

Intersoil Limited
Suite 30, 58 Low Friar Street
Newcastle,
NE1 5UE
TEL 01670 515566
FAX 01670 515577

Date: 13 June 2013
Ref: issue 13024/amd2

Ms. Forsyth
Suncroft
Station Road
Warkworth

Land at the rear of Suncroft

Commission

Intersoil was commissioned to undertake an environmental investigation of part of a former quarry and backfilled tip (termed the 'old tip') at the rear (north) of Suncroft, located off Station Road, Warkworth. The site comprises rough ground, woodland and a small workshop.

Purpose

The purpose of the investigation was to provide basic environmental information on the content of the old tip.

Scope

The scope comprised sinking two exploratory boreholes, the installation of soil gas standpipes and subsequent environmental testing of soils and gas monitoring.

Fieldwork

Two lightweight percussion boreholes were undertaken using a mini-rig. Fieldwork was undertaken on the 24th April 2013. Boreholes were planned to extend to 5m. A number of disturbed samples were taken at metre intervals from each borehole. A number of in-situ Standard Penetration Tests (SPT's) were undertaken at metre intervals. Boreholes extended to 5m in Borehole 4 and 4.2m in Borehole 5.

Ground Conditions

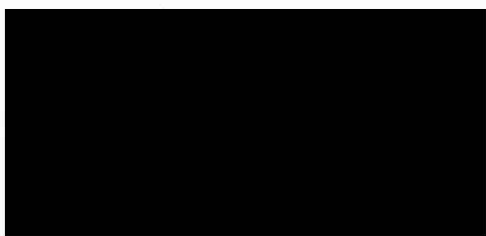
Made ground comprising ashy gravel with brick rubble, glass, clinker, slate and a little plastic was noted in both locations. It extended from surface to 4.8m in Borehole 4 and to the base (4.2m) of Borehole 5. Firm brown poorly laminated clay was noted between 4.8 and 5m depth in Borehole 4.

Installations

Standpipes were installed in each borehole. Slotted pipe was 3m in length and 50mm in diameter. The standpipes were surrounded by pea gravel and the annulus sealed by bentonite pellets. A gas tap was placed at the top of each pipe and marked by plastic headworks.

In-Situ Testing

The results of the SPT testing recorded values between N1 and N5. No progress was possible beyond 4.2m in Borehole 5.



Intersoil Limited
Suite 30, 58 Low Friar Street
Newcastle,
NE1 5UE
TEL 01670 515566
FAX 01670 515577

Soils Analysis

Three samples of ashy fill underwent testing by Chemtech (reported in Certificate 48007). The samples were scheduled for a range of heavy metals, phenol, cyanide, water soluble sulphate, sulphides, acidity, organic content and hydrocarbons (total petroleum hydrocarbons – TPH and polycyclic aromatic hydrocarbons - PAH). The results are appended.

Leaching

A leaching test was undertaken on the soil sample containing the highest arsenic concentration. The sample underwent analysis for a range of heavy metals and PAH hydrocarbon. The results are appended.

