ALcontrol Laboratories

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528700
Fax: (01244) 528701
email: mkt@alcontrol.com
Website: www.alcontrol.com

Royal Haskoning
Rightwell House
Bretton
Bretton
Peterborough
Cambridgeshire
PE3 8DW

**Attention:** Declan Fives

# CERTIFICATE OF ANALYSIS

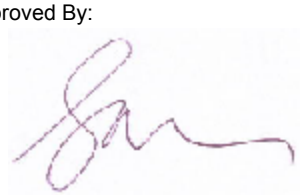
| | |
|---|---|
| **Date:** | 23 May 2014 |
| **Customer:** | H_RHASKON_PTB |
| **Sample Delivery Group (SDG):** | 140514-91 |
| **Your Reference:** | 9Y0074 103 100 |
| **Location:** | Cole Green |
| **Report No:** | 270988 |

We received 5 samples on Wednesday May 14, 2014 and 2 of these samples were scheduled for analysis which was completed on Friday May 23, 2014. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

All chemical testing (unless subcontracted) is performed at ALcontrol Hawarden Laboratories.

Approved By:



**Sonia McWhan**

Operations Manager

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 140514-91 | **Location:** | Cole Green | **Order Number:** | 9Y0074-103-100 |
| **Job:** | H_RHASKON_PTB-82 | **Customer:** | Royal Haskoning | **Report Number:** | 270988 |
| **Client Reference:** | 9Y0074 103 100 | **Attention:** | Declan Fives | **Superseded Report:** | |

## Received Sample Overview

| Lab Sample No(s) | Customer Sample Ref. | AGS Ref. | Depth (m) | Sampled Date |
|---|---|---|---|---|
| 9282401 | BH11 | | 0.50 | 12/05/2014 |
| 9282402 | BH11 | | 1.00 | 12/05/2014 |
| 9282404 | BH11 | | 2.00 | 12/05/2014 |
| 9282406 | BH11 | | 5.00 | 12/05/2014 |
| 9282407 | BH11 | | 6.50 | 12/05/2014 |

**Only received samples which have had analysis scheduled will be shown on the following pages.**

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 140514-91 | **Location:** | Cole Green | **Order Number:** | 9Y0074-103-100 |
| **Job:** | H_RHASKON_PTB-82 | **Customer:** | Royal Haskoning | **Report Number:** | 270988 |
| **Client Reference:** | 9Y0074 103 100 | **Attention:** | Declan Fives | **Superseded Report:** | |

**SOLID**

**Results Legend**

X **Test**

N **No Determination Possible**

| Lab Sample No(s) | | | 9282402 | | | 9282406 | | |
|---|---|---|---|---|---|---|---|---|
| Customer Sample Reference | | | BH11 | | | BH11 | | |
| AGS Reference | | | | | | | | |
| Depth (m) | | | 1.00 | | | 5.00 | | |
| Container | | | 1kg TUB | 250g Amber Jar (AL | 60g VOC (ALE215) | 1kg TUB | 250g Amber Jar (AL | 60g VOC (ALE215) |
| Boron Water Soluble | All | NDPs: 0 Tests: 2 | | X | | | X | |
| EPH CWG (Aliphatic) GC (S) | All | NDPs: 0 Tests: 2 | | X | | | X | |
| EPH CWG (Aromatic) GC (S) | All | NDPs: 0 Tests: 2 | | X | | | X | |
| GRO by GC-FID (S) | All | NDPs: 0 Tests: 2 | | | X | | | X |
| Metals in solid samples by OES | All | NDPs: 0 Tests: 2 | | X | | | X | |
| PAH by GCMS | All | NDPs: 0 Tests: 2 | | X | | | X | |
| pH | All | NDPs: 0 Tests: 2 | X | | | X | | |
| Sample description | All | NDPs: 0 Tests: 2 | | X | | | X | |
| Semi Volatile Organic Compounds | All | NDPs: 0 Tests: 1 | | X | | | | |
| Total Organic Carbon | All | NDPs: 0 Tests: 2 | | X | | | X | |
| TPH CWG GC (S) | All | NDPs: 0 Tests: 2 | | X | | | X | |
| VOC MS (S) | All | NDPs: 0 Tests: 1 | | | X | | | |

