

**Report No. 1203919/P2**

**TEST RESULTS**

**APPENDIX I I**

**Client: Hull Bulk Handling Limited**

**HULL BULK HANDLING,  
QUEEN ELIZABETH DOCK, HULL**

Accreditation Codes: N (Not Accredited), U (UKAS), UM (UKAS & MCERTS)
Tests marked 'M' have been subcontracted to another laboratory.
(NVM) - denotes the sample matrix is dissimilar to matrices upon which the MCERTS validation was based.
All results are reported on a dry weight basis at 105°C unless otherwise stated. (except GC samples)
ESG accepts no responsibility for any sampling not carried out by our personnel.

On behalf of Andrew Timms
ESG:
Operations Manager
Date of Issue: 18-Apr-2012

- Table 1 Main Analysis Results (Pages 2 to 3)
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The following tables are contained in this report:
The 8 samples described in this report were registered for analysis by ESG on 05-Apr-2012. This report supersedes any versions previously issued by the laboratory.
The analysis was completed by: 18-Apr-2012
Tests where the accreditation is set to N or No, and any individual data items marked with a " are not UKAS or MCERTS accredited. Any options or interpretations expressed herein are outside the scope of any UKAS accreditation held by ESG.

Site: Hull Bulk Handling

Analytical Geotechnics
Fairfield House
1 Fairfield Street
Bingham
Nottinghamshire
NG13 8FB

Report No. EFS/123299M (Ver. 1)

TEST REPORT
SOIL SAMPLE ANALYSIS





Method Code		Method Reporting Limit	Units	Sample Date	Client Sample Description	LAB ID Number
BH-01	1.00	2.63	%		BH-01 1.00	1260195
BH-10	1.10	6.59	%		BH-10 1.10	1260199
BH-12	0.00-0.50	40.9	mg/kg		BH-12 0.00-0.50	1260200
BH-12	0.00-0.50	23.7	mg/kg		BH-12 0.00-0.50	1260202
BH-2	4.00	1.49	mg/kg		BH-2 4.00	1260196
BH-2	9.00-1.00	0.73	mg/kg		BH-2 9.00-1.00	1260201
BH-2	0.50-1.00	3.64	mg/kg		BH-2 0.50-1.00	1260197
BH-8	0.10-0.80	3.46	mg/kg		BH-8 0.10-0.80	1260198
<b>Client Name:</b> Analytical Geotechnics <b>Contact:</b> Mr J Davies <b>Soil Sample Analysis</b>						
<b>Client Sample Description</b>						
<b>Method Reporting Limits:</b> APC: 0.02 FOCs: 0.01 WIS: 0.01 % Moisture: 0.01						
<b>Units:</b> Moisture: % FOCs: % WIS: % % Moisture: %						
<b>Soil Sample Analysis</b> Date Printed: 19-Apr-2012 Report Number: EFS/12329M Table Number: 1						

Method Code		Method Reporting Limit	Units	Sample Date	Client Sample Description	LAB ID Number
BH-01	1.00	39.00	mg/kg		BH-01 1.00	1260195
BH-10	1.10	36.10	mg/kg		BH-10 1.10	1260199
BH-12	0.00-0.50	23.40	mg/kg		BH-12 0.00-0.50	1260200
BH-12	0.00-0.50	14.5	mg/kg		BH-12 0.00-0.50	1260202
BH-2	4.00	16.7	mg/kg		BH-2 4.00	1260196
BH-2	9.00-1.00	11.50	mg/kg		BH-2 9.00-1.00	1260201
BH-2	0.50-1.00	5.10	mg/kg		BH-2 0.50-1.00	1260197
BH-8	0.10-0.80	14.80	mg/kg		BH-8 0.10-0.80	1260198
<b>Client Name:</b> Analytical Geotechnics <b>Contact:</b> Mr J Davies <b>Soil Sample Analysis</b>						
<b>Client Sample Description</b>						
<b>Method Reporting Limits:</b> APC: 0.02 FOCs: 0.01 WIS: 0.01 % Moisture: 0.01						
<b>Units:</b> TPH by GC/MS (AR/E): mg/kg TPH by GC/MS (AR): mg/kg Total Chlorine @ 1.00C: mg/kg P Nitro Index (AR): mg/kg Oxychloride (AR): mg/kg pH Units (AR): mg/kg Zinc (MS): mg/kg Selenium (MS): mg/kg Nickel (MS): mg/kg Mercury (MS): mg/kg Lead (MS): mg/kg Copper (MS): mg/kg Chromium (S): mg/kg Cadmium (MS): mg/kg Arsenic (MS): mg/kg Total Chlorine @ 1.00C: mg/kg						
<b>Soil Sample Analysis</b> Date Printed: 19-Apr-2012 Report Number: EFS/12329M Table Number: 1						

# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

Customer and Site Details:  
 Sample Details:  
 LIMS ID Number:  
 QC Batch Number:  
 Quantitation File:  
 Directory:  
 Dilution:

Analytical Geotechnics: Hull Bulk Handling  
 BH01 1.00  
 CL1260195  
 120357  
 Initial Calibration  
 1712MSS.PAH  
 1.0

Job Number:  
 Date Booked in:  
 Date Extracted:  
 Date Analysed:  
 Matrix:  
 Ext Method:

S12\_3299M  
 05-Apr-12  
 17-Apr-12  
 17-Apr-12  
 Soil  
 Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	-	< 0.09	-	UM
Acenaphthylene	208-96-8	-	< 0.09	-	U
Acenaphthene	83-32-9	-	< 0.09	-	UM
Fluorene	86-73-7	-	< 0.09	-	UM
Phenanthrene	85-01-8	6.13	0.50	98	UM
Anthracene	120-12-7	6.19	0.13	98	U
Fluoranthene	206-44-0	7.55	1.01	98	UM
Pyrene	129-00-0	7.84	0.93	98	UM
Benzo[a]anthracene	56-55-3	9.57	0.55	93	UM
Chrysene	218-01-9	9.62	0.50	96	UM
Benzo[b]fluoranthene	205-99-2	11.13	0.67	93	UM
Benzo[k]fluoranthene	207-08-9	11.16	0.21	92	UM
Benzo[a]pyrene	50-32-8	11.57	0.51	99	UM
Indeno[1,2,3-cd]pyrene	193-39-5	13.00	0.39	93	UM
Dibenz[a,h]anthracene	53-70-3	13.03	0.10	89	UM
Benzo[ghi]perylene	191-24-2	13.36	0.30	97	UM
Total (USEPA16) PAHs	-	-	< 6.07	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area	Surrogates	% Rec
1,4-Dichlorobenzene-d4	NA	Nitrobenzene-d5	NA
Naphthalene-d8	98	2-Fluorobiphenyl	101
Acenaphthene-d10	99	Terphenyl-d14	112
Phenanthrene-d10	97		
Chrysene-d12	115		
Perylene-d12	131		