Soil Gas Monitoring

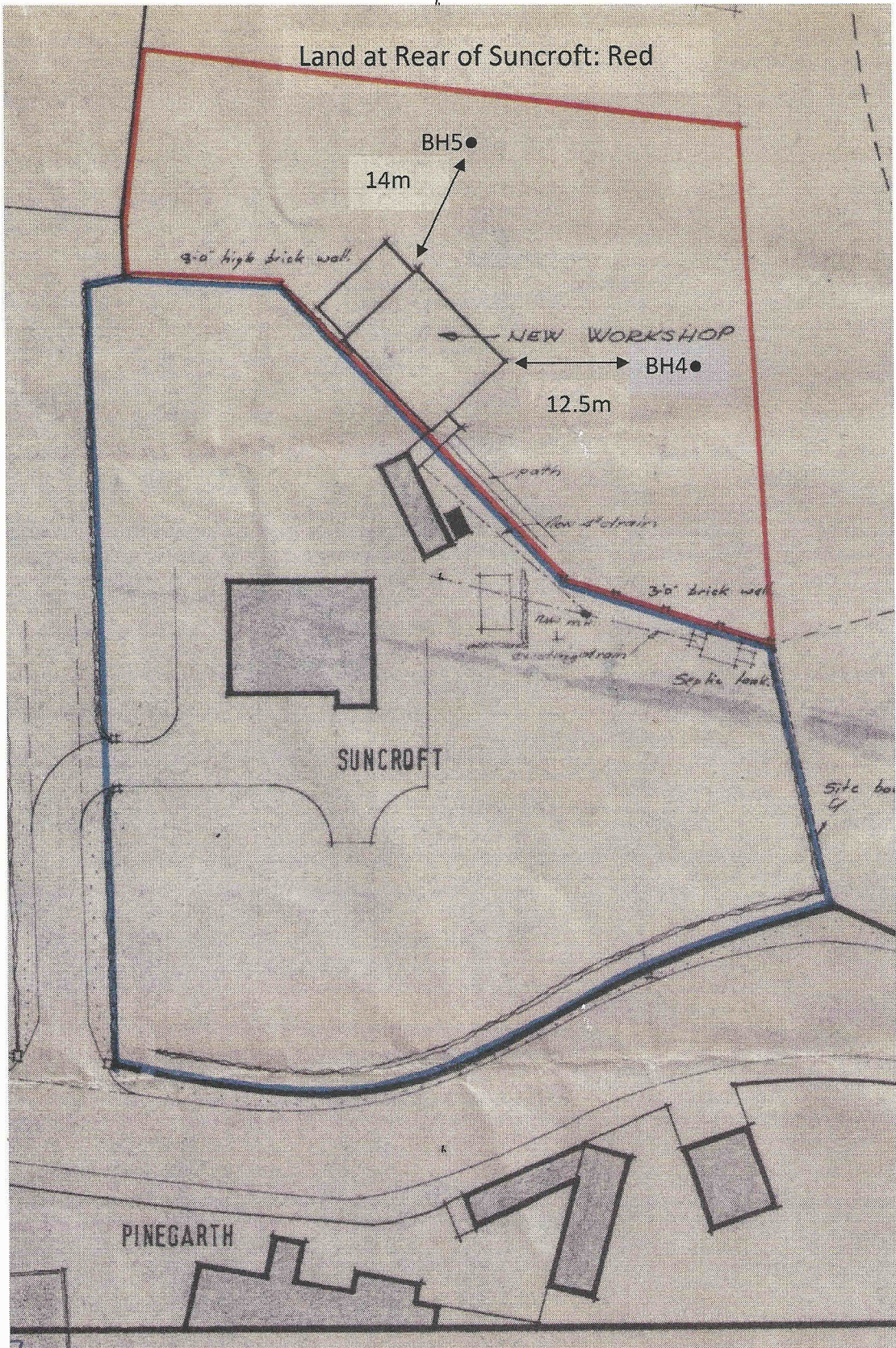
Six soil gas surveys have been undertaken. Monitoring was undertaken using a Gasdata LMS portable meter. The meter underwent its factory calibration in early May 2013. No methane was detected. Carbon dioxide was a little elevated at times and reached a maximum of 7.4% on the 24th May 2013. Oxygen concentrations dropped to a low of 16.1% on the 24th May. No maintained positive flow was recorded during the surveys. However some minor fluctuation in flow was recorded periodically. The results are appended.

Groundwater

No groundwater was recorded during boring. No groundwater was recorded in the standpipes during monitoring.