# CERTIFICATE OF ANALYSIS

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|---|---|---|---|---|---|
| **SDG:** | 140514-91 | **Location:** | Cole Green | **Order Number:** | 9Y0074-103-100 |
| **Job:** | H_RHASKON_PTB-82 | **Customer:** | Royal Haskoning | **Report Number:** | 270988 |
| **Client Reference:** | 9Y0074 103 100 | **Attention:** | Declan Fives | **Superseded Report:** | |

# Sample Descriptions

## Grain Sizes

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **very fine** | <0.063mm | **fine** | 0.063mm - 0.1mm | **medium** | 0.1mm - 2mm | **coarse** | 2mm - 10mm | **very coarse** | >10mm |

| Lab Sample No(s) | Customer Sample Ref. | Depth (m) | Colour | Description | Grain size | Inclusions | Inclusions 2 |
|---|---|---|---|---|---|---|---|
| 9282402 | BH11 | 1.00 | Light Brown | Silty Clay Loam | 0.063 - 0.1 mm | N/A | N/A |
| 9282406 | BH11 | 5.00 | Light Brown | Silty Clay Loam | 0.063 - 0.1 mm | N/A | N/A |

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally ocurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 140514-91 | **Location:** | Cole Green | **Order Number:** | 9Y0074-103-100 |
| **Job:** | H_RHASKON_PTB-82 | **Customer:** | Royal Haskoning | **Report Number:** | 270988 |
| **Client Reference:** | 9Y0074 103 100 | **Attention:** | Declan Fives | **Superseded Report:** | |

**Results Legend**

| | |
|---|---|
| # | ISO17025 accredited. |
| M | *m*CERTS accredited. |
| aq | Aqueous / settled sample. |
| diss.filt | Dissolved / filtered sample. |
| tot.unfilt | Total / unfiltered sample. |
| * | Subcontracted test. |
| ** | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |
| (F) | Trigger breach confirmed |
| 1-5&+§@ | Sample deviation (see appendix) |

| Component | LOD/Units | Method | Customer Sample R | BH11 | BH11 |
|---|---|---|---|---|---|
| | | | Depth (m) | 1.00 | 5.00 |
| | | | Sample Type | Soil/Solid | Soil/Solid |
| | | | Date Sampled | 12/05/2014 | 12/05/2014 |
| | | | Sampled Time | . | . |
| | | | Date Received | 14/05/2014 | 14/05/2014 |
| | | | SDG Ref | 140514-91 | 140514-91 |
| | | | Lab Sample No.(s) | 9282402 | 9282406 |
| | | | AGS Reference | | |
| Moisture Content Ratio | % | PM024 | | 16 | 15 |
| Organic Carbon, Total | <0.2 % | TM132 | | 0.551 M | 0.211 M |
| Fraction Organic Carbon (FOC) | <0.002 - | TM132 | | 0.00551 # | 0.00211 # |
| pH | 1 pH Units | TM133 | | 8.29 M | 8.5 M |
| Arsenic | <0.6 mg/kg | TM181 | | 36 M | 23.7 M |
| Barium | <0.6 mg/kg | TM181 | | 41.4 # | 28.3 # |
| Beryllium | <0.01 mg/kg | TM181 | | 1.41 M | 1.24 M |
| Cadmium | <0.02 mg/kg | TM181 | | <0.02 M | <0.02 M |
| Chromium | <0.9 mg/kg | TM181 | | 47.1 M | 28.3 M |
| Copper | <1.4 mg/kg | TM181 | | 14.2 M | 14 M |
| Lead | <0.7 mg/kg | TM181 | | 17.9 M | 15.6 M |
| Mercury | <0.14 mg/kg | TM181 | | <0.14 M | 0.198 M |
| Nickel | <0.2 mg/kg | TM181 | | 38.2 M | 29.9 M |
| Selenium | <1 mg/kg | TM181 | | <1 # | <1 # |
| Vanadium | <0.2 mg/kg | TM181 | | 81.1 # | 52.6 # |
| Zinc | <1.9 mg/kg | TM181 | | 81.5 M | 74.4 M |
| Boron, water soluble | <1 mg/kg | TM222 | | 7.8 M | 28.5 M |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 140514-91 | **Location:** | Cole Green | **Order Number:** | 9Y0074-103-100 |
| **Job:** | H_RHASKON_PTB-82 | **Customer:** | Royal Haskoning | **Report Number:** | 270988 |
| **Client Reference:** | 9Y0074 103 100 | **Attention:** | Declan Fives | **Superseded Report:** | |