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

## Customer and Site Details:

Analytical Geotechnics: Hull Bulk Handling  
 Job Number: S12\_3299M  
 Date Booked in: 05-Apr-12  
 Date Extracted: 17-Apr-12  
 Date Analysed: 17-Apr-12  
 Matrix: Soil  
 Ext Method: Ultrasonic  
 Initial Calibration: 1712MS5.PAH  
 Job Number: BH2 4.00  
 Date Booked in: CL1260196  
 Date Extracted: 120357  
 Initial Calibration: 1712MS5.PAH  
 Job Number: 1.0  
 Dilution: 1.0

## Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
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Naphthalene	91-20-3	-	< 0.12	-	UM
Acenaphthylene	208-96-8	-	< 0.12	-	U
Acenaphthene	83-32-9	-	< 0.12	-	UM
Fluorene	86-73-7	-	< 0.12	-	UM
Phenanthrene	85-01-8	6.13	0.22	97	UM
Anthracene	120-12-7	-	< 0.12	-	U
Fluoranthene	206-44-0	7.55	0.40	98	UM
Pyrene	129-00-0	7.85	0.35	99	UM
Benz[a]anthracene	56-55-3	9.57	0.22	94	UM
Chrysene	218-01-9	9.62	0.17	96	UM
Benz[b]fluoranthene	205-99-2	11.13	0.23	96	UM
Benz[k]fluoranthene	207-08-9	-	< 0.12	-	UM
Benz[a]pyrene	50-32-8	11.57	0.16	94	UM
Indeno[1,2,3-cd]pyrene	193-39-5	13.01	0.12	80	UM
Dibenz[a,h]anthracene	53-70-3	-	< 0.12	-	UM
Benzo[ghi]perylene	191-24-2	-	< 0.12	-	UM
Total (USEPA16) PAHs	-	-	> 2.78	-	N

"M" denotes that % fit has been manually interpreted

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	99
Tetraphenyl-d14	108

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	101
Acenaphthene-d10	100
Phenanthrene-d10	98
Chrysene-d12	106
Perylene-d12	116

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

**Customer and Site Details:**

Analytical Geotechnics: Hull Bulk Handling  
 Job Number: BHS 0.50-1.00  
 Date Booked in: CL1260197  
 Date Extracted: 120357  
 Date Analysed: 1712MS5.PAH-  
 Matrix: 1.0  
 Ext Method: Ultrasonic  
 Soil  
 S12\_3299M  
 05-Apr-12  
 17-Apr-12  
 17-Apr-12

Sample Details:  
 LIMS ID Number:  
 GC Batch Number:  
 Quantitation File:  
 Directory:  
 Dilution:

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	3.62	0.14	98	UM
Acenaphthylene	208-96-8	-	< 0.09	-	U
Acenaphthene	83-32-9	-	< 0.09	-	UM
Fluorene	86-73-7	-	< 0.09	-	UM
Phenanthrene	85-01-8	-	< 0.09	-	UM
Anthracene	120-12-7	-	< 0.09	-	U
Fluoranthene	206-44-0	-	< 0.09	-	UM
Pyrene	129-00-0	-	< 0.09	-	UM
Benz[a]anthracene	56-55-3	-	< 0.09	-	UM
Chrysene	218-01-9	-	< 0.09	-	UM
Benz[b]fluoranthene	205-99-2	-	< 0.09	-	UM
Benz[k]fluoranthene	207-08-9	-	< 0.09	-	UM
Benz[a]pyrene	50-32-8	-	< 0.09	-	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.09	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.09	-	UM
Benzo[g,h,i]perylene	191-24-2	-	< 0.09	-	UM
Total (USEPA16) PAHs	-	-	< 1.48	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area	Surrogates	% Rec
1,4-Dichlorobenzene-d4	NA	Nitrobenzene-d5	NA
Naphthalene-d8	99	2-Fluorobiphenyl	100
Acenaphthene-d10	97	Terphenyl-d14	105
Phenanthrene-d10	97		
Chrysene-d12	107		
Perylene-d12	120		

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

Customer and Site Details: Analytical Geotechnics: Hull Bulk Handling Job Number: S12\_329M  
 Sample Details: BH8 0.10-0.80 CL1260198 Date Booked in: 05-Apr-12  
 LIMS ID Number: 120357 Date Extracted: 17-Apr-12  
 QC Batch Number: Initial Calibration 1712MS5.PAH Dilution: 1.0  
 Directory: 1712MS5.PAH Matrix: Soil  
 Quantitation File: 120357 Date Analysed: 17-Apr-12  
 Ext Method: Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	3.62	0.50	97	UM
Acenaphthylene	208-96-8	-	< 0.09	-	U
Acenaphthene	83-32-9	4.81	0.16	98	UM
Fluorene	86-73-7	5.22	0.14	96	UM
Phenanthrene	85-01-8	6.13	1.34	98	UM
Anthracene	120-12-7	6.18	0.38	92	U
Fluoranthene	206-44-0	7.54	3.38	98	UM
Pyrene	129-00-0	7.84	3.88	99	UM
Benzo[a]anthracene	56-55-3	9.57	1.76	95	UM
Chrysene	218-01-9	9.62	1.26	96	UM
Benzo[b]fluoranthene	205-99-2	11.13	3.73	99	UM
Benzo[k]fluoranthene	207-09-9	11.16	1.03	99	UM
Benzo[a]pyrene	50-32-8	11.57	3.27	98	UM
Indeno[1,2,3-cd]pyrene	193-39-5	13.01	2.44	100	UM
Dibenz[a,h]anthracene	53-70-3	13.03	0.51	93	UM
Benzo[ghi]perylene	191-24-2	13.37	2.03	97	UM
Total (USEPA16) PAHs	-	-	> 25.93	-	N

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area	Surrogates	% Rec
1,4-Dichlorobenzene-d4	NA	Nitrobenzene-d5	NA
Naphthalene-d8	100	2-Fluorobiphenyl	100
Acenaphthene-d10	102	Terphenyl-d14	112
Phenanthrene-d10	104		
Chrysene-d12	130		
Perylene-d12	154		

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.



## Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

**Customer and Site Details:** Analytical Geotechnics: Hull Bulk Handling Job Number: S12\_3299M  
 BH10 1.10 Date Booked in: 05-Apr-12  
 CL1260199 Date Extracted: 17-Apr-12  
 120357 Date Analyzed: 17-Apr-12  
 Initial Calibration 1712MS5.PA1A Matrix: Soil  
 Directory: 1.0 Ext Method: Ultrasonic  
 Dilution: 1.0

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	3.62	0.27	96	UM
Acenaphthylene	208-96-8	4.68	0.09	92	U
Acenaphthene	83-32-9	4.81	0.20	100	UM
Fluorene	86-73-7	5.22	0.27	97	UM
Phenanthrene	85-01-8	6.13	3.25	99	UM
Anthracene	120-12-7	6.18	1.11	97	U
Fluoranthene	206-44-0	7.54	7.59	98	UM
Pyrene	129-00-0	7.84	6.40	99	UM
Benzo[a]anthracene	56-55-3	9.57	4.87	99	UM
Chrysene	218-01-9	9.62	4.43	97	UM
Benzo[b]fluoranthene	205-99-2	11.13	5.77	99	UM
Benzo[k]fluoranthene	207-08-9	11.16	1.73	98	UM
Benzo[a]pyrene	50-32-8	11.57	4.53	96	UM
Indeno[1,2,3-cd]pyrene	193-39-5	13.01	3.49	98	UM
Dibenzo[a,h]anthracene	53-70-3	13.03	0.93	99	UM
Benzo[ghi]perylene	191-24-2	13.36	2.34	96	UM
Total (USEPA16) PAHs	-	-	47.28	-	N

\*M\* denotes that % fit has been manually interpreted

Internal Standards	% Area	Surrogates	% Rec
1,4-Dichlorobenzene-d4	NA	Nitrobenzene-d5	NA
Naphthalene-d8	100	2-Fluorobiphenyl	96
Acenaphthene-d10	102	Terphenyl-d14	107
Phenanthrene-d10	105		
Chrysene-d12	130		
Perylene-d12	152		

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.



# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

**Customer and Site Details:**  
 Sample Details: BH12 0.00-0.50  
 LIMS ID Number: CL1260200  
 QC Batch Number: 120357  
 Quantitation File: Initial Calibration  
 Directory: 1712MS5.PAH

**Analytical Geotechnics: Hull Bulk Handling**  
 Job Number: S12\_3299M  
 Date Booked in: 05-Apr-12  
 Date Extracted: 17-Apr-12  
 Date Analysed: 17-Apr-12  
 Matrix: Soil  
 Ext Method: Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	3.62	0.67	97	UM
Acenaphthylene	208-96-8	-	< 0.10	-	U
Acenaphthene	83-32-9	4.81	0.10	89	UM
Fluorene	86-73-7	5.22	0.18	88	UM
Phenanthrene	85-01-8	6.13	1.70	98	UM
Anthracene	120-12-7	6.19	0.39	98	U
Fluoranthene	206-44-0	7.54	2.24	98	UM
Pyrene	129-00-0	7.84	2.00	98	UM
Benzo[a]anthracene	56-55-3	9.57	1.37	98	UM
Chrysene	218-01-9	9.62	1.28	99	UM
Benzo[b]fluoranthene	205-99-2	11.13	1.79	98	UM
Benzo[k]fluoranthene	207-08-9	11.16	0.52	98	UM
Benzo[a]pyrene	50-32-8	11.57	1.28	98	UM
Indeno[1,2,3-cd]pyrene	193-39-5	13.01	1.09	99	UM
Dibenzo[a,h]anthracene	53-70-3	13.03	0.32	87	UM
Benzo[ghi]perylene	191-24-2	13.36	0.93	97	UM
Total (USEPA16) PAHs	-	-	< 15.94	-	N

\*M\* denotes that % fit has been manually interpreted

Internal Standards	% Area	Surrogates	% Rec
1,4-Dichlorobenzene-d4	NA	Nitrobenzene-d5	NA
Naphthalene-d8	101	2-Fluorobiphenyl	96
Acenaphthene-d10	104	Terphenyl-d14	107
Phenanthrene-d10	107		
Chrysene-d12	128		
Perylene-d12	150		

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

Customer and Site Details:  
 Sample ID Number: BHZ7,9 0.00-1.00  
 LIMS ID Number: CL1260201  
 QC Batch Number: 120357  
 Quantitation File: Initial Calibration  
 Directory: 1712MS5.PAH  
 Dilution: 1.0

Analytical Geotechnics: Hull Bulk Handling  
 Job Number: S12\_3299M  
 Date Booked in: 05-Apr-12  
 Date Extracted: 17-Apr-12  
 Date Analysed: 17-Apr-12  
 Matrix: Soil  
 Ext Method: Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
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Naphthalene	91-20-3	-	< 0.09	-	UM
Acenaphthylene	208-96-8	-	< 0.09	-	U
Acenaphthene	83-32-9	-	< 0.09	-	UM
Fluorene	86-73-7	-	< 0.09	-	UM
Phenanthrene	85-01-8	-	< 0.09	-	UM
Anthracene	120-12-7	-	< 0.09	-	U
Fluoranthene	206-44-0	-	< 0.09	-	UM
Pyrene	129-00-0	-	< 0.09	-	UM
Benzo[a]anthracene	56-55-3	-	< 0.09	-	UM
Chrysene	218-01-9	-	< 0.09	-	UM
Benzo[b]fluoranthene	205-99-2	-	< 0.09	-	UM
Benzo[k]fluoranthene	207-08-9	-	< 0.09	-	UM
Benzo[a]pyrene	50-32-8	-	< 0.09	-	UM
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.09	-	UM
Dibenzo[a,h]anthracene	53-70-3	-	< 0.09	-	UM
Benzo[g,h,i]perylene	191-24-2	-	< 0.09	-	UM
Coronene	191-07-1*	-	< 0.09	-	N
Total (USEPA16) PAHs	-	-	> 1.49	-	N

