.

**Appendix 1 - QUALITY CONTROL - Replicates**

Sediment/Soil	TP05-15-02	TP05-15-02	TP05-21-02	TP05-21-02
	05-07-18	QC # 21844	05-07-19	QC # 21845

Physical Tests

Moisture %	10.3	12.1	6.25	6.98
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Non-Halogenated Volatiles

Benzene	<0.040	<0.040	<0.040	<0.040
Ethylbenzene	<0.050	<0.050	<0.050	<0.050
Toluene	<0.10	<0.10	<0.10	<0.10
meta- & para-Xylene	0.115	<0.050	<0.050	<0.050
ortho-Xylene	0.063	<0.050	<0.050	<0.050
Total Xylenes	0.178	<0.075	<0.075	<0.075

CCME Hydrocarbon Fractions

F1 (C6-C10)	40	44	<10	<10
F1-BTEX	39	44	<10	<10
F2 (C10-C16)	2560	4180	<30	<30
F3 (C16-C34)	798	1210	202	185
F4 (C34-C50)	<50	60	<50	<50

Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

Appendix 1 - QUALITY CONTROL - Replicates

Sediment/Soil	TP05-15-02	TP05-15-02	TP05-21-02	TP05-21-02
	05-07-18	QC # 21844	05-07-19	QC # 21845

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.40	<0.40	-	-
Acenaphthylene	<0.50	<0.50	-	-
Anthracene	<0.50	<0.50	-	-
Benz(a)anthracene	<0.050	<0.050	-	-
Benzo(a)pyrene	<0.050	<0.050	-	-
Benzo(b)fluoranthene	<0.050	<0.050	-	-
Benzo(g,h,i)perylene	<0.050	<0.050	-	-
Benzo(k)fluoranthene	<0.050	<0.050	-	-
Chrysene	<0.050	<0.050	-	-
Dibenz(a,h)anthracene	<0.050	<0.050	-	-
Fluoranthene	<0.050	0.072	-	-
Fluorene	<0.50	<0.50	-	-
Indeno(1,2,3-c,d)pyrene	<0.050	<0.050	-	-
Naphthalene	<0.50	<0.50	-	-
Phenanthrene	<0.50	<0.50	-	-
Pyrene	0.111	0.156	-	-

Results are expressed as milligram per dry kilogram unless otherwise noted.
Results are expressed as milligrams per dry kilogram except where noted.
< = Less than the detection limit indicated.

Appendix 1 - QUALITY CONTROL - Replicates

Sediment/Soil		TP05-22-02	TP05-22-02	TP05-24-01	TP05-24-01
		05-07-19	QC # 22728	05-07-19	QC # 22730
Physical Tests					
Moisture	%	15.4	16.6	6.24	5.73
pH		-	-	4.05	4.07
Total Metals					
Antimony	T-Sb	<10	<10	<10	<10
Arsenic	T-As	1760	1590	341	393
Barium	T-Ba	239	244	76.4	79.0
Beryllium	T-Be	<0.50	<0.50	<0.50	<0.50
Cadmium	T-Cd	<0.50	<0.50	<0.50	<0.50
Chromium	T-Cr	83.3	83.1	38.2	40.3
Cobalt	T-Co	18.8	19.2	6.8	7.3
Copper	T-Cu	48.8	45.7	26.9	31.2
Lead	T-Pb	<30	<30	<30	<30
Mercury	T-Hg	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum	T-Mo	<4.0	<4.0	<4.0	<4.0
Nickel	T-Ni	61.1	62.5	22.4	24.3
Selenium	T-Se	<2.0	<2.0	<2.0	<2.0
Silver	T-Ag	<2.0	<2.0	<2.0	<2.0
Thallium	T-Tl	<1.0	<1.0	<1.0	<1.0
Tin	T-Sn	<5.0	<5.0	<5.0	<5.0
Vanadium	T-V	62.3	58.3	27.3	31.6
Zinc	T-Zn	71.1	71.0	39.2	42.2

Results are expressed as milligram per dry kilogram unless otherwise noted.
Results are expressed as milligrams per dry kilogram except where noted.
< = Less than the detection limit indicated.

Appendix 1 - QUALITY CONTROL - Replicates

Sediment/Soil	TP05-25-03	TP05-25-03	TP05-27-02	TP05-27-02
	05-07-19	QC # 21846	05-07-19	QC # 22731

Physical Tests

Moisture	%	7.30	7.16	8.43	8.79
pH		-	-	5.75	5.70

Total Metals

Antimony	T-Sb	-	-	<10	<10
Arsenic	T-As	-	-	14.6	8.3
Barium	T-Ba	-	-	41.4	38.3
Beryllium	T-Be	-	-	<0.50	<0.50
Cadmium	T-Cd	-	-	<0.50	<0.50
Chromium	T-Cr	-	-	25.3	25.8
Cobalt	T-Co	-	-	5.0	4.8
Copper	T-Cu	-	-	14.0	14.2
Lead	T-Pb	-	-	<30	<30
Mercury	T-Hg	-	-	<0.0050	<0.0050
Molybdenum	T-Mo	-	-	<4.0	<4.0
Nickel	T-Ni	-	-	13.7	13.8
Selenium	T-Se	-	-	<2.0	<2.0
Silver	T-Ag	-	-	<2.0	<2.0
Thallium	T-Tl	-	-	<1.0	<1.0
Tin	T-Sn	-	-	<5.0	<5.0
Vanadium	T-V	-	-	21.5	21.5
Zinc	T-Zn	-	-	22.8	22.7

Inorganic Parameters

Sulphide	S	-	-	<2.0	<2.0
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Non-Halogenated Volatiles

Benzene	<0.040	<0.040	-	-
Ethylbenzene	<0.050	<0.050	-	-
Toluene	<0.10	<0.10	-	-
meta- & para-Xylene	0.061	<0.050	-	-
ortho-Xylene	0.080	<0.050	-	-
Total Xylenes	0.141	<0.075	-	-

Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**Appendix 1 - QUALITY CONTROL - Replicates**

Sediment/Soil	TP05-25-03	TP05-25-03	TP05-27-02	TP05-27-02
	05-07-19	QC # 21846	05-07-19	QC # 22731

CCME Hydrocarbon Fractions

F1 (C6-C10)	19	15	-	-
F1-BTEX	19	15	-	-
F2 (C10-C16)	291	196	-	-
F3 (C16-C34)	213	165	-	-
F4 (C34-C50)	<50	<50	-	-

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.040	<0.040	-	-
Acenaphthylene	<0.050	<0.050	-	-
Anthracene	<0.050	<0.050	-	-
Benz(a)anthracene	<0.050	<0.050	-	-
Benzo(a)pyrene	<0.050	<0.050	-	-
Benzo(b)fluoranthene	<0.050	<0.050	-	-
Benzo(g,h,i)perylene	<0.050	<0.050	-	-
Benzo(k)fluoranthene	<0.050	<0.050	-	-
Chrysene	<0.050	<0.050	-	-
Dibenz(a,h)anthracene	<0.050	<0.050	-	-
Fluoranthene	<0.050	<0.050	-	-
Fluorene	0.100	0.081	-	-
Indeno(1,2,3-c,d)pyrene	<0.050	<0.050	-	-
Naphthalene	<0.050	<0.050	-	-
Phenanthrene	<0.050	<0.050	-	-
Pyrene	<0.050	<0.050	-	-

Results are expressed as milligram per dry kilogram unless otherwise noted.
Results are expressed as milligrams per dry kilogram except where noted.
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Appendix 1 - QUALITY CONTROL - Replicates

Sediment/Soil	TP05-29-02	TP05-29-02
	05-07-19	QC # 21847

Physical Tests

Moisture %	9.93	9.52
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Non-Halogenated Volatiles

Benzene	<0.040	<0.040
Ethylbenzene	<0.050	<0.050
Toluene	<0.10	<0.10
meta- & para-Xylene	<0.050	<0.050
ortho-Xylene	0.080	<0.050
Total Xylenes	0.080	<0.075

CCME Hydrocarbon Fractions

F1 (C6-C10)	<10	<10
F1-BTEX	<10	<10
F2 (C10-C16)	52	77
F3 (C16-C34)	<50	<50
F4 (C34-C50)	<50	<50

Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**Appendix 1 - QUALITY CONTROL - Replicates**

Sediment/Soil		TP05-32-03 05-07-19	TP05-32-03 QC # 21848	TP05-32-03 QC # 22729
Physical Tests				
Moisture	%	6.76	6.60	7.01
pH		6.92	-	6.95
Total Metals				
Antimony	T-Sb	<10	-	<10
Arsenic	T-As	339	-	302
Barium	T-Ba	71.4	-	79.5
Beryllium	T-Be	<0.50	-	<0.50
Cadmium	T-Cd	<0.50	-	<0.50
Chromium	T-Cr	42.8	-	42.5
Cobalt	T-Co	8.8	-	8.6
Copper	T-Cu	20.3	-	22.4
Lead	T-Pb	<30	-	<30
Mercury	T-Hg	<0.0050	-	<0.0050
Molybdenum	T-Mo	<4.0	-	<4.0
Nickel	T-Ni	29.5	-	27.8
Selenium	T-Se	<2.0	-	<2.0
Silver	T-Ag	<2.0	-	<2.0
Thallium	T-Tl	<1.0	-	<1.0
Tin	T-Sn	<5.0	-	<5.0
Vanadium	T-V	27.6	-	28.3
Zinc	T-Zn	42.9	-	41.2
Non-Halogenated Volatiles				
Benzene		<0.040	<0.040	-
Ethylbenzene		<0.050	<0.050	-
Toluene		<0.10	<0.10	-
meta- & para-Xylene		0.221	<0.050	-
ortho-Xylene		0.261	0.134	-
Total Xylenes		0.482	0.134	-

Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**Appendix 1 - QUALITY CONTROL - Replicates**

Sediment/Soil	TP05-32-03	TP05-32-03	TP05-32-03
	05-07-19	QC # 21848	QC # 22729

CCME Hydrocarbon Fractions

F1 (C6-C10)	11	<10	-
F1-BTEX	11	<10	-
F2 (C10-C16)	2590	1650	-
F3 (C16-C34)	1870	1650	-
F4 (C34-C50)	437	328	-

Glycols

Diethylene Glycol	<10	-	<10
Ethylene Glycol	<10	-	<10
1,2-Propylene Glycol	<10	-	<10

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.40	<0.40	-
Acenaphthylene	<0.50	<0.50	-
Anthracene	<0.50	<0.50	-
Benz(a)anthracene	<0.050	<0.050	-
Benzo(a)pyrene	<0.050	<0.050	-
Benzo(b)fluoranthene	<0.050	<0.050	-
Benzo(g,h,i)perylene	<0.050	<0.050	-
Benzo(k)fluoranthene	<0.050	<0.050	-
Chrysene	<0.050	<0.050	-
Dibenz(a,h)anthracene	<0.050	<0.050	-
Fluoranthene	<0.050	<0.050	-
Fluorene	<0.50	<0.50	-
Indeno(1,2,3-c,d)pyrene	<0.050	<0.050	-
Naphthalene	<0.50	<0.50	-
Phenanthrene	<0.50	<0.50	-
Pyrene	<0.050	<0.050	-

Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**Appendix 1 - QUALITY CONTROL - Replicates**

Sediment/Soil	TP05-33-03 05-07-19	TP05-33-03 QC # 22732	TP05-36-03 05-07-19	TP05-36-03 QC # 21849
Physical Tests				
Moisture %	9.48	8.84	9.99	9.86
Non-Halogenated Volatiles				
Benzene	-	-	<0.20	<0.20
Ethylbenzene	-	-	2.46	2.12
Toluene	-	-	1.63	1.26
meta- & para-Xylene	-	-	17.3	15.2
ortho-Xylene	-	-	13.7	12.3
Total Xylenes	-	-	30.9	27.5
CCME Hydrocarbon Fractions				
F1 (C6-C10)	-	-	1390	1180
F1-BTEX	-	-	1360	1180
F2 (C10-C16)	-	-	8790	11200
F3 (C16-C34)	-	-	3320	4030
F4 (C34-C50)	-	-	<50	<50
Glycols				
Diethylene Glycol	<10	<10	-	-
Ethylene Glycol	<10	<10	-	-
1,2-Propylene Glycol	<10	<10	-	-

Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

Appendix 1 - QUALITY CONTROL - Replicates

Sediment/Soil	TP05-33-03	TP05-33-03	TP05-36-03	TP05-36-03
	05-07-19	QC # 22732	05-07-19	QC # 21849

Polycyclic Aromatic Hydrocarbons

Acenaphthene	-	-	<1.5	<1.5
Acenaphthylene	-	-	<0.50	<0.50
Anthracene	-	-	<0.50	<0.50
Benz(a)anthracene	-	-	<0.50	<0.50
Benzo(a)pyrene	-	-	<0.050	<0.050
Benzo(b)fluoranthene	-	-	<0.050	<0.050
Benzo(g,h,i)perylene	-	-	<0.050	<0.050
Benzo(k)fluoranthene	-	-	<0.050	<0.050
Chrysene	-	-	<0.50	<0.50
Dibenz(a,h)anthracene	-	-	<0.050	<0.050
Fluoranthene	-	-	<0.50	<0.50
Fluorene	-	-	<3.1	<3.1
Indeno(1,2,3-c,d)pyrene	-	-	<0.050	<0.050
Naphthalene	-	-	<5.9	<5.9
Phenanthrene	-	-	1.54	1.52
Pyrene	-	-	<0.50	<0.50

Results are expressed as milligram per dry kilogram unless otherwise noted.
Results are expressed as milligrams per dry kilogram except where noted.
< = Less than the detection limit indicated.

Appendix 1 - QUALITY CONTROL - Replicates

Sediment/Soil	TP05-38-02	TP05-38-02	TP05-42-01	TP05-42-01
	05-07-19	QC # 22733	05-07-19	QC # 21850

Physical Tests

Moisture %	3.19	11.1	7.95	7.90
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Non-Halogenated Volatiles

Benzene	-	-	<0.040	<0.040
Ethylbenzene	-	-	<0.050	<0.050
Toluene	-	-	<0.10	<0.10
meta- & para-Xylene	-	-	<0.050	<0.050
ortho-Xylene	-	-	<0.050	<0.050
Total Xylenes	-	-	<0.075	<0.075

CCME Hydrocarbon Fractions

F1 (C6-C10)	-	-	<10	<10
F1-BTEX	-	-	<10	<10
F2 (C10-C16)	-	-	65	110
F3 (C16-C34)	-	-	137	341
F4 (C34-C50)	-	-	<50	110

Glycols

Diethylene Glycol	<10	<10	-	-
Ethylene Glycol	<10	<10	-	-
1,2-Propylene Glycol	<10	<10	-	-

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 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**Appendix 1 - QUALITY CONTROL - Replicates**

Sediment/Soil	TP05-46-02	TP05-46-02	TP05-51-01	TP05-51-01
	05-07-21	QC # 21851	05-07-21	QC # 22736

Physical Tests

Moisture %	8.52	7.97	7.92	7.34
pH	-	-	4.58	4.59

Total Metals

Antimony	T-Sb	-	-	<10	<10
Arsenic	T-As	-	-	8.8	8.8
Barium	T-Ba	-	-	38.2	36.8
Beryllium	T-Be	-	-	<0.50	<0.50
Cadmium	T-Cd	-	-	<0.50	<0.50
Chromium	T-Cr	-	-	28.5	27.8
Cobalt	T-Co	-	-	4.3	4.2
Copper	T-Cu	-	-	15.3	16.2
Lead	T-Pb	-	-	<30	<30
Mercury	T-Hg	-	-	0.0084	0.0077
Molybdenum	T-Mo	-	-	<4.0	<4.0
Nickel	T-Ni	-	-	16.3	17.5
Selenium	T-Se	-	-	<2.0	<2.0
Silver	T-Ag	-	-	<2.0	<2.0
Thallium	T-Tl	-	-	<1.0	<1.0
Tin	T-Sn	-	-	<5.0	<5.0
Vanadium	T-V	-	-	24.7	25.5
Zinc	T-Zn	-	-	22.4	22.5

Inorganic Parameters

Sulphide S	-	-	<10	<10
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Non-Halogenated Volatiles

Benzene	<0.040	<0.040	-	-
Ethylbenzene	<0.050	<0.050	-	-
Toluene	<0.10	<0.10	-	-
meta- & para-Xylene	<0.050	<0.050	-	-
ortho-Xylene	<0.050	<0.050	-	-
Total Xylenes	<0.075	<0.075	-	-

Results are expressed as milligram per dry kilogram unless otherwise noted.
Results are expressed as milligrams per dry kilogram except where noted.
< = Less than the detection limit indicated.

Appendix 1 - QUALITY CONTROL - Replicates

Sediment/Soil	TP05-46-02	TP05-46-02	TP05-51-01	TP05-51-01
	05-07-21	QC # 21851	05-07-21	QC # 22736
<u>CCME Hydrocarbon Fractions</u>				
F1 (C6-C10)	<10	<10	-	-
F1-BTEX	<10	<10	-	-
F2 (C10-C16)	50	54	-	-
F3 (C16-C34)	<50	<50	-	-
F4 (C34-C50)	<50	<50	-	-

Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

Appendix 1 - QUALITY CONTROL - Replicates

Sediment/Soil	TP05-55-01	TP05-55-01	TP05-55-02	TP05-55-02
	05-07-21	QC # 22734	05-07-21	QC # 21852

Physical Tests

Moisture	%	-	-	9.64	10.9
pH		6.26	6.20	-	-

Total Metals

Antimony	T-Sb	<10	<10	-	-
Arsenic	T-As	<5.0	<5.0	-	-
Barium	T-Ba	38.2	33.1	-	-
Beryllium	T-Be	<0.50	<0.50	-	-
Cadmium	T-Cd	<0.50	<0.50	-	-
Chromium	T-Cr	28.1	25.7	-	-
Cobalt	T-Co	4.3	4.3	-	-
Copper	T-Cu	13.4	13.3	-	-
Lead	T-Pb	<30	<30	-	-
Mercury	T-Hg	<0.0050	<0.0050	-	-
Molybdenum	T-Mo	<4.0	<4.0	-	-
Nickel	T-Ni	15.8	15.2	-	-
Selenium	T-Se	<2.0	<2.0	-	-
Silver	T-Ag	<2.0	<2.0	-	-
Thallium	T-Tl	<1.0	<1.0	-	-
Tin	T-Sn	<5.0	<5.0	-	-
Vanadium	T-V	21.8	19.9	-	-
Zinc	T-Zn	22.0	21.5	-	-

Non-Halogenated Volatiles

Benzene	-	-	<0.040	<0.040
Ethylbenzene	-	-	<0.050	<0.050
Toluene	-	-	<0.10	<0.10
meta- & para-Xylene	-	-	0.072	0.072
ortho-Xylene	-	-	0.105	0.085
Total Xylenes	-	-	0.177	0.157

Results are expressed as milligram per dry kilogram unless otherwise noted.
Results are expressed as milligrams per dry kilogram except where noted.
< = Less than the detection limit indicated.

Appendix 1 - QUALITY CONTROL - Replicates

Sediment/Soil	TP05-55-01	TP05-55-01	TP05-55-02	TP05-55-02
	05-07-21	QC # 22734	05-07-21	QC # 21852

CCME Hydrocarbon Fractions

F1 (C6-C10)	-	-	372	352
F1-BTEX	-	-	371	351
F2 (C10-C16)	-	-	2700	4270
F3 (C16-C34)	-	-	513	774
F4 (C34-C50)	-	-	<50	<50

Polycyclic Aromatic Hydrocarbons

Acenaphthene	-	-	<0.40	<0.40
Acenaphthylene	-	-	<0.50	<0.50
Anthracene	-	-	<0.50	<0.50
Benz(a)anthracene	-	-	<0.050	<0.050
Benzo(a)pyrene	-	-	<0.050	<0.050
Benzo(b)fluoranthene	-	-	<0.050	<0.050
Benzo(g,h,i)perylene	-	-	<0.050	<0.050
Benzo(k)fluoranthene	-	-	<0.050	<0.050
Chrysene	-	-	<0.050	<0.050
Dibenz(a,h)anthracene	-	-	<0.050	<0.050
Fluoranthene	-	-	0.056	0.060
Fluorene	-	-	<0.86	<0.86
Indeno(1,2,3-c,d)pyrene	-	-	<0.050	<0.050
Naphthalene	-	-	<0.81	<0.81
Phenanthrene	-	-	0.84	0.76
Pyrene	-	-	<0.050	<0.050

Results are expressed as milligram per dry kilogram unless otherwise noted.
Results are expressed as milligrams per dry kilogram except where noted.
< = Less than the detection limit indicated.

**Appendix 1 - QUALITY CONTROL - Replicates**

Sediment/Soil		TP05-57-01 05-07-21	TP05-57-01 QC # 22735	TP05-59-01 05-07-21	TP05-59-01 QC # 22737
Physical Tests					
Moisture	%	0.18	0.17	6.84	7.24
pH		2.70	2.76	3.11	3.15
Total Metals					
Antimony	T-Sb	<10	<10	<10	<10
Arsenic	T-As	4090	4670	4020	2590
Barium	T-Ba	193	155	173	187
Beryllium	T-Be	<0.50	<0.50	<0.50	<0.50
Cadmium	T-Cd	<0.50	<0.50	<0.50	<0.50
Chromium	T-Cr	65.3	62.0	69.1	70.8
Cobalt	T-Co	9.5	7.8	10.1	9.8
Copper	T-Cu	42.9	36.0	34.6	42.0
Lead	T-Pb	<30	<30	<30	<30
Mercury	T-Hg	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum	T-Mo	<4.0	<4.0	<4.0	<4.0
Nickel	T-Ni	33.1	31.1	36.9	38.9
Selenium	T-Se	<2.0	<2.0	<2.0	<2.0
Silver	T-Ag	<2.0	<2.0	<2.0	<2.0
Thallium	T-Tl	<1.0	<1.0	<1.0	<1.0
Tin	T-Sn	<5.0	<5.0	<5.0	<5.0
Vanadium	T-V	52.7	48.5	50.8	52.2
Zinc	T-Zn	48.2	48.0	49.6	50.6
Inorganic Parameters					
Sulphide	S	-	-	<2.0	2.4

Results are expressed as milligram per dry kilogram unless otherwise noted.
Results are expressed as milligrams per dry kilogram except where noted.
< = Less than the detection limit indicated.

**Appendix 1 - QUALITY CONTROL - Replicates**

Sediment/Soil	TP05-61-01	TP05-61-01
	05-07-21	QC # 21853

Physical Tests

Moisture %	6.23	7.00
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Non-Halogenated Volatiles

Benzene	<0.040	<0.040
Ethylbenzene	<0.050	<0.050
Toluene	<0.10	<0.10
meta- & para-Xylene	<0.050	<0.050
ortho-Xylene	<0.050	<0.050
Total Xylenes	<0.075	<0.075

CCME Hydrocarbon Fractions

F1 (C6-C10)	<10	<10
F1-BTEX	<10	<10
F2 (C10-C16)	50	57
F3 (C16-C34)	142	162
F4 (C34-C50)	<50	<50

Results are expressed as milligram per dry kilogram unless otherwise noted.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

Appendix 1 - QUALITY CONTROL - Reference Materials

Sediment/Soil

		Result	Target	Units	DL	ALSQC#	Method
<i>NIST Montana Soil, 2711</i>							
<u>Total Metals</u>							
Antimony	T-Sb	18	19	mg/kg	10	22740	a
Antimony	T-Sb	14	19	mg/kg	10	22744	a
Arsenic	T-As	105	105	mg/kg	5	22740	a
Arsenic	T-As	104	105	mg/kg	5	22744	a
Barium	T-Ba	216	726	mg/kg	1	22740	a
Barium	T-Ba	209	726	mg/kg	1	22744	a
Beryllium	T-Be	1.07	0.98	mg/kg	0.5	22740	a
Beryllium	T-Be	1.04	0.98	mg/kg	0.5	22744	a
Cadmium	T-Cd	42.0	41.7	mg/kg	0.5	22740	a
Cadmium	T-Cd	41.4	41.7	mg/kg	0.5	22744	a
Calcium	T-Ca	22800	28800	mg/kg	50	22740	a
Calcium	T-Ca	22500	28800	mg/kg	50	22744	a
Chromium	T-Cr	22.9	47.0	mg/kg	2	22740	a
Chromium	T-Cr	22.8	47.0	mg/kg	2	22744	a
Cobalt	T-Co	8.4	10.0	mg/kg	2	22740	a
Cobalt	T-Co	8.4	10.0	mg/kg	2	22744	a
Copper	T-Cu	119	114	mg/kg	1	22740	a
Copper	T-Cu	117	114	mg/kg	1	22744	a
Lead	T-Pb	1190	1160	mg/kg	50	22740	a
Lead	T-Pb	1180	1160	mg/kg	50	22744	a
Magnesium	T-Mg	8500	10500	mg/kg	50	22740	a
Magnesium	T-Mg	8470	10500	mg/kg	50	22744	a
Mercury	T-Hg	6.85	6.25	mg/kg	0.05	22748	b
Mercury	T-Hg	6.17	6.25	mg/kg	0.05	22754	b
Molybdenum	T-Mo	<4.0	<4.0	mg/kg	4	22740	a
Molybdenum	T-Mo	<4.0	<4.0	mg/kg	4	22744	a
Nickel	T-Ni	16.9	20.6	mg/kg	5	22740	a
Nickel	T-Ni	16.5	20.6	mg/kg	5	22744	a
Potassium	T-K	4700	24500	mg/kg	200	22740	a
Potassium	T-K	4550	24500	mg/kg	200	22744	a
Selenium	T-Se	4.3	<2.0	mg/kg	2	22740	a
Selenium	T-Se	<2.0	<2.0	mg/kg	2	22744	a
Selenium	T-Se	1.02	1.52	mg/kg	0.1	22771	c
Selenium	T-Se	1.26	1.52	mg/kg	0.1	22775	c

Methods:a = CSR/HCl-HNO₃/ICPOESb = CSR/HCl-HNO₃/CVAFSc = CSR/HCl-HNO₃/HVAAS

Appendix 1 - QUALITY CONTROL - Reference Materials

Sediment/Soil

		Result	Target	Units	DL	ALSQC#	Method
<i>NIST Montana Soil, 2711</i>							
<u>Total Metals</u>							
Silver	T-Ag	5.0	4.6	mg/kg	2	22740	a
Silver	T-Ag	4.3	4.6	mg/kg	2	22744	a
Sodium	T-Na	340	11400	mg/kg	200	22740	a
Sodium	T-Na	270	11400	mg/kg	200	22744	a
Thallium	T-Tl	<10	<10	mg/kg	10	22740	a
Thallium	T-Tl	<10	<10	mg/kg	10	22744	a
Thallium	T-Tl	2.0	2.5	mg/kg	1	22760	b
Thallium	T-Tl	1.9	2.5	mg/kg	1	22763	b
Tin	T-Sn	<10	<10	mg/kg	10	22740	a
Tin	T-Sn	<10	<10	mg/kg	10	22744	a
Vanadium	T-V	49.6	81.6	mg/kg	2	22740	a
Vanadium	T-V	52.2	81.6	mg/kg	2	22744	a
Zinc	T-Zn	339	350	mg/kg	1	22740	a
Zinc	T-Zn	337	350	mg/kg	1	22744	a
<i>CANMET Till Reference Material, TILL-1</i>							
<u>Total Metals</u>							
Antimony	T-Sb	<10	<10	mg/kg	10	22741	a
Antimony	T-Sb	<10	<10	mg/kg	10	22745	a
Arsenic	T-As	17.8	18.0	mg/kg	5	22741	a
Arsenic	T-As	17.2	18.0	mg/kg	5	22745	a
Barium	T-Ba	90.2	702	mg/kg	1	22741	a
Barium	T-Ba	88.9	702	mg/kg	1	22745	a
Beryllium	T-Be	0.52	2.40	mg/kg	0.5	22741	a
Beryllium	T-Be	0.53	2.40	mg/kg	0.5	22745	a
Cadmium	T-Cd	<0.50	<0.50	mg/kg	0.5	22741	a
Cadmium	T-Cd	<0.50	<0.50	mg/kg	0.5	22745	a
Calcium	T-Ca	3620	19400	mg/kg	50	22741	a
Calcium	T-Ca	3650	19400	mg/kg	50	22745	a
Chromium	T-Cr	30.0	65.0	mg/kg	2	22741	a
Chromium	T-Cr	29.8	65.0	mg/kg	2	22745	a
Cobalt	T-Co	13.1	18.0	mg/kg	2	22741	a
Cobalt	T-Co	13.2	18.0	mg/kg	2	22745	a

Methods:a = CSR/HCl-HNO₃/ICPOES

b = SM__CSR_ICPMS

**Appendix 1 - QUALITY CONTROL - Reference Materials**

Sediment/Soil

		Result	Target	Units	DL	ALSQC#	Method
CANMET Till Reference Material, TILL-1							
Total Metals							
Copper	T-Cu	49.7	47.0	mg/kg	1	22741	a
Copper	T-Cu	49.5	47.0	mg/kg	1	22745	a
Lead	T-Pb	<50	<50	mg/kg	50	22741	a
Lead	T-Pb	<50	<50	mg/kg	50	22745	a
Magnesium	T-Mg	6290	13000	mg/kg	50	22741	a
Magnesium	T-Mg	6280	13000	mg/kg	50	22745	a
Mercury	T-Hg	0.105	0.095	mg/kg	0.05	22749	b
Mercury	T-Hg	0.103	0.095	mg/kg	0.05	22755	b
Molybdenum	T-Mo	<4.0	<4.0	mg/kg	4	22741	a
Molybdenum	T-Mo	<4.0	<4.0	mg/kg	4	22745	a
Nickel	T-Ni	18.2	24.0	mg/kg	5	22741	a
Nickel	T-Ni	18.2	24.0	mg/kg	5	22745	a
Potassium	T-K	690	18400	mg/kg	200	22741	a
Potassium	T-K	690	18400	mg/kg	200	22745	a
Selenium	T-Se	<2.0	2.0	mg/kg	2	22741	a
Selenium	T-Se	<2.0	2.0	mg/kg	2	22745	a
Silver	T-Ag	<2.0	<2.0	mg/kg	2	22741	a
Silver	T-Ag	<2.0	<2.0	mg/kg	2	22745	a
Sodium	T-Na	370	20100	mg/kg	200	22741	a
Sodium	T-Na	370	20100	mg/kg	200	22745	a
Thallium	T-Tl	<10	10	mg/kg	10	22741	a
Thallium	T-Tl	<10	10	mg/kg	10	22745	a
Tin	T-Sn	<5.0	5.0	mg/kg	5	22741	a
Tin	T-Sn	<5.0	5.0	mg/kg	5	22745	a
Vanadium	T-V	60.6	99.0	mg/kg	2	22741	a
Vanadium	T-V	64.8	99.0	mg/kg	2	22745	a
Zinc	T-Zn	73.6	98.0	mg/kg	1	22741	a
Zinc	T-Zn	73.8	98.0	mg/kg	1	22745	a

ALS Environmental RM Soil, ARM-1**CCME Hydrocarbon Fractions**

F2 (C10-C16)	3420	2410	mg/kg	30	21957	c
F2 (C10-C16)	2340	2410	mg/kg	30	22057	c

Methods:a = CSR/HCl-HNO₃/ICPOESb = CSR/HCl-HNO₃/CVAFS

c = Soxhlet/GC-FID

Appendix 1 - QUALITY CONTROL - Reference Materials

Sediment/Soil

	Result	Target	Units	DL	ALSQC#	Method
ALS Environmental RM Soil, ARM-1						
<u>CCME Hydrocarbon Fractions</u>						
F2 (C10-C16)	3170	2410	mg/kg	30	22096	a
F2 (C10-C16)	2630	2410	mg/kg	30	22240	a
F2 (C10-C16)	2660	2410	mg/kg	30	22389	a
F2 (C10-C16)	1760	2410	mg/kg	30	22517	a
F3 (C16-C34)	3220	3420	mg/kg	50	21957	a
F3 (C16-C34)	3150	3420	mg/kg	50	22057	a
F3 (C16-C34)	5000	3420	mg/kg	50	22096	a
F3 (C16-C34)	3340	3420	mg/kg	50	22240	a
F3 (C16-C34)	3540	3420	mg/kg	50	22389	a
F3 (C16-C34)	2750	3420	mg/kg	50	22517	a
F4 (C34-C50)	1060	1280	mg/kg	50	21957	a
F4 (C34-C50)	772	1280	mg/kg	50	22057	a
F4 (C34-C50)	1420	1280	mg/kg	50	22096	a
F4 (C34-C50)	854	1280	mg/kg	50	22240	a
F4 (C34-C50)	1060	1280	mg/kg	50	22389	a
F4 (C34-C50)	707	1280	mg/kg	50	22517	a
F4G-sg	9040	6070	mg/kg	500	22061	b
<u>Polycyclic Aromatic Hydrocarbons</u>						
Acenaphthene	0.555	0.721	mg/kg	0.04	21989	c
Acenaphthene	0.609	0.721	mg/kg	0.04	22476	c
Acenaphthylene	0.452	0.710	mg/kg	0.05	21989	c
Acenaphthylene	0.500	0.710	mg/kg	0.05	22136	c
Acenaphthylene	0.484	0.710	mg/kg	0.05	22476	c
Anthracene	0.811	0.993	mg/kg	0.05	21989	c
Anthracene	0.750	0.993	mg/kg	0.05	22136	c
Anthracene	0.690	0.993	mg/kg	0.05	22476	c
Benz(a)anthracene	2.96	2.84	mg/kg	0.05	21989	c
Benz(a)anthracene	2.84	2.84	mg/kg	0.05	22136	c
Benz(a)anthracene	3.16	2.84	mg/kg	0.05	22476	c
Benzo(a)pyrene	2.11	2.08	mg/kg	0.05	21989	c
Benzo(a)pyrene	1.93	2.08	mg/kg	0.05	22136	c
Benzo(a)pyrene	2.31	2.08	mg/kg	0.05	22476	c
Benzo(b)fluoranthene	3.48	3.18	mg/kg	0.05	21989	c
Benzo(b)fluoranthene	2.86	3.18	mg/kg	0.05	22136	c

Methods:

a = Soxhlet/GC-FID

b = Gravimetry

c = Soxhlet/GC-MS

Appendix 1 - QUALITY CONTROL - Reference Materials

Sediment/Soil

	Result	Target	Units	DL	ALSQC#	Method
ALS Environmental RM Soil, ARM-1						
<u>Polycyclic Aromatic Hydrocarbons</u>						
Benzo(b)fluoranthene	3.71	3.18	mg/kg	0.05	22476	a
Benzo(g,h,i)perylene	1.08	1.52	mg/kg	0.05	21989	a
Benzo(g,h,i)perylene	1.10	1.52	mg/kg	0.05	22136	a
Benzo(g,h,i)perylene	1.29	1.52	mg/kg	0.05	22476	a
Benzo(k)fluoranthene	1.22	1.26	mg/kg	0.05	21989	a
Benzo(k)fluoranthene	1.30	1.26	mg/kg	0.05	22136	a
Benzo(k)fluoranthene	1.21	1.26	mg/kg	0.05	22476	a
Chrysene	2.25	2.70	mg/kg	0.05	21989	a
Chrysene	2.33	2.70	mg/kg	0.05	22136	a
Chrysene	2.49	2.70	mg/kg	0.05	22476	a
Dibenz(a,h)anthracene	0.323	0.415	mg/kg	0.05	21989	a
Dibenz(a,h)anthracene	0.299	0.415	mg/kg	0.05	22136	a
Dibenz(a,h)anthracene	0.306	0.415	mg/kg	0.05	22476	a
Fluoranthene	6.95	7.25	mg/kg	0.05	21989	a
Fluoranthene	7.93	7.25	mg/kg	0.05	22476	a
Fluorene	1.10	1.19	mg/kg	0.05	21989	a
Fluorene	1.05	1.19	mg/kg	0.05	22136	a
Fluorene	1.18	1.19	mg/kg	0.05	22476	a
Indeno(1,2,3-c,d)pyrene	1.34	1.80	mg/kg	0.05	21989	a
Indeno(1,2,3-c,d)pyrene	1.60	1.80	mg/kg	0.05	22136	a
Indeno(1,2,3-c,d)pyrene	2.09	1.80	mg/kg	0.05	22476	a
Naphthalene	3.97	4.16	mg/kg	0.05	21989	a
Naphthalene	3.74	4.16	mg/kg	0.05	22136	a
Naphthalene	4.13	4.16	mg/kg	0.05	22476	a
Phenanthrene	4.81	5.11	mg/kg	0.05	21989	a
Phenanthrene	4.56	5.11	mg/kg	0.05	22136	a
Phenanthrene	5.06	5.11	mg/kg	0.05	22476	a
Pyrene	5.72	6.19	mg/kg	0.05	21989	a
Pyrene	5.35	6.19	mg/kg	0.05	22136	a
Pyrene	6.94	6.19	mg/kg	0.05	22476	a
ALS Environmental Soil RM, SAL01						
<u>Physical Tests</u>						
Conductivity (dS/m)	6.30	6.52	dS/m	0.002	22050	b

Methods:

a = Soxhlet/GC-MS

b = Saturated Paste/Meter

**Appendix 1 - QUALITY CONTROL - Reference Materials**

Sediment/Soil

	Result	Target	Units	DL	ALSQC#	Method
ALS Environmental Soil RM, SAL01						
<u>Physical Tests</u>						
pH	7.70	7.68	pH	0.1	22050	a
<u>Saturated Paste Extractables</u>						
Calcium Ca	398	371	mg/kg	0.5	22050	b
Chloride Cl	705	763	mg/kg	0.5	22050	c
Magnesium Mg	92.3	89.2	mg/kg	0.5	22050	b
Potassium K	22	<20	mg/kg	20	22050	b
Saturation Percentage %	58.0	55.6	%	0.1	22050	d
Sodium Na	400	385	mg/kg	20	22050	b
Sulphate SO4	1060	999	mg/kg	1	22050	c

Methods:

a = Saturated Paste/Meter
 b = SM__SAR-Paste_ICPOES
 c = Saturated Paste/iC
 d = Saturated Paste/Gravimetry

Appendix 1 - QUALITY CONTROL - Spikes

Sediment/Soil

	Result	Target	Units	DL	ALSQC#	Method
<u>Non-Halogenated Volatiles</u>						
Benzene	1.88	2.00	mg/kg	0.04	22155	a
Benzene	1.80	2.00	mg/kg	0.04	22463	a
Ethylbenzene	2.12	2.00	mg/kg	0.04	22155	a
Ethylbenzene	1.93	2.00	mg/kg	0.04	22463	a
Toluene	2.00	2.00	mg/kg	0.1	22155	a
Toluene	1.91	2.00	mg/kg	0.1	22463	a
meta- & para-Xylene	2.15	2.00	mg/kg	0.04	22155	a
meta- & para-Xylene	1.87	2.00	mg/kg	0.04	22463	a
ortho-Xylene	2.27	2.00	mg/kg	0.04	22155	a
ortho-Xylene	2.03	2.00	mg/kg	0.04	22463	a
<u>CCME Hydrocarbon Fractions</u>						
F1 (C6-C10)	29	29	mg/kg	10	22157	b
F1 (C6-C10)	22	29	mg/kg	10	22256	b
F1 (C6-C10)	22	29	mg/kg	10	22465	b
<u>Glycols</u>						
Diethylene Glycol	47	50	mg/kg	10	22751	c
Ethylene Glycol	49	50	mg/kg	10	22751	c
1,2-Propylene Glycol	51	50	mg/kg	10	22751	c

Methods:

a = Purge&Trap/GC-MS

b = Purge&Trap/GC-FID

c = GC-FID

Appendix 1 - QUALITY CONTROL - Blanks

Sediment/Soil

		Result	Target	Units	DL	ALSQC#	Method
Total Metals							
Antimony	T-Sb	<10	<10	mg/kg	10	22738	a
Antimony	T-Sb	<10	<10	mg/kg	10	22739	a
Antimony	T-Sb	<10	<10	mg/kg	10	22742	a
Antimony	T-Sb	<10	<10	mg/kg	10	22743	a
Arsenic	T-As	<5.0	<5.0	mg/kg	5	22738	a
Arsenic	T-As	<5.0	<5.0	mg/kg	5	22739	a
Arsenic	T-As	<5.0	<5.0	mg/kg	5	22742	a
Arsenic	T-As	<5.0	<5.0	mg/kg	5	22743	a
Barium	T-Ba	<1.0	<1.0	mg/kg	1	22738	a
Barium	T-Ba	<1.0	<1.0	mg/kg	1	22739	a
Barium	T-Ba	<1.0	<1.0	mg/kg	1	22742	a
Barium	T-Ba	<1.0	<1.0	mg/kg	1	22743	a
Beryllium	T-Be	<0.50	<0.50	mg/kg	0.5	22738	a
Beryllium	T-Be	<0.50	<0.50	mg/kg	0.5	22739	a
Beryllium	T-Be	<0.50	<0.50	mg/kg	0.5	22742	a
Beryllium	T-Be	<0.50	<0.50	mg/kg	0.5	22743	a
Cadmium	T-Cd	<0.50	<0.50	mg/kg	0.5	22738	a
Cadmium	T-Cd	<0.50	<0.50	mg/kg	0.5	22739	a
Cadmium	T-Cd	<0.50	<0.50	mg/kg	0.5	22742	a
Cadmium	T-Cd	<0.50	<0.50	mg/kg	0.5	22743	a
Chromium	T-Cr	<2.0	<2.0	mg/kg	2	22738	a
Chromium	T-Cr	<2.0	<2.0	mg/kg	2	22739	a
Chromium	T-Cr	<2.0	<2.0	mg/kg	2	22742	a
Chromium	T-Cr	<2.0	<2.0	mg/kg	2	22743	a
Cobalt	T-Co	<2.0	<2.0	mg/kg	2	22738	a
Cobalt	T-Co	<2.0	<2.0	mg/kg	2	22739	a
Cobalt	T-Co	<2.0	<2.0	mg/kg	2	22742	a
Cobalt	T-Co	<2.0	<2.0	mg/kg	2	22743	a
Copper	T-Cu	<1.0	<1.0	mg/kg	1	22738	a
Copper	T-Cu	<1.0	<1.0	mg/kg	1	22739	a
Copper	T-Cu	<1.0	<1.0	mg/kg	1	22742	a
Copper	T-Cu	<1.0	<1.0	mg/kg	1	22743	a
Lead	T-Pb	<50	<50	mg/kg	50	22738	a
Lead	T-Pb	<50	<50	mg/kg	50	22739	a
Lead	T-Pb	<50	<50	mg/kg	50	22742	a
Lead	T-Pb	<50	<50	mg/kg	50	22743	a

Methods:a = CSR/HCl-HNO₃/ICPOES

Appendix 1 - QUALITY CONTROL - Blanks

Sediment/Soil

		Result	Target	Units	DL	ALSQC#	Method
Total Metals							
Mercury	T-Hg	<0.050	<0.050	mg/kg	0.05	22746	a
Mercury	T-Hg	<0.050	<0.050	mg/kg	0.05	22747	a
Mercury	T-Hg	<0.050	<0.050	mg/kg	0.05	22752	a
Mercury	T-Hg	<0.050	<0.050	mg/kg	0.05	22753	a
Molybdenum	T-Mo	<4.0	<4.0	mg/kg	4	22738	b
Molybdenum	T-Mo	<4.0	<4.0	mg/kg	4	22739	b
Molybdenum	T-Mo	<4.0	<4.0	mg/kg	4	22742	b
Molybdenum	T-Mo	<4.0	<4.0	mg/kg	4	22743	b
Nickel	T-Ni	<5.0	<5.0	mg/kg	5	22738	b
Nickel	T-Ni	<5.0	<5.0	mg/kg	5	22739	b
Nickel	T-Ni	<5.0	<5.0	mg/kg	5	22742	b
Nickel	T-Ni	<5.0	<5.0	mg/kg	5	22743	b
Selenium	T-Se	<2.0	<2.0	mg/kg	2	22738	b
Selenium	T-Se	<2.0	<2.0	mg/kg	2	22739	b
Selenium	T-Se	<2.0	<2.0	mg/kg	2	22742	b
Selenium	T-Se	<2.0	<2.0	mg/kg	2	22743	b
Selenium	T-Se	<0.10	<0.10	mg/kg	0.1	22769	c
Selenium	T-Se	<0.10	<0.10	mg/kg	0.1	22770	c
Selenium	T-Se	<0.10	<0.10	mg/kg	0.1	22773	c
Selenium	T-Se	<0.10	<0.10	mg/kg	0.1	22774	c
Silver	T-Ag	<2.0	<2.0	mg/kg	2	22738	b
Silver	T-Ag	<2.0	<2.0	mg/kg	2	22739	b
Silver	T-Ag	<2.0	<2.0	mg/kg	2	22742	b
Silver	T-Ag	<2.0	<2.0	mg/kg	2	22743	b
Thallium	T-Tl	<10	<10	mg/kg	10	22738	b
Thallium	T-Tl	<10	<10	mg/kg	10	22739	b
Thallium	T-Tl	<10	<10	mg/kg	10	22742	b
Thallium	T-Tl	<10	<10	mg/kg	10	22743	b
Thallium	T-Tl	<1.0	<1.0	mg/kg	1	22758	d
Thallium	T-Tl	<1.0	<1.0	mg/kg	1	22759	d
Thallium	T-Tl	<1.0	<1.0	mg/kg	1	22761	d
Thallium	T-Tl	<1.0	<1.0	mg/kg	1	22762	d
Tin	T-Sn	<5.0	<5.0	mg/kg	5	22738	b
Tin	T-Sn	<5.0	<5.0	mg/kg	5	22739	b
Tin	T-Sn	<5.0	<5.0	mg/kg	5	22742	b
Tin	T-Sn	<5.0	<5.0	mg/kg	5	22743	b