## PAH by GCMS

**Results Legend**

| | |
|---|---|
| # | ISO17025 accredited. |
| M | *m*CERTS accredited. |
| aq | Aqueous / settled sample. |
| diss.filt | Dissolved / filtered sample. |
| tot.unfilt | Total / unfiltered sample. |
| * | Subcontracted test. |
| ** | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |
| (F) | Trigger breach confirmed |
| 1-5&♦§@ | Sample deviation (see appendix) |

| Component | LOD/Units | Method | Customer Sample R | BH11 | BH11 |
|---|---|---|---|---|---|
| | | | Depth (m) | 1.00 | 5.00 |
| | | | Sample Type | Soil/Solid | Soil/Solid |
| | | | Date Sampled | 12/05/2014 | 12/05/2014 |
| | | | Sampled Time | . | . |
| | | | Date Received | 14/05/2014 | 14/05/2014 |
| | | | SDG Ref | 140514-91 | 140514-91 |
| | | | Lab Sample No.(s) | 9282402 | 9282406 |
| | | | AGS Reference | | |
| Naphthalene-d8 % recovery** | % | TM218 | | 125 | 97.8 |
| Acenaphthene-d10 % recovery** | % | TM218 | | 125 | 95.4 |
| Phenanthrene-d10 % recovery** | % | TM218 | | 120 | 89.1 |
| Chrysene-d12 % recovery** | % | TM218 | | 116 | 80.7 |
| Perylene-d12 % recovery** | % | TM218 | | 115 | 79 |
| Naphthalene | <9 µg/kg | TM218 | | 13.3 M | <9 M |
| Acenaphthylene | <12 µg/kg | TM218 | | <12 M | <12 M |
| Acenaphthene | <8 µg/kg | TM218 | | <8 M | <8 M |
| Fluorene | <10 µg/kg | TM218 | | <10 M | <10 M |
| Phenanthrene | <15 µg/kg | TM218 | | <15 M | <15 M |
| Anthracene | <16 µg/kg | TM218 | | <16 M | <16 M |
| Fluoranthene | <17 µg/kg | TM218 | | <17 M | <17 M |
| Pyrene | <15 µg/kg | TM218 | | <15 M | <15 M |
| Benz(a)anthracene | <14 µg/kg | TM218 | | <14 M | <14 M |
| Chrysene | <10 µg/kg | TM218 | | <10 M | <10 M |
| Benzo(b)fluoranthene | <15 µg/kg | TM218 | | <15 M | <15 M |
| Benzo(k)fluoranthene | <14 µg/kg | TM218 | | <14 M | <14 M |
| Benzo(a)pyrene | <15 µg/kg | TM218 | | <15 M | <15 M |
| Indeno(1,2,3-cd)pyrene | <18 µg/kg | TM218 | | <18 M | <18 M |
| Dibenzo(a,h)anthracene | <23 µg/kg | TM218 | | <23 M | <23 M |
| Benzo(g,h,i)perylene | <24 µg/kg | TM218 | | <24 M | <24 M |
| PAH, Total Detected USEPA 16 | <118 µg/kg | TM218 | | <118 | <118 |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 140514-91 | **Location:** | Cole Green | **Order Number:** | 9Y0074-103-100 |
| **Job:** | H_RHASKON_PTB-82 | **Customer:** | Royal Haskoning | **Report Number:** | 270988 |
| **Client Reference:** | 9Y0074 103 100 | **Attention:** | Declan Fives | **Superseded Report:** | |