\* Denotes compound is not UKAS accredited  
 \* "M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	102
Acenaphthene-d10	102
Phenanthrene-d10	99
Chrysene-d12	117
Perylene-d12	135

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	96
Terphenyl-d14	110

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

Customer and Site Details:  
 Sample ID Number: BH12-14 0.00-0.50  
 LIMS ID Number: CL1260202  
 QC Batch Number: 120357  
 Quantitation File: Initial Calibration  
 Directory: 1712MS5.PAH  
 Dilution: 1.0

Analytical Geotechnics: Hull Bulk Handling  
 Job Number: S12\_3299M  
 Date Booked in: 05-Apr-12  
 Date Extracted: 17-Apr-12  
 Matrix: Soil  
 Ext Method: Ultrasonic

Accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit	Accr. code
Naphthalene	91-20-3	3.62	0.70	97	UM
Acenaphthylene	208-96-8	-	< 0.10	-	U
Acenaphthene	83-32-9	4.81	0.11	88	UM
Fluorene	86-73-7	5.22	0.16	89	UM
Phenanthrene	85-01-8	6.13	1.53	98	UM
Anthracene	120-12-7	6.18	0.33	99	U
Fluoranthene	206-44-0	7.54	1.78	98	UM
Pyrene	129-00-0	7.84	1.57	99	UM
Benzo[a]anthracene	56-55-3	9.57	1.04	97	UM
Chrysene	218-01-9	9.62	1.02	97	UM
Benzo[b]fluoranthene	205-99-2	11.13	1.32	99	UM
Benzo[k]fluoranthene	207-08-9	11.16	0.39	98	UM
Benzo[a]pyrene	50-32-8	11.57	0.89	99	UM
Indeno[1,2,3-cd]pyrene	193-39-5	13.01	0.74	95	UM
Dibenzofluoranthene	53-70-3	13.03	0.22	98	UM
Benzo[ghi]perylene	191-24-2	13.36	0.66	97	UM
Coronene	191-07-1 *	15.94	0.18	67	N
Total (USEPA16) PAHs	-	-	< 12.55	-	N

\* Denotes compound is not UKAS accredited  
 \* "M" denotes that % fit has been manually interpreted

Internal Standards	% Area	Surrogates	% Rec
1,4-Dichlorobenzene-d4	NA	Nitrobenzene-d5	NA
Naphthalene-d8	105	2-Fluorobiphenyl	97
Acenaphthene-d10	106	Terphenyl-d14	109
Phenanthrene-d10	109		
Chrysene-d12	130		
Perylene-d12	150		

Concentrations are reported on a dry weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Sample ID	Client ID	Aliphatics	Aromatics	Aliphatics	Aromatics	Aliphatics	Aromatics	Aliphatics	Aromatics	Aliphatics	Aromatics	Aliphatics	Aromatics	Aliphatics	Aromatics
CL1260196	BHD1 1D0	<4.66	<5	<4.66	<5	<4.66	<5	<4.66	<5	<4.66	<5	<4.66	<5	<4.66	<5
CL1260196	BH2 4 D0	<6.1	<6	<6.1	<6	<6.1	<6	<6.1	<6	<6.1	<6	<6.1	<6	<6.1	<6
CL1260197	BH5 0.50-1.00	<4.7	<4	<4.7	<4	<4.7	<4	<4.7	<4	<4.7	<4	<4.7	<4	<4.7	<4
CL1260196	BH8 0.10-0.30	<4.6	<4	<4.6	<4	<4.6	<4	<4.6	<4	<4.6	<4	<4.6	<4	<4.6	<4
CL1260199	BH10 1.10	<4.5	<4	<4.5	<4	<4.5	<4	<4.5	<4	<4.5	<4	<4.5	<4	<4.5	<4
CL1260200	BH12 0.00-0.50	<5.3	<5	<5.3	<5	<5.3	<5	<5.3	<5	<5.3	<5	<5.3	<5	<5.3	<5

\* This sample data is not ISO17025 accredited  
 The sample data is not MCERTS accredited

Concentration, (mg/kg) - as dry weight

Customer and Site Details: Analytical Geochemics: Hull Bulk Handling  
 Job Number: S12 329M  
 QC Batch Number: 120104  
 Method: Ultrasonic  
 Directory: 0416PCB.GC8  
 Accreditation code: N  
 Customer and Site Details: Analytical Geochemics: Hull Bulk Handling  
 Job Number: S12 329M  
 QC Batch Number: 120349  
 Method: Ultra Sonic  
 Directory: D:\TEST\DATA\2012\04\17\PH\_GC3105284001.D  
 Events: Heane, DCM  
 Separation: Sikas gel  
 Matrix: SOI  
 Date Booked in: 05-Apr-12  
 Date Extracted: 16-Apr-12  
 Date Analyzed: 17-Apr-12

ALIPHATIC / AROMATIC FRACTION BY GC/FID

Sample ID	Customer ID	PCB28	PCB52	PCB104	PCB118	PCB153	PCB138	PCB180
CL1260201	BH2,7,9 0.00-1.00	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
CL1260202	BH12-14 0.00-0.50	<5.1	<5.1	<5.1	<5.1	<5.1	<5.1	<5.1

Concentration, (µg/kg)

Customer and Site Details: Analytical Geochemics: Hull Bulk Handling  
 Job Number: S12 329M  
 QC Batch Number: 120104  
 Method: Ultrasonic  
 Directory: 0416PCB.GC8  
 Accreditation code: N  
 Customer and Site Details: Analytical Geochemics: Hull Bulk Handling  
 Job Number: S12 329M  
 QC Batch Number: 120349  
 Method: Ultrasonic  
 Directory: 0416PCB.GC8  
 Accreditation code: N  
 Matrix: SOI  
 Date Booked in: 05-Apr-12  
 Date Extracted: 17-Apr-12  
 Date Analyzed: 18-Apr-12

Polychlorinated Biphenyls (congeners)