Methods:

a = CSR/HCl-HNO₃/CVAFS
b = CSR/HCl-HNO₃/ICPOES
c = CSR/HCl-HNO₃/HVAAS
d = SM__CSR_ICPMS

Appendix 1 - QUALITY CONTROL - Blanks

Sediment/Soil

		Result	Target	Units	DL	ALSQC#	Method
<u>Total Metals</u>							
Vanadium	T-V	<2.0	<2.0	mg/kg	2	22738	a
Vanadium	T-V	<2.0	<2.0	mg/kg	2	22739	a
Vanadium	T-V	<2.0	<2.0	mg/kg	2	22742	a
Vanadium	T-V	<2.0	<2.0	mg/kg	2	22743	a
Zinc	T-Zn	<1.0	<1.0	mg/kg	1	22738	a
Zinc	T-Zn	<1.0	<1.0	mg/kg	1	22739	a
Zinc	T-Zn	<1.0	<1.0	mg/kg	1	22742	a
Zinc	T-Zn	<1.0	<1.0	mg/kg	1	22743	a
<u>Non-Halogenated Volatiles</u>							
Benzene		<0.040	<0.040	mg/kg	0.04	22156	b
Benzene		<0.040	<0.040	mg/kg	0.04	22464	b
Ethylbenzene		<0.050	<0.050	mg/kg	0.05	22156	b
Ethylbenzene		<0.050	<0.050	mg/kg	0.05	22464	b
Toluene		<0.100	<0.100	mg/kg	0.1	22156	b
Toluene		<0.100	<0.100	mg/kg	0.1	22464	b
meta- & para-Xylene		<0.050	<0.050	mg/kg	0.05	22156	b
meta- & para-Xylene		<0.050	<0.050	mg/kg	0.05	22464	b
ortho-Xylene		<0.050	<0.050	mg/kg	0.05	22156	b
ortho-Xylene		<0.050	<0.050	mg/kg	0.05	22464	b
<u>CCME Hydrocarbon Fractions</u>							
F1 (C6-C10)		<10	<10	mg/kg	10	22156	c
F1 (C6-C10)		<10	<10	mg/kg	10	22255	c
F1 (C6-C10)		<10	<10	mg/kg	10	22464	c
F4G-sg		<500	<500	mg/kg	500	22060	d
<u>Glycols</u>							
Diethylene Glycol		<10	<10	mg/kg	10	22750	e
Ethylene Glycol		<10	<10	mg/kg	10	22750	e
1,2-Propylene Glycol		<10	<10	mg/kg	10	22750	e
<u>Polycyclic Aromatic Hydrocarbons</u>							
Acenaphthene		<0.050	<0.050	mg/kg	0.05	21988	f
Acenaphthene		<0.050	<0.050	mg/kg	0.05	22135	f
Acenaphthene		<0.050	<0.050	mg/kg	0.05	22355	f
Acenaphthene		<0.050	<0.050	mg/kg	0.05	22475	f
Acenaphthylene		<0.050	<0.050	mg/kg	0.05	21988	f
Acenaphthylene		<0.050	<0.050	mg/kg	0.05	22135	f

Methods:a = CSR/HCl-HNO₃/ICPOES

b = Purge&Trap/GC-MS

c = Purge&Trap/GC-FID

d = Gravimetry

e = GC-FID

f = Soxhlet/GC-MS

Appendix 1 - QUALITY CONTROL - Blanks

Sediment/Soil

	Result	Target	Units	DL	ALSQC#	Method
<u>Polycyclic Aromatic Hydrocarbons</u>						
Acenaphthylene	<0.050	<0.050	mg/kg	0.05	22355	a
Acenaphthylene	<0.050	<0.050	mg/kg	0.05	22475	a
Anthracene	<0.050	<0.050	mg/kg	0.05	21988	a
Anthracene	<0.050	<0.050	mg/kg	0.05	22135	a
Anthracene	<0.050	<0.050	mg/kg	0.05	22355	a
Anthracene	<0.050	<0.050	mg/kg	0.05	22475	a
Benz(a)anthracene	<0.050	<0.050	mg/kg	0.05	21988	a
Benz(a)anthracene	<0.050	<0.050	mg/kg	0.05	22135	a
Benz(a)anthracene	<0.050	<0.050	mg/kg	0.05	22355	a
Benz(a)anthracene	<0.050	<0.050	mg/kg	0.05	22475	a
Benzo(a)pyrene	<0.050	<0.050	mg/kg	0.05	21988	a
Benzo(a)pyrene	<0.050	<0.050	mg/kg	0.05	22135	a
Benzo(a)pyrene	<0.050	<0.050	mg/kg	0.05	22355	a
Benzo(a)pyrene	<0.050	<0.050	mg/kg	0.05	22475	a
Benzo(b)fluoranthene	<0.050	<0.050	mg/kg	0.05	21988	a
Benzo(b)fluoranthene	<0.050	<0.050	mg/kg	0.05	22135	a
Benzo(b)fluoranthene	<0.050	<0.050	mg/kg	0.05	22355	a
Benzo(b)fluoranthene	<0.050	<0.050	mg/kg	0.05	22475	a
Benzo(g,h,i)perylene	<0.050	<0.050	mg/kg	0.05	21988	a
Benzo(g,h,i)perylene	<0.050	<0.050	mg/kg	0.05	22135	a
Benzo(g,h,i)perylene	<0.050	<0.050	mg/kg	0.05	22355	a
Benzo(g,h,i)perylene	<0.050	<0.050	mg/kg	0.05	22475	a
Benzo(k)fluoranthene	<0.050	<0.050	mg/kg	0.05	21988	a
Benzo(k)fluoranthene	<0.050	<0.050	mg/kg	0.05	22135	a
Benzo(k)fluoranthene	<0.050	<0.050	mg/kg	0.05	22355	a
Benzo(k)fluoranthene	<0.050	<0.050	mg/kg	0.05	22475	a
Chrysene	<0.050	<0.050	mg/kg	0.05	21988	a
Chrysene	<0.050	<0.050	mg/kg	0.05	22135	a
Chrysene	<0.050	<0.050	mg/kg	0.05	22355	a
Chrysene	<0.050	<0.050	mg/kg	0.05	22475	a
Dibenz(a,h)anthracene	<0.050	<0.050	mg/kg	0.05	21988	a
Dibenz(a,h)anthracene	<0.050	<0.050	mg/kg	0.05	22135	a
Dibenz(a,h)anthracene	<0.050	<0.050	mg/kg	0.05	22355	a
Dibenz(a,h)anthracene	<0.050	<0.050	mg/kg	0.05	22475	a
Fluoranthene	<0.050	<0.050	mg/kg	0.05	21988	a
Fluoranthene	<0.050	<0.050	mg/kg	0.05	22135	a

Methods:

a = Soxhlet/GC-MS

Appendix 1 - QUALITY CONTROL - Blanks

Sediment/Soil

	Result	Target	Units	DL	ALSQC#	Method
<u>Polycyclic Aromatic Hydrocarbons</u>						
Fluoranthene	<0.050	<0.050	mg/kg	0.05	22355	a
Fluoranthene	<0.050	<0.050	mg/kg	0.05	22475	a
Fluorene	<0.050	<0.050	mg/kg	0.05	21988	a
Fluorene	<0.050	<0.050	mg/kg	0.05	22135	a
Fluorene	<0.050	<0.050	mg/kg	0.05	22355	a
Fluorene	<0.050	<0.050	mg/kg	0.05	22475	a
Indeno(1,2,3-c,d)pyrene	<0.050	<0.050	mg/kg	0.05	21988	a
Indeno(1,2,3-c,d)pyrene	<0.050	<0.050	mg/kg	0.05	22135	a
Indeno(1,2,3-c,d)pyrene	<0.050	<0.050	mg/kg	0.05	22355	a
Indeno(1,2,3-c,d)pyrene	<0.050	<0.050	mg/kg	0.05	22475	a
Naphthalene	<0.050	<0.050	mg/kg	0.05	21988	a
Naphthalene	<0.050	<0.050	mg/kg	0.05	22135	a
Naphthalene	<0.050	<0.050	mg/kg	0.05	22355	a
Naphthalene	<0.050	<0.050	mg/kg	0.05	22475	a
Phenanthrene	<0.050	<0.050	mg/kg	0.05	21988	a
Phenanthrene	<0.050	<0.050	mg/kg	0.05	22135	a
Phenanthrene	<0.050	<0.050	mg/kg	0.05	22355	a
Phenanthrene	<0.050	<0.050	mg/kg	0.05	22475	a
Pyrene	<0.050	<0.050	mg/kg	0.05	21988	a
Pyrene	<0.050	<0.050	mg/kg	0.05	22135	a
Pyrene	<0.050	<0.050	mg/kg	0.05	22355	a
Pyrene	<0.050	<0.050	mg/kg	0.05	22475	a
<u>Extractable Hydrocarbons</u>						
F2 (C10-C16)	<30	<30	mg/kg	30	21956	b
F2 (C10-C16)	<30	<30	mg/kg	30	22095	b
F2 (C10-C16)	<30	<30	mg/kg	30	22239	b
F2 (C10-C16)	<30	<30	mg/kg	30	22388	b
F2 (C10-C16)	<30	<30	mg/kg	30	22516	b
F3 (C16-C34)	<50	<50	mg/kg	50	21956	b
F3 (C16-C34)	<50	<50	mg/kg	50	22095	b
F3 (C16-C34)	<50	<50	mg/kg	50	22239	b
F3 (C16-C34)	<50	<50	mg/kg	50	22388	b
F3 (C16-C34)	<50	<50	mg/kg	50	22516	b
F4 (C34-C50)	<50	<50	mg/kg	50	21956	b
F4 (C34-C50)	<50	<50	mg/kg	50	22095	b

Methods:

a = Soxhlet/GC-MS

b = Soxhlet/GC-FID

Appendix 1 - QUALITY CONTROL - Blanks

Sediment/Soil

	Result	Target	Units	DL	ALSQC#	Method
<u>Extractable Hydrocarbons</u>						
F4 (C34-C50)	<50	<50	mg/kg	50	22239	a
F4 (C34-C50)	<50	<50	mg/kg	50	22388	a
F4 (C34-C50)	<50	<50	mg/kg	50	22516	a

Methods:

a = Soxhlet/GC-FID

Bold Targets indicate uncertified targets

Appendix 2 - METHODOLOGY



Outlines of the methodologies utilized for the analysis of the samples submitted are as follows

Moisture in Sediment/Soil

This analysis is carried out gravimetrically by drying the sample at 103 C for a minimum of six hours.

Recommended Holding Time:

Sample: 14 days

Reference: Puget

Laboratory Location: ALS Environmental, Calgary

pH in Soil

This analysis is carried out in accordance with U.S. EPA Method 9045 (Publ. # SW-846 3rd ed., Washington, DC 20460). The procedure involves mixing the soil in a one to one ratio with deionized/distilled water or calcium chloride solution, depending on whether the soil is considered calcareous or noncalcareous. The pH of the resulting solution is then measured with a standard pH probe.

Laboratory Location: ALS Environmental, Vancouver

Metals in Sediment/Soil

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B or Method 3051, United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by either hotplate or block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by atomic absorption/fluorescence spectrophotometry (EPA Method 7000 series), inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B), and/or inductively coupled plasma - mass spectrometry (EPA Method 6020).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

Recommended Holding Time:

Sample: 6 months (Hg = 28 days)

Extract: 6 months (Hg = 28 days, Sb & Sn = 7 days)

Reference: BCMELP



Appendix 2 - METHODOLOGY - Continued

Laboratory Location: ALS Environmental, Vancouver

Sulphide in Sediment/Soil

This analysis is carried out on a leachable basis. The procedure involves mixing the sample with a sodium hydroxide solution in a one to ten ratio and leaching for several hours. The leachate is then centrifuged and analyzed colorimetrically.

Laboratory Location: ALS Environmental, Vancouver

Volatile Organic Compounds in Sediment/Soil

This analysis involves the extraction of a subsample of the sediment/soil with methanol. Aliquots of the methanol extract are then analyzed for specific Volatile Organic Compounds (VOC) by capillary column gas chromatography with mass spectrometric detection (GC/MS). The VOC analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 8260, published by the United States Environmental Protection Agency (EPA).

Recommended Holding Time:

Sample: 7 days

Extract: 40 days

Reference: EPA

Laboratory Location: ALS Environmental, Calgary

Calculation of Total Xylenes

Total Xylenes is the sum of the concentrations of the ortho, meta, and para Xylene isomers. Results below detection limit (DL) are treated as zero. The DL for Total Xylenes is set to a value no less than the square root of the sum of the squares of the DLs of the individual Xylenes.

Laboratory Location: ALS Environmental, Vancouver

Petroleum Hydrocarbons in Sediment/Soil (Canada-Wide Standard)

This analysis is carried out in accordance with the "Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method, Canadian Council of Ministers of the Environment, December 2000." The various extraction fractions are analysed as follows:

CWS Fractions 1 and 1-BTEX:

This procedure involves the extraction of a subsample of the sediment/soil with methanol. Aliquots of the methanol extract are then analysed by



Appendix 2 - METHODOLOGY - Continued

capillary column gas chromatography with flame-ionization detection (GC/FID) for CWS Fraction 1, and by capillary column gas chromatography with mass spectrometric detection (GC/MS) for the BTEX compounds.

Reported results may include any or all of the following:

CWS Fraction 1 (C6-10):

sum of all petroleum hydrocarbon compounds that elute between nC6 and nC10 obtained by GC/FID analysis

CWS Fraction 1-BTEX:

CWS Fraction 1 (C6-10), minus BTEX compounds

Recommended Holding Time:

Sample: 7 days for CWS Fraction 1

Extract: 7 days for all CWS Fractions

Reference: CCME

Laboratory Location: ALS Environmental, Calgary

Petroleum Hydrocarbons in Sediment/Soil (Canada-Wide Standard)

This analysis is carried out in accordance with the "Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method, Canadian Council of Ministers of the Environment, December 2000." The various extraction fractions are analysed as follows:

CWS Fractions 2, 2-PAH, 3, 3-PAH, 4 and 4G-SG:

The procedure uses an automated system at high temperature and pressure (Accelerated Solvent Extractor - ASE) or a Soxhlet system to extract a subsample of the sediment/soil with a 1:1 mixture of hexane and acetone. The extract is concentrated and undergoes a silica-gel clean-up to remove polar material. The final extract is analysed by high temperature capillary column gas chromatography with flame ionization detection (GC/FID). CWS Fractions 4G and 4G-SG (Gravimetric Heavy Hydrocarbons) are analysed gravimetrically.

Reported results may include any or all of the following:

CWS Fraction 2 (C10-16):

sum of all petroleum hydrocarbon compounds that elute between nC10 and nC16 obtained by GC/FID analysis

CWS Fraction 2-PAH:

CWS Fraction 2 (C10-16), minus selected PAH compounds (Naphthalene)

CWS Fraction 3 (C16-34):

sum of all petroleum hydrocarbon compounds that elute between nC16 and nC34 obtained by GC/FID analysis

CWS Fraction 3-PAH:

CWS Fraction 3 (C16-34), minus selected PAH compounds



Appendix 2 - METHODOLOGY - Continued

CWS Fraction 4 (C34-50):

sum of all petroleum hydrocarbon compounds that elute between nC34 and nC50 obtained by GC/FID analysis

CWS Fraction 4G (GHH):

Results obtained by gravimetric analysis.

CWS Fraction 4G-SG (GHH + SG):

Results obtained by gravimetric analysis after silica gel clean-up

Recommended Holding Time:

Sample: 14 days for CWS Fractions 2, 3, 4, 4G & 4G-SG

Extract: 7 days for all CWS Fractions

Reference: CCME

Laboratory Location: ALS Environmental, Calgary

Polycyclic Aromatic Hydrocarbons in Sediment/Soil

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3630 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure uses a Soxhlet system to extract a subsample of the sediment/soil with a 1:1 mixture of hexane and acetone. The extract is then solvent exchanged to toluene and undergoes a silica gel clean-up to remove sample components that could potentially interfere with the analysis. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS).

Recommended Holding Time:

Sample: 14 days

Extract: 40 days

Reference: EPA

Laboratory Location: ALS Environmental, Calgary

Cyanide in Sediment/Soil

Method Revised and Replace: 1997 02 01 This analysis is carried out in accordance with U.S. EPA Method 9010 (Publ. # SW-846 3rd ed., Washington, DC 20460) Specifically, subsamples are distilled using an acid reflux distillation. Liberated hydrogen cyanide gas is trapped in a weak NaOH solution. The extracts are then analysed colorimetrically.

Laboratory Location: ALS Environmental, Vancouver

Glycols in Sediment/Soil

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 8015B, published by the United States Environmental Protection Agency (EPA). The procedure involves extraction of a subsample of the sediment/soil with deionized water, followed by treatment of the extract with a strong base (NaOH) and benzoyl chloride to form the corresponding benzoate esters. The benzoate esters are then extracted with hexane and the extract is analyzed by capillary column gas chromatography with flame ionization detection (FID).



Appendix 2 - METHODOLOGY - Continued

Recommended Holding Time:

Sample: 14 days

Extract: 40 days

Reference: EPA

Laboratory Location: ALS Environmental, Vancouver

pH in Soil

This analysis is carried out in accordance with procedures described in "Soil Sampling and Methods of Analysis" (CSSS). The procedure involves mixing the air-dried sample with deionized/distilled water. The pH of the solution is then measured using a standard pH probe. A one to two ratio of sediment to water is used for mineral soils and a one to ten ratio is used for highly organic soils.

Laboratory Location: ALS Environmental, Vancouver

Moisture in Sediment/Soil

This analysis is carried out gravimetrically by drying the sample at 103 C for a minimum of six hours.

Recommended Holding Time:

Sample: 14 days

Reference: Puget

Laboratory Location: ALS Environmental, Vancouver

pH in Sediment/Soil

This analysis is adapted from the methods outlined in "Soil Sampling and Methods of Analysis" (Canadian Society of Soil Science).

"Saturated Paste Extract" In summary, 200 - 500 dry grams of sample is extracted for a minimum of 4 hours with an amount of deionized water required to create a saturated paste. The resulting extract is then filtered and analysed for pH.

"Fixed Ratio Extract (e.g., 1:1, 1:5)" In summary, weigh out the appropriate amount of air-dried soil and add sufficient deionized water to achieve the desired extraction ratio and shake for 1 hour. The resulting extract is then filtered and analysed for pH.

pH analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode.

Recommended Holding Time:

Extract: asap

Reference: APHA



Appendix 2 - METHODOLOGY - Continued

Laboratory Location: ALS Environmental, Calgary

Conductivity in Soil by Saturation Paste Extraction

This analysis is adapted from the methods outlined in "Soil Sampling and Methods of Analysis" (Canadian Society of Soil Science). In summary, 200 - 500 dry grams of sample is extracted for a minimum of 4 hours with an amount of deionized water required to create a saturated paste. The resulting extract is then filtered or decanted and analysed for conductivity with an conductivity electrode using procedures adapted from APHA Method 2510 "Conductivity".

Recommended Holding Time:

Sample Extraction: 6 months

Sample Analysis: 28 days

Laboratory Location: ALS Environmental, Calgary

Sodium Adsorption Ratio (SAR) in Sediment/Soil

Sodium Adsorption Ratio (SAR) is calculated from the Sodium, Calcium, and Magnesium concentrations in the saturated paste extract of a sediment sample. The SAR calculation is described in "Soil Sampling and Methods of Analysis" by M. Carter.

Recommended Holding Time:

Sample/Extract: not applicable

Laboratory Location: ALS Environmental, Vancouver

Saturated Paste Extracts

This analysis is adapted from the methods outlined in "Soil Sampling and Methods of Analysis" (Canadian Society of Soil Science). In summary, 200 - 500 dry grams of sample is extracted for a minimum of 4 hours with an amount of deionized water required to create a saturated paste. The saturation % can be calculated from the amount of soil and water. The resulting extract is then filtered or decanted and analysed for various parameters.

Recommended Holding Time:

Sample: 6 month

Reference: Canadian Society of Soil Science

Laboratory Location: ALS Environmental, Calgary

Theoretical Gypsum Requirement (TGR) in Sediment/Soil

Theoretical Gypsum Requirement (TGR) is calculated from the Sodium Adsorption Ratio (SAR), and from the Sodium and Saturation % results, using Method A as described in "A Comparison of Methods for Gypsum Requirement of Brine-Contaminated Soils", by J. Ashworth, D. Keyes and J.



Appendix 2 - METHODOLOGY - Continued

Crepin (Cdn J. of Soil Science, 1999). Theoretical Gypsum Requirement results are reported as metric tonnes per hectare to a depth of 15 cm.

Please note that 50 tonnes/hectare is considered the maximum practical gypsum amendment.

Recommended Holding Time:
Sample/Extract: not applicable

Laboratory Location: ALS Environmental, Vancouver

Metals in Saturated Paste Sediment Extracts

Saturated paste sediment extracts are analyzed for metals by inductively coupled plasma optical emission spectrophotometry (EPA Method 6010B) or flame atomic absorption/emission spectrophotometry (EPA Method 7000 series). Reported metals results have been converted into milligrams per dry kilogram.

Recommended Holding Time:
Sample/Extract: 6 months
Reference: EPA

Laboratory Location: ALS Environmental, Vancouver

Anions in Soil by Saturation Paste Extraction

This analysis is adapted from the methods outlined in "Soil Sampling and Methods of Analysis" (Canadian Society of Soil Science). In summary, 200 - 500 dry grams of sample is extracted for a minimum of 4 hours with an amount of deionized water required to create a saturated paste. The resulting extract is then filtered or decanted and analysed by IC for the requested parameters using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions are determined by filtering the sample through a 0.45 micron membrane filter and injecting the filtrate onto a Dionex IonPac AG17 anion exchange column with a sodium carbonate and sodium bicarbonate eluent stream. Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate. Further details are available on request.

Recommended Holding Time:
Sample Extraction: 6 months
Sample Analysis: 28 days (bromide, chloride, fluoride, sulphate)
Sample Analysis: 2 days (nitrate, nitrite)
Reference: Canadian Society of Soil Science, APHA and EPA

Laboratory Location: ALS Environmental, Calgary

File No. R3059

Appendix 2 - METHODOLOGY - Continued



Results contained within this certificate relate only to the samples as submitted.

This Certificate Of Analysis shall only be reproduced in full, except with the written approval of ALS Environmental.

End of Report



CERTIFICATE OF ANALYSIS

Date: November 16, 2005

ALS File No. R3059b

Report On: A053017

Report To: **SNC Lavalin, Morrow Environmental**
#112, 1212 - 1st Street SE
Calgary, AB
T2G 2H8

Attention: **Mr. Neil Sandstrom**

Received: July 30, 2005

ALS ENVIRONMENTAL

per:

Monica Gibson

Monica Gibson, M.Sc. - Project Chemist
Brent Whitehead, B.Sc. - Operations Supervisor

File No. R3059b

REMARKS



This file for ALS file R3059b supercedes R3059. Added Saturated Paste pH and Sulphate analysis. Corrected 2:1 pH results for -21, -81 and -86.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-11-01	TP05-11-02	TP05-12-01	TP05-12-02	TP05-13-01
Sample Date	05-07-18	05-07-18	05-07-18	05-07-18	05-07-18
ALS ID	1	2	3	4	5

Physical Tests

Conductivity (dS/m)	-	-	-	-	-
Moisture %	4.88	5.47	8.25	10.4	9.93
pH	8.14	7.75	7.81	5.61	6.72
pH (Saturated Paste)	7.61	5.73	7.08	-	-
Sodium Adsorption Ratio (SAR)	-	-	-	-	-
Saturation Percentage %	-	-	-	-	-
TGR (tonnes/hectare)	-	-	-	-	-

Cyanides

Total Cyanide CN	-	<3.0	-	<3.0	-
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Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-11-01	TP05-11-02	TP05-12-01	TP05-12-02	TP05-13-01
Sample Date	05-07-18	05-07-18	05-07-18	05-07-18	05-07-18
ALS ID	1	2	3	4	5

Total Metals

Antimony	T-Sb	<10	<10	<10	<10	<10
Arsenic	T-As	1510	2420	72.8	20.8	<5.0
Barium	T-Ba	212	189	45.4	42.2	30.9
Beryllium	T-Be	<0.50	<0.50	<0.50	<0.50	<0.50
Cadmium	T-Cd	1.18	<0.50	<0.50	<0.50	<0.50
Chromium	T-Cr	77.0	75.5	32.6	26.1	18.5
Cobalt	T-Co	19.8	18.6	5.6	5.1	3.5
Copper	T-Cu	157	171	46.0	14.8	6.7
Lead	T-Pb	40	<30	37	<30	<30
Mercury	T-Hg	0.0064	<0.0050	0.0054	<0.0050	<0.0050
Molybdenum	T-Mo	<4.0	<4.0	4.6	<4.0	<4.0
Nickel	T-Ni	57.9	51.5	31.9	14.2	9.4
Selenium	T-Se	<2.0	<2.0	<2.0	<2.0	<2.0
Silver	T-Ag	<2.0	<2.0	<2.0	<2.0	<2.0
Thallium	T-Tl	<1.0	<1.0	<1.0	<1.0	<1.0
Tin	T-Sn	<5.0	<5.0	9.3	<5.0	<5.0
Vanadium	T-V	55.2	48.5	25.0	23.6	18.6
Zinc	T-Zn	329	163	75.8	25.3	19.5

Inorganic Parameters

Sulphide	S	<1.0	1.2	1.37	-	-
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Non-Halogenated Volatiles

Benzene	<0.040	<0.040	<0.040	<0.040	<0.040
Ethylbenzene	<0.050	<0.050	<0.050	<0.050	<0.050
Toluene	<0.10	<0.10	<0.10	<0.10	<0.10
meta- & para-Xylene	<0.050	<0.050	<0.050	<0.050	<0.050
ortho-Xylene	<0.050	<0.050	<0.050	<0.050	<0.050
Total Xylenes	<0.075	<0.075	<0.075	<0.075	<0.075

CCME Hydrocarbon Fractions

F1 (C6-C10)	<10	<10	62	46	<10
F1-BTEX	<10	<10	62	46	<10
F2 (C10-C16)	105	52	1680	<30	<30
F3 (C16-C34)	351	375	1040	<50	<50
F4 (C34-C50)	<50	<50	213	<50	<50
F4G-sg	-	-	-	-	-
F4G-SG Required (yes/no)	no	no	no	no	no

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-11-01	TP05-11-02	TP05-12-01
Sample Date	05-07-18	05-07-18	05-07-18
ALS ID	1	2	3

Glycols

Diethylene Glycol	-	<10	-
Ethylene Glycol	-	<10	-
1,2-Propylene Glycol	-	<10	-
Triethylene Glycol	-	<10	-

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.040	-	0.094
Acenaphthylene	<0.050	-	<0.050
Anthracene	<0.050	-	0.212
Benz(a)anthracene	<0.050	-	<0.050
Benzo(a)pyrene	<0.050	-	<0.050
Benzo(b)fluoranthene	<0.050	-	<0.050
Benzo(g,h,i)perylene	<0.050	-	<0.050
Benzo(k)fluoranthene	<0.050	-	<0.050
Chrysene	<0.050	-	<0.050
Dibenz(a,h)anthracene	<0.050	-	<0.050
Fluoranthene	<0.050	-	<0.050
Fluorene	<0.050	-	0.294
Indeno(1,2,3-c,d)pyrene	<0.050	-	<0.050
Naphthalene	0.370	-	0.211
Phenanthrene	<0.050	-	0.115
Pyrene	<0.050	-	<0.050

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Sediment/Soil

Sample ID	TP05-13-02	TP05-14-01	TP05-14-02	TP05-15-01	TP05-15-02
Sample Date	05-07-18	05-07-18	05-07-18	05-07-18	05-07-18
ALS ID	6	7	8	9	10

Physical Tests

Conductivity (dS/m)	-	-	-	-	-
Moisture %	7.84	7.74	8.46	6.77	10.3
pH	7.14	7.53	7.79	3.47	7.63
pH (Saturated Paste)	-	7.33	7.21	3.47	7.47
Sodium Adsorption Ratio (SAR)	-	-	-	-	-
Saturation Percentage %	-	-	-	-	-
TGR (tonnes/hectare)	-	-	-	-	-

Cyanides

Total Cyanide CN	<3.0	-	<3.0	-	-
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Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-13-02	TP05-14-01	TP05-14-02	TP05-15-01	TP05-15-02
Sample Date	05-07-18	05-07-18	05-07-18	05-07-18	05-07-18
ALS ID	6	7	8	9	10

Total Metals

Antimony	T-Sb	<10	171	14	<10	<10
Arsenic	T-As	<5.0	1690	14.7	2110	619
Barium	T-Ba	42.6	249	61.0	189	101
Beryllium	T-Be	<0.50	<0.50	<0.50	<0.50	<0.50
Cadmium	T-Cd	<0.50	6.38	0.60	<0.50	<0.50
Chromium	T-Cr	25.7	74.4	30.0	79.8	45.6
Cobalt	T-Co	4.2	12.9	4.0	7.8	11.0
Copper	T-Cu	11.9	429	33.5	42.4	30.3
Lead	T-Pb	<30	3410	1570	<30	<30
Mercury	T-Hg	<0.0050	0.0549	<0.0050	<0.0050	0.0076
Molybdenum	T-Mo	<4.0	10.6	<4.0	<4.0	<4.0
Nickel	T-Ni	13.4	42.5	14.0	33.6	35.4
Selenium	T-Se	<2.0	<2.0	<2.0	<2.0	<2.0
Silver	T-Ag	<2.0	<2.0	<2.0	<2.0	<2.0
Thallium	T-Tl	<1.0	<1.0	<1.0	<1.0	<1.0
Tin	T-Sn	<5.0	7.2	<5.0	<5.0	<5.0
Vanadium	T-V	22.2	40.0	19.8	52.6	35.8
Zinc	T-Zn	30.9	1570	257	59.4	56.5

Inorganic Parameters

Sulphide	S	-	<1.0	1.2	21.9	<3.3
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Non-Halogenated Volatiles

Benzene	<0.040	0.201	0.332	<0.040	<0.040
Ethylbenzene	<0.050	0.341	0.093	<0.050	<0.050
Toluene	<0.10	0.89	1.03	<0.10	<0.10
meta- & para-Xylene	<0.050	1.63	1.22	<0.050	0.115
ortho-Xylene	<0.050	2.02	0.817	<0.050	0.063
Total Xylenes	<0.075	3.65	2.04	<0.075	0.178

CCME Hydrocarbon Fractions

F1 (C6-C10)	<10	275	144	35	40
F1-BTEX	<10	270	141	35	39
F2 (C10-C16)	<30	3700	2600	<30	2560
F3 (C16-C34)	<50	4050	1300	157	798
F4 (C34-C50)	<50	1790	363	56	<50
F4G-sg	-	7200	1790	-	-
F4G-SG Required (yes/no)	no	yes	yes	no	no

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-13-02	TP05-14-02	TP05-15-02
Sample Date	05-07-18	05-07-18	05-07-18
ALS ID	6	8	10

Glycols

Diethylene Glycol	-	<10	-
Ethylene Glycol	-	<10	-
1,2-Propylene Glycol	-	<10	-
Triethylene Glycol	-	<10	-

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.040	-	<0.40
Acenaphthylene	<0.050	-	<0.50
Anthracene	<0.050	-	<0.50
Benz(a)anthracene	<0.050	-	<0.050
Benzo(a)pyrene	<0.050	-	<0.050
Benzo(b)fluoranthene	<0.050	-	<0.050
Benzo(g,h,i)perylene	<0.050	-	<0.050
Benzo(k)fluoranthene	<0.050	-	<0.050
Chrysene	<0.050	-	<0.050
Dibenz(a,h)anthracene	<0.050	-	<0.050
Fluoranthene	<0.050	-	<0.050
Fluorene	<0.050	-	<0.50
Indeno(1,2,3-c,d)pyrene	<0.050	-	<0.050
Naphthalene	<0.050	-	<0.50
Phenanthrene	<0.050	-	<0.50
Pyrene	<0.050	-	0.111

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-16-01	TP05-16-02	TP05-17-01	TP05-17-02	TP05-18-01
Sample Date	05-07-18	05-07-18	05-07-18	05-07-18	05-07-18
ALS ID	11	12	13	14	15

Physical Tests

Conductivity (dS/m)	-	-	-	-	-
Moisture %	5.42	6.02	8.19	10.5	6.66
pH	8.09	8.53	9.36	7.75	8.38
pH (Saturated Paste)	7.56	7.62	7.84	7.25	7.74
Sodium Adsorption Ratio (SAR)	-	-	-	-	-
Saturation Percentage %	-	-	-	-	-
TGR (tonnes/hectare)	-	-	-	-	-

Cyanides

Total Cyanide CN	<3.0	<3.0	-	-	-
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Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-16-01	TP05-16-02	TP05-17-01	TP05-17-02	TP05-18-01
Sample Date	05-07-18	05-07-18	05-07-18	05-07-18	05-07-18
ALS ID	11	12	13	14	15

Total Metals

Antimony	T-Sb	<10	<10	<10	<10	<10
Arsenic	T-As	1060	556	122	8.9	511
Barium	T-Ba	189	147	194	37.8	239
Beryllium	T-Be	<0.50	<0.50	<0.50	<0.50	<0.50
Cadmium	T-Cd	<0.50	<0.50	<0.50	<0.50	<0.50
Chromium	T-Cr	87.3	66.4	84.7	29.0	91.5
Cobalt	T-Co	20.5	16.5	20.7	5.5	20.6
Copper	T-Cu	44.6	40.8	45.9	12.8	53.4
Lead	T-Pb	88	84	<30	<30	<30
Mercury	T-Hg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum	T-Mo	<4.0	<4.0	<4.0	<4.0	<4.0
Nickel	T-Ni	62.9	51.1	64.0	17.6	59.7
Selenium	T-Se	<2.0	<2.0	<2.0	<2.0	<2.0
Silver	T-Ag	<2.0	<2.0	<2.0	<2.0	<2.0
Thallium	T-Tl	<1.0	<1.0	<1.0	<1.0	<1.0
Tin	T-Sn	<5.0	<5.0	<5.0	<5.0	<5.0
Vanadium	T-V	58.9	44.9	58.0	22.5	63.7
Zinc	T-Zn	70.9	70.3	75.6	30.3	80.2

Inorganic Parameters

Sulphide	S	1.3	0.68	<1.0	<1.0	1.2
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Non-Halogenated Volatiles

Benzene	-	-	-	-	<0.040
Ethylbenzene	-	-	-	-	<0.050
Toluene	-	-	-	-	<0.10
meta- & para-Xylene	-	-	-	-	<0.050
ortho-Xylene	-	-	-	-	<0.050
Total Xylenes	-	-	-	-	<0.075

CCME Hydrocarbon Fractions

F1 (C6-C10)	-	-	-	-	31
F1-BTEX	-	-	-	-	31
F2 (C10-C16)	-	-	-	-	<30
F3 (C16-C34)	-	-	-	-	117
F4 (C34-C50)	-	-	-	-	<50
F4G-sg	-	-	-	-	-
F4G-SG Required (yes/no)	-	-	-	-	no

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Sediment/Soil

Sample ID	TP05-18-02	TP05-19-01	TP05-19-02	TP05-20-01	TP05-20-02
Sample Date	05-07-18	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	16	17	18	19	20

Physical Tests

Conductivity (dS/m)	-	-	-	-	-
Moisture %	9.80	3.64	5.14	-	-
pH	7.61	3.82	7.59	3.89	5.58
pH (Saturated Paste)	-	3.82	6.14	-	-
Sodium Adsorption Ratio (SAR)	-	-	-	-	-
Saturation Percentage %	-	-	-	-	-
TGR (tonnes/hectare)	-	-	-	-	-

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-18-02	TP05-19-01	TP05-19-02	TP05-20-01	TP05-20-02
Sample Date	05-07-18	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	16	17	18	19	20

Total Metals

Antimony	T-Sb	<10	<10	<10	<10	<10
Arsenic	T-As	12.0	1110	1340	479	10.4
Barium	T-Ba	47.3	177	142	81.9	35.2
Beryllium	T-Be	<0.50	<0.50	<0.50	<0.50	<0.50
Cadmium	T-Cd	<0.50	<0.50	<0.50	<0.50	<0.50
Chromium	T-Cr	32.7	74.8	61.1	40.5	25.6
Cobalt	T-Co	5.5	11.6	13.9	7.1	5.0
Copper	T-Cu	15.0	33.5	34.7	26.2	16.4
Lead	T-Pb	<30	<30	<30	<30	<30
Mercury	T-Hg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum	T-Mo	<4.0	<4.0	<4.0	<4.0	<4.0
Nickel	T-Ni	18.0	40.9	41.9	22.4	15.6
Selenium	T-Se	<2.0	<2.0	<2.0	<2.0	<2.0
Silver	T-Ag	<2.0	<2.0	<2.0	<2.0	<2.0
Thallium	T-Tl	<1.0	<1.0	<1.0	<1.0	<1.0
Tin	T-Sn	<5.0	<5.0	<5.0	<5.0	<5.0
Vanadium	T-V	27.6	53.5	41.3	34.9	24.0
Zinc	T-Zn	28.1	55.7	53.9	35.5	23.4

Inorganic Parameters

Sulphide	S	-	<5.0	<5.0	-	-
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Non-Halogenated Volatiles

Benzene	<0.040	<0.040	<0.040	-	-
Ethylbenzene	<0.050	<0.050	<0.050	-	-
Toluene	<0.10	<0.10	<0.10	-	-
meta- & para-Xylene	<0.050	<0.050	<0.050	-	-
ortho-Xylene	<0.050	<0.050	<0.050	-	-
Total Xylenes	<0.075	<0.075	<0.075	-	-

CCME Hydrocarbon Fractions

F1 (C6-C10)	<10	<10	<10	-	-
F1-BTEX	<10	<10	<10	-	-
F2 (C10-C16)	<30	<30	<30	-	-
F3 (C16-C34)	<50	81	57	-	-
F4 (C34-C50)	<50	<50	<50	-	-
F4G-sg	-	-	-	-	-
F4G-SG Required (yes/no)	no	no	no	-	-

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-21-01	TP05-21-02	TP05-22-01	TP05-22-02	TP05-23-01
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	21	22	23	24	25

Physical Tests

Conductivity (dS/m)	-	-	-	-	-
Moisture %	9.43	6.25	0.14	15.4	6.21
pH	4.26	7.73	7.59	7.70	8.04
pH (Saturated Paste)	3.83	7.54	6.94	7.25	6.41
Sodium Adsorption Ratio (SAR)	-	-	-	-	-
Saturation Percentage %	-	-	-	-	-
TGR (tonnes/hectare)	-	-	-	-	-

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-21-01	TP05-21-02	TP05-22-01	TP05-22-02	TP05-23-01
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	21	22	23	24	25

Total Metals

Antimony	T-Sb	<10	<10	<10	<10	<10
Arsenic	T-As	1600	3660	1190	1760	1130
Barium	T-Ba	75.4	166	232	239	236
Beryllium	T-Be	<0.50	<0.50	<0.50	<0.50	<0.50
Cadmium	T-Cd	<0.50	<0.50	<0.50	<0.50	<0.50
Chromium	T-Cr	50.6	63.5	83.5	83.3	85.0
Cobalt	T-Co	5.8	15.0	17.7	18.8	18.0
Copper	T-Cu	20.6	44.0	41.9	48.8	42.7
Lead	T-Pb	<30	<30	<30	<30	<30
Mercury	T-Hg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum	T-Mo	<4.0	<4.0	<4.0	<4.0	<4.0
Nickel	T-Ni	22.7	45.4	60.5	61.1	61.6
Selenium	T-Se	<2.0	<2.0	<2.0	<2.0	<2.0
Silver	T-Ag	<2.0	<2.0	<2.0	<2.0	<2.0
Thallium	T-Tl	<1.0	<1.0	<1.0	<1.0	<1.0
Tin	T-Sn	<5.0	<5.0	<5.0	<5.0	<5.0
Vanadium	T-V	35.9	45.8	65.6	62.3	62.3
Zinc	T-Zn	35.1	55.7	70.4	71.1	75.6

Inorganic Parameters

Sulphide	S	-	<5.0	<5.0	2.2	<5.0
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Non-Halogenated Volatiles

Benzene	<0.040	<0.040	-	-	<0.040
Ethylbenzene	<0.050	<0.050	-	-	<0.050
Toluene	<0.10	<0.10	-	-	<0.10
meta- & para-Xylene	<0.050	<0.050	-	-	<0.050
ortho-Xylene	<0.050	<0.050	-	-	<0.050
Total Xylenes	<0.075	<0.075	-	-	<0.075

CCME Hydrocarbon Fractions

F1 (C6-C10)	<10	<10	-	-	<10
F1-BTEX	<10	<10	-	-	<10
F2 (C10-C16)	<30	<30	-	-	<30
F3 (C16-C34)	175	202	-	-	120
F4 (C34-C50)	<50	<50	-	-	<50
F4G-sg	-	-	-	-	-
F4G-SG Required (yes/no)	no	no	-	-	no

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-21-01	TP05-21-02
Sample Date	05-07-19	05-07-19
ALS ID	21	22

Glycols

Diethylene Glycol	-	<10
Ethylene Glycol	-	<10
1,2-Propylene Glycol	-	<10
Triethylene Glycol	-	<10

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.040	-
Acenaphthylene	<0.050	-
Anthracene	<0.050	-
Benz(a)anthracene	<0.050	-
Benzo(a)pyrene	<0.050	-
Benzo(b)fluoranthene	<0.050	-
Benzo(g,h,i)perylene	<0.050	-
Benzo(k)fluoranthene	<0.050	-
Chrysene	<0.050	-
Dibenz(a,h)anthracene	<0.050	-
Fluoranthene	<0.050	-
Fluorene	<0.050	-
Indeno(1,2,3-c,d)pyrene	<0.050	-
Naphthalene	<0.050	-
Phenanthrene	<0.050	-
Pyrene	<0.050	-

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-23-02	TP05-23-03	TP05-24-01	TP05-24-02	TP05-25-01
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	26	27	28	29	30

Physical Tests

Conductivity (dS/m)	-	-	-	-	-
Moisture %	4.86	12.8	6.24	5.09	7.69
pH	-	7.15	4.05	7.99	7.91
pH (Saturated Paste)	-	7.32	3.75	7.73	7.40
Sodium Adsorption Ratio (SAR)	-	-	-	-	-
Saturation Percentage %	-	-	-	-	-
TGR (tonnes/hectare)	-	-	-	-	-

Cyanides

Total Cyanide CN	-	<3.0	-	-	-
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Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-23-02	TP05-23-03	TP05-24-01	TP05-24-02	TP05-25-01
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	26	27	28	29	30

Total Metals

Antimony	T-Sb	-	<10	<10	<10	<10
Arsenic	T-As	-	15.7	341	189	3010
Barium	T-Ba	-	42.6	76.4	73.3	150
Beryllium	T-Be	-	<0.50	<0.50	<0.50	<0.50
Cadmium	T-Cd	-	<0.50	<0.50	<0.50	<0.50
Chromium	T-Cr	-	36.5	38.2	51.4	61.6
Cobalt	T-Co	-	6.6	6.8	11.2	12.6
Copper	T-Cu	-	19.5	26.9	47.3	51.5
Lead	T-Pb	-	<30	<30	<30	49
Mercury	T-Hg	-	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum	T-Mo	-	<4.0	<4.0	<4.0	<4.0
Nickel	T-Ni	-	21.9	22.4	35.0	44.5
Selenium	T-Se	-	<2.0	<2.0	<2.0	<2.0
Silver	T-Ag	-	<2.0	<2.0	<2.0	<2.0
Thallium	T-Tl	-	<1.0	<1.0	<1.0	<1.0
Tin	T-Sn	-	<5.0	<5.0	<5.0	<5.0
Vanadium	T-V	-	25.9	27.3	34.3	42.0
Zinc	T-Zn	-	30.8	39.2	45.2	59.2