Intersoil Ltd

Enc:
Borehole Locations
Borehole Logs
Gas Results
Soil Analysis Results



BOREHOLE LOG

Project suncroft warkworth				BOREHOLE No BH4	
Job No 13032	Date 24-04-13	Ground Level (m)	Co-Ordinates ()		
Contractor INTERSOIL				Sheet 1 of 1	

SAMPLES & TESTS			STRATA					Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION		
0.30	D						MADE GROUND loose grey and grey black ash, with clinker, little glass, slate, brick, plastic gravel		
0.80	D								
1.00	SPT	N2							
1.80	D								
2.00	SPT	N2							
2.80	D					(4.80)			
3.00	SPT	N1							
3.80	D								
4.00	SPT	N5							
4.80	D					4.80			
						5.00	Firm brown sandy laminated CLAY		

AGS3 UK BH WARKWORTH SUNCROFT.GPJ AGS 3_1.GDT 14/6/13

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											PIPE TO 3M DRY

All dimensions in metres Scale 1:34.375	Client Forsyth	Method/ Plant Used	Logged By AM
--	-------------------	-----------------------	-----------------

BOREHOLE LOG

Project suncroft warkworth				BOREHOLE No BH5	
Job No 13032	Date 24-04-13	Ground Level (m)	Co-Ordinates ()		
Contractor INTERSOIL				Sheet 1 of 1	

SAMPLES & TESTS			STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)		
0.30	D					(0.60)	MADE GROUND grey brown clay fill with brick rubble and sandstone cobble and gravel. little ash.	
0.80	D					0.60	MADE GROUND Very loose grey and grey black, grey brown ash and clinker, brick rubble, glass, slate, plastic	
1.00	SPT	N1						
1.80	D						terminated early on obstruction at 4.2m	
2.80	D					(3.60)		
3.00	SPT	N3						
3.80	D							
4.00	SPT	40/200mm				4.20		

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											PIPE TO 3M DRY

All dimensions in metres Scale 1:34.375	Client Forsyth	Method/ Plant Used	Logged By AM
--	----------------	-----------------------	-----------------

AGS3 UK BH WARKWORTH SUNCROFT.GPJ AGS 3 1.GDI 14/6/13



ANALYTICAL TEST REPORT

Contract no: 48007
Contract name: Suncroft, Warkworth
Client reference: -
Clients name: Intersoil
Clients address: Suite 30
58 Low Friar Street
Newcastle Upon Tyne
NE1 5UE
Samples received: 29 April 2013
Analysis started: 29 April 2013
Analysis completed: 07 May 2013
Report issued: 07 May 2013

Notes: Opinions and interpretations expressed herein are outside the UKAS accreditation scope. Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling. Methods, procedures and performance data are available on request. Results reported herein relate only to the material supplied to the laboratory. This report shall not be reproduced except in full, without prior written approval. Samples will be disposed of 6 weeks from initial receipt unless otherwise instructed.

Key: U UKAS accredited test
M MCERTS & UKAS accredited test
\$ Test carried out by an approved subcontractor
I/S Insufficient sample to carry out test
N/S Sample not suitable for testing

Approved by:



Karan Campbell
Director

John Campbell
Director

Chemtech Environmental Limited

SAMPLE INFORMATION

MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

All results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.
Analytical results are exclusive of stones.

Lab ref	Sample id	Depth (m)	Soil description passing 2mm sieve	Description of material retained on 2mm sieve	% Retained on 2mm sieve	Moisture (%)
48007-1	BH 4	0.30-0.50	Loamy Sandy Clay	Stones, Slag, Gravel & Glass	49.4	26.6
48007-2	BH 4	1.80-2.00	Loamy Sandy Clay	Slag & Gravel	36.8	23.0
48007-3	BH 5	0.80-1.00	Loamy Sandy Clay	Stones, Glass & Gravel	55.5	18.5