Template Ver: 1

Lanetti Waste Acceptance Criteria Limit Values correct as of 17th March 2005

Accreditation	Method Code	Leachate Analysis	mg/l except "	mg/kg (dry weight)	mg/kg (dry weight)
		2:1 Leachate	8:1 Leachate	Calculated amount leached @ 2:1	Calculated amount leached @ 10:1
U	WSLM3	pH (pH units) "	7.6	8.1	
U	WSLM2	Conductivity (µs/cm) "	1210	189	
				Calculated data not under Accepted	
1	ICPMSW	Arsenic	0.002	0.004	0.02
N	ICPWATVAR	Barium	0.44	0.19	2.3
N	ICPMSW	Cadmium	<0.001	<0.001	<0.001
N	ICPMSW	Chromium	0.002	0.004	0.01
N	ICPMSW	Copper	0.005	0.02	0.02
N	ICPMSW	Mercury	<0.001	<0.001	<0.001
N	ICPMSW	Molybdenum	0.031	0.005	0.062
N	ICPMSW	Nickel	0.004	<0.001	0.008
N	ICPMSW	Lead	0.042	0.01	0.084
N	ICPMSW	Antimony	<0.001	0.001	<0.002
N	ICPMSW	Selenium	0.001	<0.001	0.002
N	ICPMSW	Zinc	0.191	0.04	0.382
N	KONENS	Chloride	241	22	482
N	ISEF	Fluoride	0.7	3.8	1.4
N	ICPWATVAR	Sulphate as SO4	142	18	294
N	WSLM27	Total Dissolved Solids	944	155	1889
N	SFAP1	Phenol Index	<0.05	<0.05	<0.1
N	WSLM13	Dissolved Organic Carbon	9.5	3.7	18
					48
					500
					800
					1000

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in solid (Dry Weight Basis)	Inert Waste	Hazardous Waste in Non-Hazardous Landfill	Stable Non-Hazardous Waste in Non-Hazardous Landfill
N	WSLM58	Total Organic Carbon (% M/M)	0.73	3	5	6
N	LOH50	Loss on Ignition (%)	1			10
U	BTEXHA	Sum of BTEX (mg/kg)	<0.05	6		
N	PCBUSECD	Sum of 7 Congener PCB's (mg/kg)	<0.035	1		
U	TFHFIDUS	Mineral Oil (mg/kg)	108	500		
N	PAHMUSUS	PAH Sum of 17 (mg/kg)	<1.68	100		
U	PHSOIL	pH (pH units)	8.8			>6
N	ANC	Acid Neutralisation Capacity (mol/kg) @pH 7	18.92			To be evaluated

Client	Analtical Geotechnics	Site	Hull Bulk Handling	Sample Description	Report No	Sample No	Issue Date	Leaching Data
		Contact	Mr J Davies		512_3289	CL/1200201	19-Apr-12	Weight of sample (kg) 0.225
								Moisture content @ 105C (%) 13.8
								Equivalent Weight based on drying at 105C (kg) 0.184
								Volume of water required to carry out 2:1 stage (litres) 0.368
								Weight of Sieved Soil to carry out 2:1 stage (kg) 0.282
								Weight of Deionised water to carry out 2:1 stage (kg) 0.413
								Volume to undertake analysis (2:1 Stage) (litres) 0.300
								Weight of Deionised water to carry out 8:1 stage (kg) 1.461

**WASTE ACCEPTANCE CRITERIA TESTING**  
**BSEN 12457/3**

Template Ver 1  
Lanarth Waste Acceptance Criteria (with values correct as of 11th March 2005)

Accreditation	Method Code	Leachate Analysis	mg/l except "	mg/kg (dry weight)	mg/kg (dry weight)
		2:1 Leachate	8:1 Leachate	Calculated amount leached @ 2:1	Calculated amount leached @ 10:1
U	WSLM3	pH (pH units) "	7.6	7.9	
U	WSLM2	Conductivity (µs/cm) "	1740	354	
I	ICPMSW	Arsenic	0.002	0.003	0.5
N	ICPWATVAR	Barium	0.51	1.02	20
N	ICPMSW	Cadmium	<0.0001	<0.0002	0.04
N	ICPMSW	Chromium	0.002	0.004	0.5
N	ICPMSW	Copper	0.007	0.014	2
N	ICPMSW	Mercury	<0.0001	<0.0002	0.01
N	ICPMSW	Molybdenum	0.075	0.15	0.5
N	ICPMSW	Nickel	0.008	0.012	0.4
N	ICPMSW	Lead	0.041	0.052	0.5
N	ICPMSW	Antimony	0.005	0.01	0.08
N	ICPMSW	Selenium	0.003	0.006	0.1
N	ICPMSW	Zinc	0.287	0.574	1.64
N	KONENS	Chloride	179	358	433
N	ISEF	Fluoride	3	6	23
N	ICPWATVAR	Sulphate as SO4	598	1172	1581
N	WSLM27	Total Dissolved Solids	1360	2720	4523
N	SFAP1	Phenol Index	<0.05	<0.1	<0.5
N	WSLM13	Dissolved Organic Carbon	13	26	71

Lanarth Waste Acceptance Criteria Limit Values for BSEN 12457/3 L/S 10 litre kg-1 mg/kg (dry weight)

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in	Sample	Limit Value
N	WSLM59	Total Organic Carbon (% M/M)	18.5	3	5
N	LOI450	Loss on Ignition (%)	21.7	6	10
U	BTEXHA	Sum of BTEX (mg/kg)	<0.05	1	6
N	PCBUSECD	Sum of 7 Congener PCBs (mg/kg)	<0.035	1	6
U	TPHFIDUS	Mineral Oil (mg/kg)	402	500	100
N	PAHMSUS	PAH Sum of 17 (mg/kg)	<12.73	100	>6
U	PHSOIL	pH (pH units)	8.2		
N	ANC	Acid Neutralisation Capacity (mol/kg) @pH 7	8.7		

Lanarth Waste Acceptance Criteria Limit Values

Client	Contact	Site	Sample Description	Report No	Sample No	Issue Date	Leaching Data
Analytical Geotechnics	Mr J Davies	Hull Bulk Handling	BH12-14 0.00-0.50	512_3298	CL/1260202	19-Apr-12	Weight of sample (kg) 0.225 Moisture content @ 105°C (%) 17.6 Equipment Weight based on drying at 105°C (kg) 0.185 Volume of water required to carry out 2:1 stage (litre) 0.328 Weight of Sieved Soil to carry out 2:1 stage (kg) 0.274 Weight of Deionised water to carry out 2:1 stage (kg) 0.401 Volume to undertake analysis (2:1 Stage) (litre) 0.300 Weight of Deionised water to carry out 8:1 stage (kg) 1.407

**WASTE ACCEPTANCE CRITERIA TESTING  
BSEN 12457/3**

ESG accepts no responsibility for any sampling not carried out by our personnel.