Inorganic Parameters

Sulphide	S	-	<1.0	<5.0	<0.20	<5.0
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Non-Halogenated Volatiles

Benzene	<0.040	<0.040	<0.040	<0.040	<0.040
Ethylbenzene	<0.050	<0.050	<0.050	<0.050	<0.050
Toluene	<0.10	0.12	<0.10	<0.10	<0.10
meta- & para-Xylene	0.674	3.29	<0.050	<0.050	<0.050
ortho-Xylene	0.552	2.29	<0.050	<0.050	<0.050
Total Xylenes	1.23	5.58	<0.075	<0.075	<0.075

CCME Hydrocarbon Fractions

F1 (C6-C10)	57	210	73	<10	<10
F1-BTEX	56	204	73	<10	<10
F2 (C10-C16)	775	1750	<30	<30	<30
F3 (C16-C34)	224	449	70	77	72
F4 (C34-C50)	<50	<50	<50	<50	70
F4G-sg	-	-	-	-	-
F4G-SG Required (yes/no)	no	no	no	no	no

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID TP05-23-03

Sample Date 05-07-19
ALS ID 27

Glycols

Diethylene Glycol	<10
Ethylene Glycol	<10
1,2-Propylene Glycol	<10
Triethylene Glycol	<10

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.40
Acenaphthylene	<0.50
Anthracene	<0.50
Benz(a)anthracene	<0.050
Benzo(a)pyrene	<0.050

Benzo(b)fluoranthene	<0.050
Benzo(g,h,i)perylene	<0.050
Benzo(k)fluoranthene	<0.050
Chrysene	<0.050
Dibenz(a,h)anthracene	<0.050

Fluoranthene	<0.050
Fluorene	<0.50
Indeno(1,2,3-c,d)pyrene	<0.050
Naphthalene	<0.50
Phenanthrene	<0.50

Pyrene	<0.050
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Remarks regarding the analyses appear at the beginning of this report.
Results are expressed as milligrams per dry kilogram except where noted.
< = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-25-02	TP05-25-03	TP05-26-01	TP05-26-02	TP05-26-03
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	31	32	33	34	35

Physical Tests

Conductivity	(dS/m)	-	-	-	-
Moisture	%	3.58	7.30	10.8	5.14
pH		-	-	3.39	7.94
pH (Saturated Paste)		-	-	3.20	7.16
Sodium Adsorption Ratio (SAR)		-	-	-	-
Saturation Percentage %		-	-	-	-
TGR (tonnes/hectare)		-	-	-	-

Dissolved Anions

Sulphate	SO4	-	-	530	-
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Cyanides

Total Cyanide	CN	-	<3.0	-	<3.0
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Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-25-02	TP05-25-03	TP05-26-01	TP05-26-02	TP05-26-03
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	31	32	33	34	35

Total Metals

Antimony	T-Sb	-	-	<10	<10	-
Arsenic	T-As	-	-	1620	1580	-
Barium	T-Ba	-	-	206	207	-
Beryllium	T-Be	-	-	<0.50	<0.50	-
Cadmium	T-Cd	-	-	<0.50	<0.50	-
Chromium	T-Cr	-	-	72.6	89.3	-
Cobalt	T-Co	-	-	9.7	20.4	-
Copper	T-Cu	-	-	46.0	47.1	-
Lead	T-Pb	-	-	712	<30	-
Mercury	T-Hg	-	-	0.0063	<0.0050	-
Molybdenum	T-Mo	-	-	<4.0	<4.0	-
Nickel	T-Ni	-	-	34.0	63.4	-
Selenium	T-Se	-	-	<2.0	<2.0	-
Silver	T-Ag	-	-	<2.0	<2.0	-
Thallium	T-Tl	-	-	<1.0	<1.0	-
Tin	T-Sn	-	-	<5.0	<5.0	-
Vanadium	T-V	-	-	51.4	59.1	-
Zinc	T-Zn	-	-	61.4	75.2	-

Inorganic Parameters

Sulphide	S	-	-	4.3	<1.0	-
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Non-Halogenated Volatiles

Benzene	<0.040	<0.040	<0.040	<0.040	<0.040
Ethylbenzene	<0.050	<0.050	<0.050	<0.050	<0.050
Toluene	<0.10	<0.10	<0.10	<0.10	<0.10
meta- & para-Xylene	<0.050	0.061	<0.050	<0.050	<0.050
ortho-Xylene	<0.050	0.080	<0.050	<0.050	<0.050
Total Xylenes	<0.075	0.141	<0.075	<0.075	<0.075

CCME Hydrocarbon Fractions

F1 (C6-C10)	<10	19	<10	<10	<10
F1-BTEX	<10	19	<10	<10	<10
F2 (C10-C16)	<30	291	<30	<30	740
F3 (C16-C34)	<50	213	123	101	450
F4 (C34-C50)	<50	<50	<50	<50	<50
F4G-sg	-	-	-	-	-
F4G-SG Required (yes/no)	no	no	no	no	no

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Sediment/Soil

Sample ID TP05-25-03

Sample Date 05-07-19
ALS ID 32

Glycols

Diethylene Glycol	<10
Ethylene Glycol	<10
1,2-Propylene Glycol	<10
Triethylene Glycol	<10

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.040
Acenaphthylene	<0.050
Anthracene	<0.050
Benz(a)anthracene	<0.050
Benzo(a)pyrene	<0.050

Benzo(b)fluoranthene	<0.050
Benzo(g,h,i)perylene	<0.050
Benzo(k)fluoranthene	<0.050
Chrysene	<0.050
Dibenz(a,h)anthracene	<0.050

Fluoranthene	<0.050
Fluorene	0.100
Indeno(1,2,3-c,d)pyrene	<0.050
Naphthalene	<0.050
Phenanthrene	<0.050

Pyrene	<0.050
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Remarks regarding the analyses appear at the beginning of this report.
Results are expressed as milligrams per dry kilogram except where noted.
< = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-27-01	TP05-27-02	TP05-28-01	TP05-28-02	TP05-28-03
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	36	37	38	39	40

Physical Tests

Conductivity (dS/m)	-	-	-	-	-
Moisture %	5.65	8.43	6.90	13.1	8.36
pH	7.42	5.75	-	-	-
pH (Saturated Paste)	6.97	6.45	-	-	-
Sodium Adsorption Ratio (SAR)	-	-	-	-	-
Saturation Percentage %	-	-	-	-	-
TGR (tonnes/hectare)	-	-	-	-	-

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-27-01	TP05-27-02	TP05-28-01	TP05-28-02	TP05-28-03
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	36	37	38	39	40

Total Metals

Antimony	T-Sb	<10	<10	-	-	-
Arsenic	T-As	1440	14.6	-	-	-
Barium	T-Ba	152	41.4	-	-	-
Beryllium	T-Be	<0.50	<0.50	-	-	-
Cadmium	T-Cd	<0.50	<0.50	-	-	-
Chromium	T-Cr	62.8	25.3	-	-	-
Cobalt	T-Co	13.2	5.0	-	-	-
Copper	T-Cu	33.5	14.0	-	-	-
Lead	T-Pb	<30	<30	-	-	-
Mercury	T-Hg	0.0093	<0.0050	-	-	-
Molybdenum	T-Mo	<4.0	<4.0	-	-	-
Nickel	T-Ni	41.7	13.7	-	-	-
Selenium	T-Se	<2.0	<2.0	-	-	-
Silver	T-Ag	<2.0	<2.0	-	-	-
Thallium	T-Tl	<1.0	<1.0	-	-	-
Tin	T-Sn	<5.0	<5.0	-	-	-
Vanadium	T-V	44.2	21.5	-	-	-
Zinc	T-Zn	64.8	22.8	-	-	-

Inorganic Parameters

Sulphide	S	1.1	<2.0	-	-	-
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Non-Halogenated Volatiles

Benzene	-	-	<0.080	0.49	<0.80
Ethylbenzene	-	-	<0.10	4.62	7.8
Toluene	-	-	<0.20	4.9	8.1
meta- & para-Xylene	-	-	4.77	28.3	49.0
ortho-Xylene	-	-	10.2	18.6	29.4
Total Xylenes	-	-	14.9	46.9	78.4

CCME Hydrocarbon Fractions

F1 (C6-C10)	-	-	1040	1730	2740
F1-BTEX	-	-	1030	1670	2650
F2 (C10-C16)	-	-	5440	8610	9130
F3 (C16-C34)	-	-	1530	2980	2410
F4 (C34-C50)	-	-	<50	<50	<50
F4G-sg	-	-	-	-	-
F4G-SG Required (yes/no)	-	-	no	no	no

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Sediment/Soil

Sample ID TP05-28-03

Sample Date 05-07-19
ALS ID 40

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.80
Acenaphthylene	<1.0
Anthracene	<1.0
Benz(a)anthracene	<0.050
Benzo(a)pyrene	<0.050
Benzo(b)fluoranthene	<0.050
Benzo(g,h,i)perylene	<0.050
Benzo(k)fluoranthene	<0.050
Chrysene	<0.050
Dibenz(a,h)anthracene	<0.050
Fluoranthene	0.096
Fluorene	<1.0
Indeno(1,2,3-c,d)pyrene	<0.050
Naphthalene	8.4
Phenanthrene	<1.0
Pyrene	0.258

Remarks regarding the analyses appear at the beginning of this report.
Results are expressed as milligrams per dry kilogram except where noted.
< = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-29-01	TP05-29-02	TP05-29-03	TP05-30-01	TP05-30-02
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	41	42	43	44	45

Physical Tests

Conductivity (dS/m)	-	-	-	-	-
Moisture %	4.45	9.93	10.2	4.58	7.49
pH	8.04	-	5.90	5.61	-
pH (Saturated Paste)	7.48	-	-	-	-
Sodium Adsorption Ratio (SAR)	-	-	-	-	-
Saturation Percentage %	-	-	-	-	-
TGR (tonnes/hectare)	-	-	-	-	-

Cyanides

Total Cyanide CN	-	-	-	-	<3.0
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Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-29-01	TP05-29-02	TP05-29-03	TP05-30-01	TP05-30-02
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	41	42	43	44	45

Total Metals

Antimony	T-Sb	<10	-	<10	<10	-
Arsenic	T-As	940	-	14.7	9.9	-
Barium	T-Ba	159	-	41.0	37.4	-
Beryllium	T-Be	<0.50	-	<0.50	<0.50	-
Cadmium	T-Cd	<0.50	-	<0.50	<0.50	-
Chromium	T-Cr	65.3	-	27.8	27.4	-
Cobalt	T-Co	13.7	-	4.6	4.5	-
Copper	T-Cu	34.2	-	11.7	12.9	-
Lead	T-Pb	<30	-	<30	<30	-
Mercury	T-Hg	<0.0050	-	<0.0050	<0.0050	-
Molybdenum	T-Mo	<4.0	-	<4.0	<4.0	-
Nickel	T-Ni	43.4	-	13.7	15.2	-
Selenium	T-Se	<2.0	-	<2.0	<2.0	-
Silver	T-Ag	<2.0	-	<2.0	<2.0	-
Thallium	T-Tl	<1.0	-	<1.0	<1.0	-
Tin	T-Sn	<5.0	-	<5.0	<5.0	-
Vanadium	T-V	44.7	-	27.3	19.9	-
Zinc	T-Zn	64.2	-	23.8	20.9	-

Inorganic Parameters

Sulphide	S	<2.0	-	-	-	-
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Non-Halogenated Volatiles

Benzene	<0.040	<0.040	<0.040	-	-
Ethylbenzene	<0.050	<0.050	0.120	-	-
Toluene	<0.10	<0.10	0.26	-	-
meta- & para-Xylene	0.276	<0.050	0.578	-	-
ortho-Xylene	0.826	0.080	0.283	-	-
Total Xylenes	1.10	0.080	0.861	-	-

CCME Hydrocarbon Fractions

F1 (C6-C10)	52	<10	<10	-	-
F1-BTEX	51	<10	<10	-	-
F2 (C10-C16)	2290	52	<30	<30	<30
F3 (C16-C34)	1170	<50	<50	<50	<50
F4 (C34-C50)	142	<50	<50	<50	<50
F4G-sg	-	-	-	-	-
F4G-SG Required (yes/no)	no	no	no	no	no

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-29-03	TP05-30-02
Sample Date	05-07-19	05-07-19
ALS ID	43	45

Glycols

Diethylene Glycol	-	<10
Ethylene Glycol	-	<10
1,2-Propylene Glycol	-	<10
Triethylene Glycol	-	<10

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.040	-
Acenaphthylene	<0.050	-
Anthracene	<0.050	-
Benz(a)anthracene	<0.050	-
Benzo(a)pyrene	<0.050	-
Benzo(b)fluoranthene	<0.050	-
Benzo(g,h,i)perylene	<0.050	-
Benzo(k)fluoranthene	<0.050	-
Chrysene	<0.050	-
Dibenz(a,h)anthracene	<0.050	-
Fluoranthene	<0.050	-
Fluorene	<0.050	-
Indeno(1,2,3-c,d)pyrene	<0.050	-
Naphthalene	<0.050	-
Phenanthrene	<0.050	-
Pyrene	<0.050	-

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-31-01	TP05-31-02	TP05-31-03	TP05-32-01	TP05-32-02
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	46	47	48	49	50

Physical Tests

Conductivity (dS/m)	-	-	-	-	-
Moisture %	13.2	7.64	7.56	6.07	2.51
pH	7.55	-	-	3.35	-
pH (Saturated Paste)	-	-	-	3.29	-
Sodium Adsorption Ratio (SAR)	-	-	-	-	-
Saturation Percentage %	-	-	-	-	-
TGR (tonnes/hectare)	-	-	-	-	-

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-31-01	TP05-31-02	TP05-31-03	TP05-32-01	TP05-32-02
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	46	47	48	49	50

Total Metals

Antimony	T-Sb	<10	-	-	<10	-
Arsenic	T-As	81.3	-	-	3700	-
Barium	T-Ba	48.0	-	-	216	-
Beryllium	T-Be	<0.50	-	-	<0.50	-
Cadmium	T-Cd	<0.50	-	-	<0.50	-
Chromium	T-Cr	34.3	-	-	70.0	-
Cobalt	T-Co	6.8	-	-	9.8	-
Copper	T-Cu	16.2	-	-	34.3	-
Lead	T-Pb	<30	-	-	<30	-
Mercury	T-Hg	<0.0050	-	-	<0.0050	-
Molybdenum	T-Mo	<4.0	-	-	<4.0	-
Nickel	T-Ni	21.5	-	-	34.3	-
Selenium	T-Se	<2.0	-	-	<2.0	-
Silver	T-Ag	<2.0	-	-	<2.0	-
Thallium	T-Tl	<1.0	-	-	<1.0	-
Tin	T-Sn	<5.0	-	-	<5.0	-
Vanadium	T-V	23.8	-	-	46.7	-
Zinc	T-Zn	28.8	-	-	49.3	-

Inorganic Parameters

Sulphide	S	-	-	-	<2.0	-
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Non-Halogenated Volatiles

Benzene	-	-	-	<0.040	<0.040
Ethylbenzene	-	-	-	<0.050	<0.050
Toluene	-	-	-	<0.10	<0.10
meta- & para-Xylene	-	-	-	<0.050	<0.050
ortho-Xylene	-	-	-	<0.050	<0.050
Total Xylenes	-	-	-	<0.075	<0.075

CCME Hydrocarbon Fractions

F1 (C6-C10)	-	-	-	<10	<10
F1-BTEX	-	-	-	<10	<10
F2 (C10-C16)	<30	<30	<30	31	33
F3 (C16-C34)	127	<50	58	84	<50
F4 (C34-C50)	61	<50	<50	<50	<50
F4G-sg	-	-	-	-	-
F4G-SG Required (yes/no)	no	no	no	no	no

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-31-01	TP05-31-02	TP05-31-03	TP05-32-01
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	46	47	48	49

Glycols

Diethylene Glycol	-	-	-	<10
Ethylene Glycol	-	-	-	<10
1,2-Propylene Glycol	-	-	-	<10
Triethylene Glycol	-	-	-	<10

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.040	<0.040	<0.040	-
Acenaphthylene	<0.050	<0.050	<0.050	-
Anthracene	<0.050	<0.050	<0.050	-
Benz(a)anthracene	<0.050	<0.050	<0.050	-
Benzo(a)pyrene	<0.050	<0.050	<0.050	-
Benzo(b)fluoranthene	<0.050	<0.050	<0.050	-
Benzo(g,h,i)perylene	<0.050	<0.050	<0.050	-
Benzo(k)fluoranthene	<0.050	<0.050	<0.050	-
Chrysene	<0.050	<0.050	<0.050	-
Dibenz(a,h)anthracene	<0.050	<0.050	<0.050	-
Fluoranthene	<0.050	<0.050	<0.050	-
Fluorene	<0.050	<0.050	<0.050	-
Indeno(1,2,3-c,d)pyrene	<0.050	<0.050	<0.050	-
Naphthalene	<0.050	<0.050	<0.050	-
Phenanthrene	<0.050	<0.050	<0.050	-
Pyrene	<0.050	<0.050	<0.050	-

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-32-03	TP05-33-01	TP05-33-02	TP05-33-03	TP05-34-01
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	51	52	53	54	55

Physical Tests

Conductivity (dS/m)	-	-	-	-	-
Moisture %	6.76	5.22	7.47	9.48	6.33
pH	6.92	-	-	-	3.31
pH (Saturated Paste)	6.85	-	-	-	3.26
Sodium Adsorption Ratio (SAR)	-	-	-	-	-
Saturation Percentage %	-	-	-	-	-
TGR (tonnes/hectare)	-	-	-	-	-

Cyanides

Total Cyanide CN	-	-	-	<3.0	-
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Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-32-03	TP05-33-01	TP05-33-02	TP05-33-03	TP05-34-01
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	51	52	53	54	55

Total Metals

Antimony	T-Sb	<10	-	-	-	<10
Arsenic	T-As	339	-	-	-	1120
Barium	T-Ba	71.4	-	-	-	181
Beryllium	T-Be	<0.50	-	-	-	<0.50
Cadmium	T-Cd	<0.50	-	-	-	<0.50
Chromium	T-Cr	42.8	-	-	-	82.6
Cobalt	T-Co	8.8	-	-	-	8.2
Copper	T-Cu	20.3	-	-	-	34.3
Lead	T-Pb	<30	-	-	-	<30
Mercury	T-Hg	<0.0050	-	-	-	<0.0050
Molybdenum	T-Mo	<4.0	-	-	-	<4.0
Nickel	T-Ni	29.5	-	-	-	34.1
Selenium	T-Se	<2.0	-	-	-	<2.0
Silver	T-Ag	<2.0	-	-	-	<2.0
Thallium	T-Tl	<1.0	-	-	-	<1.0
Tin	T-Sn	<5.0	-	-	-	<5.0
Vanadium	T-V	27.6	-	-	-	49.9
Zinc	T-Zn	42.9	-	-	-	54.0

Inorganic Parameters

Sulphide	S	<2.0	-	-	-	<5.0
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Non-Halogenated Volatiles

Benzene	<0.040	<0.040	<0.040	<0.20	-
Ethylbenzene	<0.050	<0.050	0.242	3.86	-
Toluene	<0.10	<0.10	0.35	2.66	-
meta- & para-Xylene	0.221	0.070	11.1	19.4	-
ortho-Xylene	0.261	0.231	12.9	11.7	-
Total Xylenes	0.482	0.301	24.0	31.2	-

CCME Hydrocarbon Fractions

F1 (C6-C10)	11	26	470	1010	-
F1-BTEX	11	26	445	977	-
F2 (C10-C16)	2590	2590	7030	6220	-
F3 (C16-C34)	1870	1870	1380	1120	-
F4 (C34-C50)	437	437	<50	<50	-
F4G-sg	-	-	-	-	-
F4G-SG Required (yes/no)	no	no	no	no	-

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-32-03	TP05-33-03
Sample Date	05-07-19	05-07-19
ALS ID	51	54

Glycols

Diethylene Glycol	<10	<10
Ethylene Glycol	<10	<10
1,2-Propylene Glycol	<10	<10
Triethylene Glycol	<10	<10

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.40	<0.75
Acenaphthylene	<0.50	<0.50
Anthracene	<0.50	<0.50
Benz(a)anthracene	<0.050	<0.050
Benzo(a)pyrene	<0.050	<0.050
Benzo(b)fluoranthene	<0.050	<0.050
Benzo(g,h,i)perylene	<0.050	<0.050
Benzo(k)fluoranthene	<0.050	<0.050
Chrysene	<0.050	<0.050
Dibenz(a,h)anthracene	<0.050	<0.050
Fluoranthene	<0.050	<0.050
Fluorene	<0.50	<1.9
Indeno(1,2,3-c,d)pyrene	<0.050	<0.050
Naphthalene	<0.50	6.91
Phenanthrene	<0.50	1.36
Pyrene	<0.050	<0.050

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-34-02	TP05-34-03	TP05-35-01	TP05-35-02	TP05-35-03
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	56	57	58	59	60

Physical Tests

Conductivity (dS/m)	-	-	-	-	-
Moisture %	6.26	-	5.55	2.52	11.6
pH	6.66	5.01	8.27	-	-
pH (Saturated Paste)	5.44	-	7.42	-	-
Sodium Adsorption Ratio (SAR)	-	-	-	-	-
Saturation Percentage %	-	-	-	-	-
TGR (tonnes/hectare)	-	-	-	-	-

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-34-02	TP05-34-03	TP05-35-01	TP05-35-02	TP05-35-03
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	56	57	58	59	60

Total Metals

Antimony	T-Sb	<10	<10	<10	-	-
Arsenic	T-As	882	29.8	359	-	-
Barium	T-Ba	214	35.8	129	-	-
Beryllium	T-Be	<0.50	<0.50	<0.50	-	-
Cadmium	T-Cd	<0.50	<0.50	<0.50	-	-
Chromium	T-Cr	78.0	22.6	80.7	-	-
Cobalt	T-Co	23.5	4.4	20.6	-	-
Copper	T-Cu	40.5	11.0	49.2	-	-
Lead	T-Pb	92	<30	<30	-	-
Mercury	T-Hg	<0.0050	<0.0050	<0.0050	-	-
Molybdenum	T-Mo	<4.0	<4.0	<4.0	-	-
Nickel	T-Ni	63.8	12.3	58.8	-	-
Selenium	T-Se	<2.0	<2.0	<2.0	-	-
Silver	T-Ag	<2.0	<2.0	<2.0	-	-
Thallium	T-Tl	<1.0	<1.0	<1.0	-	-
Tin	T-Sn	<5.0	<5.0	<5.0	-	-
Vanadium	T-V	49.6	19.0	47.2	-	-
Zinc	T-Zn	77.3	19.9	76.4	-	-

Inorganic Parameters

Sulphide	S	<2.0	-	0.76	-	-
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Non-Halogenated Volatiles

Benzene	-	-	-	-	<0.040
Ethylbenzene	-	-	-	-	<0.050
Toluene	-	-	-	-	<0.10
meta- & para-Xylene	-	-	-	-	0.071
ortho-Xylene	-	-	-	-	<0.050
Total Xylenes	-	-	-	-	<0.075

CCME Hydrocarbon Fractions

F1 (C6-C10)	-	-	-	-	<10
F1-BTEX	-	-	-	-	<10
F2 (C10-C16)	-	-	<30	<30	<30
F3 (C16-C34)	-	-	87	<50	<50
F4 (C34-C50)	-	-	<50	<50	<50
F4G-sg	-	-	-	-	-
F4G-SG Required (yes/no)	-	-	no	no	no

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-36-01	TP05-36-02	TP05-36-03	TP05-37-01	TP05-38-01
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	61	62	63	64	65

Physical Tests

Conductivity (dS/m)	-	-	-	-	-
Moisture %	2.93	12.6	9.99	8.95	6.06
pH	6.13	-	-	5.37	5.84
pH (Saturated Paste)	-	-	-	-	-
Sodium Adsorption Ratio (SAR)	-	-	-	-	-
Saturation Percentage %	-	-	-	-	-
TGR (tonnes/hectare)	-	-	-	-	-

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-36-01	TP05-36-02	TP05-36-03	TP05-37-01	TP05-38-01
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	61	62	63	64	65

Total Metals

Antimony	T-Sb	<10	-	-	<10	<10
Arsenic	T-As	9.0	-	-	6.4	12.5
Barium	T-Ba	32.5	-	-	41.9	32.4
Beryllium	T-Be	<0.50	-	-	<0.50	<0.50
Cadmium	T-Cd	<0.50	-	-	<0.50	<0.50
Chromium	T-Cr	29.2	-	-	25.4	27.2
Cobalt	T-Co	4.7	-	-	4.3	5.2
Copper	T-Cu	11.9	-	-	13.6	13.2
Lead	T-Pb	<30	-	-	<30	<30
Mercury	T-Hg	<0.0050	-	-	<0.0050	<0.0050
Molybdenum	T-Mo	<4.0	-	-	<4.0	<4.0
Nickel	T-Ni	16.8	-	-	13.2	14.3
Selenium	T-Se	<2.0	-	-	<2.0	<2.0
Silver	T-Ag	<2.0	-	-	<2.0	<2.0
Thallium	T-Tl	<1.0	-	-	<1.0	<1.0
Tin	T-Sn	<5.0	-	-	<5.0	<5.0
Vanadium	T-V	20.6	-	-	22.1	21.1
Zinc	T-Zn	22.0	-	-	22.7	20.0

Non-Halogenated Volatiles

Benzene	<0.040	<0.040	<0.20	<0.040	-
Ethylbenzene	<0.050	<0.050	2.46	<0.050	-
Toluene	<0.10	<0.10	1.63	<0.10	-
meta- & para-Xylene	0.081	1.85	17.3	<0.050	-
ortho-Xylene	0.067	1.83	13.7	<0.050	-
Total Xylenes	0.148	3.68	30.9	<0.075	-

CCME Hydrocarbon Fractions

F1 (C6-C10)	272	401	1390	<10	-
F1-BTEX	272	398	1360	<10	-
F2 (C10-C16)	2780	4770	8790	33	34
F3 (C16-C34)	638	1480	3320	<50	160
F4 (C34-C50)	<50	<50	<50	<50	<50
F4G-sg	-	-	-	-	-
F4G-SG Required (yes/no)	no	no	no	no	no

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Sediment/Soil

Sample ID TP05-36-03

Sample Date 05-07-19
ALS ID 63

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<1.5
Acenaphthylene	<0.50
Anthracene	<0.50
Benz(a)anthracene	<0.50
Benzo(a)pyrene	<0.050
Benzo(b)fluoranthene	<0.050
Benzo(g,h,i)perylene	<0.050
Benzo(k)fluoranthene	<0.050
Chrysene	<0.50
Dibenz(a,h)anthracene	<0.050
Fluoranthene	<0.50
Fluorene	<3.1
Indeno(1,2,3-c,d)pyrene	<0.050
Naphthalene	<5.9
Phenanthrene	1.54
Pyrene	<0.50

Remarks regarding the analyses appear at the beginning of this report.
Results are expressed as milligrams per dry kilogram except where noted.
< = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-38-02	TP05-39-01	TP05-39-02	TP05-40-01	TP05-40-02
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	66	67	68	69	70

Physical Tests

Conductivity (dS/m)	-	-	-	-	-
Moisture %	3.19	4.88	5.09	3.84	3.03
pH	-	3.36	7.79	5.93	7.04
pH (Saturated Paste)	-	3.23	-	6.34	-
Sodium Adsorption Ratio (SAR)	-	-	-	-	-
Saturation Percentage %	-	-	-	-	-
TGR (tonnes/hectare)	-	-	-	-	-

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-38-02	TP05-39-01	TP05-39-02	TP05-40-01	TP05-40-02
Sample Date	05-07-19	05-07-19	05-07-19	05-07-19	05-07-19
ALS ID	66	67	68	69	70

Total Metals

Antimony	T-Sb	-	<10	<10	<10	<10
Arsenic	T-As	-	1250	372	680	10.8
Barium	T-Ba	-	188	558	141	41.3
Beryllium	T-Be	-	<0.50	<0.50	<0.50	<0.50
Cadmium	T-Cd	-	<0.50	<0.50	<0.50	<0.50
Chromium	T-Cr	-	71.6	94.3	64.5	32.7
Cobalt	T-Co	-	8.8	24.0	12.0	5.8
Copper	T-Cu	-	31.1	49.2	27.7	15.2
Lead	T-Pb	-	<30	<30	<30	<30
Mercury	T-Hg	-	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum	T-Mo	-	<4.0	<4.0	<4.0	<4.0
Nickel	T-Ni	-	32.2	62.6	39.0	17.5
Selenium	T-Se	-	<2.0	<2.0	<2.0	<2.0
Silver	T-Ag	-	<2.0	<2.0	<2.0	<2.0
Thallium	T-Tl	-	<1.0	<1.0	<1.0	<1.0
Tin	T-Sn	-	<5.0	<5.0	<5.0	<5.0
Vanadium	T-V	-	48.3	64.4	41.5	24.5
Zinc	T-Zn	-	50.6	79.5	48.3	27.1

Inorganic Parameters

Sulphide	S	-	<5.0	0.71	<2.0	-
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Non-Halogenated Volatiles

Benzene	<0.040	-	<0.040	-	-
Ethylbenzene	<0.050	-	<0.050	-	-
Toluene	<0.10	-	<0.10	-	-
meta- & para-Xylene	<0.050	-	<0.050	-	-
ortho-Xylene	<0.050	-	<0.050	-	-
Total Xylenes	<0.075	-	<0.075	-	-

CCME Hydrocarbon Fractions

F1 (C6-C10)	<10	-	<10	-	-
F1-BTEX	<10	-	<10	-	-
F2 (C10-C16)	<30	<30	<30	<30	<30
F3 (C16-C34)	<50	111	162	125	<50
F4 (C34-C50)	<50	<50	<50	<50	<50
F4G-sg	-	-	-	-	-
F4G-SG Required (yes/no)	no	no	no	no	no

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID TP05-38-02

Sample Date 05-07-19
ALS ID 66

Glycols

Diethylene Glycol	<10
Ethylene Glycol	<10
1,2-Propylene Glycol	<10
Triethylene Glycol	<10

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.040
Acenaphthylene	<0.050
Anthracene	<0.050
Benz(a)anthracene	<0.050
Benzo(a)pyrene	<0.050

Benzo(b)fluoranthene	<0.050
Benzo(g,h,i)perylene	<0.050
Benzo(k)fluoranthene	<0.050
Chrysene	<0.050
Dibenz(a,h)anthracene	<0.050

Fluoranthene	<0.050
Fluorene	<0.050
Indeno(1,2,3-c,d)pyrene	<0.050
Naphthalene	<0.050
Phenanthrene	<0.050

Pyrene	<0.050
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Remarks regarding the analyses appear at the beginning of this report.
Results are expressed as milligrams per dry kilogram except where noted.
< = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-40-03	TP05-41-01	TP05-42-01	TP05-42-02	TP05-43-01
Sample Date	05-07-19	05-07-19	05-07-19	05-07-21	05-07-21
ALS ID	71	72	73	74	75

Physical Tests

Conductivity (dS/m)	-	0.784	-	-	-
Moisture %	10.7	<0.10	7.95	5.36	5.58
pH	-	7.80	5.93	4.81	7.32
pH (Saturated Paste)	-	-	-	-	6.42
Sodium Adsorption Ratio (SAR)	-	1.25	-	-	-
Saturation Percentage %	-	99.6	-	-	-
TGR (tonnes/hectare)	-	<0.10	-	-	-

Dissolved Anions

Sulphate SO4	-	-	-	-	348
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Saturated Paste Extractables

Calcium Ca	-	85.8	-	-	-
Chloride Cl	-	57.8	-	-	-
Magnesium Mg	-	10.9	-	-	-
Potassium K	-	40	-	-	-
Sodium Na	-	46	-	-	-
Sulphate SO4	-	229	-	-	-

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-40-03	TP05-41-01	TP05-42-01	TP05-42-02	TP05-43-01
Sample Date	05-07-19	05-07-19	05-07-19	05-07-21	05-07-21
ALS ID	71	72	73	74	75

Total Metals

Antimony	T-Sb	-	<10	<10	<10	<10
Arsenic	T-As	-	915	1150	9.0	1370
Barium	T-Ba	-	189	146	34.2	217
Beryllium	T-Be	-	<0.50	<0.50	<0.50	<0.50
Cadmium	T-Cd	-	<0.50	<0.50	<0.50	<0.50
Chromium	T-Cr	-	76.7	67.8	24.9	71.5
Cobalt	T-Co	-	19.0	15.3	4.3	16.7
Copper	T-Cu	-	47.4	37.8	13.5	36.8
Lead	T-Pb	-	<30	<30	<30	<30
Mercury	T-Hg	-	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum	T-Mo	-	<4.0	<4.0	<4.0	<4.0
Nickel	T-Ni	-	61.4	46.2	13.7	49.8
Selenium	T-Se	-	<2.0	<2.0	<2.0	<2.0
Silver	T-Ag	-	<2.0	<2.0	<2.0	<2.0
Thallium	T-Tl	-	<1.0	<1.0	<1.0	<1.0
Tin	T-Sn	-	<5.0	<5.0	<5.0	8.8
Vanadium	T-V	-	55.8	45.5	24.4	45.8
Zinc	T-Zn	-	53.9	57.1	21.7	60.6

Inorganic Parameters

Sulphide	S	-	<2.0	<5.0	-	2.9
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Non-Halogenated Volatiles

Benzene	<0.040	-	<0.040	<0.040	<0.040
Ethylbenzene	<0.050	-	<0.050	<0.050	<0.050
Toluene	<0.10	-	<0.10	<0.10	<0.10
meta- & para-Xylene	<0.050	-	<0.050	<0.050	<0.050
ortho-Xylene	<0.050	-	<0.050	<0.050	<0.050
Total Xylenes	<0.075	-	<0.075	<0.075	<0.075

CCME Hydrocarbon Fractions

F1 (C6-C10)	<10	-	<10	<10	<10
F1-BTEX	<10	-	<10	<10	<10
F2 (C10-C16)	<30	-	65	<30	<30
F3 (C16-C34)	<50	-	137	<50	157
F4 (C34-C50)	<50	-	<50	<50	60
F4G-sg	-	-	-	-	-
F4G-SG Required (yes/no)	no	-	no	no	no

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-43-02	TP05-44-01	TP05-44-02	TP05-45-01	TP05-45-02
Sample Date	05-07-21	05-07-21	05-07-21	05-07-21	05-07-21
ALS ID	76	77	78	79	80

Physical Tests

Conductivity (dS/m)	-	-	-	-	-
Moisture %	10.1	9.08	10.2	4.98	3.10
pH	5.61	6.60	5.75	7.97	8.11
pH (Saturated Paste)	-	-	-	7.79	7.17
Sodium Adsorption Ratio (SAR)	-	-	-	-	-
Saturation Percentage %	-	-	-	-	-
TGR (tonnes/hectare)	-	-	-	-	-

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-43-02	TP05-44-01	TP05-44-02	TP05-45-01	TP05-45-02
Sample Date	05-07-21	05-07-21	05-07-21	05-07-21	05-07-21
ALS ID	76	77	78	79	80

Total Metals

Antimony	T-Sb	<10	<10	<10	<10	<10
Arsenic	T-As	26.2	17.2	7.8	1150	177
Barium	T-Ba	28.7	42.5	32.1	223	174
Beryllium	T-Be	<0.50	<0.50	<0.50	<0.50	<0.50
Cadmium	T-Cd	<0.50	<0.50	<0.50	<0.50	<0.50
Chromium	T-Cr	24.9	48.3	27.4	80.3	70.8
Cobalt	T-Co	4.4	9.8	5.1	18.3	16.7
Copper	T-Cu	15.1	26.5	18.3	59.4	53.7
Lead	T-Pb	<30	<30	<30	<30	<30
Mercury	T-Hg	<0.0050	<0.0050	0.0081	<0.0050	<0.0050
Molybdenum	T-Mo	<4.0	<4.0	<4.0	<4.0	<4.0
Nickel	T-Ni	14.9	33.8	15.4	56.8	51.6
Selenium	T-Se	<2.0	<2.0	<2.0	<2.0	<2.0
Silver	T-Ag	<2.0	<2.0	<2.0	<2.0	<2.0
Thallium	T-Tl	<1.0	<1.0	<1.0	<1.0	<1.0
Tin	T-Sn	<5.0	<5.0	<5.0	<5.0	<5.0
Vanadium	T-V	18.7	28.3	25.0	58.6	51.4
Zinc	T-Zn	22.6	36.5	22.4	67.0	56.7

Inorganic Parameters

Sulphide	S	-	-	-	0.94	<0.50
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Non-Halogenated Volatiles

Benzene	<0.040	<0.040	<0.040	<0.040	<0.040
Ethylbenzene	<0.050	<0.050	<0.050	<0.050	<0.050
Toluene	<0.10	<0.10	<0.10	<0.10	<0.10
meta- & para-Xylene	<0.050	<0.050	<0.050	<0.050	<0.050
ortho-Xylene	<0.050	<0.050	<0.050	<0.050	<0.050
Total Xylenes	<0.075	<0.075	<0.075	<0.075	<0.075

CCME Hydrocarbon Fractions

F1 (C6-C10)	<10	<10	<10	161	173
F1-BTEX	<10	<10	<10	161	173
F2 (C10-C16)	<30	<30	30	4070	5310
F3 (C16-C34)	139	<50	<50	1060	2180
F4 (C34-C50)	<50	<50	<50	53	163
F4G-sg	-	-	-	-	-
F4G-SG Required (yes/no)	no	no	no	no	yes

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-43-02	TP05-45-02
Sample Date	05-07-21	05-07-21
ALS ID	76	80

Glycols

Diethylene Glycol	<10	<10
Ethylene Glycol	<10	<10
1,2-Propylene Glycol	<10	<10
Triethylene Glycol	<10	<10

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.040	<0.40
Acenaphthylene	<0.050	<0.50
Anthracene	<0.050	<0.50
Benz(a)anthracene	<0.050	<0.050
Benzo(a)pyrene	<0.050	<0.050
Benzo(b)fluoranthene	<0.050	<0.050
Benzo(g,h,i)perylene	<0.050	<0.050
Benzo(k)fluoranthene	<0.050	<0.050
Chrysene	<0.050	<0.050
Dibenz(a,h)anthracene	<0.050	<0.050
Fluoranthene	<0.050	<0.050
Fluorene	<0.050	<0.50
Indeno(1,2,3-c,d)pyrene	<0.050	<0.050
Naphthalene	<0.050	<0.50
Phenanthrene	<0.050	<0.50
Pyrene	<0.050	<0.050

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Sediment/Soil

Sample ID	TP05-46-01	TP05-46-02	TP05-47-01	TP05-48-01	TP05-49-01
Sample Date	05-07-21	05-07-21	05-07-21	05-07-21	05-07-21
ALS ID	81	82	83	84	85

Physical Tests

Conductivity (dS/m)	-	-	-	-	-
Moisture %	6.52	8.52	7.99	5.78	0.14
pH	4.75	5.04	7.14	6.61	3.53
pH (Saturated Paste)	6.66	6.39	5.73	6.32	3.16
Sodium Adsorption Ratio (SAR)	-	-	-	-	-
Saturation Percentage %	-	-	-	-	-
TGR (tonnes/hectare)	-	-	-	-	-

Cyanides

Total Cyanide CN	-	-	<3.0	-	-
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Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-46-01	TP05-46-02	TP05-47-01	TP05-48-01	TP05-49-01
Sample Date	05-07-21	05-07-21	05-07-21	05-07-21	05-07-21
ALS ID	81	82	83	84	85

Total Metals

Antimony	T-Sb	<10	<10	<10	<10	<10
Arsenic	T-As	1010	12.2	1790	60.9	4770
Barium	T-Ba	112	38.7	115	44.1	168
Beryllium	T-Be	<0.50	<0.50	<0.50	<0.50	<0.50
Cadmium	T-Cd	<0.50	<0.50	<0.50	<0.50	<0.50
Chromium	T-Cr	36.0	27.5	67.5	27.1	62.1
Cobalt	T-Co	5.1	4.7	16.2	5.5	10.4
Copper	T-Cu	36.4	14.1	62.9	14.2	39.6
Lead	T-Pb	<30	<30	<30	<30	<30
Mercury	T-Hg	0.0079	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum	T-Mo	<4.0	<4.0	<4.0	<4.0	<4.0
Nickel	T-Ni	16.1	14.7	52.9	16.5	36.2
Selenium	T-Se	<2.0	<2.0	<2.0	<2.0	<2.0
Silver	T-Ag	<2.0	<2.0	<2.0	<2.0	<2.0
Thallium	T-Tl	<1.0	<1.0	<1.0	<1.0	<1.0
Tin	T-Sn	<5.0	<5.0	<5.0	<5.0	<5.0
Vanadium	T-V	23.8	24.4	45.6	23.1	45.8
Zinc	T-Zn	36.0	24.3	67.9	26.7	47.9

Inorganic Parameters

Sulphide	S	<10	1.3	<2.0	<5.0	<10
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Non-Halogenated Volatiles

Benzene	-	<0.040	<0.040	-	-
Ethylbenzene	-	<0.050	<0.050	-	-
Toluene	-	<0.10	<0.10	-	-
meta- & para-Xylene	-	<0.050	<0.050	-	-
ortho-Xylene	-	<0.050	<0.050	-	-
Total Xylenes	-	<0.075	<0.075	-	-

CCME Hydrocarbon Fractions

F1 (C6-C10)	-	<10	<10	-	-
F1-BTEX	-	<10	<10	-	-
F2 (C10-C16)	136	50	139	-	-
F3 (C16-C34)	212	<50	621	-	-
F4 (C34-C50)	<50	<50	121	-	-
F4G-sg	-	-	-	-	-
F4G-SG Required (yes/no)	no	no	yes	-	-

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-46-01	TP05-46-02	TP05-47-01
Sample Date	05-07-21	05-07-21	05-07-21
ALS ID	81	82	83

Glycols

Diethylene Glycol	-	<10	<10
Ethylene Glycol	-	<10	<10
1,2-Propylene Glycol	-	<10	<10
Triethylene Glycol	-	<10	<10

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.040	-	<0.040
Acenaphthylene	<0.050	-	<0.050
Anthracene	<0.050	-	<0.050
Benz(a)anthracene	<0.050	-	<0.050
Benzo(a)pyrene	<0.050	-	<0.050
Benzo(b)fluoranthene	<0.050	-	<0.050
Benzo(g,h,i)perylene	<0.050	-	<0.050
Benzo(k)fluoranthene	<0.050	-	<0.050
Chrysene	<0.050	-	<0.050
Dibenz(a,h)anthracene	<0.050	-	<0.050
Fluoranthene	<0.050	-	<0.050
Fluorene	<0.050	-	<0.050
Indeno(1,2,3-c,d)pyrene	<0.050	-	<0.050
Naphthalene	<0.050	-	<0.050
Phenanthrene	<0.050	-	<0.050
Pyrene	<0.050	-	<0.050

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-49-02	TP05-50-01	TP05-51-01	TP05-52-01	TP05-53-01
Sample Date	05-07-21	05-07-21	05-07-21	05-07-21	05-07-21
ALS ID	86	87	88	89	90

Physical Tests

Conductivity (dS/m)	-	-	-	-	-
Moisture %	7.52	14.6	7.92	<0.10	6.46
pH	4.90	-	4.58	3.18	-
pH (Saturated Paste)	4.66	-	5.38	3.41	-
Sodium Adsorption Ratio (SAR)	-	-	-	-	-
Saturation Percentage %	-	-	-	-	-
TGR (tonnes/hectare)	-	-	-	-	-

Dissolved Anions

Sulphate SO4	821	-	-	-	-
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Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-49-02	TP05-50-01	TP05-51-01	TP05-52-01	TP05-53-01
Sample Date	05-07-21	05-07-21	05-07-21	05-07-21	05-07-21
ALS ID	86	87	88	89	90

Total Metals

Antimony	T-Sb	<10	-	<10	<10	-
Arsenic	T-As	8900	-	8.8	1090	-
Barium	T-Ba	50.5	-	38.2	149	-
Beryllium	T-Be	<0.50	-	<0.50	<0.50	-
Cadmium	T-Cd	<0.50	-	<0.50	<0.50	-
Chromium	T-Cr	30.8	-	28.5	55.7	-
Cobalt	T-Co	8.3	-	4.3	8.4	-
Copper	T-Cu	44.9	-	15.3	33.7	-
Lead	T-Pb	<30	-	<30	<30	-
Mercury	T-Hg	<0.0050	-	0.0084	<0.0050	-
Molybdenum	T-Mo	<4.0	-	<4.0	<4.0	-
Nickel	T-Ni	25.7	-	16.3	29.5	-
Selenium	T-Se	<2.0	-	<2.0	<2.0	-
Silver	T-Ag	<2.0	-	<2.0	<2.0	-
Thallium	T-Tl	<1.0	-	<1.0	<1.0	-
Tin	T-Sn	<5.0	-	<5.0	<5.0	-
Vanadium	T-V	20.8	-	24.7	41.5	-
Zinc	T-Zn	26.4	-	22.4	44.6	-