Chemtech Environmental Limited

SOILS

Lab number	48007-1	48007-2	48007-3		
Sample id	BH 4	BH 4	BH 5		
Depth (m)	0.30-0.50	1.80-2.00	0.80-1.00		
Date sampled	24/04/2013	24/04/2013	24/04/2013		
Test	Method	Units			
Antimony (total)	CE058	mg/kg Sb	15	14	17
Arsenic (total)	CE054 ^M	mg/kg As	52	75	58
Cadmium (total)	CE054 ^M	mg/kg Cd	<0.2	<0.2	0.4
Chromium (total)	CE054 ^M	mg/kg Cr	54	48	58
Chromium (VI)	CE050	mg/kg CrVI	<1	<1	<1
Copper (total)	CE054 ^M	mg/kg Cu	187	608	249
Iron (total)	CE054 ^M	mg/kg Fe	126500	150200	179800
Lead (total)	CE054 ^M	mg/kg Pb	861	393	251
Mercury (total)	CE054	mg/kg Hg	<0.5	<0.5	<0.5
Nickel (total)	CE054 ^M	mg/kg Ni	135	135	156
Zinc (total)	CE054 ^M	mg/kg Zn	346	899	382
pH	CE004 ^M	units	6.7	7.4	8.0
Sulphate (2:1 water soluble)	CE061 ^M	mg/l SO ₄	53	1706	92
Sulphide	CE079	mg/kg S ²⁻	<10	<10	<10
Cyanide (free)	CE077	mg/kg CN	<2	<2	<2
Cyanide (total)	CE077	mg/kg CN	<2	<2	<2
Phenols (total)	CE078	mg/kg PhOH	<0.5	<0.5	<0.5
Organic matter content (OMC)	CE005 ^M	% w/w	5.72	3.27	4.80
PAH					
Naphthalene	CE087	mg/kg	<0.1	<0.1	<0.1
Acenaphthylene	CE087	mg/kg	<0.1	<0.1	<0.1
Acenaphthene	CE087	mg/kg	<0.1	<0.1	<0.1
Fluorene	CE087	mg/kg	<0.1	<0.1	<0.1
Phenanthrene	CE087	mg/kg	0.4	<0.1	0.2
Anthracene	CE087	mg/kg	<0.1	<0.1	<0.1
Fluoranthene	CE087	mg/kg	0.4	<0.1	0.2
Pyrene	CE087	mg/kg	0.4	<0.1	0.2
Benzo(a)anthracene	CE087	mg/kg	<0.1	<0.1	<0.1
Chrysene	CE087	mg/kg	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	CE087	mg/kg	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	CE087	mg/kg	<0.1	<0.1	<0.1
Benzo(a)pyrene	CE087	mg/kg	<0.1	<0.1	<0.1
Indeno(123cd)pyrene	CE087	mg/kg	<0.1	<0.1	<0.1
Dibenz(ah)anthracene	CE087	mg/kg	<0.1	<0.1	<0.1
Benzo(ghi)perylene	CE087	mg/kg	<0.1	<0.1	<0.1
PAH (total)	CE087	mg/kg	<5	<5	<5
TPH					
TPH Aromatic EC5-EC7	CE068	mg/kg	<0.01	<0.01	<0.01
TPH Aromatic EC7-EC8	CE068	mg/kg	<0.01	<0.01	<0.01
TPH Aromatic EC8-EC10	CE068	mg/kg	<0.01	<0.01	<0.01
TPH Aromatic EC10-EC12	CE068	mg/kg	<1	<1	<1