Tests marked "\*" have been subcontracted to another laboratory.

Operations Manager

Andrew Timms

On behalf of  
ESG :



Date of Issue: 19-Apr-2012

- Table 1 Main Analysis Results (Page 2)
- Table of PAH (MS-SIM) (10) Results (Pages 3 to 8)
- Analytical and Deviating Sample Overview (Page 9)
- Table of Method Descriptions (Page 10)
- Table of Report Notes (Page 11)

The following tables are contained in this report:

Tests where the accreditation is set to N or No, and any individual data items marked with a \* are not UKAS accredited. Any options or interpretations expressed herein are outside the scope of any UKAS accreditation held by ESG.

The analysis was completed by: 19-Apr-2012

previously issued by the laboratory.

The 6 samples described in this report were registered for analysis by ESG on 05-Apr-2012. This report supersedes any versions

Site: Hull Bulk Handling

Analytical Geotechnics  
Fairfield House  
1 Fairfield Street  
Bingham  
Nottinghamshire  
NG13 8FB

Report No. EXR/134716 (Ver. 1)



**TEST REPORT**  
**NRA LEACHATE SAMPLE ANALYSIS**

Units	Method Code	Method Reporting Limits	UKAS Accredited	Sample Date	Client Sample Description	LAB ID Number	EXV
mg/l	ICP-AES	3	Yes	18-Apr-12	BH01 1.00	1264134	
mg/l	ICP-AES	3	Yes	18-Apr-12	Total Sulphur as SO <sub>4</sub> (Dissolved)		
mg/l	ICP-AES	3	Yes	18-Apr-12	Nickel as Ni (Dissolved)		
mg/l	ICP-AES	3	Yes	18-Apr-12	Chromium as Cr (Dissolved)		
mg/l	ICP-AES	3	Yes	18-Apr-12	Cadmium as Cd (Dissolved)		
mg/l	ICP-AES	3	Yes	18-Apr-12	PAM GC-MS (16)		
mg/l	ICP-AES	3	Yes	18-Apr-12	Copper as Cu (Dissolved)		
mg/l	ICP-AES	3	Yes	18-Apr-12	Lead as Pb (Dissolved)		
mg/l	ICP-AES	3	Yes	18-Apr-12	Zinc as Zn (Dissolved)		
mg/l	ICP-AES	3	Yes	18-Apr-12	Arsenic as As (Dissolved)		
mg/l	ICP-AES	3	Yes	18-Apr-12	Mercury as Hg (Dissolved)		
mg/l	ICP-AES	3	Yes	18-Apr-12	Selenium as Se (Dissolved)		
mg/l	ICP-AES	3	Yes	18-Apr-12	Cyanide (Total) as CN		
mg/l	ICP-AES	3	Yes	18-Apr-12	Phenol Index as CEHSDM		
				18-Apr-12		1264136	
				18-Apr-12	BH2 4.00	1264135	
				18-Apr-12	BH5 0.50-1.00	1264136	
				18-Apr-12	BH6 0.10-0.80	1264137	
				18-Apr-12	BH10 1.10	1264138	
				18-Apr-12	BH12 0.00-0.50	1264139	

SC Scientific  
 1st Floor, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

Hull Bulk Handling

Client Name	Analytical Geotechnics
Contact	M J Davies
Date Printed	18-Apr-2012
Report Number	EXR/134716
Table Number	1
NRA Leachate Sample Analysis	



# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

## Customer and Site Details:

Analytical Geotechnics: Hull Bulk Handling  
 Job Number: W13\_4716  
 Date Booked in: 05-Apr-12  
 Date Extracted: 17-Apr-12  
 Date Analysed: 17-Apr-12  
 Matrix: Leachate  
 Ext Method: Bottle  
 Initial Calibration: 417MS17.PAH  
 Job Number: BH01 1.00  
 Date Booked in: EX1284134  
 Date Extracted: 120291  
 Date Analysed: Initial Calibration  
 Matrix: 417MS17.PAH  
 Ext Method: 1.0

## Sample Details:

LIMS ID Number:  
 QC Batch Number:  
 Quantitation File:  
 Directory:  
 Dilution:

UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	-	< 0.020	-
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	-	< 0.010	-
Fluorene	86-73-7	-	< 0.010	-
Phenanthrene	85-01-8	-	< 0.010	-
Anthracene	120-12-7	-	< 0.010	-
Fluoranthene	206-44-0	7.24	0.022	96
Pyrene	129-00-0	7.53	0.033	98
Benzo[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[ghi]perylene	191-24-2	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.205	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area	Sumogates	% Rec
1,4-Dichlorobenzene-d4	NA	Nitrobenzene-d5	NA
Naphthalene-d8	96	2-Fluorobiphenyl	74
Acenaphthene-d10	95	Terphenyl-d14	88
Phenanthrene-d10	94		
Chrysene-d12	91		
Perylene-d12	88		

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

**Customer and Site Details:** Analytical Geotechnics: Hull Bulk Handling  
**Sample Details:** BH2 4.00  
**LIMS ID Number:** EX1284135  
**QC Batch Number:** 120284  
**Quantitation File:** Initial Calibration  
**Directory:** 413MS10.PAH  
**Dilution:** 1.0

**Job Number:** W13\_4716  
**Date Booked in:** 05-Apr-12  
**Date Extracted:** 14-Apr-12  
**Date Analysed:** 15-Apr-12  
**Matrix:** Water  
**Ext Method:** Bottle

UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	3.20	0.043	96
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	-	< 0.010	-
Fluorene	86-73-7	-	< 0.010	-
Phenanthrene	85-01-8	5.57	0.029	99
Anthracene	120-12-7	-	< 0.010	-
Fluoranthene	206-44-0	6.88	0.045	81
Pyrene	129-00-0	7.15	0.041	97
Benzo[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.010	-
Dibenz[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[ghi]perylene	191-24-2	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.278	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	92
Acenaphthene-d10	94
Phenanthrene-d10	94
Chrysene-d12	108
Perylene-d12	131

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	73
Terphenyl-d14	78

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.



## Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

**Customer and Site Details:** Analytical Geotechnics: Hull Bulk Handling Job Number: W13\_4716  
 Sample Details: BH5 0.50-1.00 EX1284136 Date Booked in: 05-Apr-12  
 LIMS ID Number: 120284 Date Extracted: 14-Apr-12  
 QC Batch Number: Initial Calibration 413MS10.PAH-1.0 Matrix: Water  
 Quantitation File: Directory: Dilution: 1.0  
 Ext Method: Bottle

UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	3.20	0.031	92
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	-	< 0.010	-
Fluorene	86-73-7	-	< 0.010	-
Phenanthrene	85-01-8	5.57	0.017	81
Anthracene	120-12-7	-	< 0.010	-
Fluoranthene	206-44-0	6.88	0.061	79
Pyrene	129-00-0	7.16	0.060	90
Benz[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	-	< 0.010	-
Benz[b]fluoranthene	205-99-2	-	< 0.010	-
Benz[k]fluoranthene	207-08-9	-	< 0.010	-
Benz[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.010	-
Dibenz[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[ghi]perylene	191-24-2	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.289	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area	Surrogates	% Rec
1,4-Dichlorobenzene-d4	NA	Nitrobenzene-d5	NA
Naphthalene-d8	90	2-Fluorobiphenyl	81
Acenaphthene-d10	91	Terphenyl-d14	87
Phenanthrene-d10	87		
Chrysene-d12	97		
Perylene-d12	117		

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.



# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

Customer and Site Details: Analytical Geotechnics: Hull Bulk Handling  
 Sample Details: BH8 0.10-0.80  
 LIMS ID Number: EX1284137  
 GC Batch Number: 120284  
 Quantitation File: Initial Calibration  
 Directory: 413MS10.PAH  
 Dilution: 1.0

Job Number: W13\_4716  
 Date Booked in: 05-Apr-12  
 Date Extracted: 14-Apr-12  
 Date Analysed: 15-Apr-12  
 Matrix: Water  
 Ext Method: Bottle

UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	3.20	0.035	99
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	-	< 0.010	-
Fluorene	86-73-7	-	< 0.010	-
Phenanthrene	85-01-8	5.56	0.014	86
Anthracene	120-12-7	-	< 0.010	-
Fluoranthene	206-44-0	6.88	0.022	65
Pyrene	129-00-0	7.16	0.026	90
Benzo[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.010	-
Dibenz[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[ghi]perylene	191-24-2	-	< 0.010	-
Total (USEPA16) PAHs	-	-	> 0.217	-

\*M\* denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	96
Acenaphthene-d10	95
Phenanthrene-d10	97
Chrysene-d12	120
Perylene-d12	151

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	75
Terphenyl-d14	83

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.



# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

## Customer and Site Details:

Analytical Geotechnics: Hull Bulk Handling  
 Job Number: BH10 1.10  
 EX1284138  
 LIMS ID Number:  
 QC Batch Number: 120284  
 Initial Calibration  
 413MS10.PAH  
 1.0  
 Dilution:  
 Directory:  
 Quantitation File:  
 LIMS ID Number:  
 QC Batch Number:  
 Date Booked in: 05-Apr-12  
 Date Extracted: 14-Apr-12  
 Date Analysed: 15-Apr-12  
 Matrix: Water  
 Ext Method: Bottle  
 UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
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Naphthalene	91-20-3	3.20	0.042	98
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	4.37	0.017	86
Fluorene	86-73-7	4.74	0.020	88
Phenanthrene	85-01-8	5.56	0.162	100
Anthracene	120-12-7	5.62	0.023	99
Fluoranthene	206-44-0	6.88	0.078	75
Pyrene	129-00-0	7.16	0.074	95
Benzo[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.010	-
Dibenz[ah]anthracene	53-70-3	-	< 0.010	-
Benzo[ghi]perylene	191-24-2	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.506	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area	Surrogates	% Rec
1,4-Dichlorobenzene-d4	NA	Nitrobenzene-d5	NA
Naphthalene-d8	97	2-Fluorobiphenyl	69
Acenaphthene-d10	95	Terphenyl-d14	84
Phenanthrene-d10	97		
Chrysene-d12	121		
Perylene-d12	152		

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

# Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

## Customer and Site Details:

Analytical Geotechnics: Hull Bulk Handling  
 Job Number: BH12 0.00-0.50  
 LIMS ID Number: EX1284139  
 QC Batch Number: 120284  
 Initial Calibration: 413MS10.PA1A  
 Directory: 1.0  
 Dilution: 1.0

Sample Details:  
 Date Booked in: 05-Apr-12  
 Date Extracted: 14-Apr-12  
 Date Analysed: 15-Apr-12  
 Matrix: Water  
 Ext Method: Bottle

UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	-	< 0.020	-
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	-	< 0.010	-
Fluorene	86-73-7	4.75	0.017	M
Phenanthrene	85-01-8	5.56	0.047	99
Anthracene	120-12-7	-	< 0.010	-
Fluoranthene	206-44-0	6.88	0.092	90
Pyrene	129-00-0	7.16	0.076	95
Benz[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	-	< 0.010	-
Benz[b]fluoranthene	205-99-2	-	< 0.010	-
Benz[k]fluoranthene	207-08-9	-	< 0.010	-
Benz[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[ghi]perylene	191-24-2	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.362	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	94
Acenaphthene-d10	94
Phenanthrene-d10	94
Chrysene-d12	103
Perylene-d12	123