Inorganic Parameters

Sulphide	S	4.3	-	<10	<5.0	-
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Non-Halogenated Volatiles

Benzene	-	<0.040	<0.040	-	<0.040
Ethylbenzene	-	<0.050	<0.050	-	<0.050
Toluene	-	<0.10	<0.10	-	<0.10
meta- & para-Xylene	-	<0.050	<0.050	-	<0.050
ortho-Xylene	-	<0.050	<0.050	-	<0.050
Total Xylenes	-	<0.075	<0.075	-	<0.075

CCME Hydrocarbon Fractions

F1 (C6-C10)	-	<10	<10	-	133
F1-BTEX	-	<10	<10	-	133
F2 (C10-C16)	-	32	61	-	2480
F3 (C16-C34)	-	<50	233	-	497
F4 (C34-C50)	-	<50	159	-	<50
F4G-sg	-	-	-	-	-
F4G-SG Required (yes/no)	-	no	no	-	no

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Sediment/Soil

Sample ID TP05-53-01

Sample Date 05-07-21
ALS ID 90

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.40
Acenaphthylene	<0.50
Anthracene	<0.50
Benz(a)anthracene	<0.050
Benzo(a)pyrene	<0.050
Benzo(b)fluoranthene	<0.050
Benzo(g,h,i)perylene	<0.050
Benzo(k)fluoranthene	<0.050
Chrysene	<0.050
Dibenz(a,h)anthracene	<0.050
Fluoranthene	<0.050
Fluorene	<0.50
Indeno(1,2,3-c,d)pyrene	<0.050
Naphthalene	<0.50
Phenanthrene	<0.50
Pyrene	<0.050

Remarks regarding the analyses appear at the beginning of this report.
Results are expressed as milligrams per dry kilogram except where noted.
< = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-54-01	TP05-54-02	TP05-55-01	TP05-55-02	TP05-56-01
Sample Date	05-07-21	05-07-21	05-07-21	05-07-21	05-07-21
ALS ID	91	92	93	94	95

Physical Tests

Conductivity (dS/m)	-	-	-	-	-
Moisture %	0.12	<0.10	4.47	9.64	0.38
pH	2.71	3.05	6.26	-	2.70
pH (Saturated Paste)	3.15	3.16	-	-	2.53
Sodium Adsorption Ratio (SAR)	-	-	-	-	-
Saturation Percentage %	-	-	-	-	-
TGR (tonnes/hectare)	-	-	-	-	-

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-54-01	TP05-54-02	TP05-55-01	TP05-55-02	TP05-56-01
Sample Date	05-07-21	05-07-21	05-07-21	05-07-21	05-07-21
ALS ID	91	92	93	94	95

Total Metals

Antimony	T-Sb	<10	<10	<10	-	<10
Arsenic	T-As	1950	910	<5.0	-	9040
Barium	T-Ba	215	130	38.2	-	109
Beryllium	T-Be	<0.50	<0.50	<0.50	-	<0.50
Cadmium	T-Cd	<0.50	<0.50	<0.50	-	<0.50
Chromium	T-Cr	73.6	60.0	28.1	-	47.1
Cobalt	T-Co	8.5	7.8	4.3	-	4.7
Copper	T-Cu	29.1	35.1	13.4	-	109
Lead	T-Pb	<30	<30	<30	-	<30
Mercury	T-Hg	<0.0050	<0.0050	<0.0050	-	0.0057
Molybdenum	T-Mo	<4.0	<4.0	<4.0	-	<4.0
Nickel	T-Ni	30.4	27.9	15.8	-	17.2
Selenium	T-Se	<2.0	<2.0	<2.0	-	<2.0
Silver	T-Ag	<2.0	<2.0	<2.0	-	<2.0
Thallium	T-Tl	<1.0	<1.0	<1.0	-	<1.0
Tin	T-Sn	<5.0	<5.0	<5.0	-	<5.0
Vanadium	T-V	53.7	42.6	21.8	-	31.6
Zinc	T-Zn	49.0	44.2	22.0	-	32.8

Inorganic Parameters

Sulphide	S	10	<10	-	-	<10
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Non-Halogenated Volatiles

Benzene	-	-	<0.040	<0.040	-
Ethylbenzene	-	-	<0.050	<0.050	-
Toluene	-	-	<0.10	<0.10	-
meta- & para-Xylene	-	-	0.081	0.072	-
ortho-Xylene	-	-	0.127	0.105	-
Total Xylenes	-	-	0.207	0.177	-

CCME Hydrocarbon Fractions

F1 (C6-C10)	-	-	180	372	-
F1-BTEX	-	-	179	371	-
F2 (C10-C16)	-	-	2900	2700	-
F3 (C16-C34)	-	-	486	513	-
F4 (C34-C50)	-	-	<50	<50	-
F4G-sg	-	-	-	-	-
F4G-SG Required (yes/no)	-	-	no	no	-

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Sediment/Soil

Sample ID TP05-55-02

Sample Date 05-07-21
ALS ID 94

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.40
Acenaphthylene	<0.50
Anthracene	<0.50
Benz(a)anthracene	<0.050
Benzo(a)pyrene	<0.050
Benzo(b)fluoranthene	<0.050
Benzo(g,h,i)perylene	<0.050
Benzo(k)fluoranthene	<0.050
Chrysene	<0.050
Dibenz(a,h)anthracene	<0.050
Fluoranthene	0.056
Fluorene	<0.86
Indeno(1,2,3-c,d)pyrene	<0.050
Naphthalene	<0.81
Phenanthrene	0.84
Pyrene	<0.050

Remarks regarding the analyses appear at the beginning of this report.
Results are expressed as milligrams per dry kilogram except where noted.
< = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Sediment/Soil

Sample ID	TP05-56-02	TP05-56-03	TP05-57-01	TP05-57-02	TP05-58-01
Sample Date	05-07-21	05-07-21	05-07-21	05-07-21	05-07-21
ALS ID	96	97	98	99	100

Physical Tests

Conductivity (dS/m)	-	-	-	-	-
Moisture %	7.52	6.09	0.18	0.11	3.04
pH	3.16	4.50	2.70	5.09	-
pH (Saturated Paste)	2.95	4.38	3.20	3.33	-
Sodium Adsorption Ratio (SAR)	-	-	-	-	-
Saturation Percentage %	-	-	-	-	-
TGR (tonnes/hectare)	-	-	-	-	-

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-56-02	TP05-56-03	TP05-57-01	TP05-57-02	TP05-58-01
Sample Date	05-07-21	05-07-21	05-07-21	05-07-21	05-07-21
ALS ID	96	97	98	99	100

Total Metals

Antimony	T-Sb	<10	<10	<10	<10	-
Arsenic	T-As	850	710	4090	2940	-
Barium	T-Ba	48.0	199	193	237	-
Beryllium	T-Be	<0.50	<0.50	<0.50	<0.50	-
Cadmium	T-Cd	<0.50	<0.50	<0.50	<0.50	-
Chromium	T-Cr	27.6	83.1	65.3	74.2	-
Cobalt	T-Co	4.2	16.8	9.5	17.6	-
Copper	T-Cu	17.4	55.4	42.9	46.5	-
Lead	T-Pb	<30	<30	<30	<30	-
Mercury	T-Hg	<0.0050	<0.0050	<0.0050	0.0141	-
Molybdenum	T-Mo	<4.0	<4.0	<4.0	<4.0	-
Nickel	T-Ni	15.2	58.7	33.1	55.5	-
Selenium	T-Se	<2.0	<2.0	<2.0	<2.0	-
Silver	T-Ag	<2.0	<2.0	<2.0	<2.0	-
Thallium	T-Tl	<1.0	<1.0	<1.0	<1.0	-
Tin	T-Sn	<5.0	<5.0	<5.0	<5.0	-
Vanadium	T-V	22.0	60.1	52.7	56.5	-
Zinc	T-Zn	22.7	79.7	48.2	72.3	-

Inorganic Parameters

Sulphide	S	<2.0	0.54	<2.0	2.0	-
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Non-Halogenated Volatiles

Benzene	-	<0.040	-	-	<0.040
Ethylbenzene	-	<0.050	-	-	<0.050
Toluene	-	<0.10	-	-	<0.10
meta- & para-Xylene	-	<0.050	-	-	<0.050
ortho-Xylene	-	<0.050	-	-	<0.050
Total Xylenes	-	<0.075	-	-	<0.075

CCME Hydrocarbon Fractions

F1 (C6-C10)	-	<10	-	-	79
F1-BTEX	-	<10	-	-	79
F2 (C10-C16)	-	<30	-	-	1710
F3 (C16-C34)	-	97	-	-	409
F4 (C34-C50)	-	<50	-	-	<50
F4G-sg	-	-	-	-	-
F4G-SG Required (yes/no)	-	no	-	-	no

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-56-03	TP05-58-01
Sample Date	05-07-21	05-07-21
ALS ID	97	100

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.040	<0.40
Acenaphthylene	<0.050	<0.50
Anthracene	<0.050	<0.50
Benz(a)anthracene	<0.050	<0.050
Benzo(a)pyrene	<0.050	<0.050
Benzo(b)fluoranthene	<0.050	<0.050
Benzo(g,h,i)perylene	<0.050	<0.050
Benzo(k)fluoranthene	<0.050	<0.050
Chrysene	<0.050	<0.050
Dibenz(a,h)anthracene	<0.050	<0.050
Fluoranthene	<0.050	<0.050
Fluorene	<0.050	<0.50
Indeno(1,2,3-c,d)pyrene	<0.050	<0.050
Naphthalene	<0.050	<0.50
Phenanthrene	<0.050	<0.50
Pyrene	<0.050	<0.050

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-59-01	TP05-60-01	TP05-61-01
Sample Date	05-07-21	05-07-21	05-07-21
ALS ID	101	102	103

Physical Tests

Conductivity (dS/m)	-	1.27	-
Moisture %	6.84	5.00	6.23
pH	3.11	7.52	3.90
pH (Saturated Paste)	3.40	-	4.23
Sodium Adsorption Ratio (SAR)	-	0.46	-
Saturation Percentage %	-	100	-
TGR (tonnes/hectare)	-	<0.10	-

Cyanides

Total Cyanide CN	-	<3.0	-
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Saturated Paste Extractables

Calcium Ca	-	236	-
Chloride Cl	-	36.4	-
Magnesium Mg	-	12.3	-
Potassium K	-	25	-
Sodium Na	-	27	-
Sulphate SO4	-	618	-

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	TP05-59-01	TP05-60-01	TP05-61-01
Sample Date	05-07-21	05-07-21	05-07-21
ALS ID	101	102	103

Total Metals

Antimony	T-Sb	<10	<10	<10
Arsenic	T-As	4020	584	472
Barium	T-Ba	173	73.7	95.6
Beryllium	T-Be	<0.50	<0.50	<0.50
Cadmium	T-Cd	<0.50	<0.50	<0.50
Chromium	T-Cr	69.1	42.7	47.8
Cobalt	T-Co	10.1	34.9	6.1
Copper	T-Cu	34.6	24.7	20.5
Lead	T-Pb	<30	<30	<30
Mercury	T-Hg	<0.0050	<0.0050	0.0067
Molybdenum	T-Mo	<4.0	<4.0	<4.0
Nickel	T-Ni	36.9	31.1	22.8
Selenium	T-Se	<2.0	<2.0	<2.0
Silver	T-Ag	<2.0	<2.0	<2.0
Thallium	T-Tl	<1.0	<1.0	<1.0
Tin	T-Sn	<5.0	<5.0	<5.0
Vanadium	T-V	50.8	27.0	35.0
Zinc	T-Zn	49.6	54.4	35.7

Inorganic Parameters

Sulphide	S	<2.0	<2.0	<2.0
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Non-Halogenated Volatiles

Benzene	-	<0.040	<0.040
Ethylbenzene	-	<0.050	<0.050
Toluene	-	<0.10	<0.10
meta- & para-Xylene	-	<0.050	<0.050
ortho-Xylene	-	<0.050	<0.050
Total Xylenes	-	<0.075	<0.075

CCME Hydrocarbon Fractions

F1 (C6-C10)	-	<10	<10
F1-BTEX	-	<10	<10
F2 (C10-C16)	-	151	50
F3 (C16-C34)	-	1900	142
F4 (C34-C50)	-	1030	<50
F4G-sg	-	-	-
F4G-SG Required (yes/no)	-	yes	no

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID TP05-60-01

Sample Date 05-07-21
ALS ID 102

Glycols

Diethylene Glycol	<10
Ethylene Glycol	<10
1,2-Propylene Glycol	<10
Triethylene Glycol	<10

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.040
Acenaphthylene	<0.050
Anthracene	<0.050
Benz(a)anthracene	<0.050
Benzo(a)pyrene	<0.050

Benzo(b)fluoranthene	<0.050
Benzo(g,h,i)perylene	<0.050
Benzo(k)fluoranthene	<0.050
Chrysene	<0.050
Dibenz(a,h)anthracene	<0.050

Fluoranthene	<0.050
Fluorene	<0.050
Indeno(1,2,3-c,d)pyrene	<0.050
Naphthalene	0.061
Phenanthrene	<0.050

Pyrene	<0.050
--------	--------

Remarks regarding the analyses appear at the beginning of this report.
Results are expressed as milligrams per dry kilogram except where noted.
< = Less than the detection limit indicated.

Appendix 1 - QUALITY CONTROL - Reference Materials

Sediment/Soil

		Result	Target	Units	DL	ALSQC#	Method
ALS Environmental Soil RM, SAL01							
<u>Physical Tests</u>							
Conductivity	(dS/m)	6.15	6.52	dS/m	0.002	27917	a
Conductivity	(dS/m)	6.19	6.52	dS/m	0.002	27918	a
Conductivity	(dS/m)	6.13	6.52	dS/m	0.002	27919	a
pH		7.83	7.68	pH	0.1	27917	a
pH		7.71	7.68	pH	0.1	27918	a
pH		7.71	7.68	pH	0.1	27919	a
<u>Saturated Paste Extractables</u>							
Saturation Percentage	%	58.5	55.6	%	0.1	27917	b
Saturation Percentage	%	59.5	55.6	%	0.1	27918	b
Saturation Percentage	%	57.6	55.6	%	0.1	27919	b

Methods:

a = Saturated Paste/Meter

b = Saturated Paste/Gravimetry

Bold Targets indicate uncertified targets

Appendix 2 - METHODOLOGY



Outlines of the methodologies utilized for the analysis of the samples submitted are as follows

Moisture in Sediment/Soil

This analysis is carried out gravimetrically by drying the sample at 103 C for a minimum of six hours.

Recommended Holding Time:

Sample: 14 days

Reference: Puget

Laboratory Location: ALS Environmental, Calgary

pH in Soil

This analysis is carried out in accordance with U.S. EPA Method 9045 (Publ. # SW-846 3rd ed., Washington, DC 20460). The procedure involves mixing the soil in a one to one ratio with deionized/distilled water or calcium chloride solution, depending on whether the soil is considered calcareous or noncalcareous. The pH of the resulting solution is then measured with a standard pH probe.

Laboratory Location: ALS Environmental, Vancouver

Physical Parameters in Sediment/Soil

These analyses are carried out in accordance with methods described in AWWA C105 and ASTM G57-78. The procedure involves mixing the soil with reagent grade water until a saturated paste is formed. Specific parameters are then measured using various meters and probes. Further details are available on request.

Laboratory Location: ALS Environmental, Vancouver

Metals in Sediment/Soil

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B or Method 3051, United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by either hotplate or block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by atomic absorption/fluorescence spectrophotometry (EPA Method 7000 series), inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B), and/or inductively coupled plasma - mass spectrometry (EPA Method 6020).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals



Appendix 2 - METHODOLOGY - Continued

that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

Recommended Holding Time:

Sample: 6 months (Hg = 28 days)

Extract: 6 months (Hg = 28 days, Sb & Sn = 7 days)

Reference: BCMELP

Laboratory Location: ALS Environmental, Vancouver

Sulphide in Sediment/Soil

This analysis is carried out on a leachable basis. The procedure involves mixing the sample with a sodium hydroxide solution in a one to ten ratio and leaching for several hours. The leachate is then centrifuged and analyzed colorimetrically.

Laboratory Location: ALS Environmental, Vancouver

Volatile Organic Compounds in Sediment/Soil

This analysis involves the extraction of a subsample of the sediment/soil with methanol. Aliquots of the methanol extract are then analyzed for specific Volatile Organic Compounds (VOC) by capillary column gas chromatography with mass spectrometric detection (GC/MS). The VOC analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 8260, published by the United States Environmental Protection Agency (EPA).

Recommended Holding Time:

Sample: 7 days

Extract: 40 days

Reference: EPA

Laboratory Location: ALS Environmental, Calgary

Calculation of Total Xylenes

Total Xylenes is the sum of the concentrations of the ortho, meta, and para Xylene isomers. Results below detection limit (DL) are treated as zero. The DL for Total Xylenes is set to a value no less than the square root of the sum of the squares of the DLs of the individual Xylenes.

Laboratory Location: ALS Environmental, Vancouver



Petroleum Hydrocarbons in Sediment/Soil (Canada-Wide Standard)

This analysis is carried out in accordance with the "Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method, Canadian Council of Ministers of the Environment, December 2000." The various extraction fractions are analysed as follows:

CWS Fractions 1 and 1-BTEX:

This procedure involves the extraction of a subsample of the sediment/soil with methanol. Aliquots of the methanol extract are then analysed by capillary column gas chromatography with flame-ionization detection (GC/FID) for CWS Fraction 1, and by capillary column gas chromatography with mass spectrometric detection (GC/MS) for the BTEX compounds.

Reported results may include any or all of the following:

CWS Fraction 1 (C6-10):

sum of all petroleum hydrocarbon compounds that elute between nC6 and nC10 obtained by GC/FID analysis

CWS Fraction 1-BTEX:

CWS Fraction 1 (C6-10), minus BTEX compounds

Recommended Holding Time:

Sample: 7 days for CWS Fraction 1

Extract: 7 days for all CWS Fractions

Reference: CCME

Laboratory Location: ALS Environmental, Calgary

Petroleum Hydrocarbons in Sediment/Soil (Canada-Wide Standard)

This analysis is carried out in accordance with the "Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method, Canadian Council of Ministers of the Environment, December 2000." The various extraction fractions are analysed as follows:

CWS Fractions 2, 2-PAH, 3, 3-PAH, 4 and 4G-SG:

The procedure uses an automated system at high temperature and pressure (Accelerated Solvent Extractor - ASE) or a Soxhlet system to extract a subsample of the sediment/soil with a 1:1 mixture of hexane and acetone. The extract is concentrated and undergoes a silica-gel clean-up to remove polar material. The final extract is analysed by high temperature capillary column gas chromatography with flame ionization detection (GC/FID). CWS Fractions 4G and 4G-SG (Gravimetric Heavy Hydrocarbons) are analysed gravimetrically.

Appendix 2 - METHODOLOGY - Continued



Reported results may include any or all of the following:

CWS Fraction 2 (C10-16):

sum of all petroleum hydrocarbon compounds that elute between nC10 and nC16 obtained by GC/FID analysis

CWS Fraction 2-PAH:

CWS Fraction 2 (C10-16), minus selected PAH compounds (Naphthalene)

CWS Fraction 3 (C16-34):

sum of all petroleum hydrocarbon compounds that elute between nC16 and nC34 obtained by GC/FID analysis

CWS Fraction 3-PAH:

CWS Fraction 3 (C16-34), minus selected PAH compounds

CWS Fraction 4 (C34-50):

sum of all petroleum hydrocarbon compounds that elute between nC34 and nC50 obtained by GC/FID analysis

CWS Fraction 4G (GHH):

Results obtained by gravimetric analysis.

CWS Fraction 4G-SG (GHH + SG):

Results obtained by gravimetric analysis after silica gel clean-up

Recommended Holding Time:

Sample: 14 days for CWS Fractions 2, 3, 4, 4G & 4G-SG

Extract: 7 days for all CWS Fractions

Reference: CCME

Laboratory Location: ALS Environmental, Calgary

Polycyclic Aromatic Hydrocarbons in Sediment/Soil

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3630 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure uses a Soxhlet system to extract a subsample of the sediment/soil with a 1:1 mixture of hexane and acetone. The extract is then solvent exchanged to toluene and undergoes a silica gel clean-up to remove sample components that could potentially interfere with the analysis. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS).

Recommended Holding Time:

Sample: 14 days

Extract: 40 days

Reference: EPA

Laboratory Location: ALS Environmental, Calgary

Cyanide in Sediment/Soil

Method Revised and Replace: 1997 02 01 This analysis is carried out in accordance with U.S. EPA Method 9010 (Publ. # SW-846 3rd ed., Washington, DC 20460) Specifically, subsamples are distilled using an acid reflux distillation. Liberated hydrogen cyanide gas is trapped in a weak NaOH solution. The extracts are then analysed colorimetrically.



Appendix 2 - METHODOLOGY - Continued

Laboratory Location: ALS Environmental, Vancouver

Glycols in Sediment/Soil

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 8015B, published by the United States Environmental Protection Agency (EPA). The procedure involves extraction of a subsample of the sediment/soil with deionized water, followed by treatment of the extract with a strong base (NaOH) and benzoyl chloride to form the corresponding benzoate esters. The benzoate esters are then extracted with hexane and the extract is analyzed by capillary column gas chromatography with flame ionization detection (FID).

Recommended Holding Time:

Sample: 14 days

Extract: 40 days

Reference: EPA

Laboratory Location: ALS Environmental, Vancouver

pH in Soil

This analysis is carried out in accordance with procedures described in "Soil Sampling and Methods of Analysis" (CSSS). The procedure involves mixing the air-dried sample with deionized/distilled water. The pH of the solution is then measured using a standard pH probe. A one to two ratio of sediment to water is used for mineral soils and a one to ten ratio is used for highly organic soils.

Laboratory Location: ALS Environmental, Vancouver

Moisture in Sediment/Soil

This analysis is carried out gravimetrically by drying the sample at 103 C for a minimum of six hours.

Recommended Holding Time:

Sample: 14 days

Reference: Puget

Laboratory Location: ALS Environmental, Vancouver

pH in Sediment/Soil

This analysis is adapted from the methods outlined in "Soil Sampling and Methods of Analysis" (Canadian Society of Soil Science).

"Saturated Paste Extract" In summary, 200 - 500 dry grams of sample is extracted for a minimum of 4 hours with an amount of deionized water required to create a saturated paste. The resulting extract is then filtered and analysed for pH.



Appendix 2 - METHODOLOGY - Continued

"Fixed Ratio Extract (e.g., 1:1, 1:5)" In summary, weigh out the appropriate amount of air-dried soil and add sufficient deionized water to achieve the desired extraction ratio and shake for 1 hour. The resulting extract is then filtered and analysed for pH.

pH analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode.

Recommended Holding Time:

Extract: asap

Reference: APHA

Laboratory Location: ALS Environmental, Calgary

Anions in Soil by Saturation Paste Extraction

This analysis is adapted from the methods outlined in "Soil Sampling and Methods of Analysis" (Canadian Society of Soil Science). In summary, 200 - 500 dry grams of sample is extracted for a minimum of 4 hours with an amount of deionized water required to create a saturated paste. The resulting extract is then filtered or decanted and analysed by IC for the requested parameters using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions are determined by filtering the sample through a 0.45 micron membrane filter and injecting the filtrate onto a Dionex IonPac AG17 anion exchange column with a sodium carbonate and sodium bicarbonate eluent stream. Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate. Further details are available on request.

Recommended Holding Time:

Sample Extraction: 6 months

Sample Analysis: 28 days (bromide, chloride, fluoride, sulphate)

Sample Analysis: 2 days (nitrate, nitrite)

Reference: Canadian Society of Soil Science, APHA and EPA

Laboratory Location: ALS Environmental, Calgary

Conductivity in Soil by Saturation Paste Extraction

This analysis is adapted from the methods outlined in "Soil Sampling and Methods of Analysis" (Canadian Society of Soil Science). In summary, 200 - 500 dry grams of sample is extracted for a minimum of 4 hours with an amount of deionized water required to create a saturated paste. The resulting extract is then filtered or decanted and analysed for conductivity with an conductivity electrode using procedures adapted from APHA Method 2510 "Conductivity".

Recommended Holding Time:

Sample Extraction: 6 months

Sample Analysis: 28 days

Appendix 2 - METHODOLOGY - Continued



Laboratory Location: ALS Environmental, Calgary

Sodium Adsorption Ratio (SAR) in Sediment/Soil

Sodium Adsorption Ratio (SAR) is calculated from the Sodium, Calcium, and Magnesium concentrations in the saturated paste extract of a sediment sample. The SAR calculation is described in "Soil Sampling and Methods of Analysis" by M. Carter.

Recommended Holding Time:

Sample/Extract: not applicable

Laboratory Location: ALS Environmental, Vancouver

Saturated Paste Extracts

This analysis is adapted from the methods outlined in "Soil Sampling and Methods of Analysis" (Canadian Society of Soil Science). In summary, 200 - 500 dry grams of sample is extracted for a minimum of 4 hours with an amount of deionized water required to create a saturated paste. The saturation % can be calculated from the amount of soil and water. The resulting extract is then filtered or decanted and analysed for various parameters.

Recommended Holding Time:

Sample: 6 month

Reference: Canadian Society of Soil Science

Laboratory Location: ALS Environmental, Calgary

Theoretical Gypsum Requirement (TGR) in Sediment/Soil

Theoretical Gypsum Requirement (TGR) is calculated from the Sodium Adsorption Ratio (SAR), and from the Sodium and Saturation % results, using Method A as described in "A Comparison of Methods for Gypsum Requirement of Brine-Contaminated Soils", by J. Ashworth, D. Keyes and J. Crepin (Cdn J. of Soil Science, 1999). Theoretical Gypsum Requirement results are reported as metric tonnes per hectare to a depth of 15 cm.

Please note that 50 tonnes/hectare is considered the maximum practical gypsum amendment.

Recommended Holding Time:

Sample/Extract: not applicable

Laboratory Location: ALS Environmental, Vancouver

Metals in Saturated Paste Sediment Extracts

Saturated paste sediment extracts are analyzed for metals by inductively coupled plasma optical emission spectrophotometry (EPA Method 6010B) or flame atomic absorption/emission spectrophotometry (EPA Method 7000)

File No. R3059b

Appendix 2 - METHODOLOGY - Continued



series). Reported metals results have been converted into milligrams per dry kilogram.

Recommended Holding Time:
Sample/Extract: 6 months
Reference: EPA

Laboratory Location: ALS Environmental, Vancouver

Results contained within this certificate relate only to the samples as submitted.

This Certificate Of Analysis shall only be reproduced in full, except with the written approval of ALS Environmental.

End of Report



CERTIFICATE OF ANALYSIS

Date: November 8, 2005

ALS File No. R3064

Report On: Lupin A053017

Report To: **SNC Lavalin, Morrow Environmental**
#112, 1212 - 1st Street SE
Calgary, AB
T2G 2H8

Attention: **Mr. Neil Sandstrom**

Received: July 29, 2005

ALS ENVIRONMENTAL

per:

Monica Gibson

Monica Gibson, M.Sc. - Project Chemist
Brent Whitehead, B.Sc. - Operations Supervisor

RESULTS OF ANALYSIS - Sediment/Soil

Sample ID	HCDUP1	HCDUP2	HCDUP3	HCDUP4	HCDUP5
Sample Date	05-07-20	05-07-20	05-07-20	05-07-20	05-07-20
ALS ID	1	2	3	4	5

Physical Tests

Moisture	%	7.80	8.60	7.41	9.86	3.52
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Cyanides

Total Cyanide	CN	<3.0	-	-	-	-
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Non-Halogenated Volatiles

Benzene	<0.040	0.494	<0.040	<0.040	<0.040
Ethylbenzene	<0.050	7.44	<0.050	2.11	<0.050
Toluene	<0.10	8.33	<0.10	1.29	<0.10
meta- & para-Xylene	<0.050	57.0	0.227	15.6	<0.050
ortho-Xylene	<0.050	35.4	0.242	13.0	<0.050
Total Xylenes	<0.075	92.4	0.469	28.6	<0.075

CCME Hydrocarbon Fractions

F1 (C6-C10)	12	1610	13	1060	93
F1-BTEX	12	1500	12	1030	93
F2 (C10-C16)	281	14000	759	9740	5010
F3 (C16-C34)	213	3590	708	3490	2020
F4 (C34-C50)	<50	<50	160	<50	160

F4G-SG Required (yes/no)	no	no	no	no	no
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Glycols

Diethylene Glycol	<10	-	<10	-	<10
Ethylene Glycol	<10	-	11	-	<10
1,2-Propylene Glycol	<10	-	<10	-	<10

Results are expressed as milligram per dry killogram unless otherwise noted.
 < = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Sediment/Soil

Sample ID	HCDUP1	HCDUP2	HCDUP3	HCDUP4	HCDUP5
Sample Date	05-07-20	05-07-20	05-07-20	05-07-20	05-07-20
ALS ID	1	2	3	4	5

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.40	<1.4	<0.40	<0.90	<0.40
Acenaphthylene	<0.50	<0.50	<0.50	<0.50	<0.50
Anthracene	<0.50	<1.9	<0.50	<1.7	<0.50
Benz(a)anthracene	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(a)pyrene	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(b)fluoranthene	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(g,h,i)perylene	<0.050	<0.050	<0.050	<0.050	<0.050
Benzo(k)fluoranthene	<0.050	<0.050	<0.050	<0.050	<0.050
Chrysene	<0.050	<0.050	<0.050	<0.050	<0.050
Dibenz(a,h)anthracene	<0.050	<0.050	<0.050	<0.050	<0.050
Fluoranthene	<0.050	0.113	<0.050	<0.050	<0.050
Fluorene	<0.50	4.53	<0.50	4.13	<0.50
Indeno(1,2,3-c,d)pyrene	<0.050	<0.050	<0.050	<0.050	<0.050
Naphthalene	<0.50	10.1	<0.50	3.94	<0.50
Phenanthrene	<0.50	3.74	<0.50	1.81	<0.50
Pyrene	<0.050	0.318	<0.050	<0.050	<0.050

Results are expressed as milligram per dry kilogram unless otherwise noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	HCDUP6	HCDUP7	HCDUP8
Sample Date	05-07-20	05-07-20	05-07-20
ALS ID	6	7	8
Physical Tests			
Moisture %	5.66	12.9	3.78
Non-Halogenated Volatiles			
Benzene	<0.040	<0.040	<0.040
Ethylbenzene	<0.050	<0.050	<0.050
Toluene	<0.10	<0.10	<0.10
meta- & para-Xylene	<0.050	0.067	<0.050
ortho-Xylene	<0.050	0.105	<0.050
Total Xylenes	<0.075	0.172	<0.075
CCME Hydrocarbon Fractions			
F1 (C6-C10)	154	252	75
F1-BTEX	154	251	75
F2 (C10-C16)	3870	2770	2000
F3 (C16-C34)	677	450	424
F4 (C34-C50)	<50	<50	<50
F4G-SG Required (yes/no)	no	no	no

Results are expressed as milligram per dry killogram unless otherwise noted.
 < = Less than the detection limit indicated.

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	HCDUP6	HCDUP7	HCDUP8
Sample Date	05-07-20	05-07-20	05-07-20
ALS ID	6	7	8

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.40	<0.40	<0.40
Acenaphthylene	<0.50	<0.50	<0.50
Anthracene	<0.50	<0.60	<0.50
Benz(a)anthracene	<0.050	<0.050	<0.050
Benzo(a)pyrene	<0.050	<0.050	<0.050
Benzo(b)fluoranthene	<0.050	<0.050	<0.050
Benzo(g,h,i)perylene	<0.050	<0.050	<0.050
Benzo(k)fluoranthene	<0.050	<0.050	<0.050
Chrysene	<0.050	<0.050	<0.050
Dibenz(a,h)anthracene	<0.050	<0.050	<0.050
Fluoranthene	<0.050	0.060	<0.050
Fluorene	<0.50	1.03	<0.50
Indeno(1,2,3-c,d)pyrene	<0.050	<0.050	<0.050
Naphthalene	<0.50	<0.80	<0.50
Phenanthrene	<0.50	1.03	<0.50
Pyrene	<0.050	0.052	<0.050

Results are expressed as milligram per dry killogram unless otherwise noted.
 < = Less than the detection limit indicated.

Appendix 1 - QUALITY CONTROL - Replicates

Sediment/Soil	HCDUP8	HCDUP8
---------------	--------	--------

05-07-20

QC #
21859**Physical Tests**

Moisture %	3.78	4.08
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CCME Hydrocarbon Fractions

F2 (C10-C16)	2000	1700
F3 (C16-C34)	424	389
F4 (C34-C50)	<50	<50

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.40	<0.40
Acenaphthylene	<0.50	<0.50
Anthracene	<0.50	<0.50
Benz(a)anthracene	<0.050	<0.050
Benzo(a)pyrene	<0.050	<0.050
Benzo(b)fluoranthene	<0.050	<0.050
Benzo(g,h,i)perylene	<0.050	<0.050
Benzo(k)fluoranthene	<0.050	<0.050
Chrysene	<0.050	<0.050
Dibenz(a,h)anthracene	<0.050	<0.050
Fluoranthene	<0.050	<0.050
Fluorene	<0.50	<0.50
Indeno(1,2,3-c,d)pyrene	<0.050	<0.050
Naphthalene	<0.50	<0.50
Phenanthrene	<0.50	<0.50
Pyrene	<0.050	<0.050

Results are expressed as milligram per dry killogram unless otherwise noted.
 < = Less than the detection limit indicated.

Appendix 1 - QUALITY CONTROL - Spikes

Sediment/Soil

	Result	Target	Units	DL	ALSQC#	Method
<u>Non-Halogenated Volatiles</u>						
Benzene	1.89	2.00	mg/kg	0.04	22062	a
Ethylbenzene	2.03	2.00	mg/kg	0.04	22062	a
Toluene	1.94	2.00	mg/kg	0.1	22062	a
meta- & para-Xylene	2.04	2.00	mg/kg	0.04	22062	a
ortho-Xylene	2.07	2.00	mg/kg	0.04	22062	a
<u>CCME Hydrocarbon Fractions</u>						
F1 (C6-C10)	28	29	mg/kg	10	22064	b
F2 (C10-C16)	637	720	mg/kg	30	22230	c
F3 (C16-C34)	1410	1650	mg/kg	50	22230	c
F4 (C34-C50)	583	700	mg/kg	50	22230	c
<u>Glycols</u>						
Diethylene Glycol	50	50	mg/kg	10	22273	d
Ethylene Glycol	50	50	mg/kg	10	22273	d
1,2-Propylene Glycol	56	50	mg/kg	10	22273	d

Methods:

a = Purge&Trap/GC-MS

b = Purge&Trap/GC-FID

c = Soxhlet/GC-FID

d = GC-FID

Appendix 1 - QUALITY CONTROL - Blanks

Sediment/Soil

	Result	Target	Units	DL	ALSQC#	Method
<u>Cyanides</u>						
Total Cyanide CN	<3	<3	mg/kg	3	22278	a
<u>Non-Halogenated Volatiles</u>						
Benzene	<0.040	<0.040	mg/kg	0.04	22063	b
Ethylbenzene	<0.050	<0.050	mg/kg	0.05	22063	b
Toluene	<0.100	<0.100	mg/kg	0.1	22063	b
meta- & para-Xylene	<0.050	<0.050	mg/kg	0.05	22063	b
ortho-Xylene	<0.050	<0.050	mg/kg	0.05	22063	b
<u>Glycols</u>						
Diethylene Glycol	<10	<10	mg/kg	10	22272	c
Ethylene Glycol	<10	<10	mg/kg	10	22272	c
1,2-Propylene Glycol	<10	<10	mg/kg	10	22272	c
<u>Polycyclic Aromatic Hydrocarbons</u>						
Acenaphthene	<0.050	<0.050	mg/kg	0.05	22129	d
Acenaphthylene	<0.050	<0.050	mg/kg	0.05	22129	d
Anthracene	<0.050	<0.050	mg/kg	0.05	22129	d
Benz(a)anthracene	<0.050	<0.050	mg/kg	0.05	22129	d
Benzo(a)pyrene	<0.050	<0.050	mg/kg	0.05	22129	d
Benzo(b)fluoranthene	<0.050	<0.050	mg/kg	0.05	22129	d
Benzo(g,h,i)perylene	<0.050	<0.050	mg/kg	0.05	22129	d
Benzo(k)fluoranthene	<0.050	<0.050	mg/kg	0.05	22129	d
Chrysene	<0.050	<0.050	mg/kg	0.05	22129	d
Dibenz(a,h)anthracene	<0.050	<0.050	mg/kg	0.05	22129	d
Fluoranthene	<0.050	<0.050	mg/kg	0.05	22129	d
Fluorene	<0.050	<0.050	mg/kg	0.05	22129	d
Indeno(1,2,3-c,d)pyrene	<0.050	<0.050	mg/kg	0.05	22129	d
Naphthalene	<0.050	<0.050	mg/kg	0.05	22129	d
Phenanthrene	<0.050	<0.050	mg/kg	0.05	22129	d
Pyrene	<0.050	<0.050	mg/kg	0.05	22129	d
<u>Extractable Hydrocarbons</u>						
F2 (C10-C16)	<30	<30	mg/kg	30	21982	e
F3 (C16-C34)	<50	<50	mg/kg	50	21982	e
F4 (C34-C50)	<50	<50	mg/kg	50	21982	e

Methods:

a = Colourimetry
 b = Purge&Trap/GC-MS
 c = GC-FID
 d = Soxhlet/GC-MS
 e = Soxhlet/GC-FID

Appendix 2 - METHODOLOGY



Outlines of the methodologies utilized for the analysis of the samples submitted are as follows

Moisture in Sediment/Soil

This analysis is carried out gravimetrically by drying the sample at 103 C for a minimum of six hours.

Recommended Holding Time:

Sample: 14 days

Reference: Puget

Laboratory Location: ALS Environmental, Calgary

Cyanide in Sediment/Soil

Method Revised and Replace: 1997 02 01 This analysis is carried out in accordance with U.S. EPA Method 9010 (Publ. # SW-846 3rd ed., Washington, DC 20460) Specifically, subsamples are distilled using an acid reflux distillation. Liberated hydrogen cyanide gas is trapped in a weak NaOH solution. The extracts are then analysed colorimetrically.

Laboratory Location: ALS Environmental, Vancouver

Volatile Organic Compounds in Sediment/Soil

This analysis involves the extraction of a subsample of the sediment/soil with methanol. Aliquots of the methanol extract are then analyzed for specific Volatile Organic Compounds (VOC) by capillary column gas chromatography with mass spectrometric detection (GC/MS). The VOC analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 8260, published by the United States Environmental Protection Agency (EPA).

Recommended Holding Time:

Sample: 7 days

Extract: 40 days

Reference: EPA

Laboratory Location: ALS Environmental, Calgary

Calculation of Total Xylenes

Total Xylenes is the sum of the concentrations of the ortho, meta, and para Xylene isomers. Results below detection limit (DL) are treated as zero. The DL for Total Xylenes is set to a value no less than the square root of the sum of the squares of the DLs of the individual Xylenes.

Laboratory Location: ALS Environmental, Vancouver



Petroleum Hydrocarbons in Sediment/Soil (Canada-Wide Standard)

This analysis is carried out in accordance with the "Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method, Canadian Council of Ministers of the Environment, December 2000." The various extraction fractions are analysed as follows:

CWS Fractions 1 and 1-BTEX:

This procedure involves the extraction of a subsample of the sediment/soil with methanol. Aliquots of the methanol extract are then analysed by capillary column gas chromatography with flame-ionization detection (GC/FID) for CWS Fraction 1, and by capillary column gas chromatography with mass spectrometric detection (GC/MS) for the BTEX compounds.

Reported results may include any or all of the following:

CWS Fraction 1 (C6-10):

sum of all petroleum hydrocarbon compounds that elute between nC6 and nC10 obtained by GC/FID analysis

CWS Fraction 1-BTEX:

CWS Fraction 1 (C6-10), minus BTEX compounds

Recommended Holding Time:

Sample: 7 days for CWS Fraction 1

Extract: 7 days for all CWS Fractions

Reference: CCME

Laboratory Location: ALS Environmental, Calgary

Petroleum Hydrocarbons in Sediment/Soil (Canada-Wide Standard)

This analysis is carried out in accordance with the "Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method, Canadian Council of Ministers of the Environment, December 2000." The various extraction fractions are analysed as follows:

CWS Fractions 2, 2-PAH, 3, 3-PAH, 4 and 4G-SG:

The procedure uses an automated system at high temperature and pressure (Accelerated Solvent Extractor - ASE) or a Soxhlet system to extract a subsample of the sediment/soil with a 1:1 mixture of hexane and acetone. The extract is concentrated and undergoes a silica-gel clean-up to remove polar material. The final extract is analysed by high temperature capillary column gas chromatography with flame ionization detection (GC/FID). CWS Fractions 4G and 4G-SG (Gravimetric Heavy Hydrocarbons) are analysed gravimetrically.

Appendix 2 - METHODOLOGY - Continued



Reported results may include any or all of the following:

CWS Fraction 2 (C10-16):

sum of all petroleum hydrocarbon compounds that elute between nC10 and nC16 obtained by GC/FID analysis

CWS Fraction 2-PAH:

CWS Fraction 2 (C10-16), minus selected PAH compounds (Naphthalene)

CWS Fraction 3 (C16-34):

sum of all petroleum hydrocarbon compounds that elute between nC16 and nC34 obtained by GC/FID analysis

CWS Fraction 3-PAH:

CWS Fraction 3 (C16-34), minus selected PAH compounds

CWS Fraction 4 (C34-50):

sum of all petroleum hydrocarbon compounds that elute between nC34 and nC50 obtained by GC/FID analysis

CWS Fraction 4G (GHH):

Results obtained by gravimetric analysis.

CWS Fraction 4G-SG (GHH + SG):

Results obtained by gravimetric analysis after silica gel clean-up

Recommended Holding Time:

Sample: 14 days for CWS Fractions 2, 3, 4, 4G & 4G-SG

Extract: 7 days for all CWS Fractions

Reference: CCME

Laboratory Location: ALS Environmental, Calgary

Glycols in Sediment/Soil

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 8015B, published by the United States Environmental Protection Agency (EPA). The procedure involves extraction of a subsample of the sediment/soil with deionized water, followed by treatment of the extract with a strong base (NaOH) and benzoyl chloride to form the corresponding benzoate esters. The benzoate esters are then extracted with hexane and the extract is analyzed by capillary column gas chromatography with flame ionization detection (FID).

Recommended Holding Time:

Sample: 14 days

Extract: 40 days

Reference: EPA

Laboratory Location: ALS Environmental, Vancouver

Polycyclic Aromatic Hydrocarbons in Sediment/Soil

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3630 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure uses a Soxhlet system to extract a subsample of the sediment/soil with a

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Appendix 2 - METHODOLOGY - Continued

1:1 mixture of hexane and acetone. The extract is then solvent exchanged to toluene and undergoes a silica gel clean-up to remove sample components that could potentially interfere with the analysis. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS).

Recommended Holding Time:

Sample: 14 days

Extract: 40 days

Reference: EPA

Laboratory Location: ALS Environmental, Calgary

Results contained within this certificate relate only to the samples as submitted.

This Certificate Of Analysis shall only be reproduced in full, except with the written approval of ALS Environmental.

End of Report



CERTIFICATE OF ANALYSIS

Date: November 8, 2005

ALS File No. R3058

Report On: Lupin A053017

Report To: **SNC Lavalin, Morrow Environmental**
#112, 1212 - 1st Street SE
Calgary, AB
T2G 2H8

Attention: **Mr. Neil Sandstrom**

Received: July 29, 2005

ALS ENVIRONMENTAL

per:

Monica Gibson

Monica Gibson, M.Sc. - Project Chemist
Brent Whitehead, B.Sc. - Operations Supervisor

File No. R3058

REMARKS



The Metals detection limits were increased for some samples due to elevated Iron levels.

RESULTS OF ANALYSIS - Sediment/Soil

Sample ID	METDUP1	METDUP2	METDUP3	METDUP4	METDUP5
Sample Date <i>ALS ID</i>	05-07-19 1	05-07-19 2	05-07-19 3	05-07-19 4	05-07-19 5

Physical Tests

pH	10.9	11.4	8.32	3.60	3.56
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Total Metals

Antimony	T-Sb	<10	<10	<10	<10
Arsenic	T-As	47.5	154	302	1740
Barium	T-Ba	55.0	185	173	204
Beryllium	T-Be	<0.50	<0.50	<0.50	<0.50
Cadmium	T-Cd	<0.50	<0.50	<0.50	<0.50
Chromium	T-Cr	46.4	85.5	70.6	67.8
Cobalt	T-Co	5.4	21.6	18.3	7.4
Copper	T-Cu	16.0	53.1	43.4	26.1
Lead	T-Pb	<30	<30	<30	<30
Mercury	T-Hg	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum	T-Mo	11.6	<4.0	<4.0	<4.0
Nickel	T-Ni	25.4	67.3	55.7	28.6
Selenium	T-Se	<2.0	<2.0	<2.0	<2.0
Silver	T-Ag	<2.0	<2.0	<2.0	<2.0
Thallium	T-Tl	<1.0	<1.0	<1.0	<1.0
Tin	T-Sn	<5.0	<5.0	<5.0	<5.0
Vanadium	T-V	25.3	60.6	52.0	49.5
Zinc	T-Zn	26.6	80.0	61.5	49.0

Inorganic Parameters

Sulphide	S	<0.21	0.29	0.89	5.4
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Remarks regarding the analyses appear at the beginning of this report.