48007

Suncroft, Warkworth

Chemtech Environmental Limited

SOILS

Lab number			48007-1	48007-2	48007-3
Sample id			BH 4	BH 4	BH 5
Depth (m)			0.30-0.50	1.80-2.00	0.80-1.00
Date sampled			24/04/2013	24/04/2013	24/04/2013
Test	Method	Units			
TPH Aromatic EC12-EC16	CE068	mg/kg	<1	<1	<1
TPH Aromatic EC16-EC21	CE068	mg/kg	1	<1	<1
TPH Aromatic EC21-EC35	CE068	mg/kg	<1	<1	<1
TPH Aromatic EC35-EC44	CE068	mg/kg	<1	<1	<1
TPH Aliphatic EC5-EC6	CE068	mg/kg	<0.1	<0.1	<0.1
TPH Aliphatic EC6-EC8	CE068	mg/kg	<0.1	<0.1	<0.1
TPH Aliphatic EC8-EC10	CE068	mg/kg	0.2	0.1	0.2
TPH Aliphatic EC10-EC12	CE068	mg/kg	2	3	<1
TPH Aliphatic EC12-EC16	CE068	mg/kg	6	4	5
TPH Aliphatic EC16-EC35	CE068	mg/kg	185	52	40
TPH Aliphatic EC35-EC44	CE068	mg/kg	21	9	6

Chemtech Environmental Limited

LEACHATES

Lab number			48007-2L
Sample id			BH 4
Depth (m)			1.80-2.00
Test	Method	Units	
Aluminium (dissolved)	CE055 ^u	mg/l Al	<0.03
Antimony (dissolved)	CE058	mg/l Sb	<0.001
Arsenic (dissolved)	CE055	mg/l As	<0.001
Cadmium (dissolved)	CE055 ^u	mg/l Cd	<0.001
Chromium (dissolved)	CE055 ^u	mg/l Cr	<0.003
Copper (dissolved)	CE055 ^u	mg/l Cu	<0.004
Lead (dissolved)	CE055 ^u	mg/l Pb	<0.009
Mercury (dissolved)	CE055	mg/l Hg	<0.001
Nickel (dissolved)	CE055 ^u	mg/l Ni	0.045
Zinc (dissolved)	CE055 ^u	mg/l Zn	0.092
PAHs			
Naphthalene	CE087	mg/l	<0.0001
Acenaphthylene	CE087	mg/l	<0.0001
Acenaphthene	CE087	mg/l	<0.0001
Fluorene	CE087	mg/l	<0.0001
Phenanthrene	CE087	mg/l	<0.0001
Anthracene	CE087	mg/l	<0.0001
Fluoranthene	CE087	mg/l	<0.0001
Pyrene	CE087	mg/l	<0.0001
Benzo(a)anthracene	CE087	mg/l	<0.0001
Chrysene	CE087	mg/l	<0.0001
Benzo(b)fluoranthene	CE087	mg/l	<0.0001
Benzo(k)fluoranthene	CE087	mg/l	<0.0001
Benzo(a)pyrene	CE087	mg/l	<0.0001
Indeno(123cd)pyrene	CE087	mg/l	<0.0001
Dibenz(ah)anthracene	CE087	mg/l	<0.0001
Benzo(ghi)perylene	CE087	mg/l	<0.0001
PAH (total)	CE087	mg/l	<0.0001