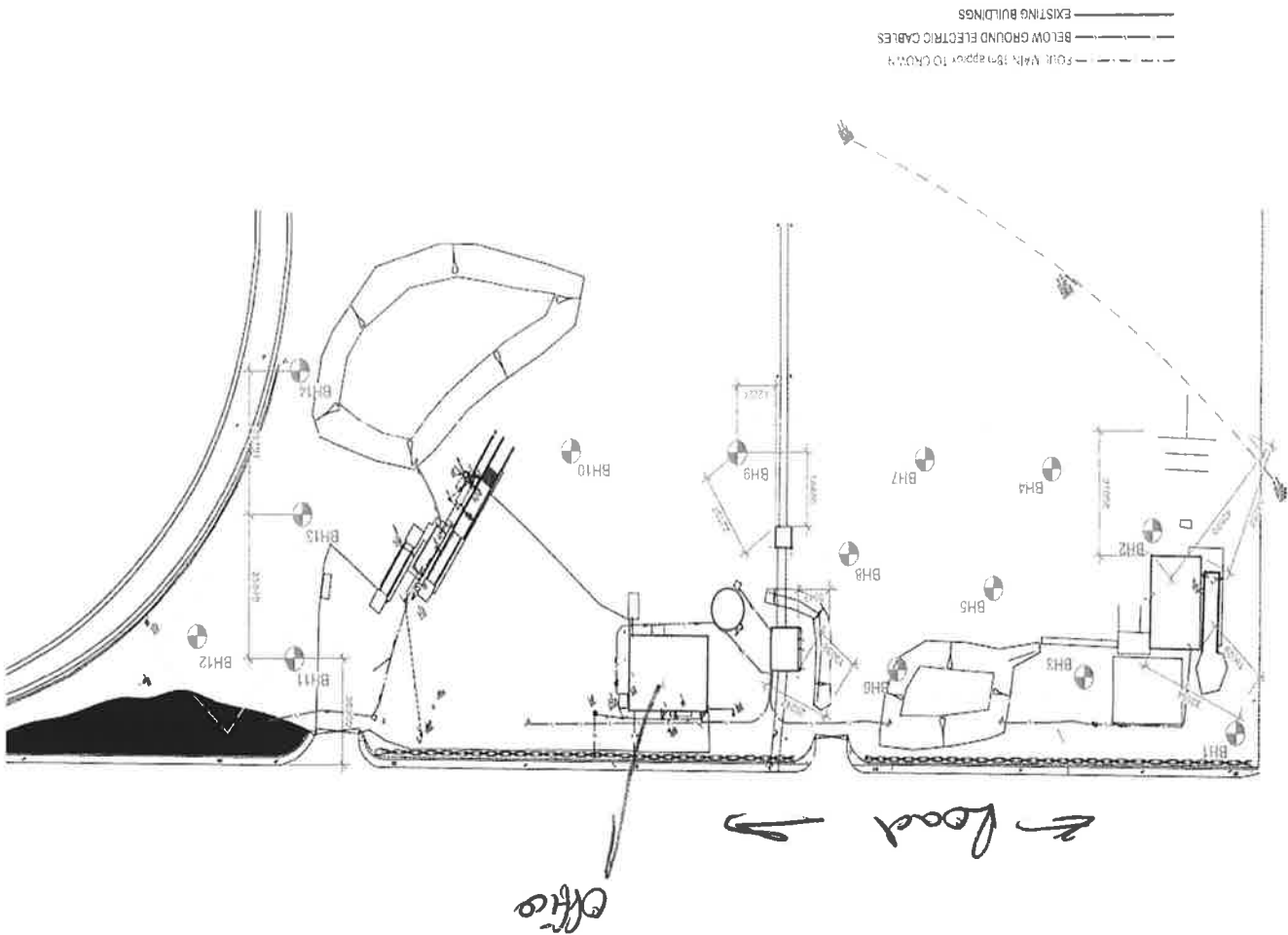
  

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	77
Terphenyl-d14	84

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

ANALYTICAL GEOTECHNICS LTD								
LABORATORY TEST RESULTS – CHEMICAL ANALYSES								
CLIENT: Hull Bulk Handling Limited								
DATE: 25.04.2012								
SITE: Hull Bulk Handling, Queen Elizabeth Dock, Hull								
HOLE No.	REF	DEPTH (m)	SO <sub>4</sub> 2:1 extract (g/l)	SO <sub>4</sub> (%)	SO <sub>4</sub> (water) (mg/l)	CHLORIDE CONTENT (%)	High Alumina Cement (1)	pH
BH2	J7	12.00	0.13					7.8
BH3	J2	1.20	0.22					8.1
BH6	J1	0.10	1.34					8.4
BH7	W1	2.00			0.15			8.2
BH8	J13	17.5	0.10					8.0
BH11	J3	2.00	0.27					8.1
BH12	J10	13.00	0.41					6.9
BH13	J1	0.10	0.18					8.8
NOTES:								

HULL BULK STORAGE  
BOREHOLE LOCATION PLAN  
1:1000 @ A3 size







Report No. 1203919/P2

**CONCEPTUAL SITE MODEL AND RISK ASSESSMENT**

**APPENDIX IV**

Client: Hull Bulk Handling Limited

**HULL BULK HANDLING,  
QUEEN ELIZABETH DOCK, HULL**

## Conceptual Site Model / Risk Assessment

**ANALYTICAL GEOTECHNICS LTD**

**CLIENT:** Hull Bulk Handling Limited  
**SITE:** Hull Bulk Handling, Queen Elizabeth Dock, Hull

**JOB No:** 1203919/P2

**DATE:** May, 2012

SOURCE	PATHWAY	RECEPTOR	HAZARD SEVERITY	PROBABILITY	RISK
<b>On Site:</b> Coal, ash, chalk, stone, building rubble; soil; tar/mac surfacing clay. Principal contaminants of concern (PCoC) – leachable PAHs & sulphate, Arsenic, pH, sulphate and TPHs in respect of water pipes.	Indirect ingestion	End users (adult employees)	Mild – short term exposure	Unlikely	Negligible
		Visitors (temporary – short term)	Minor – limited exposure	Unlikely	Negligible
	Indirect ingestion; inhalation; dermal contact	Construction Workers (temporary – short term)	Minor – short term exposure; use of PPE	Low likelihood	Negligible
		Groundwater (principal aquifer)	Minor – low vulnerability; minimal source	Unlikely	Negligible
	Pathway through granular near surface fill	Surface water (River Humber)	Minor – minimal source	Low likelihood	Negligible
		End users (adult employees)	Minor – no source identified	Unlikely	Negligible
Off Site: no potential off site source has been identified.	Possible pathway through granular near surface fill	Visitors (temporary – short term)	Minor – no source identified	Unlikely	Negligible
		Construction Workers (temporary – short term)	Minor – no source identified	Unlikely	Negligible