RESULTS OF ANALYSIS - Sediment/Soil



Sample Date	05-07-19
ALS ID	6

pH 5.87

Antimony	T-Sb	<20
Arsenic	T-As	30
Barium	T-Ba	505
Beryllium	T-Be	<1.0
Cadmium	T-Cd	<1.0
Chromium	T-Cr	64.4
Cobalt	T-Co	46.5
Copper	T-Cu	2230
Lead	T-Pb	<60
Mercury	T-Hg	<0.0050
Molybdenum	T-Mo	<8.0
Nickel	T-Ni	33
Selenium	T-Se	<4.0
Silver	T-Ag	<4.0
Thallium	T-Tl	<1.0
Tin	T-Sn	<10
Vanadium	T-V	130
Zinc	T-Zn	126

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Appendix 1 - QUALITY CONTROL - Replicates

Sediment/Soil		METDUP5	METDUP5
		05-07-19	QC # 22363
Physical Tests			
pH		3.56	2.86
Total Metals			
Antimony	T-Sb	<10	<10
Arsenic	T-As	9230	9660
Barium	T-Ba	94.8	95.4
Beryllium	T-Be	<0.50	<0.50
Cadmium	T-Cd	<0.50	<0.50
Chromium	T-Cr	36.0	42.1
Cobalt	T-Co	5.0	5.1
Copper	T-Cu	84.7	73.2
Lead	T-Pb	<30	42
Mercury	T-Hg	0.0094	0.0069
Molybdenum	T-Mo	<4.0	<4.0
Nickel	T-Ni	18.7	18.5
Selenium	T-Se	<2.0	<2.0
Silver	T-Ag	2.5	<2.0
Thallium	T-Tl	<1.0	<1.0
Tin	T-Sn	<5.0	<5.0
Vanadium	T-V	27.5	26.7
Zinc	T-Zn	31.1	31.6

Remarks regarding the analyses appear at the beginning of this report.

Appendix 1 - QUALITY CONTROL - Reference Materials

Sediment/Soil

		Result	Target	Units	DL	ALSQC#	Method
<i>NIST Montana Soil, 2711</i>							
<u>Total Metals</u>							
Antimony	T-Sb	15	19	mg/kg	10	22366	a
Arsenic	T-As	99.7	105	mg/kg	5	22366	a
Barium	T-Ba	203	726	mg/kg	1	22366	a
Beryllium	T-Be	1.02	0.98	mg/kg	0.5	22366	a
Cadmium	T-Cd	40.5	41.7	mg/kg	0.5	22366	a
Chromium	T-Cr	22.4	47.0	mg/kg	2	22366	a
Cobalt	T-Co	8.0	10.0	mg/kg	2	22366	a
Copper	T-Cu	112	114	mg/kg	1	22366	a
Lead	T-Pb	1170	1160	mg/kg	50	22366	a
Mercury	T-Hg	6.29	6.25	mg/kg	0.05	22370	b
Molybdenum	T-Mo	<4.0	<4.0	mg/kg	4	22366	a
Nickel	T-Ni	16.2	20.6	mg/kg	5	22366	a
Selenium	T-Se	<2.0	<2.0	mg/kg	2	22366	a
Silver	T-Ag	4.2	4.6	mg/kg	2	22366	a
Thallium	T-Tl	<10	<10	mg/kg	10	22366	a
Thallium	T-Tl	1.9	2.5	mg/kg	1	22374	c
Tin	T-Sn	<10	<10	mg/kg	10	22366	a
Vanadium	T-V	53.1	81.6	mg/kg	2	22366	a
Zinc	T-Zn	335	350	mg/kg	1	22366	a

CANMET Till Reference Material, TILL-1

<u>Total Metals</u>							
Antimony	T-Sb	<10	<10	mg/kg	10	22367	a
Arsenic	T-As	18.0	18.0	mg/kg	5	22367	a
Barium	T-Ba	87.0	702	mg/kg	1	22367	a
Beryllium	T-Be	0.52	2.40	mg/kg	0.5	22367	a
Cadmium	T-Cd	<0.50	<0.50	mg/kg	0.5	22367	a
Chromium	T-Cr	29.1	65.0	mg/kg	2	22367	a
Cobalt	T-Co	12.9	18.0	mg/kg	2	22367	a
Copper	T-Cu	47.6	47.0	mg/kg	1	22367	a
Lead	T-Pb	<50	<50	mg/kg	50	22367	a
Mercury	T-Hg	0.113	0.095	mg/kg	0.05	22371	b
Molybdenum	T-Mo	<4.0	<4.0	mg/kg	4	22367	a

Methods:a = CSR/HCl-HNO₃/ICPOESb = CSR/HCl-HNO₃/CVAFS

c = SM__CSR_ICPMS

Appendix 1 - QUALITY CONTROL - Reference Materials

Sediment/Soil

		Result	Target	Units	DL	ALSQC#	Method
<i>CANMET Till Reference Material, TILL-1</i>							
<u>Total Metals</u>							
Nickel	T-Ni	18.0	24.0	mg/kg	5	22367	a
Selenium	T-Se	<2.0	2.0	mg/kg	2	22367	a
Silver	T-Ag	<2.0	<2.0	mg/kg	2	22367	a
Thallium	T-Tl	<10	10	mg/kg	10	22367	a
Tin	T-Sn	<5.0	5.0	mg/kg	5	22367	a
Vanadium	T-V	61.5	99.0	mg/kg	2	22367	a
Zinc	T-Zn	70.6	98.0	mg/kg	1	22367	a

Methods:a = CSR/HCl-HNO₃/ICPOES

Appendix 1 - QUALITY CONTROL - Blanks

Sediment/Soil

		Result	Target	Units	DL	ALSQC#	Method
Total Metals							
Antimony	T-Sb	<10	<10	mg/kg	10	22364	a
Antimony	T-Sb	<10	<10	mg/kg	10	22365	a
Arsenic	T-As	<5.0	<5.0	mg/kg	5	22364	a
Arsenic	T-As	<5.0	<5.0	mg/kg	5	22365	a
Barium	T-Ba	<1.0	<1.0	mg/kg	1	22364	a
Barium	T-Ba	<1.0	<1.0	mg/kg	1	22365	a
Beryllium	T-Be	<0.50	<0.50	mg/kg	0.5	22364	a
Beryllium	T-Be	<0.50	<0.50	mg/kg	0.5	22365	a
Cadmium	T-Cd	<0.50	<0.50	mg/kg	0.5	22364	a
Cadmium	T-Cd	<0.50	<0.50	mg/kg	0.5	22365	a
Chromium	T-Cr	<2.0	<2.0	mg/kg	2	22364	a
Chromium	T-Cr	<2.0	<2.0	mg/kg	2	22365	a
Cobalt	T-Co	<2.0	<2.0	mg/kg	2	22364	a
Cobalt	T-Co	<2.0	<2.0	mg/kg	2	22365	a
Copper	T-Cu	<1.0	<1.0	mg/kg	1	22364	a
Copper	T-Cu	<1.0	<1.0	mg/kg	1	22365	a
Lead	T-Pb	<50	<50	mg/kg	50	22364	a
Lead	T-Pb	<50	<50	mg/kg	50	22365	a
Mercury	T-Hg	<0.050	<0.050	mg/kg	0.05	22368	b
Mercury	T-Hg	<0.050	<0.050	mg/kg	0.05	22369	b
Molybdenum	T-Mo	<4.0	<4.0	mg/kg	4	22364	a
Molybdenum	T-Mo	<4.0	<4.0	mg/kg	4	22365	a
Nickel	T-Ni	<5.0	<5.0	mg/kg	5	22364	a
Nickel	T-Ni	<5.0	<5.0	mg/kg	5	22365	a
Selenium	T-Se	<2.0	<2.0	mg/kg	2	22364	a
Selenium	T-Se	<2.0	<2.0	mg/kg	2	22365	a
Silver	T-Ag	<2.0	<2.0	mg/kg	2	22364	a
Silver	T-Ag	<2.0	<2.0	mg/kg	2	22365	a
Thallium	T-Tl	<10	<10	mg/kg	10	22364	a
Thallium	T-Tl	<10	<10	mg/kg	10	22365	a
Thallium	T-Tl	<1.0	<1.0	mg/kg	1	22372	c
Thallium	T-Tl	<1.0	<1.0	mg/kg	1	22373	c
Tin	T-Sn	<5.0	<5.0	mg/kg	5	22364	a
Tin	T-Sn	<5.0	<5.0	mg/kg	5	22365	a
Vanadium	T-V	<2.0	<2.0	mg/kg	2	22364	a
Vanadium	T-V	<2.0	<2.0	mg/kg	2	22365	a

Methods:a = CSR/HCl-HNO₃/ICPOESb = CSR/HCl-HNO₃/CVAFS

c = SM__CSR_ICPMS

File No. R3058

Appendix 1 - QUALITY CONTROL - Blanks



Sediment/Soil

		Result	Target	Units	DL	ALSQC#	Method
Total Metals							
Zinc	T-Zn	<1.0	<1.0	mg/kg	1	22364	a
Zinc	T-Zn	<1.0	<1.0	mg/kg	1	22365	a

Methods:

a = CSR/HCl-HNO₃/ICPOES

Bold Targets indicate uncertified targets

Appendix 2 - METHODOLOGY



Outlines of the methodologies utilized for the analysis of the samples submitted are as follows

pH in Sediment/Soil

This analysis is adapted from the methods outlined in "Soil Sampling and Methods of Analysis" (Canadian Society of Soil Science).

"Saturated Paste Extract" In summary, 200 - 500 dry grams of sample is extracted for a minimum of 4 hours with an amount of deionized water required to create a saturated paste. The resulting extract is then filtered and analysed for pH.

"Fixed Ratio Extract (e.g., 1:1, 1:5)" In summary, weigh out the appropriate amount of air-dried soil and add sufficient deionized water to achieve the desired extraction ratio and shake for 1 hour. The resulting extract is then filtered and analysed for pH.

pH analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode.

Recommended Holding Time:

Extract: asap

Reference: APHA

Laboratory Location: ALS Environmental, Calgary

Metals in Sediment/Soil

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B or Method 3051, United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by either hotplate or block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by atomic absorption/fluorescence spectrophotometry (EPA Method 7000 series), inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B), and/or inductively coupled plasma - mass spectrometry (EPA Method 6020).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

Recommended Holding Time:

Sample: 6 months (Hg = 28 days)

Extract: 6 months (Hg = 28 days, Sb & Sn = 7 days)

Appendix 2 - METHODOLOGY - Continued



Reference: BCMELP

Laboratory Location: ALS Environmental, Vancouver

Sulphide in Sediment/Soil

This analysis is carried out on a leachable basis. The procedure involves mixing the sample with a sodium hydroxide solution in a one to ten ratio and leaching for several hours. The leachate is then centrifuged and analyzed colorimetrically.

Laboratory Location: ALS Environmental, Vancouver

pH in Soil

This analysis is carried out in accordance with procedures described in "Soil Sampling and Methods of Analysis" (CSSS). The procedure involves mixing the air-dried sample with deionized/distilled water. The pH of the solution is then measured using a standard pH probe. A one to two ratio of sediment to water is used for mineral soils and a one to ten ratio is used for highly organic soils.

Laboratory Location: ALS Environmental, Vancouver

Results contained within this certificate relate only to the samples as submitted.

This Certificate Of Analysis shall only be reproduced in full, except with the written approval of ALS Environmental.

End of Report



CERTIFICATE OF ANALYSIS

Date: August 26, 2005

ALS File No. CC500001r

Report On: Lupin A053017

Report To: **SNC Lavalin, Morrow Environmental**
#112, 1212 - 1st Street SE
Calgary, AB
T2G 2H8

Attention: **Mr. Neil Sandstrom**

Received: July 29, 2005

ALS ENVIRONMENTAL

per:

Monica Gibson

Monica Gibson, M.Sc. - Project Chemist
Brent Whitehead, B.Sc. - Operations Supervisor



REMARKS

Please note that this report for ALS WO# CC500001r supercedes CC500001, added total metals to -23 and -24.

Please note that the certain Metals detection limits have been increased for some of the samples due to the matrix interferences encountered during the analysis.

Please note that for samples ID MW-05-10, MW-05-13 and CREEK ion balance were outside normal limits. Major ions have been rechecked.

Please note that due to limited sample volume for sample ID MW-05-10 Alkalinity, pH and Conductivity analyses could not be completed.

For the submitted water sample, the measured concentration of specific dissolved parameters is greater than the corresponding total parameters concentration. The explanation for these findings is one or a combination of the following:

- laboratory method variability;
- analytical bias introduced during sample filtration;
- analytical bias introduced during general handling, storage, transportation and/or analysis of the sample;
- sample grab bias - where separate grab samples are processed to produce total and dissolved samples;
- sample split bias - where total and dissolved parameters samples are produced from the same grab sample.

For further clarification of any of the above information, please contact your ALS representative.

RESULTS OF ANALYSIS - Water

Sample ID	MW-05-01 -2005-07	MW-05-02 -2005-07	MW-05-03 -2005-07	MW-05-05 -2005-07	MW-05-09 -2005-07
Sample Date ALS ID	05-07-22 1	05-07-22 2	05-07-22 3	05-07-22 4	05-07-23 5

Physical Tests

Anion Sum (meq/L)	10.5	17.6	10.6	10.2	69.8
Cation Sum (meq/L)	11.4	17.0	11.6	10.5	65.3
Ion Balance %	3.8	-1.9	4.5	1.4	-3.3
Conductivity (uS/cm)	871	1600	1050	880	6500
Total Dissolved Solids	665	1030	659	654	4200
Total Dissolved Solids (Calc)	-	-	-	-	-
Hardness CaCO ₃	423	337	369	336	1120
pH	6.79	7.78	7.38	7.50	6.17
Salinity o/oo	-	-	-	-	-

Dissolved Anions

Alkalinity-Total	CaCO ₃	208	111	100	111	27.0
Alkalinity-Bicarbonate	CaCO ₃	208	111	100	111	27.0
Alkalinity-Carbonate	CaCO ₃	<5.0	<5.0	<5.0	<5.0	<5.0
Alkalinity-Hydroxide	CaCO ₃	<5.0	<5.0	<5.0	<5.0	<5.0
Chloride Cl		14.1	171	165	54.2	1870
Sulphate SO ₄		287	421	189	303	669

Nutrients

Nitrate Nitrogen	N	<0.050	25.2	0.147	1.86	36.3
Nitrite Nitrogen	N	0.056	0.263	0.0190	0.0710	0.24
Nitrite/Nitrate Nitrogen	N	<0.071	25.5	0.166	1.93	36.6

Cyanides

Total Cyanide	CN	-	0.422	3.97	-	-
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Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per litre except where noted.
 < = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Water

Sample ID	MW-05-01 -2005-07	MW-05-02 -2005-07	MW-05-03 -2005-07	MW-05-05 -2005-07	MW-05-09 -2005-07
Sample Date ALS ID	05-07-22 1	05-07-22 2	05-07-22 3	05-07-22 4	05-07-23 5

Dissolved Metals

Aluminum	D-Al	0.408	<0.050	0.103	0.247	<0.10
Antimony	D-Sb	0.0054	<0.0025	<0.0010	<0.0010	<0.0050
Arsenic	D-As	1.89	0.0106	0.0024	0.0279	0.011
Barium	D-Ba	0.051	0.070	0.058	0.039	0.187
Beryllium	D-Be	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Boron	D-B	0.25	0.28	0.34	0.20	0.23
Cadmium	D-Cd	0.00023	<0.00025	0.00010	<0.00010	0.00109
Calcium	D-Ca	147	96.4	126	112	368
Chromium	D-Cr	0.0050	<0.0025	0.0034	<0.0010	<0.0050
Cobalt	D-Co	0.105	0.106	0.0144	0.0292	0.114
Copper	D-Cu	0.0021	0.0223	0.0076	0.0040	<0.010
Iron	D-Fe	23.6	0.277	1.36	0.216	83.1
Lead	D-Pb	<0.0020	<0.0050	<0.0020	<0.0020	<0.010
Lithium	D-Li	<0.050	<0.050	<0.050	<0.050	0.083
Magnesium	D-Mg	13.6	23.5	13.3	14.1	49.1
Manganese	D-Mn	1.65	1.79	0.126	0.639	4.11
Molybdenum	D-Mo	0.0090	0.0815	0.0046	0.0280	0.083
Nickel	D-Ni	0.171	<0.025	<0.010	<0.010	0.209
Potassium	D-K	21.1	47.1	22.4	23.4	150
Selenium	D-Se	0.0024	<0.0050	<0.0020	<0.0020	<0.030
Silver	D-Ag	<0.00010	<0.00025	<0.00010	<0.00010	<0.00050
Sodium	D-Na	31.9	205	81.9	70.9	824
Thallium	D-Tl	<0.00040	<0.0010	<0.00040	<0.00040	<0.0020
Titanium	D-Ti	<0.050	<0.050	<0.050	<0.050	<0.050
Uranium	D-U	0.00872	<0.0010	0.00191	0.00267	<0.0020
Vanadium	D-V	<0.030	<0.030	<0.030	<0.030	<0.030
Zinc	D-Zn	0.0890	0.0100	<0.0050	<0.0050	0.0531

Non-Halogenated Volatiles

Benzene		0.00356	-	-	-	<0.00050
Ethylbenzene		0.0381	-	-	-	<0.00050
Toluene		0.0800	-	-	-	<0.0010
meta- & para-Xylene		0.224	-	-	-	<0.00050
ortho-Xylene		0.191	-	-	-	<0.00050
Total Xylenes		0.415	-	-	-	<0.00071

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per litre except where noted.
 < = Less than the detection limit indicated.

File No. CC500001r

RESULTS OF ANALYSIS - Water



Sample ID	MW-05-01 -2005-07	MW-05-03 -2005-07	MW-05-09 -2005-07
Sample Date	05-07-22	05-07-22	05-07-23
ALS ID	1	3	5

CCME Hydrocarbon Fractions

F1 (C6-C10)	1.30	-	<0.10
F1-BTEX	0.77	-	<0.10
F2 (C10-C16)	30.4	-	0.99

Glycols

Diethylene Glycol	-	<5.0	<5.0
Ethylene Glycol	-	<5.0	<5.0
1,2-Propylene Glycol	-	<5.0	<5.0
Triethylene Glycol	-	<10	<10

Remarks regarding the analyses appear at the beginning of this report.
Results are expressed as milligrams per litre except where noted.
< = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Water

Sample ID	MW-05-10 -2005-07	MW-05-11 -2005-07	MW-05-13 -2005-07	MW-05-16 -2005-07	MW-05-21 -2005-07
Sample Date ALS ID	05-07-22 6	05-07-22 7	05-07-23 8	05-07-23 9	05-07-23 10

Physical Tests

Anion Sum (meq/L)	14.9	22.5	109	25.7	14.6
Cation Sum (meq/L)	21.5	22.4	48.2	22.8	14.4
Ion Balance %	-	-0.1	-38.5	-6.0	-0.8
Conductivity (uS/cm)	3.6	1770	10400	2250	1240
Total Dissolved Solids	1140	1440	3560	1910	909
Total Dissolved Solids (Calc)	-	-	-	-	-
Hardness CaCO ₃	895	810	1580	991	412
pH	6.04	7.17	7.42	7.66	7.56
Salinity o/oo	-	-	-	-	-

Dissolved Anions

Alkalinity-Total	CaCO ₃	-	126	305	68.7	182
Alkalinity-Bicarbonate	CaCO ₃	-	126	306	68.7	182
Alkalinity-Carbonate	CaCO ₃	-	<5.0	<5.0	<5.0	<5.0
Alkalinity-Hydroxide	CaCO ₃	-	<5.0	<5.0	<5.0	<5.0
Chloride Cl		41.8	142	792	32.5	94.3
Sulphate SO ₄		658	761	1560	234	399

Nutrients

Nitrate Nitrogen	N	0.095	1.17	666	258	0.219
Nitrite Nitrogen	N	<0.025	0.0450	2.90	0.770	0.0890
Nitrite/Nitrate Nitrogen	N	0.095	1.21	668	259	0.308

Cyanides

Total Cyanide	CN	-	-	0.017	<0.010	0.178
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 < = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Water

Sample ID	MW-05-10 -2005-07	MW-05-11 -2005-07	MW-05-13 -2005-07	MW-05-16 -2005-07	MW-05-21 -2005-07
Sample Date ALS ID	05-07-22 6	05-07-22 7	05-07-23 8	05-07-23 9	05-07-23 10

Dissolved Metals

Aluminum	D-Al	2.76	<0.050	<0.050	<0.050	<0.020
Antimony	D-Sb	<0.0025	0.0031	0.0061	<0.0025	<0.0010
Arsenic	D-As	0.244	0.0131	0.0172	0.0120	0.0661
Barium	D-Ba	0.106	0.026	0.139	0.055	0.061
Beryllium	D-Be	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Boron	D-B	0.41	0.70	2.65	3.60	0.67
Cadmium	D-Cd	0.00133	0.00325	<0.00025	0.00104	<0.00010
Calcium	D-Ca	318	264	492	359	139
Chromium	D-Cr	0.0320	<0.0025	<0.0025	<0.0025	<0.0010
Cobalt	D-Co	0.0519	0.0746	0.0050	0.0428	0.107
Copper	D-Cu	0.235	0.0083	0.0092	<0.0050	0.0037
Iron	D-Fe	14.9	4.38	0.324	0.040	5.29
Lead	D-Pb	0.0376	<0.0050	<0.0050	<0.0050	<0.0020
Lithium	D-Li	<0.050	0.061	<0.050	<0.050	<0.050
Magnesium	D-Mg	24.5	36.8	85.3	23.0	15.5
Manganese	D-Mn	1.89	2.78	1.98	3.09	2.70
Molybdenum	D-Mo	0.0275	<0.0050	0.0116	<0.0050	0.0034
Nickel	D-Ni	0.115	0.133	<0.025	0.070	0.068
Potassium	D-K	29.3	26.6	129	17.9	18.6
Selenium	D-Se	<0.0050	<0.0050	<0.010	<0.0050	0.0039
Silver	D-Ag	<0.00025	<0.00025	<0.00025	<0.00025	<0.00010
Sodium	D-Na	39.8	119	302	53.8	124
Thallium	D-Tl	<0.0010	<0.0010	<0.0010	<0.0010	<0.00040
Titanium	D-Ti	0.121	<0.050	<0.050	<0.050	<0.050
Uranium	D-U	0.0378	0.0029	0.0085	0.0112	0.00434
Vanadium	D-V	0.050	<0.030	0.036	<0.030	<0.030
Zinc	D-Zn	5.78	1.50	0.0276	0.0793	0.0129

Non-Halogenated Volatiles

Benzene	<0.0010	<0.00050	0.00202	-	0.00604
Ethylbenzene	<0.0010	<0.00050	0.00139	-	<0.00050
Toluene	<0.0020	<0.0010	0.0047	-	<0.0010
meta- & para-Xylene	<0.0010	0.00156	0.00534	-	0.00081
ortho-Xylene	<0.0010	0.00101	0.00203	-	0.00064
Total Xylenes	<0.0014	0.00257	0.00737	-	0.00145

Remarks regarding the analyses appear at the beginning of this report.
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 < = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Water

Sample ID	MW-05-10 -2005-07	MW-05-11 -2005-07	MW-05-13 -2005-07	MW-05-21 -2005-07
Sample Date ALS ID	05-07-22 6	05-07-22 7	05-07-23 8	05-07-23 10

CCME Hydrocarbon Fractions

F1 (C6-C10)	<0.10	<0.10	<0.10	<0.10
F1-BTEX	<0.10	<0.10	<0.10	<0.10
F2 (C10-C16)	3.61	0.54	0.88	0.80

Glycols

Diethylene Glycol	<5.0	<5.0	<5.0	-
Ethylene Glycol	<5.0	<5.0	<5.0	-
1,2-Propylene Glycol	<5.0	<5.0	<5.0	-
Triethylene Glycol	<10	<10	<10	-

Polycyclic Aromatic Hydrocarbons

Acenaphthene	0.000157	<0.000050	-	-
Acenaphthylene	<0.00030	<0.000050	-	-
Acridine	<0.00070	<0.000050	-	-
Anthracene	<0.00040	<0.000050	-	-
Benz(a)anthracene	<0.000050	<0.000050	-	-
Benzo(a)pyrene	<0.000050	<0.000050	-	-
Benzo(b)fluoranthene	<0.000050	<0.000050	-	-
Benzo(g,h,i)perylene	<0.000050	<0.000050	-	-
Benzo(k)fluoranthene	<0.000050	<0.000050	-	-
Chrysene	<0.000050	<0.000050	-	-
Dibenz(a,h)anthracene	<0.000050	<0.000050	-	-
Fluoranthene	0.000358	<0.000050	-	-
Fluorene	<0.00030	<0.000050	-	-
Indeno(1,2,3-c,d)pyrene	<0.000050	<0.000050	-	-
Naphthalene	<0.000050	<0.000050	-	-
Phenanthrene	<0.00020	<0.000050	-	-
Pyrene	<0.00040	<0.000050	-	-
Quinoline	<0.000060	<0.000050	-	-

Remarks regarding the analyses appear at the beginning of this report.
Results are expressed as milligrams per litre except where noted.
< = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Water

Sample ID	MW-05-28 -2005-07	MW-05-43 -2005-07	MW-05-55 -2005-07	MW-05-60 -2005-07	SEEP-1- 2005-07
Sample Date ALS ID	05-07-23 11	05-07-24 12	05-07-23 13	05-07-23 14	05-07-23 15

Physical Tests

Anion Sum (meq/L)		1.99	15.1	4.07	33.4	18.1
Cation Sum (meq/L)		2.59	16.8	4.04	32.9	17.8
Ion Balance %		13.0	5.2	-0.5	-0.8	-0.8
Conductivity (uS/cm)		212	1260	373	2840	1560
Total Dissolved Solids		140	998	265	2160	1170
Total Dissolved Solids (Calc)		-	-	-	-	-
Hardness CaCO3		89.2	716	193	938	684
pH		5.80	6.65	6.45	5.59	7.75
Salinity o/oo		-	-	-	1.8	-

Dissolved Anions

Alkalinity-Total	CaCO3	20.8	124	15.8	<5.0	92.5
Alkalinity-Bicarbonate	CaCO3	20.8	124	15.8	<5.0	92.5
Alkalinity-Carbonate	CaCO3	<5.0	<5.0	<5.0	<5.0	<5.0
Alkalinity-Hydroxide	CaCO3	<5.0	<5.0	<5.0	<5.0	<5.0
Chloride Cl		2.30	36.0	1.30	373	80.9
Sulphate SO4		72.6	557	178	1090	652

Nutrients

Nitrate Nitrogen	N	<0.050	0.0273	0.0150	2.33	5.07
Nitrite Nitrogen	N	<0.050	<0.0050	0.0290	<0.050	0.646
Nitrite/Nitrate Nitrogen	N	<0.071	0.027	0.044	2.33	5.71

Cyanides

Total Cyanide	CN	-	-	-	<0.010	0.657
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Remarks regarding the analyses appear at the beginning of this report.
Results are expressed as milligrams per litre except where noted.
< = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Water

Sample ID SEEP-1-
2005-07

Sample Date 05-07-23
ALS ID 15

Total Metals

Aluminum	T-Al	0.104
Antimony	T-Sb	<0.0025
Arsenic	T-As	0.0479
Barium	T-Ba	0.050
Beryllium	T-Be	<0.0050
Boron	T-B	0.46
Cadmium	T-Cd	<0.000085
Calcium	T-Ca	226
Chromium	T-Cr	<0.0050
Cobalt	T-Co	0.358
Copper	T-Cu	0.0052
Iron	T-Fe	0.434
Lead	T-Pb	<0.0025
Lithium	T-Li	0.106
Magnesium	T-Mg	29.0
Manganese	T-Mn	0.462
Mercury	T-Hg	<0.000050
Molybdenum	T-Mo	<0.0050
Nickel	T-Ni	0.0551
Potassium	T-K	17.6
Selenium	T-Se	<0.0050
Silver	T-Ag	<0.00010
Sodium	T-Na	83.0
Thallium	T-Tl	<0.0010
Tin	T-Sn	<0.0025
Titanium	T-Ti	<0.010
Uranium	T-U	0.0372
Vanadium	T-V	<0.030
Zinc	T-Zn	<0.025

Remarks regarding the analyses appear at the beginning of this report.
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< = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Water

Sample ID	MW-05-28 -2005-07	MW-05-43 -2005-07	MW-05-55 -2005-07	MW-05-60 -2005-07	SEEP-1- 2005-07
Sample Date ALS ID	05-07-23 11	05-07-24 12	05-07-23 13	05-07-23 14	05-07-23 15

Dissolved Metals

Aluminum	D-Al	0.411	0.168	0.127	1.90	-
Antimony	D-Sb	<0.00050	<0.0025	<0.00050	<0.0025	-
Arsenic	D-As	0.0398	0.0866	0.0032	0.0156	-
Barium	D-Ba	0.073	0.036	0.030	0.033	-
Beryllium	D-Be	<0.0050	<0.0050	<0.0050	<0.0050	-
Boron	D-B	<0.10	0.37	<0.10	0.26	-
Cadmium	D-Cd	0.000467	<0.00025	0.000969	0.0141	-
Calcium	D-Ca	22.8	238	59.8	313	-
Chromium	D-Cr	0.00215	<0.0025	<0.00050	<0.0025	-
Cobalt	D-Co	0.0611	0.0564	0.0580	3.28	-
Copper	D-Cu	0.0052	<0.0050	0.0055	0.0723	-
Iron	D-Fe	10.8	10.6	0.208	0.042	-
Lead	D-Pb	0.0026	<0.0050	<0.0010	<0.0050	-
Lithium	D-Li	<0.050	<0.050	<0.050	0.102	-
Magnesium	D-Mg	7.84	29.2	10.6	37.7	-
Manganese	D-Mn	1.23	1.72	0.766	3.89	-
Molybdenum	D-Mo	<0.0010	<0.0050	<0.0010	<0.0050	-
Nickel	D-Ni	0.0756	0.067	0.128	1.24	-
Potassium	D-K	5.7	13.6	4.2	18.1	-
Selenium	D-Se	<0.0010	<0.0050	<0.0010	<0.0050	-
Silver	D-Ag	<0.000050	<0.00025	<0.000050	<0.00025	-
Sodium	D-Na	3.9	36.3	<2.0	304	-
Thallium	D-Tl	<0.00020	<0.0010	<0.00020	<0.0010	-
Titanium	D-Ti	<0.050	<0.050	<0.050	<0.050	-
Uranium	D-U	0.00049	0.0031	<0.00020	<0.0010	-
Vanadium	D-V	<0.030	<0.030	<0.030	<0.030	-
Zinc	D-Zn	0.0486	0.0333	0.0845	2.53	-

Non-Halogenated Volatiles

Benzene	0.112	<0.00050	<0.00050	0.00091	<0.00050
Ethylbenzene	0.0374	<0.00050	<0.00050	0.00065	<0.00050
Toluene	0.161	<0.0010	<0.0010	0.0023	<0.0010
meta- & para-Xylene	0.236	0.00176	0.00326	0.00458	<0.00050
ortho-Xylene	0.215	0.00518	0.00757	0.00328	<0.00050
Total Xylenes	0.451	0.00694	0.0108	0.00786	<0.00071

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per litre except where noted.
 < = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Water

Sample ID	MW-05-28 -2005-07	MW-05-43 -2005-07	MW-05-55 -2005-07	MW-05-60 -2005-07	SEEP-1- 2005-07
Sample Date ALS ID	05-07-23 11	05-07-24 12	05-07-23 13	05-07-23 14	05-07-23 15

CCME Hydrocarbon Fractions

F1 (C6-C10)	1.57	<0.10	0.65	<0.10	<0.10
F1-BTEX	1.57	<0.10	0.64	<0.10	<0.10
F2 (C10-C16)	30.9	14.6	8.26	1.23	<0.30

Glycols

Diethylene Glycol	<5.0	9.1	-	<5.0	-
Ethylene Glycol	<5.0	697	-	<5.0	-
1,2-Propylene Glycol	<5.0	<5.0	-	<5.0	-
Triethylene Glycol	<10	<10	-	<10	-

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.00050	<0.000050	-	-	-
Acenaphthylene	<0.00050	0.00221	-	-	-
Acridine	<0.00050	<0.000050	-	-	-
Anthracene	<0.00050	<0.000050	-	-	-
Benz(a)anthracene	<0.00050	<0.000050	-	-	-
Benzo(a)pyrene	<0.000050	<0.000050	-	-	-
Benzo(b)fluoranthene	<0.000050	<0.000050	-	-	-
Benzo(g,h,i)perylene	<0.000050	<0.000050	-	-	-
Benzo(k)fluoranthene	<0.000050	<0.000050	-	-	-
Chrysene	<0.00050	<0.000050	-	-	-
Dibenz(a,h)anthracene	<0.000050	<0.000050	-	-	-
Fluoranthene	<0.00050	<0.000050	-	-	-
Fluorene	<0.00060	0.00221	-	-	-
Indeno(1,2,3-c,d)pyrene	<0.000050	<0.000050	-	-	-
Naphthalene	<0.00070	<0.000050	-	-	-
Phenanthrene	<0.00050	<0.000050	-	-	-
Pyrene	0.00175	<0.000050	-	-	-
Quinoline	<0.011	<0.000050	-	-	-

Remarks regarding the analyses appear at the beginning of this report.
Results are expressed as milligrams per litre except where noted.
< = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Water

Sample ID	SEEP-2- 2005-07	SEEP-3- 2005-07	SEEP-5- 2005-07	SEEP-6- 2005-07	SEEP-8- 2005-07
Sample Date ALS ID	05-07-23 16	05-07-23 17	05-07-23 18	05-07-23 19	05-07-23 20

Physical Tests

Anion Sum (meq/L)	14.9	22.6	4.57	5.88	11.0
Cation Sum (meq/L)	14.7	22.1	4.42	6.01	11.2
Ion Balance %	-0.6	-1.1	-1.7	1.1	1.1
Conductivity (uS/cm)	1310	1830	496	551	932
Total Dissolved Solids	947	1420	295	386	697
Total Dissolved Solids (Calc)	-	-	-	-	-
Hardness CaCO ₃	516	872	144	252	326
pH	7.79	8.01	3.76	4.14	4.00
Salinity o/oo	-	-	-	-	-

Dissolved Anions

Alkalinity-Total	CaCO ₃	67.4	191	<5.0	<5.0	112
Alkalinity-Bicarbonate	CaCO ₃	67.4	191	<5.0	<5.0	112
Alkalinity-Carbonate	CaCO ₃	<5.0	<5.0	<5.0	<5.0	<5.0
Alkalinity-Hydroxide	CaCO ₃	<5.0	<5.0	<5.0	<5.0	<5.0
Chloride Cl		115	118	12.8	5.83	77.5
Sulphate SO ₄		483	740	202	274	298

Nutrients

Nitrate Nitrogen	N	3.10	0.0310	0.0571	<0.0050	3.85
Nitrite Nitrogen	N	0.235	0.214	<0.0050	<0.0050	0.722
Nitrite/Nitrate Nitrogen	N	3.33	0.245	0.057	<0.010	4.57

Cyanides

Total Cyanide	CN	0.048	<0.010	-	-	-
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Remarks regarding the analyses appear at the beginning of this report.
Results are expressed as milligrams per litre except where noted.
< = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Water

Sample ID	SEEP-2- 2005-07	SEEP-3- 2005-07	SEEP-5- 2005-07	SEEP-6- 2005-07	SEEP-8- 2005-07
Sample Date ALS ID	05-07-23 16	05-07-23 17	05-07-23 18	05-07-23 19	05-07-23 20

Total Metals

Aluminum	T-Al	0.037	0.117	3.62	4.17	0.069
Antimony	T-Sb	0.0031	0.0081	<0.00050	<0.00050	<0.0010
Arsenic	T-As	0.0103	0.536	0.0302	0.0130	0.0437
Barium	T-Ba	0.033	0.067	0.022	0.022	0.027
Beryllium	T-Be	<0.0020	<0.0050	<0.0010	0.0015	<0.0020
Boron	T-B	0.36	0.42	<0.10	<0.10	0.51
Cadmium	T-Cd	0.000115	0.000171	0.000400	0.00101	0.000103
Calcium	T-Ca	166	294	42.1	75.2	110
Chromium	T-Cr	<0.0020	<0.0050	0.0011	<0.0010	<0.0020
Cobalt	T-Co	0.0705	0.0097	0.0658	0.191	0.0937
Copper	T-Cu	0.0094	0.0162	0.0487	0.0948	0.0088
Iron	T-Fe	1.03	1.37	13.2	1.42	0.240
Lead	T-Pb	<0.0010	0.0115	0.00259	0.00156	<0.0010
Lithium	T-Li	0.014	0.116	0.0147	0.0518	0.019
Magnesium	T-Mg	24.8	33.6	9.56	15.6	12.6
Manganese	T-Mn	0.119	0.329	0.363	1.11	0.527
Mercury	T-Hg	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Molybdenum	T-Mo	<0.0020	0.0368	<0.0010	<0.0010	0.0042
Nickel	T-Ni	0.0252	0.0299	0.146	0.367	0.0832
Potassium	T-K	6.4	24.2	2.4	2.0	14.9
Selenium	T-Se	<0.0020	<0.0050	<0.0010	<0.0010	<0.0020
Silver	T-Ag	0.000041	<0.00010	0.000023	<0.000020	<0.000040
Sodium	T-Na	95.4	89.7	9.0	6.0	95.6
Thallium	T-Tl	<0.00040	<0.0010	<0.00020	<0.00020	<0.00040
Tin	T-Sn	<0.0010	<0.0025	<0.00050	<0.00050	<0.0010
Titanium	T-Ti	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium	T-U	0.00069	0.0114	0.00069	0.00125	0.00667
Vanadium	T-V	<0.030	<0.030	<0.030	<0.030	<0.030
Zinc	T-Zn	0.177	<0.025	0.0633	0.300	0.018

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per litre except where noted.
 < = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Water

Sample ID	SEEP-2- 2005-07	SEEP-3- 2005-07	SEEP-5- 2005-07	SEEP-8- 2005-07
Sample Date	05-07-23	05-07-23	05-07-23	05-07-23
ALS ID	16	17	18	20

Non-Halogenated Volatiles

Benzene	<0.00050	<0.00050	<0.00050	<0.00050
Ethylbenzene	<0.00050	<0.00050	<0.00050	<0.00050
Toluene	<0.0010	<0.0010	<0.0010	<0.0010
meta- & para-Xylene	<0.00050	<0.00050	<0.00050	<0.00050
ortho-Xylene	<0.00050	<0.00050	<0.00050	<0.00050
Total Xylenes	<0.00071	<0.00071	<0.00071	<0.00071

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 < = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Water

Sample ID	SEEP-2- 2005-07	SEEP-3- 2005-07	SEEP-5- 2005-07	SEEP-8- 2005-07
Sample Date ALS ID	05-07-23 16	05-07-23 17	05-07-23 18	05-07-23 20

CCME Hydrocarbon Fractions

F1 (C6-C10)	<0.10	<0.10	<0.10	<0.10
F1-BTEX	<0.10	<0.10	<0.10	<0.10
F2 (C10-C16)	<0.30	0.80	<0.30	0.30

Glycols

Diethylene Glycol	-	<5.0	-	-
Ethylene Glycol	-	<5.0	-	-
1,2-Propylene Glycol	-	<5.0	-	-
Triethylene Glycol	-	<10	-	-

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.000050	<0.000050	-	<0.000050
Acenaphthylene	<0.000050	<0.000050	-	<0.000050
Acridine	<0.000050	<0.000050	-	<0.000050
Anthracene	<0.000050	<0.000050	-	<0.000050
Benz(a)anthracene	<0.000050	<0.000050	-	<0.000050
Benzo(a)pyrene	<0.000050	<0.000050	-	<0.000050
Benzo(b)fluoranthene	<0.000050	<0.000050	-	<0.000050
Benzo(g,h,i)perylene	<0.000050	<0.000050	-	<0.000050
Benzo(k)fluoranthene	<0.000050	<0.000050	-	<0.000050
Chrysene	<0.000050	<0.000050	-	<0.000050
Dibenz(a,h)anthracene	<0.000050	<0.000050	-	<0.000050
Fluoranthene	<0.000050	<0.000060	-	<0.000050
Fluorene	<0.000050	<0.000050	-	<0.000050
Indeno(1,2,3-c,d)pyrene	<0.000050	<0.000050	-	<0.000050
Naphthalene	<0.000050	<0.000050	-	<0.000050
Phenanthrene	<0.000050	<0.000050	-	<0.000050
Pyrene	<0.000050	0.000199	-	<0.000050
Quinoline	<0.000050	<0.000050	-	<0.000050

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per litre except where noted.
 < = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Water

Sample ID	SEEP-9- 2005-07	SEEP-10- 2005-07	SEEP-12- 2005-07	SEEP-13- 2005-07	WDup1- 2005-07
Sample Date ALS ID	05-07-23 21	05-07-24 22	05-07-24 23	05-07-24 24	05-07-24 25

Physical Tests

Anion Sum (meq/L)	37.7	7.00	7.23	20.6	15.1
Cation Sum (meq/L)	35.2	6.72	6.86	17.8	16.9
Ion Balance %	-3.4	-2.0	-2.7	-7.2	5.5
Conductivity (uS/cm)	3070	612	616	1850	1280
Total Dissolved Solids	2360	458	472	1240	1000
Total Dissolved Solids (Calc)	-	-	472	1240	-
Hardness CaCO ₃	859	290	317	570	723
pH	8.03	6.91	5.83	6.60	6.78
Salinity o/oo	-	-	-	<1.0	-

Dissolved Anions

Alkalinity-Total	CaCO ₃	113	24.1	<5.0	35.6	123
Alkalinity-Bicarbonate	CaCO ₃	113	34.1	<5.0	35.6	123
Alkalinity-Carbonate	CaCO ₃	<5.0	<5.0	<5.0	<5.0	<5.0
Alkalinity-Hydroxide	CaCO ₃	<5.0	<5.0	<5.0	<5.0	<5.0
Chloride Cl		588	14.4	21.2	269	36.4
Sulphate SO ₄		721	278	319	568	560

Nutrients

Nitrate Nitrogen	N	53.6	4.52	<0.0050	6.31	<0.0050
Nitrite Nitrogen	N	0.23	<0.0050	<0.0050	0.0300	<0.0050
Nitrite/Nitrate Nitrogen	N	53.8	4.52	<0.010	6.34	<0.010

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RESULTS OF ANALYSIS - Water

Sample ID	SEEP-9- 2005-07	SEEP-10- 2005-07	SEEP-12- 2005-07	SEEP-13- 2005-07
Sample Date ALS ID	05-07-23 21	05-07-24 22	05-07-24 23	05-07-24 24

Total Metals

Aluminum	T-Al	1.45	0.428	1.92	8.82
Antimony	T-Sb	<0.0025	<0.00050	<0.0010	<0.0010
Arsenic	T-As	0.112	0.00526	0.184	0.0068
Barium	T-Ba	0.048	0.022	0.043	<0.020
Beryllium	T-Be	<0.0050	<0.0010	<0.0020	0.0024
Boron	T-B	<0.10	<0.10	<0.10	<0.10
Cadmium	T-Cd	0.00205	0.00142	0.000049	0.00256
Calcium	T-Ca	276	92.5	119	184
Chromium	T-Cr	0.0058	<0.0010	0.0092	<0.0020
Cobalt	T-Co	0.209	0.158	0.0672	0.320
Copper	T-Cu	0.0070	0.0194	0.0066	0.0455
Iron	T-Fe	4.75	0.262	16.2	7.69
Lead	T-Pb	0.0056	<0.00050	0.0025	0.0127
Lithium	T-Li	0.056	0.0375	0.021	0.086
Magnesium	T-Mg	41.5	14.4	16.3	36.6
Manganese	T-Mn	2.36	0.910	1.07	2.91
Mercury	T-Hg	<0.000050	<0.000050	<0.000050	<0.000050
Molybdenum	T-Mo	<0.0050	<0.0010	<0.0020	<0.0020
Nickel	T-Ni	0.430	0.421	0.136	0.523
Potassium	T-K	31.6	9.9	12.1	11.6
Selenium	T-Se	<0.0050	<0.0010	<0.0020	<0.0040
Silver	T-Ag	<0.00010	<0.000020	<0.000040	<0.000040
Sodium	T-Na	385	12.3	15.4	142
Thallium	T-Tl	<0.0010	<0.00020	<0.00040	<0.00040
Tin	T-Sn	<0.0025	<0.00050	<0.0010	<0.0010
Titanium	T-Ti	0.040	<0.010	0.122	<0.010
Uranium	T-U	0.0023	0.00239	0.00224	0.0143
Vanadium	T-V	<0.030	<0.030	<0.030	<0.030
Zinc	T-Zn	0.167	0.391	0.018	0.697