Chemtech Environmental Limited

METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE058	Antimony (total)	Aqua regia digest, ICP-OES	Dry		1	mg/kg Sb
CE054	Arsenic (total)	Aqua regia digest, ICP-OES	Dry	M	1	mg/kg As
CE054	Cadmium (total)	Aqua regia digest, ICP-OES	Dry	M	0.2	mg/kg Cd
CE054	Chromium (total)	Aqua regia digest, ICP-OES	Dry	M	1	mg/kg Cr
CE050	Chromium (VI)	Acid extraction, Colorimetry	Dry		1	mg/kg CrVI
CE054	Copper (total)	Aqua regia digest, ICP-OES	Dry	M	1	mg/kg Cu
CE054	Iron (total)	Aqua regia digest, ICP-OES	Dry	M	20	mg/kg Fe
CE054	Lead (total)	Aqua regia digest, ICP-OES	Dry	M	1	mg/kg Pb
CE054	Mercury (total)	Aqua regia digest, ICP-OES	Dry		0.5	mg/kg Hg
CE054	Nickel (total)	Aqua regia digest, ICP-OES	Dry	M	1	mg/kg Ni
CE054	Zinc (total)	Aqua regia digest, ICP-OES	Dry	M	3	mg/kg Zn
CE004	pH	Based on BS 1377, pH Meter	Wet	M	-	units
CE061	Sulphate (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry	M	10	mg/l SO ₄
CE079	Sulphide	Extraction, Continuous Flow Colorimetry	Wet		10	mg/kg S ²⁻
CE077	Cyanide (free)	Extraction, Continuous Flow Colorimetry	Wet		2	mg/kg CN
CE077	Cyanide (total)	Extraction, Continuous Flow Colorimetry	Wet		2	mg/kg CN
CE078	Phenols (total)	Extraction, Continuous Flow Colorimetry	Wet		0.5	mg/kg PhOH
CE005	Organic matter content (OMC)	Based on BS 1377, Colorimetry	Dry	M	0.01	% w/w
CE087	PAH (speciated)	Solvent extraction, GC-MS	Wet		0.1	mg/kg
CE087	PAH (total)	Solvent extraction, GC-MS	Wet		5	mg/kg
CE068	TPH Aliphatic/Aromatic fractions (C5-C10)	Headspace GC-FID	Wet		0.01-0.1	mg/kg
CE068	TPH Aliphatic/Aromatic fractions (C10-C44)	Solvent extraction, GC-FID	Wet		1	mg/kg

Chemtech Environmental Limited

METHOD DETAILS

METHOD	LEACHATES	METHOD SUMMARY	STATUS	LOD	UNITS
CE055	Aluminium (dissolved)	ICP-OES	U	0.03	mg/l Al
CE058	Antimony (dissolved)	ICP-OES		0.001	mg/l Sb
CE059	Arsenic (dissolved)	ICP-OES		0.001	mg/l As
CE055	Cadmium (dissolved)	ICP-OES	U	0.001	mg/l Cd
CE055	Chromium (dissolved)	ICP-OES	U	0.003	mg/l Cr
CE055	Copper (dissolved)	ICP-OES	U	0.004	mg/l Cu
CE055	Lead (dissolved)	ICP-OES	U	0.009	mg/l Pb
CE055	Mercury (dissolved)	ICP-OES		0.001	mg/l Hg
CE055	Nickel (dissolved)	ICP-OES	U	0.002	mg/l Ni
CE055	Zinc (dissolved)	ICP-OES	U	0.020	mg/l Zn
CE087	PAH (speciated)	Solvent extraction, GC-MS		0.0001	mg/l
CE087	PAH (total)	Solvent extraction, GC-MS		0.0001	mg/l

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

- N No (not deviating sample)
- Y Yes (deviating sample)
- A Sampling date not provided
- B Sampling time not provided (waters only)
- C Sample exceeded holding time(s)
- D Sample not received in appropriate containers
- E Headspace present in sample container
- F Sample not chemically fixed (where appropriate)
- G Sample not cooled
- H Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
48007-1	BH 4	0.30-0.50	Y	TPH C5-C10 (D,E)
48007-2	BH 4	1.80-2.00	Y	TPH C5-C10 (D,E)
48007-3	BH 5	0.80-1.00	Y	TPH C5-C10 (D,E)

intersoil.co.uk

REAR SUNCROFT (TIP)

Operation

Date

Start Atmos. Press.

End Atmos Press.

Conditions

1

SOIL GAS SURVEY

27-Apr-13

1015 MILLIBARS

1015 MILLIBARS

cool dry

NOTES

- 1) nmf=no maintained flow
- 2) positive flow rate fluctuated during readings
- 3) Gasdata LM1 used: Next calibration due May 2013

NIM = not measured

Readings are % volume

LOCATION	CH4 - %LEL	CH4-%VOL	CO2	O2	Flow(l/hr)	Water (mbgl)	comments
BH4	0	0	1.5	19.9	nmf	dry to 4m base	
BH5	0	0	0.4	20.8	nmf	dry to 2.3m base	

intersoil.co.uk

REAR SUNCROFT (TIP)

Operation

Date

Start Atmos. Press.