Remarks regarding the analyses appear at the beginning of this report.
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RESULTS OF ANALYSIS - Water

Sample ID	SEEP-9- 2005-07	SEEP-10- 2005-07	SEEP-12- 2005-07	SEEP-13- 2005-07	WDup1- 2005-07
Sample Date ALS ID	05-07-23 21	05-07-24 22	05-07-24 23	05-07-24 24	05-07-24 25

Dissolved Metals

Aluminum	D-Al	-	-	-	-	0.159
Antimony	D-Sb	-	-	-	-	<0.0025
Arsenic	D-As	-	-	-	-	0.0842
Barium	D-Ba	-	-	-	-	0.037
Beryllium	D-Be	-	-	-	-	<0.0050
Boron	D-B	-	-	-	-	0.37
Cadmium	D-Cd	-	-	-	-	<0.00025
Calcium	D-Ca	-	-	105	172	241
Chromium	D-Cr	-	-	-	-	<0.0025
Cobalt	D-Co	-	-	-	-	0.0503
Copper	D-Cu	-	-	-	-	<0.0050
Iron	D-Fe	-	-	12.9	7.51	10.7
Lead	D-Pb	-	-	-	-	<0.0050
Lithium	D-Li	-	-	-	-	<0.050
Magnesium	D-Mg	-	-	13.3	33.8	29.6
Manganese	D-Mn	-	-	0.993	2.98	1.73
Molybdenum	D-Mo	-	-	-	-	<0.0050
Nickel	D-Ni	-	-	-	-	0.061
Potassium	D-K	-	-	<20	<20	13.7
Selenium	D-Se	-	-	-	-	<0.0050
Silver	D-Ag	-	-	-	-	<0.00025
Sodium	D-Na	-	-	<20	138	36.5
Thallium	D-Tl	-	-	-	-	<0.0010
Titanium	D-Ti	-	-	-	-	<0.050
Uranium	D-U	-	-	-	-	0.0030
Vanadium	D-V	-	-	-	-	<0.030
Zinc	D-Zn	-	-	-	-	0.0331

Non-Halogenated Volatiles

Benzene	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Ethylbenzene	<0.00050	<0.00050	0.0328	<0.00050	<0.00050
Toluene	<0.0010	<0.0010	0.0178	<0.0010	<0.0010
meta- & para-Xylene	<0.00050	<0.00050	0.281	0.00058	0.00176
ortho-Xylene	<0.00050	<0.00050	0.240	0.00064	0.00528
Total Xylenes	<0.00071	<0.00071	0.521	0.00122	0.00704

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RESULTS OF ANALYSIS - Water

Sample ID	SEEP-9- 2005-07	SEEP-10- 2005-07	SEEP-12- 2005-07	SEEP-13- 2005-07	WDup1- 2005-07
Sample Date ALS ID	05-07-23 21	05-07-24 22	05-07-24 23	05-07-24 24	05-07-24 25

CCME Hydrocarbon Fractions

F1 (C6-C10)	<0.10	<0.10	1.64	<0.10	<0.10
F1-BTEX	<0.10	<0.10	1.07	<0.10	<0.10
F2 (C10-C16)	0.36	<0.30	4.43	0.62	13.8

Glycols

Diethylene Glycol	-	-	<5.0	-	<5.0
Ethylene Glycol	-	-	<5.0	-	563
1,2-Propylene Glycol	-	-	<5.0	-	<5.0
Triethylene Glycol	-	-	-	-	-

Polycyclic Aromatic Hydrocarbons

Acenaphthene	<0.000050	-	0.000188	-	<0.000070
Acenaphthylene	<0.000050	-	<0.000050	-	0.00346
Acridine	<0.000050	-	<0.000050	-	<0.000050
Anthracene	<0.000050	-	<0.000050	-	<0.000050
Benz(a)anthracene	<0.000050	-	<0.000050	-	<0.000050
Benzo(a)pyrene	<0.000050	-	<0.000050	-	<0.000050
Benzo(b)fluoranthene	<0.000050	-	<0.000050	-	<0.000050
Benzo(g,h,i)perylene	<0.000050	-	<0.000050	-	<0.000050
Benzo(k)fluoranthene	<0.000050	-	<0.000050	-	<0.000050
Chrysene	<0.000050	-	<0.000050	-	<0.000050
Dibenz(a,h)anthracene	<0.000050	-	<0.000050	-	<0.000050
Fluoranthene	<0.000050	-	<0.000050	-	<0.000050
Fluorene	<0.000050	-	0.00133	-	<0.0040
Indeno(1,2,3-c,d)pyrene	<0.000050	-	<0.000050	-	<0.000050
Naphthalene	<0.000050	-	0.0122	-	<0.00050
Phenanthrene	<0.000070	-	0.000061	-	<0.00050
Pyrene	<0.000050	-	<0.000050	-	<0.000050
Quinoline	<0.000050	-	<0.000050	-	<0.00050

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per litre except where noted.
 < = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Water

Sample ID	WDup2- 2005-07	WDup3- 2005-07	Creek- 2005-07	Sump- 2005-07
Sample Date ALS ID	05-07-24 26	05-07-24 27	05-07-24 28	05-07-24 29

Physical Tests

Anion Sum (meq/L)	7.43	7.93	0.118	7.06
Cation Sum (meq/L)	9.26	8.91	0.171	9.19
Ion Balance %	10.9	5.8	18.2	13.1
Conductivity (uS/cm)	719	725	24.5	691
Total Dissolved Solids	478	538	8.3	464
Total Dissolved Solids (Calc)	-	-	-	-
Hardness CaCO ₃	272	365	7.99	269
pH	6.70	6.58	6.65	6.67
Salinity o/oo	-	-	-	-

Dissolved Anions

Alkalinity-Total	CaCO ₃	216	34.2	<5.0	199
Alkalinity-Bicarbonate	CaCO ₃	216	34.2	<5.0	199
Alkalinity-Carbonate	CaCO ₃	<5.0	<5.0	<5.0	<5.0
Alkalinity-Hydroxide	CaCO ₃	<5.0	<5.0	<5.0	<5.0
Chloride Cl		36.8	21.2	0.51	36.8
Sulphate SO ₄		100	319	4.9	98.4

Nutrients

Nitrate Nitrogen	N	<0.050	0.0058	0.0175	0.0075
Nitrite Nitrogen	N	<0.050	<0.0050	<0.0050	<0.0050
Nitrite/Nitrate Nitrogen	N	<0.071	<0.010	0.018	<0.010

Cyanides

Total Cyanide	CN	-	-	-	<0.010
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Remarks regarding the analyses appear at the beginning of this report.
Results are expressed as milligrams per litre except where noted.
< = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Water

Sample ID	WDup3- 2005-07	Creek- 2005-07
Sample Date	05-07-24	05-07-24
ALS ID	27	28

Total Metals

Aluminum	T-Al	1.41	0.0327
Antimony	T-Sb	<0.0010	<0.00050
Arsenic	T-As	0.186	0.00112
Barium	T-Ba	0.036	<0.020
Beryllium	T-Be	<0.0020	<0.0010
Boron	T-B	<0.10	<0.10
Cadmium	T-Cd	0.000054	<0.000017
Calcium	T-Ca	120	1.55
Chromium	T-Cr	0.0075	<0.0010
Cobalt	T-Co	0.0735	0.00051
Copper	T-Cu	0.0060	0.0016
Iron	T-Fe	13.3	0.164
Lead	T-Pb	0.0024	<0.00050
Lithium	T-Li	0.022	<0.0050
Magnesium	T-Mg	16.0	1.00
Manganese	T-Mn	1.04	0.00754
Mercury	T-Hg	<0.000050	<0.000050
Molybdenum	T-Mo	<0.0020	<0.0010
Nickel	T-Ni	0.143	0.0033
Potassium	T-K	9.7	<2.0
Selenium	T-Se	<0.0020	<0.0010
Silver	T-Ag	<0.000040	<0.000020
Sodium	T-Na	15.3	<2.0
Thallium	T-Tl	<0.00040	<0.00020
Tin	T-Sn	<0.0010	<0.00050
Titanium	T-Ti	0.048	<0.010
Uranium	T-U	0.00219	<0.00020
Vanadium	T-V	<0.030	<0.030
Zinc	T-Zn	0.019	<0.0050

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per litre except where noted.
 < = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Water

Sample ID	WDup2- 2005-07	WDup3- 2005-07	Sump- 2005-07
Sample Date ALS ID	05-07-24 26	05-07-24 27	05-07-24 29

Dissolved Metals

Aluminum	D-Al	0.026	-	0.029
Antimony	D-Sb	<0.00050	-	<0.00050
Arsenic	D-As	0.385	-	0.386
Barium	D-Ba	0.086	-	0.085
Beryllium	D-Be	<0.0050	-	<0.0050
Boron	D-B	0.67	-	0.69
Cadmium	D-Cd	<0.000050	-	<0.000050
Calcium	D-Ca	94.0	-	93.0
Chromium	D-Cr	0.00291	-	0.00319
Cobalt	D-Co	0.0412	-	0.0410
Copper	D-Cu	0.0035	-	0.0037
Iron	D-Fe	50.4	-	49.9
Lead	D-Pb	<0.0010	-	<0.0010
Lithium	D-Li	<0.050	-	<0.050
Magnesium	D-Mg	9.17	-	8.97
Manganese	D-Mn	1.26	-	1.26
Molybdenum	D-Mo	0.0046	-	0.0048
Nickel	D-Ni	0.0265	-	0.0266
Potassium	D-K	29.3	-	29.4
Selenium	D-Se	<0.0010	-	<0.0010
Silver	D-Ag	<0.000050	-	<0.000050
Sodium	D-Na	27.1	-	27.4
Thallium	D-Tl	<0.00020	-	<0.00020
Titanium	D-Ti	<0.050	-	<0.050
Uranium	D-U	0.00093	-	0.00097
Vanadium	D-V	<0.030	-	<0.030
Zinc	D-Zn	0.196	-	0.172

Non-Halogenated Volatiles

Benzene	<0.00050	<0.00050	<0.00050
Ethylbenzene	<0.00050	0.0328	<0.00050
Toluene	<0.0010	0.0180	<0.0010
meta- & para-Xylene	<0.00050	0.282	<0.00050
ortho-Xylene	0.00056	0.240	0.00061
Total Xylenes	<0.00071	0.522	<0.00071

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per litre except where noted.
 < = Less than the detection limit indicated.

File No. CC500001r

RESULTS OF ANALYSIS - Water



Sample ID	WDup2- 2005-07	WDup3- 2005-07	Sump- 2005-07	MW-05-07 -2005-07
Sample Date <i>ALS ID</i>	05-07-24 26	05-07-24 27	05-07-24 29	05-07-24 30

CCME Hydrocarbon Fractions

F1 (C6-C10)	<0.10	1.66	<0.10	-
F1-BTEX	<0.10	1.09	<0.10	-
F2 (C10-C16)	5.92	3.53	6.68	12.6

Remarks regarding the analyses appear at the beginning of this report.
Results are expressed as milligrams per litre except where noted.
< = Less than the detection limit indicated.

**Appendix 1 - QUALITY CONTROL - Replicates**

Water	MW-05-13 -2005-07	MW-05-13 -2005-07	MW-05-21 -2005-07	MW-05-21 -2005-07
	05-07-23	QC # 22310	05-07-23	QC # 21856

Physical Tests

Conductivity	(uS/cm)	-	-	1240	1240
Hardness	CaCO ₃	1580	1560	-	-
pH		-	-	7.56	7.60

Dissolved Anions

Alkalinity-Total	CaCO ₃	-	-	182	183
Alkalinity-Bicarbonate	CaCO ₃	-	-	182	183
Alkalinity-Carbonate	CaCO ₃	-	-	<5.0	<5.0
Alkalinity-Hydroxide	CaCO ₃	-	-	<5.0	<5.0
Chloride	Cl	-	-	94.3	93.1
Sulphate	SO ₄	-	-	399	398

Nutrients

Nitrate Nitrogen	N	-	-	0.219	0.221
Nitrite Nitrogen	N	-	-	0.0890	0.0870
Nitrite/Nitrate Nitrogen	N	-	-	0.308	0.308

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per litre except where noted.
 < = Less than the detection limit indicated.

**Appendix 1 - QUALITY CONTROL - Replicates**

Water	MW-05-13 -2005-07	MW-05-13 -2005-07	MW-05-21 -2005-07	MW-05-21 -2005-07
	05-07-23	QC # 22310	05-07-23	QC # 21856

Dissolved Metals

Aluminum	D-Al	<0.050	0.054	-	-
Antimony	D-Sb	0.0061	0.0060	-	-
Arsenic	D-As	0.0172	0.0169	-	-
Barium	D-Ba	0.139	0.139	-	-
Beryllium	D-Be	<0.0050	<0.0050	-	-
Boron	D-B	2.65	2.62	-	-
Cadmium	D-Cd	<0.00025	<0.00025	-	-
Calcium	D-Ca	492	485	-	-
Chromium	D-Cr	<0.0025	<0.0025	-	-
Cobalt	D-Co	0.0050	0.0051	-	-
Copper	D-Cu	0.0092	0.0092	-	-
Iron	D-Fe	0.324	0.317	-	-
Lead	D-Pb	<0.0050	<0.0050	-	-
Lithium	D-Li	<0.050	<0.050	-	-
Magnesium	D-Mg	85.3	84.6	-	-
Manganese	D-Mn	1.98	1.95	-	-
Molybdenum	D-Mo	0.0116	0.0115	-	-
Nickel	D-Ni	<0.025	<0.025	-	-
Potassium	D-K	129	130	-	-
Selenium	D-Se	<0.010	<0.010	-	-
Silver	D-Ag	<0.00025	<0.00025	-	-
Sodium	D-Na	302	304	-	-
Thallium	D-Tl	<0.0010	<0.0010	-	-
Titanium	D-Ti	<0.050	<0.050	-	-
Uranium	D-U	0.0085	0.0085	-	-
Vanadium	D-V	0.036	0.041	-	-
Zinc	D-Zn	0.0276	0.0269	-	-

Non-Halogenated Volatiles

Benzene	-	-	0.00604	0.00555
Ethylbenzene	-	-	<0.00050	<0.00050
Toluene	-	-	<0.0010	<0.0010
meta- & para-Xylene	-	-	0.00081	0.00078
ortho-Xylene	-	-	0.00064	0.00064
Total Xylenes	-	-	0.00145	0.00142

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per litre except where noted.
 < = Less than the detection limit indicated.

Appendix 1 - QUALITY CONTROL - Replicates

Water	MW-05-13 -2005-07	MW-05-13 -2005-07	MW-05-21 -2005-07	MW-05-21 -2005-07
	05-07-23	QC # 22310	05-07-23	QC # 21856

CCME Hydrocarbon Fractions

F1 (C6-C10)	-	-	<0.10	<0.10
F1-BTEX	-	-	<0.10	<0.10

Glycols

Diethylene Glycol	<5.0	<5.0	-	-
Ethylene Glycol	<5.0	<5.0	-	-
1,2-Propylene Glycol	<5.0	<5.0	-	-

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per litre except where noted.
 < = Less than the detection limit indicated.

**Appendix 1 - QUALITY CONTROL - Replicates**

Water	SEEP-8- 2005-07	SEEP-8- 2005-07	SEEP-9- 2005-07	SEEP-9- 2005-07
	05-07-23	QC # 21857	05-07-23	QC # 22311

Physical Tests

Conductivity	(uS/cm)	932	1030	-	-
Hardness	CaCO ₃	-	-	859	862
pH		4.00	7.93	-	-

Dissolved Anions

Alkalinity-Total	CaCO ₃	112	115	-	-
Alkalinity-Bicarbonate	CaCO ₃	112	115	-	-
Alkalinity-Carbonate	CaCO ₃	<5.0	<5.0	-	-
Alkalinity-Hydroxide	CaCO ₃	<5.0	<5.0	-	-
Chloride	Cl	77.5	77.4	-	-
Sulphate	SO ₄	298	298	-	-

Nutrients

Nitrate Nitrogen	N	3.85	3.85	-	-
Nitrite Nitrogen	N	0.722	0.721	-	-
Nitrite/Nitrate Nitrogen	N	4.57	4.57	-	-

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per litre except where noted.
 < = Less than the detection limit indicated.

Appendix 1 - QUALITY CONTROL - Replicates

Water		SEEP-8- 2005-07	SEEP-8- 2005-07	SEEP-9- 2005-07	SEEP-9- 2005-07
		05-07-23	QC # 21857	05-07-23	QC # 22311
Total Metals					
Aluminum	T-Al	-	-	1.45	1.42
Antimony	T-Sb	-	-	<0.0025	<0.0025
Arsenic	T-As	-	-	0.112	0.109
Barium	T-Ba	-	-	0.048	0.049
Beryllium	T-Be	-	-	<0.0050	<0.0050
Boron	T-B	-	-	<0.10	<0.10
Cadmium	T-Cd	-	-	0.00205	0.00183
Calcium	T-Ca	-	-	276	276
Chromium	T-Cr	-	-	0.0058	0.0055
Cobalt	T-Co	-	-	0.209	0.206
Copper	T-Cu	-	-	0.0070	0.0071
Iron	T-Fe	-	-	4.75	4.77
Lead	T-Pb	-	-	0.0056	0.0056
Lithium	T-Li	-	-	0.056	0.053
Magnesium	T-Mg	-	-	41.5	41.8
Manganese	T-Mn	-	-	2.36	2.31
Mercury	T-Hg	<0.000050	<0.000050	-	-
Molybdenum	T-Mo	-	-	<0.0050	<0.0050
Nickel	T-Ni	-	-	0.430	0.419
Potassium	T-K	-	-	31.6	31.6
Selenium	T-Se	-	-	<0.0050	<0.0050
Silver	T-Ag	-	-	<0.00010	<0.00010
Sodium	T-Na	-	-	385	394
Thallium	T-Tl	-	-	<0.0010	<0.0010
Tin	T-Sn	-	-	<0.0025	<0.0025
Titanium	T-Ti	-	-	0.040	0.043
Uranium	T-U	-	-	0.0023	0.0023
Vanadium	T-V	-	-	<0.030	<0.030
Zinc	T-Zn	-	-	0.167	0.163

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per litre except where noted.
 < = Less than the detection limit indicated.

Appendix 1 - QUALITY CONTROL - Replicates

Water	SEEP-8- 2005-07	SEEP-8- 2005-07	SEEP-9- 2005-07	SEEP-9- 2005-07
	05-07-23	QC # 21857	05-07-23	QC # 22311

Non-Halogenated Volatiles

Benzene	<0.00050	<0.00050	-	-
Ethylbenzene	<0.00050	<0.00050	-	-
Toluene	<0.0010	<0.0010	-	-
meta- & para-Xylene	<0.00050	<0.00050	-	-
ortho-Xylene	<0.00050	<0.00050	-	-
Total Xylenes	<0.00071	<0.00071	-	-

CCME Hydrocarbon Fractions

F1 (C6-C10)	<0.10	<0.10	-	-
F1-BTEX	<0.10	<0.10	-	-

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per litre except where noted.
 < = Less than the detection limit indicated.

**Appendix 1 - QUALITY CONTROL - Replicates**

Water	Sump- 2005-07	Sump- 2005-07
	05-07-24	QC # 21858

Physical Tests

Conductivity	(uS/cm)	691	688
pH		6.67	6.67

Dissolved Anions

Alkalinity-Total	CaCO3	199	195
Alkalinity-Bicarbonate	CaCO3	199	195
Alkalinity-Carbonate	CaCO3	<5.0	<5.0
Alkalinity-Hydroxide	CaCO3	<5.0	<5.0
Chloride	Cl	36.8	37.0
Sulphate	SO4	98.4	98.7

Nutrients

Nitrate Nitrogen	N	0.0075	0.0146
Nitrite Nitrogen	N	<0.0050	<0.0050
Nitrite/Nitrate Nitrogen	N	<0.010	0.015

Non-Halogenated Volatiles

Benzene	<0.00050	<0.00050
Ethylbenzene	<0.00050	<0.00050
Toluene	<0.0010	<0.0010
meta- & para-Xylene	<0.00050	<0.00050
ortho-Xylene	0.00061	0.00058
Total Xylenes	<0.00071	<0.00071

CCME Hydrocarbon Fractions

F1 (C6-C10)	<0.10	<0.10
F1-BTEX	<0.10	<0.10

Remarks regarding the analyses appear at the beginning of this report.
 Results are expressed as milligrams per litre except where noted.
 < = Less than the detection limit indicated.

**Appendix 1 - QUALITY CONTROL - Reference Materials**

Water

		Result	Target	Units	DL	ALSQC#	Method
ALSEV Metals in Water - High, 4GK116							
Total Metals							
Aluminum	T-Al	1.91	2.00	mg/L	0.2	22315	a
Aluminum	T-Al	1.96	2.00	mg/L	0.2	22316	a
Aluminum	T-Al	1.92	2.00	mg/L	0.2	22318	a
Antimony	T-Sb	0.95	1.00	mg/L	0.2	22315	a
Antimony	T-Sb	1.00	1.00	mg/L	0.2	22316	a
Antimony	T-Sb	1.02	1.00	mg/L	0.2	22318	a
Arsenic	T-As	1.01	1.00	mg/L	0.2	22315	a
Arsenic	T-As	1.00	1.00	mg/L	0.2	22316	a
Arsenic	T-As	0.99	1.00	mg/L	0.2	22318	a
Barium	T-Ba	0.254	0.250	mg/L	0.01	22315	a
Barium	T-Ba	0.251	0.250	mg/L	0.01	22316	a
Barium	T-Ba	0.253	0.250	mg/L	0.01	22318	a
Beryllium	T-Be	0.0998	0.100	mg/L	0.005	22315	a
Beryllium	T-Be	0.0998	0.100	mg/L	0.005	22316	a
Beryllium	T-Be	0.100	0.100	mg/L	0.005	22318	a
Boron	T-B	1.00	1.00	mg/L	0.1	22315	a
Boron	T-B	0.99	1.00	mg/L	0.1	22316	a
Boron	T-B	0.99	1.00	mg/L	0.1	22318	a
Cadmium	T-Cd	0.097	0.100	mg/L	0.01	22315	a
Cadmium	T-Cd	0.100	0.100	mg/L	0.01	22316	a
Cadmium	T-Cd	0.100	0.100	mg/L	0.01	22318	a
Calcium	T-Ca	50.0	50.0	mg/L	0.05	22315	a
Calcium	T-Ca	49.3	50.0	mg/L	0.05	22316	a
Calcium	T-Ca	48.5	50.0	mg/L	0.05	22318	a
Chromium	T-Cr	0.242	0.250	mg/L	0.01	22315	a
Chromium	T-Cr	0.245	0.250	mg/L	0.01	22316	a
Chromium	T-Cr	0.244	0.250	mg/L	0.01	22318	a
Cobalt	T-Co	0.243	0.250	mg/L	0.01	22315	a
Cobalt	T-Co	0.251	0.250	mg/L	0.01	22316	a
Cobalt	T-Co	0.249	0.250	mg/L	0.01	22318	a
Copper	T-Cu	0.250	0.250	mg/L	0.01	22315	a
Copper	T-Cu	0.245	0.250	mg/L	0.01	22316	a
Copper	T-Cu	0.248	0.250	mg/L	0.01	22318	a
Iron	T-Fe	0.990	1.00	mg/L	0.03	22315	a

Methods:

a = ICPOES

**Appendix 1 - QUALITY CONTROL - Reference Materials**

Water

		Result	Target	Units	DL	ALSQC#	Method
ALSEV Metals in Water - High, 4GK116							
Total Metals							
Iron	T-Fe	1.01	1.00	mg/L	0.03	22316	a
Iron	T-Fe	1.01	1.00	mg/L	0.03	22318	a
Lead	T-Pb	0.505	0.500	mg/L	0.05	22315	a
Lead	T-Pb	0.491	0.500	mg/L	0.05	22316	a
Lead	T-Pb	0.492	0.500	mg/L	0.05	22318	a
Lithium	T-Li	0.235	0.250	mg/L	0.01	22315	a
Lithium	T-Li	0.234	0.250	mg/L	0.01	22316	a
Lithium	T-Li	0.226	0.250	mg/L	0.01	22318	a
Magnesium	T-Mg	49.2	50.0	mg/L	0.1	22315	a
Magnesium	T-Mg	48.2	50.0	mg/L	0.1	22316	a
Magnesium	T-Mg	48.7	50.0	mg/L	0.1	22318	a
Manganese	T-Mn	0.251	0.250	mg/L	0.005	22315	a
Manganese	T-Mn	0.253	0.250	mg/L	0.005	22316	a
Manganese	T-Mn	0.250	0.250	mg/L	0.005	22318	a
Molybdenum	T-Mo	0.257	0.250	mg/L	0.03	22315	a
Molybdenum	T-Mo	0.248	0.250	mg/L	0.03	22316	a
Molybdenum	T-Mo	0.245	0.250	mg/L	0.03	22318	a
Nickel	T-Ni	0.483	0.500	mg/L	0.05	22315	a
Nickel	T-Ni	0.502	0.500	mg/L	0.05	22316	a
Nickel	T-Ni	0.490	0.500	mg/L	0.05	22318	a
Potassium	T-K	48.1	50.0	mg/L	2	22315	a
Potassium	T-K	48.9	50.0	mg/L	2	22316	a
Potassium	T-K	49.5	50.0	mg/L	2	22318	a
Selenium	T-Se	0.99	1.00	mg/L	0.2	22315	a
Selenium	T-Se	0.98	1.00	mg/L	0.2	22316	a
Selenium	T-Se	0.94	1.00	mg/L	0.2	22318	a
Silver	T-Ag	0.098	0.100	mg/L	0.01	22315	a
Silver	T-Ag	0.099	0.100	mg/L	0.01	22316	a
Silver	T-Ag	0.093	0.100	mg/L	0.01	22318	a
Sodium	T-Na	50.7	50.0	mg/L	2	22315	a
Sodium	T-Na	48.9	50.0	mg/L	2	22316	a
Sodium	T-Na	48.9	50.0	mg/L	2	22318	a
Thallium	T-Tl	0.93	1.00	mg/L	0.2	22315	a
Thallium	T-Tl	0.97	1.00	mg/L	0.2	22316	a
Thallium	T-Tl	0.97	1.00	mg/L	0.2	22318	a

Methods:

a = ICPOES

**Appendix 1 - QUALITY CONTROL - Reference Materials**

Water

		Result	Target	Units	DL	ALSQC#	Method
ALSEV Metals in Water - High, 4GK116							
Total Metals							
Thallium	T-Tl	0.97	1.00	mg/L	0.2	22318	a
Tin	T-Sn	0.484	0.500	mg/L	0.03	22315	a
Tin	T-Sn	0.490	0.500	mg/L	0.03	22316	a
Tin	T-Sn	0.473	0.500	mg/L	0.03	22318	a
Titanium	T-Ti	0.256	0.250	mg/L	0.01	22315	a
Titanium	T-Ti	0.256	0.250	mg/L	0.01	22316	a
Titanium	T-Ti	0.251	0.250	mg/L	0.01	22318	a
Vanadium	T-V	0.540	0.500	mg/L	0.03	22315	a
Vanadium	T-V	0.499	0.500	mg/L	0.03	22316	a
Vanadium	T-V	0.508	0.500	mg/L	0.03	22318	a
Zinc	T-Zn	0.493	0.500	mg/L	0.005	22315	a
Zinc	T-Zn	0.498	0.500	mg/L	0.005	22316	a
Zinc	T-Zn	0.496	0.500	mg/L	0.005	22318	a

ALSEV Metals in Water - Mid, 4GK116

Total Metals							
Aluminum	T-Al	0.0982	0.100	mg/L	0.001	22317	b
Antimony	T-Sb	0.0454	0.0500	mg/L	0.0001	22317	b
Arsenic	T-As	0.0484	0.0500	mg/L	0.0001	22317	b
Barium	T-Ba	0.0121	0.0125	mg/L	0.00005	22317	b
Beryllium	T-Be	0.00498	0.00500	mg/L	0.0005	22317	b
Boron	T-B	0.048	0.050	mg/L	0.01	22317	b
Cadmium	T-Cd	0.00466	0.00500	mg/L	0.00005	22317	b
Calcium	T-Ca	2.44	2.50	mg/L	0.02	22317	b
Chromium	T-Cr	0.0127	0.0125	mg/L	0.0005	22317	b
Cobalt	T-Co	0.0124	0.0125	mg/L	0.0001	22317	b
Copper	T-Cu	0.0121	0.0125	mg/L	0.0001	22317	b
Iron	T-Fe	0.05	0.05	mg/L	0.03	22317	b
Lead	T-Pb	0.0239	0.0250	mg/L	0.00005	22317	b
Lithium	T-Li	0.0117	0.0125	mg/L	0.005	22317	b
Magnesium	T-Mg	2.35	2.50	mg/L	0.005	22317	b
Manganese	T-Mn	0.0120	0.0125	mg/L	0.00005	22317	b
Molybdenum	T-Mo	0.0122	0.0125	mg/L	0.00005	22317	b

Methods:

a = ICPOES

b = ICPMS

**Appendix 1 - QUALITY CONTROL - Reference Materials**

Water

		Result	Target	Units	DL	ALSQC#	Method
ALSEV Metals in Water - Mid, 4GK116							
Total Metals							
Nickel	T-Ni	0.0248	0.0250	mg/L	0.0005	22317	a
Potassium	T-K	2.48	2.50	mg/L	0.05	22317	a
Selenium	T-Se	0.0485	0.0500	mg/L	0.0005	22317	a
Silver	T-Ag	0.00475	0.00500	mg/L	0.00001	22317	a
Sodium	T-Na	2.54	2.50	mg/L	0.01	22317	a
Thallium	T-Tl	0.0457	0.0500	mg/L	0.0001	22317	a
Tin	T-Sn	0.0236	0.0250	mg/L	0.0001	22317	a
Uranium	T-U	0.000251	0.000250	mg/L	0.00001	22317	a
Vanadium	T-V	0.0241	0.0250	mg/L	0.001	22317	a
Zinc	T-Zn	0.0245	0.0250	mg/L	0.001	22317	a
SPEX Anions (10xD), 27-108AS							
Dissolved Anions							
Chloride	Cl	4.89	4.99	mg/L	0.5	22165	b
Chloride	Cl	5.03	4.99	mg/L	0.5	22660	b
Sulphate	SO4	15.7	15.0	mg/L	1	22165	b
Sulphate	SO4	15.2	15.0	mg/L	1	22660	b
Nutrients							
Nitrate Nitrogen	N	2.54	2.49	mg/L	0.005	22165	b
Nitrate Nitrogen	N	2.59	2.49	mg/L	0.005	22660	b
Nitrite Nitrogen	N	2.47	2.50	mg/L	0.005	22165	b
Nitrite Nitrogen	N	2.37	2.50	mg/L	0.005	22660	b
SPEX Cyanide (Complex), 21-29 TCYN							
Cyanides							
Total Cyanide	CN	0.596	0.597	mg/L	0.005	22324	c

Methods:

a = ICPMS

b = WA_Anions_IC

c = Colourimetry

Appendix 1 - QUALITY CONTROL - Spikes

Water

	Result	Target	Units	DL	ALSQC#	Method
<u>Cyanides</u>						
Total Cyanide CN	96.4	100	mg/L	0.005	22325	a
<u>Total Metals</u>						
Mercury T-Hg	<0.000050	0.000100	mg/L	0.00005	22166	b
<u>Non-Halogenated Volatiles</u>						
Benzene	0.0462	0.0500	mg/L	0.0005	22126	c
Ethylbenzene	0.0461	0.0500	mg/L	0.0005	22126	c
Toluene	0.0446	0.0500	mg/L	0.001	22126	c
meta- & para-Xylene	0.0928	0.100	mg/L	0.0005	22126	c
ortho-Xylene	0.0481	0.0500	mg/L	0.0005	22126	c
<u>CCME Hydrocarbon Fractions</u>						
F2 (C10-C16)	2.23	2.40	mg/L	0.3	22111	d
<u>Glycols</u>						
Diethylene Glycol	26.9	25.0	mg/L	5	22313	e
Diethylene Glycol	17.4	25.0	mg/L	5	22320	e
Ethylene Glycol	26.1	25.0	mg/L	5	22313	e
Ethylene Glycol	19.6	25.0	mg/L	5	22320	e
1,2-Propylene Glycol	25.6	25.0	mg/L	5	22313	e
1,2-Propylene Glycol	21.1	25.0	mg/L	5	22320	e
<u>Polycyclic Aromatic Hydrocarbons</u>						
Acenaphthene	0.00206	0.00200	mg/L	0.00005	22134	f
Acenaphthene	0.00371	0.00400	mg/L	0.00005	22138	f
Acenaphthene	0.00325	0.00400	mg/L	0.00005	22328	f
Acenaphthene	0.00395	0.00400	mg/L	0.00005	22467	f
Acenaphthylene	0.00206	0.00200	mg/L	0.00005	22134	f
Acenaphthylene	0.00378	0.00400	mg/L	0.00005	22138	f
Acenaphthylene	0.00363	0.00400	mg/L	0.00005	22328	f
Acenaphthylene	0.00411	0.00400	mg/L	0.00005	22467	f
Acridine	0.00205	0.00200	mg/L	0.00005	22134	f
Acridine	0.00380	0.00400	mg/L	0.00005	22138	f
Acridine	0.00296	0.00400	mg/L	0.00005	22328	f
Acridine	0.00332	0.00400	mg/L	0.00005	22467	f
Anthracene	0.00203	0.00200	mg/L	0.00005	22134	f
Anthracene	0.00368	0.00400	mg/L	0.00005	22138	f
Anthracene	0.00330	0.00400	mg/L	0.00005	22328	f

Methods:

a = Colourimetry

b = CVAFS

c = WA_BETX_P&T_MS

d = WA_F2-F3_Ext_FID

e = GC-FID

f = WA_PAH_Ext_MS

Appendix 1 - QUALITY CONTROL - Spikes

Water

	Result	Target	Units	DL	ALSQC#	Method
<u>Polycyclic Aromatic Hydrocarbons</u>						
Anthracene	0.00390	0.00400	mg/L	0.00005	22467	a
Benz(a)anthracene	0.00216	0.00200	mg/L	0.00005	22134	a
Benz(a)anthracene	0.00417	0.00400	mg/L	0.00005	22138	a
Benz(a)anthracene	0.00352	0.00400	mg/L	0.00005	22328	a
Benz(a)anthracene	0.00381	0.00400	mg/L	0.00005	22467	a
Benzo(a)pyrene	0.00223	0.00200	mg/L	0.00005	22134	a
Benzo(a)pyrene	0.00381	0.00400	mg/L	0.00005	22138	a
Benzo(a)pyrene	0.00342	0.00400	mg/L	0.00005	22328	a
Benzo(a)pyrene	0.00400	0.00400	mg/L	0.00005	22467	a
Benzo(b)fluoranthene	0.00233	0.00200	mg/L	0.00005	22134	a
Benzo(b)fluoranthene	0.00406	0.00400	mg/L	0.00005	22138	a
Benzo(b)fluoranthene	0.00337	0.00400	mg/L	0.00005	22328	a
Benzo(b)fluoranthene	0.00375	0.00400	mg/L	0.00005	22467	a
Benzo(g,h,i)perylene	0.00171	0.00200	mg/L	0.00005	22134	a
Benzo(g,h,i)perylene	0.00319	0.00400	mg/L	0.00005	22138	a
Benzo(g,h,i)perylene	0.00292	0.00400	mg/L	0.00005	22328	a
Benzo(g,h,i)perylene	0.00354	0.00400	mg/L	0.00005	22467	a
Benzo(k)fluoranthene	0.00255	0.00200	mg/L	0.00005	22134	a
Benzo(k)fluoranthene	0.00431	0.00400	mg/L	0.00005	22138	a
Benzo(k)fluoranthene	0.00307	0.00400	mg/L	0.00005	22328	a
Benzo(k)fluoranthene	0.00392	0.00400	mg/L	0.00005	22467	a
Chrysene	0.00195	0.00200	mg/L	0.00005	22134	a
Chrysene	0.00377	0.00400	mg/L	0.00005	22138	a
Chrysene	0.00286	0.00400	mg/L	0.00005	22328	a
Chrysene	0.00375	0.00400	mg/L	0.00005	22467	a
Dibenz(a,h)anthracene	0.00188	0.00200	mg/L	0.00005	22134	a
Dibenz(a,h)anthracene	0.00341	0.00400	mg/L	0.00005	22138	a
Dibenz(a,h)anthracene	0.00265	0.00400	mg/L	0.00005	22328	a
Dibenz(a,h)anthracene	0.00376	0.00400	mg/L	0.00005	22467	a
Fluoranthene	0.00209	0.00200	mg/L	0.00005	22134	a
Fluoranthene	0.00379	0.00400	mg/L	0.00005	22138	a
Fluoranthene	0.00332	0.00400	mg/L	0.00005	22328	a
Fluoranthene	0.00384	0.00400	mg/L	0.00005	22467	a
Fluorene	0.00205	0.00200	mg/L	0.00005	22134	a
Fluorene	0.00379	0.00400	mg/L	0.00005	22138	a
Fluorene	0.00323	0.00400	mg/L	0.00005	22328	a

Methods:

a = WA_PAH_Ext_MS

Appendix 1 - QUALITY CONTROL - Spikes

Water

	Result	Target	Units	DL	ALSQC#	Method
<u>Polycyclic Aromatic Hydrocarbons</u>						
Fluorene	0.00378	0.00400	mg/L	0.00005	22467	a
Indeno(1,2,3-c,d)pyrene	0.00189	0.00200	mg/L	0.00005	22134	a
Indeno(1,2,3-c,d)pyrene	0.00343	0.00400	mg/L	0.00005	22138	a
Indeno(1,2,3-c,d)pyrene	0.00311	0.00400	mg/L	0.00005	22328	a
Indeno(1,2,3-c,d)pyrene	0.00387	0.00400	mg/L	0.00005	22467	a
Naphthalene	0.127	0.100	mg/L	0.001	21903	b
Naphthalene	0.110	0.100	mg/L	0.001	22052	b
Naphthalene	0.00213	0.00200	mg/L	0.00005	22134	a
Naphthalene	0.00381	0.00400	mg/L	0.00005	22138	a
Naphthalene	0.084	0.100	mg/L	0.001	22260	b
Naphthalene	0.00320	0.00400	mg/L	0.00005	22328	a
Naphthalene	0.00392	0.00400	mg/L	0.00005	22467	a
Phenanthrene	0.128	0.100	mg/L	0.001	21903	b
Phenanthrene	0.120	0.100	mg/L	0.001	22052	b
Phenanthrene	0.00207	0.00200	mg/L	0.00005	22134	a
Phenanthrene	0.00397	0.00400	mg/L	0.00005	22138	a
Phenanthrene	0.087	0.100	mg/L	0.001	22260	b
Phenanthrene	0.00335	0.00400	mg/L	0.00005	22328	a
Phenanthrene	0.00391	0.00400	mg/L	0.00005	22467	a
Pyrene	0.125	0.100	mg/L	0.001	21903	b
Pyrene	0.120	0.100	mg/L	0.001	22052	b
Pyrene	0.00213	0.00200	mg/L	0.00005	22134	a
Pyrene	0.00384	0.00400	mg/L	0.00005	22138	a
Pyrene	0.085	0.100	mg/L	0.001	22260	b
Pyrene	0.00321	0.00400	mg/L	0.00005	22328	a
Pyrene	0.00365	0.00400	mg/L	0.00005	22467	a
Quinoline	0.00195	0.00200	mg/L	0.00005	22134	a
Quinoline	0.00390	0.00400	mg/L	0.00005	22138	a
Quinoline	0.00302	0.00400	mg/L	0.00005	22328	a
Quinoline	0.00387	0.00400	mg/L	0.00005	22467	a
<u>Extractable Hydrocarbons</u>						
Decane (nC10)	0.121	0.100	mg/L	0.001	21903	b
Decane (nC10)	0.100	0.100	mg/L	0.001	22052	b
Decane (nC10)	0.079	0.100	mg/L	0.001	22260	b
Dodecane (nC12)	0.096	0.100	mg/L	0.001	21903	b
Dodecane (nC12)	0.110	0.100	mg/L	0.001	22052	b

Methods:

a = WA_PAH_Ext_MS

b = WA_CSR_EPH_Ext_FID

Appendix 1 - QUALITY CONTROL - Spikes

Water

	Result	Target	Units	DL	ALSQC#	Method
<u>Extractable Hydrocarbons</u>						
Dodecane (nC12)	0.083	0.100	mg/L	0.001	22260	a
Dotriacontane (nC32)	0.125	0.100	mg/L	0.001	21903	a
Dotriacontane (nC32)	0.110	0.100	mg/L	0.001	22052	a
Eicosane (nC20)	0.116	0.100	mg/L	0.001	21903	a
Eicosane (nC20)	0.110	0.100	mg/L	0.001	22052	a
Eicosane (nC20)	0.085	0.100	mg/L	0.001	22260	a
Hexadecane (nC16)	0.113	0.100	mg/L	0.001	21903	a
Hexadecane (nC16)	0.110	0.100	mg/L	0.001	22052	a
Hexadecane (nC16)	0.086	0.100	mg/L	0.001	22260	a
Nonadecane (nC19)	0.102	0.100	mg/L	0.001	21903	a
Nonadecane (nC19)	0.110	0.100	mg/L	0.001	22052	a
Nonadecane (nC19)	0.085	0.100	mg/L	0.001	22260	a
Triaccontane (nC30)	0.122	0.100	mg/L	0.001	21903	a
Triaccontane (nC30)	0.110	0.100	mg/L	0.001	22052	a

Methods:

a = WA_CSR_EPH_Ext_FID

Appendix 1 - QUALITY CONTROL - Blanks

Water

			Result	Target	Units	DL	ALSQC#	Method
Dissolved Anions								
Chloride	Cl		<0.50	<0.50	mg/L	0.5	22164	a
Chloride	Cl		<0.50	<0.50	mg/L	0.5	22659	a
Sulphate	SO4		<1.0	<1.0	mg/L	1	22164	a
Sulphate	SO4		<1.0	<1.0	mg/L	1	22659	a
Nutrients								
Nitrate Nitrogen		N	<0.0050	<0.0050	mg/L	0.005	22164	a
Nitrate Nitrogen		N	<0.0050	<0.0050	mg/L	0.005	22659	a
Nitrite Nitrogen		N	<0.0050	<0.0050	mg/L	0.005	22164	a
Nitrite Nitrogen		N	<0.0050	<0.0050	mg/L	0.005	22659	a
Cyanides								
Total Cyanide	CN		<0.005	<0.005	mg/L	0.005	22321	b
Total Cyanide	CN		<0.005	<0.005	mg/L	0.005	22322	b
Total Metals								
Aluminum	T-Al		<0.0050	<0.0050	mg/L	0.005	22314	c
Antimony	T-Sb		<0.00020	<0.00020	mg/L	0.0002	22314	c
Arsenic	T-As		<0.00020	<0.00020	mg/L	0.0002	22314	c
Barium	T-Ba		<0.0010	<0.0010	mg/L	0.001	22314	c
Beryllium	T-Be		<0.0010	<0.0010	mg/L	0.001	22314	c
Boron	T-B		<0.050	<0.050	mg/L	0.05	22314	c
Cadmium	T-Cd		<0.00020	<0.00020	mg/L	0.0002	22314	c
Calcium	T-Ca		<0.050	<0.050	mg/L	0.05	22314	c
Chromium	T-Cr		<0.0010	<0.0010	mg/L	0.001	22314	c
Cobalt	T-Co		<0.0010	<0.0010	mg/L	0.001	22314	c
Copper	T-Cu		<0.0010	<0.0010	mg/L	0.001	22314	c
Lead	T-Pb		<0.0010	<0.0010	mg/L	0.001	22314	c
Lithium	T-Li		<0.010	<0.010	mg/L	0.01	22314	c
Magnesium	T-Mg		<0.050	<0.050	mg/L	0.05	22314	c
Manganese	T-Mn		<0.0010	<0.0010	mg/L	0.001	22314	c
Mercury	T-Hg		<0.000050	<0.000050	mg/L	0.00005	22167	d
Molybdenum	T-Mo		<0.0010	<0.0010	mg/L	0.001	22314	c
Nickel	T-Ni		<0.0010	<0.0010	mg/L	0.001	22314	c
Potassium	T-K		<0.050	<0.050	mg/L	0.05	22314	c
Selenium	T-Se		<0.0010	<0.0010	mg/L	0.001	22314	c
Silver	T-Ag		<0.00010	<0.00010	mg/L	0.0001	22314	c
Sodium	T-Na		<0.050	<0.050	mg/L	0.05	22314	c