End Atmos Press.

Conditions

2

SOIL GAS SURVEY

17-May-13

1005 MILLIBARS

1005 MILLIBARS

cool dry

NOTES

- 1) nmf=no maintained flow
- 2) positive flow rate fluctuated during readings
- 3) Gasdata LM1 used: Next calibration due May 2014

NIM = not measured

Readings are % volume

LOCATION	CH4 - %LEL	CH4-%VOL	CO2	O2	Flow(l/hr)	Water (mbgl)	comments
BH4	0	0	0.4	19.8	nmf	dry to 4m base	
BH5	0	0	0.2	19.6	max 0.3l/hr	dry to 2.3m base	
					fluctuating		

intersoil.co.uk

REAR SUNCROFT (TIP)

Operation

3 SOIL GAS SURVEY

NOTES

Date

23-May-13

Start Atmos. Press.

1009 MILLIBARS

End Atmos Press.

1009 MILLIBARS

Conditions

sun breezy

- 1) nmf=no maintained flow
- 2) positive flow rate fluctuated during readings
- 3) Gasdata LM1 used: Next calibration due May 2014

NM = not measured

Readings are % volume

LOCATION	CH4 - %LEL	CH4-%VOL	CO2	O2	Flow(l/hr)	Water (mbgl)	comments
BH4	0	0	3.6	17.5	max 0.3	dry to 4m base	
BH5	0	0	3.6	16.8	flow -2.7 to 1.8 fluc.	dry to 2.3m	

intersoil.co.uk

REAR SUNCROFT (TIP)

Operation

4 SOIL GAS SURVEY

NOTES

Date

24-May-13

Start Atmos. Press.

1011 MILLIBARS

End Atmos Press.

1011 MILLIBARS

Conditions

Cool dry

- 1) nmf=no maintained flow
- 2) positive flow rate fluctuated during readings
- 3) Gasdata LM1 used: Next calibration due May 2014

NM = not measured

Readings are % volume

LOCATION	CH4 - %LEL	CH4-%VOL	CO2	O2	Flow(l/hr)	Water (mbgl)	comments
BH4	0	0	3.7	16.9	max 0.4	dry	
BH5	0	0	7.4	16.1	max 0.3 fluc.	dry	

intersoil.co.uk

REAR SUNCROFT (TIP)

Operation

Date

Start Atmos. Press.

End Atmos Press.

Conditions

5

SOIL GAS SURVEY

04-Jun-13

1030 MILLIBARS

1030 MILLIBARS

dry

NOTES

- 1) nmf=no maintained flow
 - 2) positive flow rate fluctuated during readings
 - 3) Gasdata LM1 used: Next calibration due May 2014
- NM = not measured

Readings are % volume

LOCATION	CH4 - %LEL	CH4-%VOL	CO2	O2	Flow(l/hr)	Water (mbgl)	comments
BH4	0	0	0.6	19.8	nmf	dry	
BH5	0	0	2.3	16.1	nmf	dry	

intersoil.co.uk

REAR SUNCROFT (TIP)

Operation

Date

Start Atmos. Press.

End Atmos Press.

Conditions

6

SOIL GAS SURVEY

13-Jun-13

998 MILLIBARS

998 MILLIBARS

dry. Mild

NOTES

- 1) nmf=no maintained flow
 - 2) positive flow rate fluctuated during readings
 - 3) Gasdata LM1 used: Next calibration due May 2014
- NM = not measured

Readings are % volume

LOCATION	CH4 - %LEL	CH4-%VOL	CO2	O2	Flow(l/hr)	Water (mbgl)	comments
BH4	0	0	0	20.4	max 0.1	dry	
BH5	0	0	0.2	19.8	max 0.1	dry	
					fluc.		