Methods:

a = WA_Anions_IC

b = Colourimetry

c = ICPMS

d = CVAFS

Appendix 1 - QUALITY CONTROL - Blanks

Water

		Result	Target	Units	DL	ALSQC#	Method
<u>Total Metals</u>							
Thallium	T-Tl	<0.0010	<0.0010	mg/L	0.001	22314	a
Tin	T-Sn	<0.0010	<0.0010	mg/L	0.001	22314	a
Uranium	T-U	<0.000010	<0.000010	mg/L	0.00001	22314	a
Vanadium	T-V	<0.0050	<0.0050	mg/L	0.005	22314	a
Zinc	T-Zn	<0.0050	<0.0050	mg/L	0.005	22314	a
<u>CCME Hydrocarbon Fractions</u>							
F1 (C6-C10)		<0.10	<0.10	mg/L	0.1	22125	b
F2 (C10-C16)		<0.30	<0.30	mg/L	0.3	22112	c
<u>Glycols</u>							
Diethylene Glycol		<5.0	<5.0	mg/L	5	22312	d
Diethylene Glycol		<5.0	<5.0	mg/L	5	22319	d
Ethylene Glycol		<5.0	<5.0	mg/L	5	22312	d
Ethylene Glycol		<5.0	<5.0	mg/L	5	22319	d
1,2-Propylene Glycol		<5.0	<5.0	mg/L	5	22312	d
1,2-Propylene Glycol		<5.0	<5.0	mg/L	5	22319	d
<u>Polycyclic Aromatic Hydrocarbons</u>							
Acenaphthene		<0.000050	<0.000050	mg/L	0.00005	22133	e
Acenaphthene		<0.000050	<0.000050	mg/L	0.00005	22137	e
Acenaphthene		<0.000050	<0.000050	mg/L	0.00005	22327	e
Acenaphthene		<0.000050	<0.000050	mg/L	0.00005	22466	e
Acenaphthylene		<0.000050	<0.000050	mg/L	0.00005	22133	e
Acenaphthylene		<0.000050	<0.000050	mg/L	0.00005	22137	e
Acenaphthylene		<0.000050	<0.000050	mg/L	0.00005	22327	e
Acenaphthylene		<0.000050	<0.000050	mg/L	0.00005	22466	e
Acridine		<0.000050	<0.000050	mg/L	0.00005	22133	e
Acridine		<0.000050	<0.000050	mg/L	0.00005	22137	e
Acridine		<0.000050	<0.000050	mg/L	0.00005	22327	e
Acridine		<0.000050	<0.000050	mg/L	0.00005	22466	e
Anthracene		<0.000050	<0.000050	mg/L	0.00005	22133	e
Anthracene		<0.000050	<0.000050	mg/L	0.00005	22137	e
Anthracene		<0.000050	<0.000050	mg/L	0.00005	22327	e
Anthracene		<0.000050	<0.000050	mg/L	0.00005	22466	e
Benz(a)anthracene		<0.000050	<0.000050	mg/L	0.00005	22133	e
Benz(a)anthracene		<0.000050	<0.000050	mg/L	0.00005	22137	e
Benz(a)anthracene		<0.000050	<0.000050	mg/L	0.00005	22327	e

Methods:

a = ICPMS

b = WA_CWS_F1_P&T_FID

c = WA_F2-F3_Ext_FID

d = GC-FID

e = WA_PAH_Ext_MS

Appendix 1 - QUALITY CONTROL - Blanks

Water

	Result	Target	Units	DL	ALSQC#	Method
<u>Polycyclic Aromatic Hydrocarbons</u>						
Benz(a)anthracene	<0.000050	<0.000050	mg/L	0.00005	22466	a
Benzo(a)pyrene	<0.000050	<0.000050	mg/L	0.00005	22133	a
Benzo(a)pyrene	<0.000050	<0.000050	mg/L	0.00005	22137	a
Benzo(a)pyrene	<0.000050	<0.000050	mg/L	0.00005	22327	a
Benzo(a)pyrene	<0.000050	<0.000050	mg/L	0.00005	22466	a
Benzo(b)fluoranthene	<0.000050	<0.000050	mg/L	0.00005	22133	a
Benzo(b)fluoranthene	<0.000050	<0.000050	mg/L	0.00005	22137	a
Benzo(b)fluoranthene	<0.000050	<0.000050	mg/L	0.00005	22327	a
Benzo(b)fluoranthene	<0.000050	<0.000050	mg/L	0.00005	22466	a
Benzo(g,h,i)perylene	<0.000050	<0.000050	mg/L	0.00005	22133	a
Benzo(g,h,i)perylene	<0.000050	<0.000050	mg/L	0.00005	22137	a
Benzo(g,h,i)perylene	<0.000050	<0.000050	mg/L	0.00005	22327	a
Benzo(g,h,i)perylene	<0.000050	<0.000050	mg/L	0.00005	22466	a
Benzo(k)fluoranthene	<0.000050	<0.000050	mg/L	0.00005	22133	a
Benzo(k)fluoranthene	<0.000050	<0.000050	mg/L	0.00005	22137	a
Benzo(k)fluoranthene	<0.000050	<0.000050	mg/L	0.00005	22327	a
Benzo(k)fluoranthene	<0.000050	<0.000050	mg/L	0.00005	22466	a
Chrysene	<0.000050	<0.000050	mg/L	0.00005	22133	a
Chrysene	<0.000050	<0.000050	mg/L	0.00005	22137	a
Chrysene	<0.000050	<0.000050	mg/L	0.00005	22327	a
Chrysene	<0.000050	<0.000050	mg/L	0.00005	22466	a
Dibenz(a,h)anthracene	<0.000050	<0.000050	mg/L	0.00005	22133	a
Dibenz(a,h)anthracene	<0.000050	<0.000050	mg/L	0.00005	22137	a
Dibenz(a,h)anthracene	<0.000050	<0.000050	mg/L	0.00005	22327	a
Dibenz(a,h)anthracene	<0.000050	<0.000050	mg/L	0.00005	22466	a
Fluoranthene	<0.000050	<0.000050	mg/L	0.00005	22133	a
Fluoranthene	<0.000050	<0.000050	mg/L	0.00005	22137	a
Fluoranthene	<0.000050	<0.000050	mg/L	0.00005	22327	a
Fluoranthene	<0.000050	<0.000050	mg/L	0.00005	22466	a
Fluorene	<0.000050	<0.000050	mg/L	0.00005	22133	a
Fluorene	<0.000050	<0.000050	mg/L	0.00005	22137	a
Fluorene	<0.000050	<0.000050	mg/L	0.00005	22327	a
Fluorene	<0.000050	<0.000050	mg/L	0.00005	22466	a
Indeno(1,2,3-c,d)pyrene	<0.000050	<0.000050	mg/L	0.00005	22133	a
Indeno(1,2,3-c,d)pyrene	<0.000050	<0.000050	mg/L	0.00005	22137	a
Indeno(1,2,3-c,d)pyrene	<0.000050	<0.000050	mg/L	0.00005	22327	a

Methods:

a = WA_PAH_Ext_MS

Appendix 1 - QUALITY CONTROL - Blanks

Water

	Result	Target	Units	DL	ALSQC#	Method
<u>Polycyclic Aromatic Hydrocarbons</u>						
Indeno(1,2,3-c,d)pyrene	<0.000050	<0.000050	mg/L	0.00005	22466	a
Naphthalene	<0.000050	<0.000050	mg/L	0.00005	22133	a
Naphthalene	<0.000050	<0.000050	mg/L	0.00005	22137	a
Naphthalene	<0.000050	<0.000050	mg/L	0.00005	22327	a
Naphthalene	<0.000050	<0.000050	mg/L	0.00005	22466	a
Phenanthrene	<0.000050	<0.000050	mg/L	0.00005	22133	a
Phenanthrene	<0.000050	<0.000050	mg/L	0.00005	22137	a
Phenanthrene	<0.000050	<0.000050	mg/L	0.00005	22327	a
Phenanthrene	<0.000050	<0.000050	mg/L	0.00005	22466	a
Pyrene	<0.000050	<0.000050	mg/L	0.00005	22133	a
Pyrene	<0.000050	<0.000050	mg/L	0.00005	22137	a
Pyrene	<0.000050	<0.000050	mg/L	0.00005	22327	a
Pyrene	<0.000050	<0.000050	mg/L	0.00005	22466	a
Quinoline	<0.000050	<0.000050	mg/L	0.00005	22133	a
Quinoline	<0.000050	<0.000050	mg/L	0.00005	22137	a
Quinoline	<0.000050	<0.000050	mg/L	0.00005	22327	a
Quinoline	<0.000050	<0.000050	mg/L	0.00005	22466	a

Methods:

a = WA_PAH_Ext_MS



Appendix 2 - METHODOLOGY

Outlines of the methodologies utilized for the analysis of the samples submitted are as follows

Anion Sum, Cation Sum, and Ion Balance (%)

Cation Sum, Anion Sum and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

$$\text{Ion Balance (\%)} = [(\text{Cation Sum}) - (\text{Anion Sum})] / [(\text{Cation Sum}) + (\text{Anion Sum})]$$

Laboratory Location: ALS Environmental, Vancouver

Conductivity in Water

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

Recommended Holding Time:

Sample: 28 days

Reference: APHA

Laboratory Location: ALS Environmental, Calgary

pH in Water

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode.

Recommended Holding Time:

Sample: 2 hours

Reference: APHA

Laboratory Location: ALS Environmental, Calgary

Alkalinity in Water by Titration

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.



Appendix 2 - METHODOLOGY - Continued

Recommended Holding Time:

Sample: 14 days

Reference: APHA

Laboratory Location: ALS Environmental, Calgary

Dissolved Anions in Water by Ion Chromatography

This analysis is carried out using procedures adapted from APHA Method 4110 "Determination of Anions by Ion Chromatography" and EPA Method 300.0 "Determination of Inorganic Anions by Ion Chromatography". Anions are determined by filtering the sample through a 0.45 micron membrane filter and injecting the filtrate onto a Dionex IonPac AG17 anion exchange column with a sodium carbonate and sodium bicarbonate eluent stream. Anions routinely determined by this method include: bromide, chloride, fluoride, nitrate, nitrite and sulphate.

Recommended Holding Time:

Sample: 28 days (bromide, chloride, fluoride, sulphate)

Sample: 2 days (nitrate, nitrite)

Reference: APHA and EPA

Laboratory Location: ALS Environmental, Calgary

Metals in Water

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" 20th Edition 1998 published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotplate or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by atomic absorption/emission spectrophotometry (EPA Method 7000 series), inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B), and/or inductively coupled plasma - mass spectrometry (EPA Method 6020).

Recommended Holding Time:

Sample: 6 months

Reference: EPA

Laboratory Location: ALS Environmental, Vancouver

Volatile Organic Compounds in Water

This procedure involves the purge and trap extraction of the sample prior to analysis for specific Volatile Organic Compounds (VOC) by capillary column gas chromatography with mass spectrometric detection (GC/MS). The VOC analysis are carried out using procedures adapted from "Test Methods for Evaluating Solid



Appendix 2 - METHODOLOGY - Continued

Waste" SW-846, Method 8260, published by the United States Environmental Protection Agency (EPA).

Recommended Holding Time:

Sample: 7 days

Extract: NA

Reference: BCMELP

Laboratory Location: ALS Environmental, Calgary

Calculation of Total Xylenes

Total Xylenes is the sum of the concentrations of the ortho, meta, and para Xylene isomers. Results below detection limit (DL) are treated as zero. The DL for Total Xylenes is set to a value no less than the square root of the sum of the squares of the DLs of the individual Xylenes.

Laboratory Location: ALS Environmental, Vancouver

Volatile Hydrocarbons in Water

This procedure involves the purge and trap extraction of the sample prior to analysis for CWS F1(6-10), and Total Volatile Hydrocarbons (TVH5-10) by capillary column gas chromatography with flame-ionization detection (GC/FID). The CWS F1 was adapted from the "Reference Method for the Canadian-Wide Standards for Petroleum Hydrocarbons in Soil - Tier 1 Method. The TVH analysis are carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 8260, published by the United States Environmental Protection Agency (EPA).

Recommended Holding Time:

Sample: 7 days

Extract: 40

Reference: EPA

Laboratory Location: ALS Environmental, Calgary

Total Extractable Hydrocarbons and CWS F2-3 in Water

This TEH analysis is carried out in accordance with U.S. EPA Method 3510C/8015B (SW-846). The CWS F2 (10-16) & F3(16-32) is adopted from the "Reference Method for the Canadian-Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method. The procedure involves extraction of the entire water sample with dichloromethane. The extract is then solvent exchanged to toluene and analysed by capillary column gas chromatography with flame ionization detection (GC/FID). The TEH ranges from n-decane(n-C10) to n-Tricosane(n-C30). The CWS F2 ranges from n-decane (n-C10) to n-Hexadecane (n-C16) and the F3 ranges from n-hexadecane(n-C16) to n-dotricontane (n-32).

Recommended Holding Time:



Appendix 2 - METHODOLOGY - Continued

Sample: 7 days Extract: 40 days
Reference: BCMELP, EPA & CCME

Laboratory Location: ALS Environmental, Calgary

Cyanide Species in Water

This analysis is carried out using procedures adapted from APHA Method 4500-CN "Cyanide". Total or strong acid dissociable (SAD) cyanide and weak acid dissociable (WAD) cyanide are determined by sample distillation and analysis using the chloramine-T colourimetric method. Cyanate is determined by the cyanate hydrolysis method using an ammonia selective electrode. Thiocyanate is determined by the ferric nitrate colourimetric method.

Recommended Holding Time:
Sample: 14 days
Reference: APHA

Laboratory Location: ALS Environmental, Vancouver

Glycols in Water

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 8015B, published by the United States Environmental Protection Agency (EPA). The procedure involves treatment of the sample with a strong base (NaOH) and benzoyl chloride to form the corresponding benzoate esters. The benzoate esters are then extracted with hexane and the extract is analyzed by capillary column gas chromatography with flame ionization detection (FID).

Recommended Holding Time:
Sample: 7 days Extract: 40 days
Reference: EPA

Laboratory Location: ALS Environmental, Vancouver

Polycyclic Aromatic Hydrocarbons in Water

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3510, 3630 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure involves extraction of the entire water sample with dichloromethane. The extract is then solvent exchanged to toluene prior to analysis by capillary column gas chromatography with mass spectrometric detection (GC/MS).

Recommended Holding Time:
Sample: 7 days Extract: 40 days
Reference: EPA



Appendix 2 - METHODOLOGY - Continued

Laboratory Location: ALS Environmental, Calgary

Conventional Parameters in Water

These analyses are carried out in accordance with procedures described in "Methods for Chemical Analysis of Water and Wastes" (USEPA), "Manual for the Chemical Analysis of Water, Wastewaters, Sediments and Biological Tissues" (BCMOE), and/or "Standard Methods for the Examination of Water and Wastewater" (APHA). Further details are available on request.

Laboratory Location: ALS Environmental, Vancouver

Mercury in Water

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" 20th Edition 1998 published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).

Recommended Holding Time:

Sample: 28 days

Reference: EPA

Laboratory Location: ALS Environmental, Vancouver

Results contained within this certificate relate only to the samples as submitted.

This Certificate Of Analysis shall only be reproduced in full, except with the written approval of ALS Environmental.

End of Report



CERTIFICATE OF ANALYSIS

Date: August 15, 2005

ALS File No. R3057

Report On: Lupin A053017

Report To: **SNC Lavalin, Morrow Environmental**
#112, 1212 - 1st Street SE
Calgary, AB
T2G 2H8

Attention: **Mr. Neil Sandstrom**

Received: July 29, 2005

ALS ENVIRONMENTAL

per:

Bill Chew, B.Sc. - Manager, Client Services
Ken Pokolinski, C.H.T - Project Chemist

RESULTS OF ANALYSIS - Sediment/Soil

Sample ID	SS62	SS63	SS64	SS65	SS66
Sample Date	05-07-23	05-07-23	05-07-23	05-07-23	05-07-23
ALS ID	1	2	3	4	5

Physical Tests

Moisture	%	13.5	10.4	6.00	13.3	12.2
pH		6.88	6.70	7.11	-	6.70

Total Metals

Antimony	T-Sb	<10	<10	<10	-	<10
Arsenic	T-As	11.9	10.9	18.6	-	14.0
Barium	T-Ba	40.3	33.5	24.4	-	42.5
Beryllium	T-Be	<0.50	<0.50	<0.50	-	<0.50
Cadmium	T-Cd	<0.50	<0.50	<0.50	-	<0.50
Chromium	T-Cr	27.7	23.5	16.8	-	30.5
Cobalt	T-Co	5.3	4.2	3.2	-	5.1
Copper	T-Cu	13.3	11.5	8.8	-	14.8
Lead	T-Pb	<30	<30	<30	-	<30
Mercury	T-Hg	0.0051	0.0063	<0.0050	-	<0.0050
Molybdenum	T-Mo	<4.0	<4.0	<4.0	-	<4.0
Nickel	T-Ni	14.9	12.9	10.6	-	18.1
Selenium	T-Se	<2.0	<2.0	<2.0	-	<2.0
Silver	T-Ag	<2.0	<2.0	<2.0	-	<2.0
Thallium	T-Tl	<1.0	<1.0	<1.0	-	<1.0
Tin	T-Sn	<5.0	<5.0	<5.0	-	<5.0
Vanadium	T-V	25.0	20.7	12.2	-	20.8
Zinc	T-Zn	68.1	26.9	22.1	-	23.9

Inorganic Parameters

Sulphide	S	-	-	0.38	-	-
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Non-Halogenated Volatiles

Benzene	-	-	-	0.053	-
Ethylbenzene	-	-	-	1.15	-
Toluene	-	-	-	1.17	-
meta- & para-Xylene	-	-	-	4.45	-
ortho-Xylene	-	-	-	3.10	-
Total Xylenes	-	-	-	7.55	-

Results are expressed as milligrams per dry kilogram except where noted.

RESULTS OF ANALYSIS - Sediment/Soil

Sample ID	SS62	SS63	SS64	SS65	SS66
Sample Date	05-07-23	05-07-23	05-07-23	05-07-23	05-07-23
ALS ID	1	2	3	4	5

CCME Hydrocarbon Fractions

F1 (C6-C10)	-	-	-	197	-
F1-BTEX	-	-	-	187	-
F2 (C10-C16)	<30	<30	<30	3990	<30
F3 (C16-C34)	<50	<50	<50	4400	305
F4 (C34-C50)	<50	<50	<50	70	174
F4G-SG Required (yes/no)	no	no	no	no	no

Glycols

Diethylene Glycol	-	-	<10	-	<10
Ethylene Glycol	-	-	<10	-	<10
1,2-Propylene Glycol	-	-	<10	-	<10
Triethylene Glycol	-	-	<10	-	<10

Polycyclic Aromatic Hydrocarbons

Acenaphthene	-	-	-	-	<0.040
Acenaphthylene	-	-	-	-	<0.050
Anthracene	-	-	-	-	<0.050
Benz(a)anthracene	-	-	-	-	<0.050
Benzo(a)pyrene	-	-	-	-	<0.050
Benzo(b)fluoranthene	-	-	-	-	<0.050
Benzo(g,h,i)perylene	-	-	-	-	<0.050
Benzo(k)fluoranthene	-	-	-	-	<0.050
Chrysene	-	-	-	-	<0.050
Dibenz(a,h)anthracene	-	-	-	-	<0.050
Fluoranthene	-	-	-	-	<0.050
Fluorene	-	-	-	-	<0.050
Indeno(1,2,3-c,d)pyrene	-	-	-	-	<0.050
Naphthalene	-	-	-	-	<0.050
Phenanthrene	-	-	-	-	<0.050
Pyrene	-	-	-	-	<0.050

Results are expressed as milligrams per dry kilogram except where noted.

RESULTS OF ANALYSIS - Sediment/Soil

Sample ID	SS67	SS68	SS69	SS70	SS71
Sample Date	05-07-23	05-07-23	05-07-23	05-07-23	05-07-23
ALS ID	6	7	8	9	10

Physical Tests

Moisture	%	9.59	9.74	7.07	4.47	8.36
pH		-	-	7.68	7.30	5.70

Total Metals

Antimony	T-Sb	-	-	<10	<10	<10
Arsenic	T-As	-	-	97.3	124	<5.0
Barium	T-Ba	-	-	42.6	39.5	28.7
Beryllium	T-Be	-	-	<0.50	<0.50	<0.50
Cadmium	T-Cd	-	-	<0.50	<0.50	<0.50
Chromium	T-Cr	-	-	26.6	26.8	20.3
Cobalt	T-Co	-	-	4.8	4.9	3.5
Copper	T-Cu	-	-	13.0	13.6	8.8
Lead	T-Pb	-	-	<30	<30	<30
Mercury	T-Hg	-	-	<0.0050	<0.0050	<0.0050
Molybdenum	T-Mo	-	-	<4.0	<4.0	<4.0
Nickel	T-Ni	-	-	14.7	16.2	10.7
Selenium	T-Se	-	-	<2.0	<2.0	<2.0
Silver	T-Ag	-	-	<2.0	<2.0	<2.0
Thallium	T-Tl	-	-	<1.0	<1.0	<1.0
Tin	T-Sn	-	-	<5.0	<5.0	<5.0
Vanadium	T-V	-	-	24.2	23.3	19.5
Zinc	T-Zn	-	-	24.3	22.8	17.8

Inorganic Parameters

Sulphide	S	-	-	0.39	0.54	-
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Non-Halogenated Volatiles

Benzene	<0.040	<0.040	-	-	<0.040
Ethylbenzene	<0.050	<0.050	-	-	<0.050
Toluene	<0.10	<0.10	-	-	<0.10
meta- & para-Xylene	<0.050	<0.050	-	-	<0.050
ortho-Xylene	<0.050	<0.050	-	-	<0.050
Total Xylenes	<0.075	<0.075	-	-	<0.075

Results are expressed as milligrams per dry kilogram except where noted.

RESULTS OF ANALYSIS - Sediment/Soil

Sample ID	SS67	SS68	SS69	SS70	SS71
Sample Date	05-07-23	05-07-23	05-07-23	05-07-23	05-07-23
ALS ID	6	7	8	9	10

CCME Hydrocarbon Fractions

F1 (C6-C10)	<10	<10	-	-	<10
F1-BTEX	<10	<10	-	-	<10
F2 (C10-C16)	<30	<30	<30	<30	<30
F3 (C16-C34)	<50	<50	80	65	<50
F4 (C34-C50)	<50	<50	<50	<50	<50
F4G-SG Required (yes/no)	no	no	no	no	no

Results are expressed as milligrams per dry kilogram except where noted.

RESULTS OF ANALYSIS - Sediment/Soil

Sample ID	SS72	SS73	SS74	SS75	SS76
Sample Date	05-07-23	05-07-23	05-07-23	05-07-23	05-07-23
ALS ID	11	12	13	14	15

Physical Tests

Moisture	%	8.40	4.09	11.9	10.1	8.23
pH		5.72	-	-	-	5.21

Total Metals

Antimony	T-Sb	<10	-	-	-	<10
Arsenic	T-As	<5.0	-	-	-	40.7
Barium	T-Ba	31.7	-	-	-	28.5
Beryllium	T-Be	<0.50	-	-	-	<0.50
Cadmium	T-Cd	<0.50	-	-	-	<0.50
Chromium	T-Cr	23.1	-	-	-	20.3
Cobalt	T-Co	3.8	-	-	-	3.4
Copper	T-Cu	9.8	-	-	-	23.4
Lead	T-Pb	<30	-	-	-	<30
Mercury	T-Hg	0.0156	-	-	-	<0.0050
Molybdenum	T-Mo	<4.0	-	-	-	<4.0
Nickel	T-Ni	12.2	-	-	-	11.6
Selenium	T-Se	<2.0	-	-	-	<2.0
Silver	T-Ag	<2.0	-	-	-	<2.0
Thallium	T-Tl	<1.0	-	-	-	<1.0
Tin	T-Sn	<5.0	-	-	-	<5.0
Vanadium	T-V	21.3	-	-	-	20.6
Zinc	T-Zn	20.6	-	-	-	19.5

Inorganic Parameters

Sulphide	S	-	-	-	-	1.18
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Non-Halogenated Volatiles

Benzene	<0.040	<0.040	<0.040	<0.040	-
Ethylbenzene	<0.050	<0.050	<0.050	<0.050	-
Toluene	<0.10	<0.10	<0.10	<0.10	-
meta- & para-Xylene	<0.050	<0.050	<0.050	<0.050	-
ortho-Xylene	<0.050	0.365	<0.050	<0.050	-
Total Xylenes	<0.075	0.365	<0.075	<0.075	-

Results are expressed as milligrams per dry kilogram except where noted.

RESULTS OF ANALYSIS - Sediment/Soil

Sample ID	SS72	SS73	SS74	SS75	SS76
Sample Date	05-07-23	05-07-23	05-07-23	05-07-23	05-07-23
ALS ID	11	12	13	14	15

CCME Hydrocarbon Fractions

F1 (C6-C10)	<10	<10	<10	<10	-
F1-BTEX	<10	<10	<10	<10	-
F2 (C10-C16)	<30	4050	<30	249	-
F3 (C16-C34)	<50	2120	57	265	-
F4 (C34-C50)	<50	<50	<50	90	-
F4G-SG Required (yes/no)	no	no	no	no	no

Polycyclic Aromatic Hydrocarbons

Acenaphthene	-	<0.40	<0.040	<0.040	-
Acenaphthylene	-	<0.50	<0.050	<0.050	-
Anthracene	-	<0.50	<0.050	<0.050	-
Benz(a)anthracene	-	<0.50	<0.050	<0.050	-
Benzo(a)pyrene	-	<0.50	<0.050	<0.050	-
Benzo(b)fluoranthene	-	<0.50	<0.050	<0.050	-
Benzo(g,h,i)perylene	-	<0.50	<0.050	<0.050	-
Benzo(k)fluoranthene	-	<0.50	<0.050	<0.050	-
Chrysene	-	<0.50	<0.050	<0.050	-
Dibenz(a,h)anthracene	-	<0.50	<0.050	<0.050	-
Fluoranthene	-	<0.50	<0.050	<0.050	-
Fluorene	-	<0.70	<0.050	<0.050	-
Indeno(1,2,3-c,d)pyrene	-	<0.50	<0.050	<0.050	-
Naphthalene	-	<0.60	<0.050	<0.050	-
Phenanthrene	-	<0.50	<0.050	<0.050	-
Pyrene	-	<0.50	<0.050	<0.050	-

Results are expressed as milligrams per dry kilogram except where noted.

Appendix 1 - QUALITY CONTROL - Replicates

Sediment/Soil		SS66	SS66	SS75	SS75
		05-07-23	QC # 22416	05-07-23	QC # 21860
Physical Tests					
Moisture	%	12.2	12.5	10.1	10.8
pH		6.70	6.68	-	-
Total Metals					
Antimony	T-Sb	<10	<10	-	-
Arsenic	T-As	14.0	15.0	-	-
Barium	T-Ba	42.5	34.7	-	-
Beryllium	T-Be	<0.50	<0.50	-	-
Cadmium	T-Cd	<0.50	<0.50	-	-
Chromium	T-Cr	30.5	25.8	-	-
Cobalt	T-Co	5.1	4.3	-	-
Copper	T-Cu	14.8	10.6	-	-
Lead	T-Pb	<30	<30	-	-
Mercury	T-Hg	<0.0050	<0.0050	-	-
Molybdenum	T-Mo	<4.0	<4.0	-	-
Nickel	T-Ni	18.1	15.4	-	-
Selenium	T-Se	<2.0	<2.0	-	-
Silver	T-Ag	<2.0	<2.0	-	-
Thallium	T-Tl	<1.0	<1.0	-	-
Tin	T-Sn	<5.0	<5.0	-	-
Vanadium	T-V	20.8	17.8	-	-
Zinc	T-Zn	23.9	21.9	-	-
Non-Halogenated Volatiles					
Benzene		-	-	<0.040	<0.040
Ethylbenzene		-	-	<0.050	<0.050
Toluene		-	-	<0.10	<0.10
meta- & para-Xylene		-	-	<0.050	<0.050
ortho-Xylene		-	-	<0.050	<0.050
Total Xylenes		-	-	<0.075	<0.075

Results are expressed as milligrams per dry kilogram except where noted.

Appendix 1 - QUALITY CONTROL - Replicates

Sediment/Soil	SS66	SS66	SS75	SS75
	05-07-23	QC # 22416	05-07-23	QC # 21860
<u>CCME Hydrocarbon Fractions</u>				
F2 (C10-C16)	-	-	249	205
F3 (C16-C34)	-	-	265	239
F4 (C34-C50)	-	-	90	75
<u>Glycols</u>				
Diethylene Glycol	<10	<10	-	-
Ethylene Glycol	<10	<10	-	-
1,2-Propylene Glycol	<10	<10	-	-
<u>Polycyclic Aromatic Hydrocarbons</u>				
Acenaphthene	-	-	<0.040	<0.040
Acenaphthylene	-	-	<0.050	<0.050
Anthracene	-	-	<0.050	<0.050
Benz(a)anthracene	-	-	<0.050	<0.050
Benzo(a)pyrene	-	-	<0.050	<0.050
Benzo(b)fluoranthene	-	-	<0.050	<0.050
Benzo(g,h,i)perylene	-	-	<0.050	<0.050
Benzo(k)fluoranthene	-	-	<0.050	<0.050
Chrysene	-	-	<0.050	<0.050
Dibenz(a,h)anthracene	-	-	<0.050	<0.050
Fluoranthene	-	-	<0.050	<0.050
Fluorene	-	-	<0.050	<0.050
Indeno(1,2,3-c,d)pyrene	-	-	<0.050	<0.050
Naphthalene	-	-	<0.050	<0.050
Phenanthrene	-	-	<0.050	<0.050
Pyrene	-	-	<0.050	<0.050

Results are expressed as milligrams per dry kilogram except where noted.

Appendix 1 - QUALITY CONTROL - Reference Materials

Sediment/Soil

		Result	Target	Units	DL	ALSQC#	Method
<i>NIST Montana Soil, 2711</i>							
<u>Total Metals</u>							
Antimony	T-Sb	14	19	mg/kg	10	22421	a
Arsenic	T-As	104	105	mg/kg	5	22421	a
Barium	T-Ba	209	726	mg/kg	1	22421	a
Beryllium	T-Be	1.04	0.98	mg/kg	0.5	22421	a
Cadmium	T-Cd	41.4	41.7	mg/kg	0.5	22421	a
Chromium	T-Cr	22.8	47.0	mg/kg	2	22421	a
Cobalt	T-Co	8.4	10.0	mg/kg	2	22421	a
Copper	T-Cu	117	114	mg/kg	1	22421	a
Lead	T-Pb	1180	1160	mg/kg	50	22421	a
Mercury	T-Hg	6.17	6.25	mg/kg	0.05	22428	b
Molybdenum	T-Mo	<4.0	<4.0	mg/kg	4	22421	a
Nickel	T-Ni	16.5	20.6	mg/kg	5	22421	a
Selenium	T-Se	<2.0	<2.0	mg/kg	2	22421	a
Silver	T-Ag	4.3	4.6	mg/kg	2	22421	a
Thallium	T-Tl	<10	<10	mg/kg	10	22421	a
Thallium	T-Tl	2.0	2.5	mg/kg	1	22425	c
Tin	T-Sn	<10	<10	mg/kg	10	22421	a
Vanadium	T-V	52.2	81.6	mg/kg	2	22421	a
Zinc	T-Zn	337	350	mg/kg	1	22421	a

CANMET Till Reference Material, TILL-1

<u>Total Metals</u>							
Antimony	T-Sb	<10	<10	mg/kg	10	22422	a
Arsenic	T-As	17.2	18.0	mg/kg	5	22422	a
Barium	T-Ba	88.9	702	mg/kg	1	22422	a
Beryllium	T-Be	0.53	2.40	mg/kg	0.5	22422	a
Cadmium	T-Cd	<0.50	<0.50	mg/kg	0.5	22422	a
Chromium	T-Cr	29.8	65.0	mg/kg	2	22422	a
Cobalt	T-Co	13.2	18.0	mg/kg	2	22422	a
Copper	T-Cu	49.5	47.0	mg/kg	1	22422	a
Lead	T-Pb	<50	<50	mg/kg	50	22422	a
Mercury	T-Hg	0.103	0.095	mg/kg	0.05	22429	b
Molybdenum	T-Mo	<4.0	<4.0	mg/kg	4	22422	a

Methods:a = CSR/HCl-HNO₃/ICPOESb = CSR/HCl-HNO₃/CVAFS

c = SM__CSR_ICPMS

Appendix 1 - QUALITY CONTROL - Reference Materials

Sediment/Soil

		Result	Target	Units	DL	ALSQC#	Method
CANMET Till Reference Material, TILL-1							
Total Metals							
Nickel	T-Ni	18.2	24.0	mg/kg	5	22422	a
Selenium	T-Se	<2.0	2.0	mg/kg	2	22422	a
Silver	T-Ag	<2.0	<2.0	mg/kg	2	22422	a
Thallium	T-Tl	<10	10	mg/kg	10	22422	a
Tin	T-Sn	<5.0	5.0	mg/kg	5	22422	a
Vanadium	T-V	64.8	99.0	mg/kg	2	22422	a
Zinc	T-Zn	73.8	98.0	mg/kg	1	22422	a
ALS Environmental RM Soil, ARM-1							
CCME Hydrocarbon Fractions							
F2 (C10-C16)		3420	2410	mg/kg	30	21957	b
F3 (C16-C34)		3220	3420	mg/kg	50	21957	b
F4 (C34-C50)		1060	1280	mg/kg	50	21957	b
Polycyclic Aromatic Hydrocarbons							
Acenaphthene		0.555	0.721	mg/kg	0.04	21989	c
Acenaphthylene		0.452	0.710	mg/kg	0.05	21989	c
Anthracene		0.811	0.993	mg/kg	0.05	21989	c
Benz(a)anthracene		2.96	2.84	mg/kg	0.05	21989	c
Benzo(a)pyrene		2.11	2.08	mg/kg	0.05	21989	c
Benzo(b)fluoranthene		3.48	3.18	mg/kg	0.05	21989	c
Benzo(g,h,i)perylene		1.08	1.52	mg/kg	0.05	21989	c
Benzo(k)fluoranthene		1.22	1.26	mg/kg	0.05	21989	c
Chrysene		2.25	2.70	mg/kg	0.05	21989	c
Dibenz(a,h)anthracene		0.323	0.415	mg/kg	0.05	21989	c
Fluoranthene		6.95	7.25	mg/kg	0.05	21989	c
Fluorene		1.10	1.19	mg/kg	0.05	21989	c
Indeno(1,2,3-c,d)pyrene		1.34	1.80	mg/kg	0.05	21989	c
Naphthalene		3.97	4.16	mg/kg	0.05	21989	c
Phenanthrene		4.81	5.11	mg/kg	0.05	21989	c
Pyrene		5.72	6.19	mg/kg	0.05	21989	c

Methods:a = CSR/HCl-HNO₃/ICPOES

b = Soxhlet/GC-FID

c = Soxhlet/GC-MS

Appendix 1 - QUALITY CONTROL - Spikes

Sediment/Soil

	Result	Target	Units	DL	ALSQC#	Method
<u>Non-Halogenated Volatiles</u>						
Benzene	1.66	2.00	mg/kg	0.04	21965	a
Ethylbenzene	1.93	2.00	mg/kg	0.04	21965	a
Toluene	1.83	2.00	mg/kg	0.1	21965	a
meta- & para-Xylene	1.94	2.00	mg/kg	0.04	21965	a
ortho-Xylene	2.04	2.00	mg/kg	0.04	21965	a
<u>CCME Hydrocarbon Fractions</u>						
F1 (C6-C10)	23	30	mg/kg	10	21967	b
<u>Glycols</u>						
Diethylene Glycol	78	50	mg/kg	10	22418	c
Ethylene Glycol	69	50	mg/kg	10	22418	c
1,2-Propylene Glycol	66	50	mg/kg	10	22418	c

Methods:

a = Purge&Trap/GC-MS

b = Purge&Trap/GC-FID

c = GC-FID

Appendix 1 - QUALITY CONTROL - Blanks

Sediment/Soil

		Result	Target	Units	DL	ALSQC#	Method
Total Metals							
Antimony	T-Sb	<10	<10	mg/kg	10	22419	a
Antimony	T-Sb	<10	<10	mg/kg	10	22420	a
Arsenic	T-As	<5.0	<5.0	mg/kg	5	22419	a
Arsenic	T-As	<5.0	<5.0	mg/kg	5	22420	a
Barium	T-Ba	<1.0	<1.0	mg/kg	1	22419	a
Barium	T-Ba	<1.0	<1.0	mg/kg	1	22420	a
Beryllium	T-Be	<0.50	<0.50	mg/kg	0.5	22419	a
Beryllium	T-Be	<0.50	<0.50	mg/kg	0.5	22420	a
Cadmium	T-Cd	<0.50	<0.50	mg/kg	0.5	22419	a
Cadmium	T-Cd	<0.50	<0.50	mg/kg	0.5	22420	a
Chromium	T-Cr	<2.0	<2.0	mg/kg	2	22419	a
Chromium	T-Cr	<2.0	<2.0	mg/kg	2	22420	a
Cobalt	T-Co	<2.0	<2.0	mg/kg	2	22419	a
Cobalt	T-Co	<2.0	<2.0	mg/kg	2	22420	a
Copper	T-Cu	<1.0	<1.0	mg/kg	1	22419	a
Copper	T-Cu	<1.0	<1.0	mg/kg	1	22420	a
Lead	T-Pb	<50	<50	mg/kg	50	22419	a
Lead	T-Pb	<50	<50	mg/kg	50	22420	a
Mercury	T-Hg	<0.050	<0.050	mg/kg	0.05	22426	b
Mercury	T-Hg	<0.050	<0.050	mg/kg	0.05	22427	b
Molybdenum	T-Mo	<4.0	<4.0	mg/kg	4	22419	a
Molybdenum	T-Mo	<4.0	<4.0	mg/kg	4	22420	a
Nickel	T-Ni	<5.0	<5.0	mg/kg	5	22419	a
Nickel	T-Ni	<5.0	<5.0	mg/kg	5	22420	a
Selenium	T-Se	<2.0	<2.0	mg/kg	2	22419	a
Selenium	T-Se	<2.0	<2.0	mg/kg	2	22420	a
Silver	T-Ag	<2.0	<2.0	mg/kg	2	22419	a
Silver	T-Ag	<2.0	<2.0	mg/kg	2	22420	a
Thallium	T-Tl	<10	<10	mg/kg	10	22419	a
Thallium	T-Tl	<10	<10	mg/kg	10	22420	a
Thallium	T-Tl	<1.0	<1.0	mg/kg	1	22423	c
Thallium	T-Tl	<1.0	<1.0	mg/kg	1	22424	c
Tin	T-Sn	<5.0	<5.0	mg/kg	5	22419	a
Tin	T-Sn	<5.0	<5.0	mg/kg	5	22420	a
Vanadium	T-V	<2.0	<2.0	mg/kg	2	22419	a
Vanadium	T-V	<2.0	<2.0	mg/kg	2	22420	a

Methods:a = CSR/HCl-HNO₃/ICPOESb = CSR/HCl-HNO₃/CVAFS

c = SM__CSR_ICPMS

Appendix 1 - QUALITY CONTROL - Blanks

Sediment/Soil

		Result	Target	Units	DL	ALSQC#	Method
<u>Total Metals</u>							
Zinc	T-Zn	<1.0	<1.0	mg/kg	1	22419	a
Zinc	T-Zn	<1.0	<1.0	mg/kg	1	22420	a
<u>Non-Halogenated Volatiles</u>							
Benzene		<0.040	<0.040	mg/kg	0.04	21966	b
Ethylbenzene		<0.050	<0.050	mg/kg	0.05	21966	b
Toluene		<0.100	<0.100	mg/kg	0.1	21966	b
meta- & para-Xylene		<0.050	<0.050	mg/kg	0.05	21966	b
ortho-Xylene		<0.050	<0.050	mg/kg	0.05	21966	b
<u>CCME Hydrocarbon Fractions</u>							
F1 (C6-C10)		<10	<10	mg/kg	10	21966	c
<u>Glycols</u>							
Diethylene Glycol		<10	<10	mg/kg	10	22417	d
Ethylene Glycol		<10	<10	mg/kg	10	22417	d
1,2-Propylene Glycol		<10	<10	mg/kg	10	22417	d
<u>Polycyclic Aromatic Hydrocarbons</u>							
Acenaphthene		<0.050	<0.050	mg/kg	0.05	21988	e
Acenaphthylene		<0.050	<0.050	mg/kg	0.05	21988	e
Anthracene		<0.050	<0.050	mg/kg	0.05	21988	e
Benz(a)anthracene		<0.050	<0.050	mg/kg	0.05	21988	e
Benzo(a)pyrene		<0.050	<0.050	mg/kg	0.05	21988	e
Benzo(b)fluoranthene		<0.050	<0.050	mg/kg	0.05	21988	e
Benzo(g,h,i)perylene		<0.050	<0.050	mg/kg	0.05	21988	e
Benzo(k)fluoranthene		<0.050	<0.050	mg/kg	0.05	21988	e
Chrysene		<0.050	<0.050	mg/kg	0.05	21988	e
Dibenz(a,h)anthracene		<0.050	<0.050	mg/kg	0.05	21988	e
Fluoranthene		<0.050	<0.050	mg/kg	0.05	21988	e
Fluorene		<0.050	<0.050	mg/kg	0.05	21988	e
Indeno(1,2,3-c,d)pyrene		<0.050	<0.050	mg/kg	0.05	21988	e
Naphthalene		<0.050	<0.050	mg/kg	0.05	21988	e
Phenanthrene		<0.050	<0.050	mg/kg	0.05	21988	e
Pyrene		<0.050	<0.050	mg/kg	0.05	21988	e
<u>Extractable Hydrocarbons</u>							
F2 (C10-C16)		<30	<30	mg/kg	30	21956	f
F3 (C16-C34)		<50	<50	mg/kg	50	21956	f

Methods:a = CSR/HCl-HNO₃/ICPOES

b = Purge&Trap/GC-MS

c = Purge&Trap/GC-FID

d = GC-FID

e = Soxhlet/GC-MS

f = Soxhlet/GC-FID

File No. R3057

Appendix 1 - QUALITY CONTROL - Blanks



Sediment/Soil

	Result	Target	Units	DL	ALSQC#	Method
<u>Extractable Hydrocarbons</u>						
F4 (C34-C50)	<50	<50	mg/kg	50	21956	a

Methods:

a = Soxhlet/GC-FID

Bold Targets indicate uncertified targets

Appendix 2 - METHODOLOGY



Outlines of the methodologies utilized for the analysis of the samples submitted are as follows

Moisture in Sediment/Soil

This analysis is carried out gravimetrically by drying the sample at 103 C for a minimum of six hours.

Recommended Holding Time:

Sample: 14 days

Reference: Puget

Laboratory Location: ALS Environmental, Calgary

pH in Soil

This analysis is carried out in accordance with procedures described in "Soil Sampling and Methods of Analysis" (CSSS). The procedure involves mixing the air-dried sample with deionized/distilled water. The pH of the solution is then measured using a standard pH probe. A one to two ratio of sediment to water is used for mineral soils and a one to ten ratio is used for highly organic soils.

Laboratory Location: ALS Environmental, Vancouver

Metals in Sediment/Soil

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B or Method 3051, United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by either hotplate or block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by atomic absorption/fluorescence spectrophotometry (EPA Method 7000 series), inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B), and/or inductively coupled plasma - mass spectrometry (EPA Method 6020).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

Recommended Holding Time:

Sample: 6 months (Hg = 28 days)

Extract: 6 months (Hg = 28 days, Sb & Sn = 7 days)

Reference: BCMELP

Appendix 2 - METHODOLOGY - Continued



Laboratory Location: ALS Environmental, Vancouver

Petroleum Hydrocarbons in Sediment/Soil (Canada-Wide Standard)

This analysis is carried out in accordance with the "Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method, Canadian Council of Ministers of the Environment, December 2000." The various extraction fractions are analysed as follows:

CWS Fractions 2, 2-PAH, 3, 3-PAH, 4 and 4G-SG:

The procedure uses an automated system at high temperature and pressure (Accelerated Solvent Extractor - ASE) or a Soxhlet system to extract a subsample of the sediment/soil with a 1:1 mixture of hexane and acetone. The extract is concentrated and undergoes a silica-gel clean-up to remove polar material. The final extract is analysed by high temperature capillary column gas chromatography with flame ionization detection (GC/FID). CWS Fractions 4G and 4G-SG (Gravimetric Heavy Hydrocarbons) are analysed gravimetrically.

Reported results may include any or all of the following:

CWS Fraction 2 (C10-16):

sum of all petroleum hydrocarbon compounds that elute between nC10 and nC16 obtained by GC/FID analysis

CWS Fraction 2-PAH:

CWS Fraction 2 (C10-16), minus selected PAH compounds (Naphthalene)

CWS Fraction 3 (C16-34):

sum of all petroleum hydrocarbon compounds that elute between nC16 and nC34 obtained by GC/FID analysis

CWS Fraction 3-PAH:

CWS Fraction 3 (C16-34), minus selected PAH compounds

CWS Fraction 4 (C34-50):

sum of all petroleum hydrocarbon compounds that elute between nC34 and nC50 obtained by GC/FID analysis

CWS Fraction 4G (GHH):

Results obtained by gravimetric analysis.

CWS Fraction 4G-SG (GHH + SG):

Results obtained by gravimetric analysis after silica gel clean-up

Recommended Holding Time:

Sample: 14 days for CWS Fractions 2, 3, 4, 4G & 4G-SG

Extract: 7 days for all CWS Fractions

Reference: CCME

Laboratory Location: ALS Environmental, Calgary

Appendix 2 - METHODOLOGY - Continued



pH in Sediment/Soil

This analysis is adapted from the methods outlined in "Soil Sampling and Methods of Analysis" (Canadian Society of Soil Science).

"Saturated Paste Extract" In summary, 200 - 500 dry grams of sample is extracted for a minimum of 4 hours with an amount of deionized water required to create a saturated paste. The resulting extract is then filtered and analysed for pH.

"Fixed Ratio Extract (e.g., 1:1, 1:5)" In summary, weigh out the appropriate amount of air-dried soil and add sufficient deionized water to achieve the desired extraction ratio and shake for 1 hour. The resulting extract is then filtered and analysed for pH.

pH analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode.

Recommended Holding Time:

Extract: asap

Reference: APHA

Laboratory Location: ALS Environmental, Calgary

Sulphide in Sediment/Soil

This analysis is carried out on a leachable basis. The procedure involves mixing the sample with a sodium hydroxide solution in a one to ten ratio and leaching for several hours. The leachate is then centrifuged and analyzed colorimetrically.

Laboratory Location: ALS Environmental, Vancouver

Glycols in Sediment/Soil

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 8015B, published by the United States Environmental Protection Agency (EPA). The procedure involves extraction of a subsample of the sediment/soil with deionized water, followed by treatment of the extract with a strong base (NaOH) and benzoyl chloride to form the corresponding benzoate esters. The benzoate esters are then extracted with hexane and the extract is analyzed by capillary column gas chromatography with flame ionization detection (FID).

Recommended Holding Time:

Sample: 14 days

Extract: 40 days

Reference: EPA

Laboratory Location: ALS Environmental, Vancouver



Volatile Organic Compounds in Sediment/Soil

This analysis involves the extraction of a subsample of the sediment/soil with methanol. Aliquots of the methanol extract are then analyzed for specific Volatile Organic Compounds (VOC) by capillary column gas chromatography with mass spectrometric detection (GC/MS). The VOC analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 8260, published by the United States Environmental Protection Agency (EPA).

Recommended Holding Time:

Sample: 7 days

Extract: 40 days

Reference: EPA

Laboratory Location: ALS Environmental, Calgary

Calculation of Total Xylenes

Total Xylenes is the sum of the concentrations of the ortho, meta, and para Xylene isomers. Results below detection limit (DL) are treated as zero. The DL for Total Xylenes is set to a value no less than the square root of the sum of the squares of the DLs of the individual Xylenes.

Laboratory Location: ALS Environmental, Vancouver

Petroleum Hydrocarbons in Sediment/Soil (Canada-Wide Standard)

This analysis is carried out in accordance with the "Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method, Canadian Council of Ministers of the Environment, December 2000." The various extraction fractions are analysed as follows:

CWS Fractions 1 and 1-BTEX:

This procedure involves the extraction of a subsample of the sediment/soil with methanol. Aliquots of the methanol extract are then analysed by capillary column gas chromatography with flame-ionization detection (GC/FID) for CWS Fraction 1, and by capillary column gas chromatography with mass spectrometric detection (GC/MS) for the BTEX compounds.

Reported results may include any or all of the following:

CWS Fraction 1 (C6-10):

sum of all petroleum hydrocarbon compounds that elute between nC6 and nC10 obtained by GC/FID analysis

CWS Fraction 1-BTEX:

CWS Fraction 1 (C6-10), minus BTEX compounds

Appendix 2 - METHODOLOGY - Continued



Recommended Holding Time:

Sample: 7 days for CWS Fraction 1

Extract: 7 days for all CWS Fractions

Reference: CCME

Laboratory Location: ALS Environmental, Calgary

Polycyclic Aromatic Hydrocarbons in Sediment/Soil

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Methods 3540, 3630 & 8270, published by the United States Environmental Protection Agency (EPA). The procedure uses a Soxhlet system to extract a subsample of the sediment/soil with a 1:1 mixture of hexane and acetone. The extract is then solvent exchanged to toluene and undergoes a silica gel clean-up to remove sample components that could potentially interfere with the analysis. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection (GC/MS).

Recommended Holding Time:

Sample: 14 days

Extract: 40 days

Reference: EPA

Laboratory Location: ALS Environmental, Calgary

Moisture in Sediment/Soil

This analysis is carried out gravimetrically by drying the sample at 103 C for a minimum of six hours.

Recommended Holding Time:

Sample: 14 days

Reference: Puget

Laboratory Location: ALS Environmental, Vancouver

pH in Soil

This analysis is carried out in accordance with U.S. EPA Method 9045 (Publ. # SW-846 3rd ed., Washington, DC 20460). The procedure involves mixing the soil in a one to one ratio with deionized/distilled water or calcium chloride solution, depending on whether the soil is considered calcareous or noncalcareous. The pH of the resulting solution is then measured with a standard pH probe.

Laboratory Location: ALS Environmental, Vancouver



Results contained within this certificate relate only to the samples as submitted.

This Certificate Of Analysis shall only be reproduced in full, except with the written approval of ALS Environmental.

End of Report



CERTIFICATE OF ANALYSIS

Date: November 8, 2005

ALS File No. R3056

Report On: Lupin A053017
ALSEQ05-272

Report To: **SNC Lavalin, Morrow Environmental**
#112, 1212 - 1st Street SE
Calgary, AB
T2G 2H8

Received: July 29, 2005

ALS ENVIRONMENTAL

per:

Monica Gibson

Monica Gibson, M.Sc. - Project Chemist
Brent Whitehead, B.Sc. - Operations Supervisor

RESULTS OF ANALYSIS - Sediment/Soil

Sample ID	TP05-77-01	TP05-77-02	TP05-77-03	TP05-78-01	TP05-78-02
Sample Date	05-07-25	05-07-25	05-07-25	05-07-25	05-07-25
ALS ID	1	2	3	4	5

Physical Tests

Moisture %	-	9.94	-	-	6.33
pH	3.36	-	-	4.00	-

Total Metals

Antimony	T-Sb	<10	-	-	<10	-
Arsenic	T-As	3210	-	-	484	-
Barium	T-Ba	158	-	-	77.3	-
Beryllium	T-Be	<0.50	-	-	<0.50	-
Cadmium	T-Cd	<0.50	-	-	<0.50	-
Chromium	T-Cr	59.4	-	-	45.3	-
Cobalt	T-Co	7.9	-	-	17.9	-
Copper	T-Cu	27.8	-	-	27.7	-
Lead	T-Pb	<30	-	-	<30	-
Mercury	T-Hg	<0.0050	-	-	<0.0050	-
Molybdenum	T-Mo	<4.0	-	-	<4.0	-
Nickel	T-Ni	30.0	-	-	29.5	-
Selenium	T-Se	<2.0	-	-	<2.0	-
Silver	T-Ag	<2.0	-	-	<2.0	-
Thallium	T-Tl	<1.0	-	-	<1.0	-
Tin	T-Sn	<5.0	-	-	<5.0	-
Vanadium	T-V	49.3	-	-	30.7	-
Zinc	T-Zn	43.7	-	-	44.4	-

CCME Hydrocarbon Fractions

F2 (C10-C16)	-	3610	-	-	35
F3 (C16-C34)	-	525	-	-	308
F4 (C34-C50)	-	<50	-	-	64
F4G-SG Required (yes/no)	-	yes	-	-	no

Particle Size

< 0.075 mm %	14.6	7.30	57.7	-	-
> 0.075 mm %	85.4	92.7	42.3	-	-

Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Sediment/Soil

Sample ID	TP05-79-01	TP05-79-02	TP05-79-03	TP05-80-02	TP05-81-01
Sample Date	05-07-25	05-07-25	05-07-25	05-07-25	05-07-25
ALS ID	6	7	8	9	10

Physical Tests

Moisture	%	-	12.7	-	12.2	-
pH		5.33	-	8.21	-	4.05

Total Metals

Antimony	T-Sb	<10	-	<10	-	<10
Arsenic	T-As	369	-	11700	-	1040
Barium	T-Ba	56.7	-	104	-	103
Beryllium	T-Be	<0.50	-	<0.50	-	<0.50
Cadmium	T-Cd	<0.50	-	<0.50	-	<0.50
Chromium	T-Cr	32.6	-	35.2	-	44.3
Cobalt	T-Co	5.5	-	7.4	-	6.5
Copper	T-Cu	17.1	-	46.1	-	26.4
Lead	T-Pb	<30	-	156	-	31
Mercury	T-Hg	<0.0050	-	<0.0050	-	0.0082
Molybdenum	T-Mo	<4.0	-	<4.0	-	<4.0
Nickel	T-Ni	25.6	-	23.9	-	23.2
Selenium	T-Se	<2.0	-	<2.0	-	<2.0
Silver	T-Ag	<2.0	-	<2.0	-	<2.0
Thallium	T-Tl	<1.0	-	<1.0	-	<1.0
Tin	T-Sn	<5.0	-	<5.0	-	<5.0
Vanadium	T-V	23.3	-	28.1	-	31.0
Zinc	T-Zn	25.6	-	30.0	-	49.5

CCME Hydrocarbon Fractions

F2 (C10-C16)	-	<30	-	2580	-
F3 (C16-C34)	-	52	-	313	-
F4 (C34-C50)	-	<50	-	<50	-
F4G-SG Required (yes/no)	-	no	-	yes	-

Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Sediment/Soil

Sample ID	TP05-81-02	TP05-82-01	TP05-83-01	TP05-84-02
Sample Date	05-07-25	05-07-25	05-07-25	05-07-25
ALS ID	11	12	13	14

Physical Tests

Moisture	%	6.10	7.54	6.60	9.76
pH		-	7.66	7.06	-

Total Metals

Antimony	T-Sb	-	10	<10	-
Arsenic	T-As	-	1100	353	-
Barium	T-Ba	-	211	60.1	-
Beryllium	T-Be	-	<0.50	<0.50	-
Cadmium	T-Cd	-	0.74	<0.50	-
Chromium	T-Cr	-	76.2	40.5	-
Cobalt	T-Co	-	16.6	6.2	-
Copper	T-Cu	-	76.0	21.9	-
Lead	T-Pb	-	55	<30	-
Mercury	T-Hg	-	0.0263	<0.0050	-
Molybdenum	T-Mo	-	4.0	<4.0	-
Nickel	T-Ni	-	52.0	20.6	-
Selenium	T-Se	-	<2.0	<2.0	-
Silver	T-Ag	-	<2.0	<2.0	-
Thallium	T-Tl	-	<1.0	<1.0	-
Tin	T-Sn	-	<5.0	<5.0	-
Vanadium	T-V	-	53.0	27.7	-
Zinc	T-Zn	-	146	45.4	-

CCME Hydrocarbon Fractions

F2 (C10-C16)	<30	<30	<30	<30
F3 (C16-C34)	<50	62	148	<50
F4 (C34-C50)	<50	<50	<50	<50
F4G-SG Required (yes/no)	no	no	no	no

Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

Appendix 1 - QUALITY CONTROL - Replicates

Sediment/Soil	TP05-82-01	TP05-82-01
	05-07-25	QC # 22397

Physical Tests

pH	7.66	7.70
----	------	------

Total Metals

Antimony	T-Sb	10	12
Arsenic	T-As	1100	1330
Barium	T-Ba	211	201
Beryllium	T-Be	<0.50	<0.50
Cadmium	T-Cd	0.74	0.63
Chromium	T-Cr	76.2	74.0
Cobalt	T-Co	16.6	16.5
Copper	T-Cu	76.0	79.0
Lead	T-Pb	55	61
Mercury	T-Hg	0.0263	0.0252
Molybdenum	T-Mo	4.0	<4.0
Nickel	T-Ni	52.0	51.1
Selenium	T-Se	<2.0	<2.0
Silver	T-Ag	<2.0	<2.0
Thallium	T-Tl	<1.0	<1.0
Tin	T-Sn	<5.0	<5.0
Vanadium	T-V	53.0	51.6
Zinc	T-Zn	146	139

Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

Appendix 1 - QUALITY CONTROL - Reference Materials

Sediment/Soil

		Result	Target	Units	DL	ALSQC#	Method
<i>NIST Montana Soil, 2711</i>							
<u>Total Metals</u>							
Antimony	T-Sb	16	19	mg/kg	10	22400	a
Antimony	T-Sb	17	19	mg/kg	10	22404	a
Arsenic	T-As	101	105	mg/kg	5	22400	a
Arsenic	T-As	90.6	105	mg/kg	5	22404	a
Barium	T-Ba	209	726	mg/kg	1	22400	a
Barium	T-Ba	196	726	mg/kg	1	22404	a
Beryllium	T-Be	1.00	0.98	mg/kg	0.5	22400	a
Beryllium	T-Be	1.01	0.98	mg/kg	0.5	22404	a
Cadmium	T-Cd	40.4	41.7	mg/kg	0.5	22400	a
Cadmium	T-Cd	39.4	41.7	mg/kg	0.5	22404	a
Chromium	T-Cr	22.5	47.0	mg/kg	2	22400	a
Chromium	T-Cr	22.5	47.0	mg/kg	2	22404	a
Cobalt	T-Co	7.9	10.0	mg/kg	2	22400	a
Cobalt	T-Co	7.6	10.0	mg/kg	2	22404	a
Copper	T-Cu	114	114	mg/kg	1	22400	a
Copper	T-Cu	107	114	mg/kg	1	22404	a
Lead	T-Pb	1160	1160	mg/kg	50	22400	a
Lead	T-Pb	1100	1160	mg/kg	50	22404	a
Mercury	T-Hg	4.99	6.25	mg/kg	0.05	22117	b
Mercury	T-Hg	6.29	6.25	mg/kg	0.05	22414	b
Molybdenum	T-Mo	<4.0	<4.0	mg/kg	4	22400	a
Molybdenum	T-Mo	<4.0	<4.0	mg/kg	4	22404	a
Nickel	T-Ni	15.3	20.6	mg/kg	5	22400	a
Nickel	T-Ni	15.2	20.6	mg/kg	5	22404	a
Selenium	T-Se	<2.0	<2.0	mg/kg	2	22400	a
Selenium	T-Se	<2.0	<2.0	mg/kg	2	22404	a
Silver	T-Ag	4.3	4.6	mg/kg	2	22400	a
Silver	T-Ag	4.4	4.6	mg/kg	2	22404	a
Thallium	T-Tl	<10	<10	mg/kg	10	22400	a
Thallium	T-Tl	<10	<10	mg/kg	10	22404	a
Thallium	T-Tl	1.7	2.5	mg/kg	1	22408	c
Thallium	T-Tl	1.8	2.5	mg/kg	1	22411	c
Tin	T-Sn	<10	<10	mg/kg	10	22400	a
Tin	T-Sn	<10	<10	mg/kg	10	22404	a

Methods:a = CSR/HCl-HNO₃/ICPOESb = CSR/HCl-HNO₃/CVAFS

c = SM__CSR_ICPMS

**Appendix 1 - QUALITY CONTROL - Reference Materials**

Sediment/Soil

		Result	Target	Units	DL	ALSQC#	Method
<i>NIST Montana Soil, 2711</i>							
<u>Total Metals</u>							
Vanadium	T-V	51.5	81.6	mg/kg	2	22400	a
Vanadium	T-V	45.6	81.6	mg/kg	2	22404	a
Zinc	T-Zn	330	350	mg/kg	1	22400	a
Zinc	T-Zn	315	350	mg/kg	1	22404	a
<i>CANMET Till Reference Material, TILL-1</i>							
<u>Total Metals</u>							
Antimony	T-Sb	<10	<10	mg/kg	10	22401	a
Antimony	T-Sb	<10	<10	mg/kg	10	22405	a
Arsenic	T-As	17.8	18.0	mg/kg	5	22401	a
Arsenic	T-As	17.5	18.0	mg/kg	5	22405	a
Barium	T-Ba	89.5	702	mg/kg	1	22401	a
Barium	T-Ba	85.8	702	mg/kg	1	22405	a
Beryllium	T-Be	0.50	2.40	mg/kg	0.5	22401	a
Beryllium	T-Be	0.51	2.40	mg/kg	0.5	22405	a
Cadmium	T-Cd	0.51	<0.50	mg/kg	0.5	22401	a
Cadmium	T-Cd	0.55	<0.50	mg/kg	0.5	22405	a
Chromium	T-Cr	29.6	65.0	mg/kg	2	22401	a
Chromium	T-Cr	29.1	65.0	mg/kg	2	22405	a
Cobalt	T-Co	12.6	18.0	mg/kg	2	22401	a
Cobalt	T-Co	12.5	18.0	mg/kg	2	22405	a
Copper	T-Cu	48.3	47.0	mg/kg	1	22401	a
Copper	T-Cu	46.5	47.0	mg/kg	1	22405	a
Lead	T-Pb	<50	<50	mg/kg	50	22401	a
Lead	T-Pb	<50	<50	mg/kg	50	22405	a
Mercury	T-Hg	0.079	0.095	mg/kg	0.05	22116	b
Mercury	T-Hg	0.102	0.095	mg/kg	0.05	22415	b
Molybdenum	T-Mo	<4.0	<4.0	mg/kg	4	22401	a
Molybdenum	T-Mo	<4.0	<4.0	mg/kg	4	22405	a
Nickel	T-Ni	16.8	24.0	mg/kg	5	22401	a
Nickel	T-Ni	17.0	24.0	mg/kg	5	22405	a
Selenium	T-Se	<2.0	2.0	mg/kg	2	22401	a
Selenium	T-Se	<2.0	2.0	mg/kg	2	22405	a

Methods:a = CSR/HCl-HNO₃/ICPOESb = CSR/HCl-HNO₃/CVAFS

Appendix 1 - QUALITY CONTROL - Reference Materials

Sediment/Soil

		Result	Target	Units	DL	ALSQC#	Method
<i>CANMET Till Reference Material, TILL-1</i>							
<u>Total Metals</u>							
Silver	T-Ag	<2.0	<2.0	mg/kg	2	22401	a
Silver	T-Ag	<2.0	<2.0	mg/kg	2	22405	a
Thallium	T-Tl	<10	10	mg/kg	10	22401	a
Thallium	T-Tl	<10	10	mg/kg	10	22405	a
Tin	T-Sn	<5.0	5.0	mg/kg	5	22401	a
Tin	T-Sn	<5.0	5.0	mg/kg	5	22405	a
Vanadium	T-V	62.1	99.0	mg/kg	2	22401	a
Vanadium	T-V	57.1	99.0	mg/kg	2	22405	a
Zinc	T-Zn	71.8	98.0	mg/kg	1	22401	a
Zinc	T-Zn	70.3	98.0	mg/kg	1	22405	a
<i>ALS Environmental RM Soil, ARM-1</i>							
<u>CCME Hydrocarbon Fractions</u>							
F2 (C10-C16)		3420	2410	mg/kg	30	21957	b
F3 (C16-C34)		3220	3420	mg/kg	50	21957	b
F4 (C34-C50)		1060	1280	mg/kg	50	21957	b

Methods:a = CSR/HCl-HNO₃/ICPOES

b = Soxhlet/GC-FID

Appendix 1 - QUALITY CONTROL - Blanks

Sediment/Soil

		Result	Target	Units	DL	ALSQC#	Method
Total Metals							
Antimony	T-Sb	<10	<10	mg/kg	10	22398	a
Antimony	T-Sb	<10	<10	mg/kg	10	22399	a
Antimony	T-Sb	<10	<10	mg/kg	10	22402	a
Antimony	T-Sb	<10	<10	mg/kg	10	22403	a
Arsenic	T-As	<5.0	<5.0	mg/kg	5	22398	a
Arsenic	T-As	<5.0	<5.0	mg/kg	5	22399	a
Arsenic	T-As	<5.0	<5.0	mg/kg	5	22402	a
Arsenic	T-As	<5.0	<5.0	mg/kg	5	22403	a
Barium	T-Ba	<1.0	<1.0	mg/kg	1	22398	a
Barium	T-Ba	<1.0	<1.0	mg/kg	1	22399	a
Barium	T-Ba	<1.0	<1.0	mg/kg	1	22402	a
Barium	T-Ba	<1.0	<1.0	mg/kg	1	22403	a
Beryllium	T-Be	<0.50	<0.50	mg/kg	0.5	22398	a
Beryllium	T-Be	<0.50	<0.50	mg/kg	0.5	22399	a
Beryllium	T-Be	<0.50	<0.50	mg/kg	0.5	22402	a
Beryllium	T-Be	<0.50	<0.50	mg/kg	0.5	22403	a
Cadmium	T-Cd	<0.50	<0.50	mg/kg	0.5	22398	a
Cadmium	T-Cd	<0.50	<0.50	mg/kg	0.5	22399	a
Cadmium	T-Cd	<0.50	<0.50	mg/kg	0.5	22402	a
Cadmium	T-Cd	<0.50	<0.50	mg/kg	0.5	22403	a
Chromium	T-Cr	<2.0	<2.0	mg/kg	2	22398	a
Chromium	T-Cr	<2.0	<2.0	mg/kg	2	22399	a
Chromium	T-Cr	<2.0	<2.0	mg/kg	2	22402	a
Chromium	T-Cr	<2.0	<2.0	mg/kg	2	22403	a
Cobalt	T-Co	<2.0	<2.0	mg/kg	2	22398	a
Cobalt	T-Co	<2.0	<2.0	mg/kg	2	22399	a
Cobalt	T-Co	<2.0	<2.0	mg/kg	2	22402	a
Cobalt	T-Co	<2.0	<2.0	mg/kg	2	22403	a
Copper	T-Cu	<1.0	<1.0	mg/kg	1	22398	a
Copper	T-Cu	<1.0	<1.0	mg/kg	1	22399	a
Copper	T-Cu	<1.0	<1.0	mg/kg	1	22402	a
Copper	T-Cu	<1.0	<1.0	mg/kg	1	22403	a
Lead	T-Pb	<50	<50	mg/kg	50	22398	a
Lead	T-Pb	<50	<50	mg/kg	50	22399	a
Lead	T-Pb	<50	<50	mg/kg	50	22402	a
Lead	T-Pb	<50	<50	mg/kg	50	22403	a

Methods:a = CSR/HCl-HNO₃/ICPOES

Appendix 1 - QUALITY CONTROL - Blanks

Sediment/Soil

		Result	Target	Units	DL	ALSQC#	Method
Total Metals							
Mercury	T-Hg	<0.050	<0.050	mg/kg	0.05	22115	a
Mercury	T-Hg	<0.050	<0.050	mg/kg	0.05	22412	a
Mercury	T-Hg	<0.050	<0.050	mg/kg	0.05	22413	a
Molybdenum	T-Mo	<4.0	<4.0	mg/kg	4	22398	b
Molybdenum	T-Mo	<4.0	<4.0	mg/kg	4	22399	b
Molybdenum	T-Mo	<4.0	<4.0	mg/kg	4	22402	b
Molybdenum	T-Mo	<4.0	<4.0	mg/kg	4	22403	b
Nickel	T-Ni	<5.0	<5.0	mg/kg	5	22398	b
Nickel	T-Ni	<5.0	<5.0	mg/kg	5	22399	b
Nickel	T-Ni	<5.0	<5.0	mg/kg	5	22402	b
Nickel	T-Ni	<5.0	<5.0	mg/kg	5	22403	b
Selenium	T-Se	<2.0	<2.0	mg/kg	2	22398	b
Selenium	T-Se	<2.0	<2.0	mg/kg	2	22399	b
Selenium	T-Se	<2.0	<2.0	mg/kg	2	22402	b
Selenium	T-Se	<2.0	<2.0	mg/kg	2	22403	b
Silver	T-Ag	<2.0	<2.0	mg/kg	2	22398	b
Silver	T-Ag	<2.0	<2.0	mg/kg	2	22399	b
Silver	T-Ag	<2.0	<2.0	mg/kg	2	22402	b
Silver	T-Ag	<2.0	<2.0	mg/kg	2	22403	b
Thallium	T-Tl	<10	<10	mg/kg	10	22398	b
Thallium	T-Tl	<10	<10	mg/kg	10	22399	b
Thallium	T-Tl	<10	<10	mg/kg	10	22402	b
Thallium	T-Tl	<10	<10	mg/kg	10	22403	b
Thallium	T-Tl	<1.0	<1.0	mg/kg	1	22406	c
Thallium	T-Tl	<1.0	<1.0	mg/kg	1	22407	c
Thallium	T-Tl	<1.0	<1.0	mg/kg	1	22409	c
Thallium	T-Tl	<1.0	<1.0	mg/kg	1	22410	c
Tin	T-Sn	<5.0	<5.0	mg/kg	5	22398	b
Tin	T-Sn	<5.0	<5.0	mg/kg	5	22399	b
Tin	T-Sn	<5.0	<5.0	mg/kg	5	22402	b
Tin	T-Sn	<5.0	<5.0	mg/kg	5	22403	b
Vanadium	T-V	<2.0	<2.0	mg/kg	2	22398	b
Vanadium	T-V	<2.0	<2.0	mg/kg	2	22399	b
Vanadium	T-V	<2.0	<2.0	mg/kg	2	22402	b
Vanadium	T-V	<2.0	<2.0	mg/kg	2	22403	b
Zinc	T-Zn	<1.0	<1.0	mg/kg	1	22398	b

Methods:a = CSR/HCl-HNO₃/CVAFSb = CSR/HCl-HNO₃/ICPOES

c = SM__CSR_ICPMS

Appendix 1 - QUALITY CONTROL - Blanks

Sediment/Soil

		Result	Target	Units	DL	ALSQC#	Method
<u>Total Metals</u>							
Zinc	T-Zn	<1.0	<1.0	mg/kg	1	22399	a
Zinc	T-Zn	<1.0	<1.0	mg/kg	1	22402	a
Zinc	T-Zn	<1.0	<1.0	mg/kg	1	22403	a
<u>Extractable Hydrocarbons</u>							
F2 (C10-C16)		<30	<30	mg/kg	30	21956	b
F3 (C16-C34)		<50	<50	mg/kg	50	21956	b
F4 (C34-C50)		<50	<50	mg/kg	50	21956	b

Methods:a = CSR/HCl-HNO₃/ICPOES

b = Soxhlet/GC-FID

Bold Targets indicate uncertified targets

Appendix 2 - METHODOLOGY



Outlines of the methodologies utilized for the analysis of the samples submitted are as follows

pH in Soil

This analysis is carried out in accordance with procedures described in "Soil Sampling and Methods of Analysis" (CSSS). The procedure involves mixing the air-dried sample with deionized/distilled water. The pH of the solution is then measured using a standard pH probe. A one to two ratio of sediment to water is used for mineral soils and a one to ten ratio is used for highly organic soils.

Laboratory Location: ALS Environmental, Vancouver

Metals in Sediment/Soil

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B or Method 3051, United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by either hotplate or block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by atomic absorption/fluorescence spectrophotometry (EPA Method 7000 series), inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B), and/or inductively coupled plasma - mass spectrometry (EPA Method 6020).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

Recommended Holding Time:

Sample: 6 months (Hg = 28 days)

Extract: 6 months (Hg = 28 days, Sb & Sn = 7 days)

Reference: BCMELP

Laboratory Location: ALS Environmental, Vancouver

Sediment/Soil Particle Size Distribution

This analysis is carried out in accordance with Canadian Society of Soil Science and Iowa Department of Transportation I.M. 306. The procedure involves oven-drying a representative subsample which is then passed through all requested sieves. Particle size is determined as the percentage of a sample that is greater than and less than the requested sieve sizes.

Recommended Holding Time:



Appendix 2 - METHODOLOGY - Continued

Sample: not applicable

Reference: Canadian Society of Soil Science and IDT IM

Laboratory Location: ALS Environmental, Calgary

Moisture in Sediment/Soil

This analysis is carried out gravimetrically by drying the sample at 103 C for a minimum of six hours.

Recommended Holding Time:

Sample: 14 days

Reference: Puget

Laboratory Location: ALS Environmental, Calgary

Petroleum Hydrocarbons in Sediment/Soil (Canada-Wide Standard)

This analysis is carried out in accordance with the "Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil - Tier 1 Method, Canadian Council of Ministers of the Environment, December 2000." The various extraction fractions are analysed as follows:

CWS Fractions 2, 2-PAH, 3, 3-PAH, 4 and 4G-SG:

The procedure uses an automated system at high temperature and pressure (Accelerated Solvent Extractor - ASE) or a Soxhlet system to extract a subsample of the sediment/soil with a 1:1 mixture of hexane and acetone. The extract is concentrated and undergoes a silica-gel clean-up to remove polar material. The final extract is analysed by high temperature capillary column gas chromatography with flame ionization detection (GC/FID). CWS Fractions 4G and 4G-SG (Gravimetric Heavy Hydrocarbons) are analysed gravimetrically.

Reported results may include any or all of the following:

CWS Fraction 2 (C10-16):

sum of all petroleum hydrocarbon compounds that elute between nC10 and nC16 obtained by GC/FID analysis

CWS Fraction 2-PAH:

CWS Fraction 2 (C10-16), minus selected PAH compounds (Naphthalene)

CWS Fraction 3 (C16-34):

sum of all petroleum hydrocarbon compounds that elute between nC16 and nC34 obtained by GC/FID analysis

CWS Fraction 3-PAH:

CWS Fraction 3 (C16-34), minus selected PAH compounds

CWS Fraction 4 (C34-50):

sum of all petroleum hydrocarbon compounds that elute between nC34 and nC50 obtained by GC/FID analysis



Appendix 2 - METHODOLOGY - Continued

CWS Fraction 4G (GHH):

Results obtained by gravimetric analysis.

CWS Fraction 4G-SG (GHH + SG):

Results obtained by gravimetric analysis after silica gel clean-up

Recommended Holding Time:

Sample: 14 days for CWS Fractions 2, 3, 4, 4G & 4G-SG

Extract: 7 days for all CWS Fractions

Reference: CCME

Laboratory Location: ALS Environmental, Calgary

Results contained within this certificate relate only to the samples as submitted.

This Certificate Of Analysis shall only be reproduced in full, except with the written approval of ALS Environmental.

End of Report



CERTIFICATE OF ANALYSIS

Date: October 7, 2005

ALS File No. CC500213

Report On: Lupin Gold Mine A053017
Soil Samples

Report To: **Kinross Gold**
c/o SNC Lavalin, Morrow Environ.
#112 - 1212 1st St. SE
Calgary, AB
T3G 2H8

Attention: **Mr. Neil Sandstrom**

Received: September 23, 2005

ALS ENVIRONMENTAL

per:

Monica Gibson

Monica Gibson, M.Sc. - Project Chemist
Brent Whitehead, B.Sc. - Operations Supervisor

**RESULTS OF ANALYSIS - Sediment/Soil**

Sample ID	A053017-51161	A053017-51162	A053017-51163	A053017-51164	A053017-51165
Sample Date	05-09-19	05-09-19	05-09-19	05-09-19	05-09-19
ALS ID	1	2	3	4	5

Physical Tests

pH	4.32	3.89	6.30	5.43	3.61
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Total Metals

Antimony	T-Sb	<10	<10	<10	<10
Arsenic	T-As	128	443	351	27.2
Barium	T-Ba	61.1	111	61.4	40.2
Beryllium	T-Be	<0.50	<0.50	<0.50	<0.50
Cadmium	T-Cd	<0.50	<0.50	<0.50	<0.50
Chromium	T-Cr	35.3	49.3	33.9	29.5
Cobalt	T-Co	6.0	6.7	5.8	4.2
Copper	T-Cu	17.5	24.1	15.1	12.1
Lead	T-Pb	<30	<30	<30	<30
Mercury	T-Hg	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum	T-Mo	<4.0	<4.0	<4.0	<4.0
Nickel	T-Ni	20.9	25.0	24.3	15.4
Selenium	T-Se	<2.0	<2.0	<2.0	<2.0
Silver	T-Ag	<2.0	<2.0	<2.0	<2.0
Thallium	T-Tl	<1.0	<1.0	<1.0	<1.0
Tin	T-Sn	<5.0	<5.0	<5.0	<5.0
Vanadium	T-V	24.5	33.3	23.3	22.1
Zinc	T-Zn	27.2	36.4	26.6	21.3

Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

RESULTS OF ANALYSIS - Sediment/Soil

Sample ID	A053017-51166	A053017-51167	A053017-51168	A053014-51169	A053017-51170
Sample Date	05-09-19	05-09-19	05-09-19	05-09-19	05-09-19
ALS ID	6	7	8	9	10

Physical Tests

pH	3.62	4.26	3.93	4.07	5.57
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Total Metals

Antimony	T-Sb	<10	<10	<10	<10
Arsenic	T-As	426	62.1	144	93.5
Barium	T-Ba	64.8	39.7	44.7	42.4
Beryllium	T-Be	<0.50	<0.50	<0.50	<0.50
Cadmium	T-Cd	<0.50	<0.50	<0.50	<0.50
Chromium	T-Cr	41.0	31.8	32.4	29.9
Cobalt	T-Co	5.4	5.1	5.4	3.8
Copper	T-Cu	16.0	12.9	16.8	12.7
Lead	T-Pb	<30	<30	<30	<30
Mercury	T-Hg	<0.0050	<0.0050	<0.0050	<0.0050
Molybdenum	T-Mo	<4.0	<4.0	<4.0	<4.0
Nickel	T-Ni	20.9	16.4	19.4	14.2
Selenium	T-Se	<2.0	<2.0	<2.0	<2.0
Silver	T-Ag	<2.0	<2.0	<2.0	<2.0
Thallium	T-Tl	<1.0	<1.0	<1.0	<1.0
Tin	T-Sn	<5.0	<5.0	<5.0	<5.0
Vanadium	T-V	27.4	24.9	25.1	21.1
Zinc	T-Zn	29.5	24.1	25.8	19.0

Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

Appendix 1 - QUALITY CONTROL - Replicates

Sediment/Soil	A053017- 51167	A053017- 51167
	05-09-19	QC # 25928

Total Metals

Antimony	T-Sb	<10	<10
Arsenic	T-As	62.1	52.8
Barium	T-Ba	39.7	39.3
Beryllium	T-Be	<0.50	<0.50
Cadmium	T-Cd	<0.50	<0.50
Chromium	T-Cr	31.8	30.2
Cobalt	T-Co	5.1	4.8
Copper	T-Cu	12.9	10.4
Lead	T-Pb	<30	<30
Mercury	T-Hg	<0.0050	<0.0050
Molybdenum	T-Mo	<4.0	<4.0
Nickel	T-Ni	16.4	16.1
Selenium	T-Se	<2.0	<2.0
Silver	T-Ag	<2.0	<2.0
Thallium	T-Tl	<1.0	<1.0
Tin	T-Sn	<5.0	<5.0
Vanadium	T-V	24.9	21.8
Zinc	T-Zn	24.1	22.3

Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.

**Appendix 1 - QUALITY CONTROL - Reference Materials**

Sediment/Soil

		Result	Target	Units	DL	ALSQC#	Method
<i>NIST Montana Soil, 2711</i>							
<u>Total Metals</u>							
Antimony	T-Sb	16	19	mg/kg	10	25934	a
Arsenic	T-As	100	105	mg/kg	5	25934	a
Barium	T-Ba	204	726	mg/kg	1	25934	a
Beryllium	T-Be	0.97	0.98	mg/kg	0.5	25934	a
Cadmium	T-Cd	40.1	41.7	mg/kg	0.5	25934	a
Chromium	T-Cr	22.3	47.0	mg/kg	2	25934	a
Cobalt	T-Co	8.1	10.0	mg/kg	2	25934	a
Copper	T-Cu	114	114	mg/kg	1	25934	a
Lead	T-Pb	1160	1160	mg/kg	50	25934	a
Mercury	T-Hg	6.32	6.25	mg/kg	0.05	25926	b
Molybdenum	T-Mo	<4.0	<4.0	mg/kg	4	25934	a
Nickel	T-Ni	16.0	20.6	mg/kg	5	25934	a
Selenium	T-Se	<2.0	<2.0	mg/kg	2	25934	a
Silver	T-Ag	4.7	4.6	mg/kg	2	25934	a
Thallium	T-Tl	1.8	2.5	mg/kg	1	25931	c
Thallium	T-Tl	<10	<10	mg/kg	10	25934	a
Tin	T-Sn	<10	<10	mg/kg	10	25934	a
Vanadium	T-V	48.7	81.6	mg/kg	2	25934	a
Zinc	T-Zn	325	350	mg/kg	1	25934	a

CANMET Till Reference Material, TILL-1

<u>Total Metals</u>							
Antimony	T-Sb	<10	<10	mg/kg	10	25935	a
Arsenic	T-As	17.1	18.0	mg/kg	5	25935	a
Barium	T-Ba	90.4	702	mg/kg	1	25935	a
Beryllium	T-Be	<0.50	2.40	mg/kg	0.5	25935	a
Cadmium	T-Cd	<0.50	<0.50	mg/kg	0.5	25935	a
Chromium	T-Cr	30.3	65.0	mg/kg	2	25935	a
Cobalt	T-Co	13.3	18.0	mg/kg	2	25935	a
Copper	T-Cu	49.9	47.0	mg/kg	1	25935	a
Lead	T-Pb	<50	<50	mg/kg	50	25935	a
Mercury	T-Hg	0.102	0.095	mg/kg	0.05	25927	b
Molybdenum	T-Mo	<4.0	<4.0	mg/kg	4	25935	a

Methods:a = CSR/HCl-HNO₃/ICPOESb = CSR/HCl-HNO₃/CVAFS

c = SM__CSR_ICPMS

Appendix 1 - QUALITY CONTROL - Reference Materials

Sediment/Soil

		Result	Target	Units	DL	ALSQC#	Method
<i>CANMET Till Reference Material, TILL-1</i>							
<u>Total Metals</u>							
Nickel	T-Ni	17.9	24.0	mg/kg	5	25935	a
Selenium	T-Se	<2.0	2.0	mg/kg	2	25935	a
Silver	T-Ag	<2.0	<2.0	mg/kg	2	25935	a
Thallium	T-Tl	<10	10	mg/kg	10	25935	a
Tin	T-Sn	<5.0	5.0	mg/kg	5	25935	a
Vanadium	T-V	64.1	99.0	mg/kg	2	25935	a
Zinc	T-Zn	72.3	98.0	mg/kg	1	25935	a

Methods:a = CSR/HCl-HNO₃/ICPOES

**Appendix 1 - QUALITY CONTROL - Blanks**

Sediment/Soil

		Result	Target	Units	DL	ALSQC#	Method
Total Metals							
Antimony	T-Sb	<10	<10	mg/kg	10	25932	a
Antimony	T-Sb	<10	<10	mg/kg	10	25933	a
Arsenic	T-As	<5.0	<5.0	mg/kg	5	25932	a
Arsenic	T-As	<5.0	<5.0	mg/kg	5	25933	a
Barium	T-Ba	<1.0	<1.0	mg/kg	1	25932	a
Barium	T-Ba	<1.0	<1.0	mg/kg	1	25933	a
Beryllium	T-Be	<0.50	<0.50	mg/kg	0.5	25932	a
Beryllium	T-Be	<0.50	<0.50	mg/kg	0.5	25933	a
Cadmium	T-Cd	<0.50	<0.50	mg/kg	0.5	25932	a
Cadmium	T-Cd	<0.50	<0.50	mg/kg	0.5	25933	a
Chromium	T-Cr	<2.0	<2.0	mg/kg	2	25932	a
Chromium	T-Cr	<2.0	<2.0	mg/kg	2	25933	a
Cobalt	T-Co	<2.0	<2.0	mg/kg	2	25932	a
Cobalt	T-Co	<2.0	<2.0	mg/kg	2	25933	a
Copper	T-Cu	<1.0	<1.0	mg/kg	1	25932	a
Copper	T-Cu	<1.0	<1.0	mg/kg	1	25933	a
Lead	T-Pb	<50	<50	mg/kg	50	25932	a
Lead	T-Pb	<50	<50	mg/kg	50	25933	a
Mercury	T-Hg	<0.050	<0.050	mg/kg	0.05	25924	b
Mercury	T-Hg	<0.050	<0.050	mg/kg	0.05	25925	b
Molybdenum	T-Mo	<4.0	<4.0	mg/kg	4	25932	a
Molybdenum	T-Mo	<4.0	<4.0	mg/kg	4	25933	a
Nickel	T-Ni	<5.0	<5.0	mg/kg	5	25932	a
Nickel	T-Ni	<5.0	<5.0	mg/kg	5	25933	a
Selenium	T-Se	<2.0	<2.0	mg/kg	2	25932	a
Selenium	T-Se	<2.0	<2.0	mg/kg	2	25933	a
Silver	T-Ag	<2.0	<2.0	mg/kg	2	25932	a
Silver	T-Ag	<2.0	<2.0	mg/kg	2	25933	a
Thallium	T-Tl	<1.0	<1.0	mg/kg	1	25929	c
Thallium	T-Tl	<1.0	<1.0	mg/kg	1	25930	c
Thallium	T-Tl	<10	<10	mg/kg	10	25932	a
Thallium	T-Tl	<10	<10	mg/kg	10	25933	a
Tin	T-Sn	<5.0	<5.0	mg/kg	5	25932	a
Tin	T-Sn	<5.0	<5.0	mg/kg	5	25933	a
Vanadium	T-V	<2.0	<2.0	mg/kg	2	25932	a
Vanadium	T-V	<2.0	<2.0	mg/kg	2	25933	a

Methods:a = CSR/HCl-HNO₃/ICPOESb = CSR/HCl-HNO₃/CVAFS

c = SM__CSR_ICPMS

Appendix 1 - QUALITY CONTROL - Blanks

Sediment/Soil

		Result	Target	Units	DL	ALSQC#	Method
Total Metals							
Zinc	T-Zn	<1.0	<1.0	mg/kg	1	25932	a
Zinc	T-Zn	<1.0	<1.0	mg/kg	1	25933	a

Methods:a = CSR/HCl-HNO₃/ICPOES

Bold Targets indicate uncertified targets



Appendix 2 - METHODOLOGY

Outlines of the methodologies utilized for the analysis of the samples submitted are as follows

pH in Soil

This analysis is carried out in accordance with procedures described in "Soil Sampling and Methods of Analysis" (CSSS). The procedure involves mixing the air-dried sample with deionized/distilled water. The pH of the solution is then measured using a standard pH probe. A one to two ratio of sediment to water is used for mineral soils and a one to ten ratio is used for highly organic soils.

Laboratory Location: ALS Environmental, Vancouver

Metals in Sediment/Soil

This analysis is carried out using procedures from CSR Analytical Method 8 "Strong Acid Leachable Metals (SALM) in Soil", BC Ministry of Environment, Lands and Parks, 26 June 2001, and procedures adapted from "Test Methods for Evaluating Solid Waste", SW-846 Method 3050B or Method 3051, United States Environmental Protection Agency (EPA). The sample is manually homogenized, dried at 60 degrees Celsius, sieved through a 2 mm (10 mesh) sieve, and a representative subsample of the dry material is weighed. The sample is then digested at 90 degrees Celsius for 2 hours by either hotplate or block digester using a 1:1 ratio of concentrated nitric and hydrochloric acids. Instrumental analysis is by atomic absorption/fluorescence spectrophotometry (EPA Method 7000 series), inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B), and/or inductively coupled plasma - mass spectrometry (EPA Method 6020).

Method Limitation: This method is not a total digestion technique. It is a very strong acid digestion that is intended to dissolve those metals that may be environmentally available. By design, elements bound in silicate structures are not normally dissolved by this procedure as they are not usually mobile in the environment.

Recommended Holding Time:

Sample: 6 months (Hg = 28 days)

Extract: 6 months (Hg = 28 days, Sb & Sn = 7 days)

Reference: BCMELP

Laboratory Location: ALS Environmental, Vancouver

Results contained within this certificate relate only to the samples as submitted.

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End of Report