## Semi Volatile Organic Compounds

| Results Legend | |
|---|---|
| # | ISO17025 accredited. |
| M | *m*CERTS accredited. |
| aq | Aqueous / settled sample. |
| diss.filt | Dissolved / filtered sample. |
| tot.unfilt | Total / unfiltered sample. |
| * | Subcontracted test. |
| ** | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |
| (F) | Trigger breach confirmed |
| 1-5&+§@ | Sample deviation (see appendix) |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Customer Sample R** | BH11 | | | | | | | |
| **Depth (m)** | 1.00 | | | | | | | |
| **Sample Type** | Soil/Solid | | | | | | | |
| **Date Sampled** | 12/05/2014 | | | | | | | |
| **Sampled Time** | . | | | | | | | |
| **Date Received** | 14/05/2014 | | | | | | | |
| **SDG Ref** | 140514-91 | | | | | | | |
| **Lab Sample No.(s)** | 9282402 | | | | | | | |
| **AGS Reference** | | | | | | | | |
| **Component** | **LOD/Units** | **Method** | | | | | | |
| Phenol | <100 µg/kg | TM157 | <100 | | | | | |
| Pentachlorophenol | <100 µg/kg | TM157 | <100 | | | | | |
| n-Nitroso-n-dipropylamine | <100 µg/kg | TM157 | <100 | | | | | |
| Nitrobenzene | <100 µg/kg | TM157 | <100 | | | | | |
| Isophorone | <100 µg/kg | TM157 | <100 | | | | | |
| Hexachloroethane | <100 µg/kg | TM157 | <100 | | | | | |
| Hexachlorocyclopentadiene | <100 µg/kg | TM157 | <100 | | | | | |
| Hexachlorobutadiene | <100 µg/kg | TM157 | <100 | | | | | |
| Hexachlorobenzene | <100 µg/kg | TM157 | <100 | | | | | |
| n-Dioctyl phthalate | <100 µg/kg | TM157 | <100 | | | | | |
| Dimethyl phthalate | <100 µg/kg | TM157 | <100 | | | | | |
| Diethyl phthalate | <100 µg/kg | TM157 | <100 | | | | | |
| n-Dibutyl phthalate | <100 µg/kg | TM157 | <100 | | | | | |
| Dibenzofuran | <100 µg/kg | TM157 | <100 | | | | | |
| Carbazole | <100 µg/kg | TM157 | <100 | | | | | |
| Butylbenzyl phthalate | <100 µg/kg | TM157 | <100 | | | | | |
| bis(2-Ethylhexyl) phthalate | <100 µg/kg | TM157 | <100 | | | | | |
| bis(2-Chloroethoxy)methane | <100 µg/kg | TM157 | <100 | | | | | |
| bis(2-Chloroethyl)ether | <100 µg/kg | TM157 | <100 | | | | | |
| Azobenzene | <100 µg/kg | TM157 | <100 | | | | | |
| 4-Nitrophenol | <100 µg/kg | TM157 | <100 | | | | | |
| 4-Nitroaniline | <100 µg/kg | TM157 | <100 | | | | | |
| 4-Methylphenol | <100 µg/kg | TM157 | <100 | | | | | |
| 4-Chlorophenylphenylether | <100 µg/kg | TM157 | <100 | | | | | |
| 4-Chloroaniline | <100 µg/kg | TM157 | <100 | | | | | |
| 4-Chloro-3-methylphenol | <100 µg/kg | TM157 | <100 | | | | | |
| 4-Bromophenylphenylether | <100 µg/kg | TM157 | <100 | | | | | |
| 3-Nitroaniline | <100 µg/kg | TM157 | <100 | | | | | |
| 2-Nitrophenol | <100 µg/kg | TM157 | <100 | | | | | |
| 2-Nitroaniline | <100 µg/kg | TM157 | <100 | | | | | |
| 2-Methylphenol | <100 µg/kg | TM157 | <100 | | | | | |
| 1,2,4-Trichlorobenzene | <100 µg/kg | TM157 | <100 | | | | | |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 140514-91 | **Location:** | Cole Green | **Order Number:** | 9Y0074-103-100 |
| **Job:** | H_RHASKON_PTB-82 | **Customer:** | Royal Haskoning | **Report Number:** | 270988 |
| **Client Reference:** | 9Y0074 103 100 | **Attention:** | Declan Fives | **Superseded Report:** | |

## Semi Volatile Organic Compounds

| Results Legend | |
|---|---|
| # | ISO17025 accredited. |
| M | *m*CERTS accredited. |
| aq | Aqueous / settled sample. |
| diss.filt | Dissolved / filtered sample. |
| tot.unfilt | Total / unfiltered sample. |
| * | Subcontracted test. |
| ** | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |
| (F) | Trigger breach confirmed |
| 1-5&+§@ | Sample deviation (see appendix) |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Customer Sample R** | BH11 | | | | | | | |
| **Depth (m)** | 1.00 | | | | | | | |
| **Sample Type** | Soil/Solid | | | | | | | |
| **Date Sampled** | 12/05/2014 | | | | | | | |
| **Sampled Time** | . | | | | | | | |
| **Date Received** | 14/05/2014 | | | | | | | |
| **SDG Ref** | 140514-91 | | | | | | | |
| **Lab Sample No.(s)** | 9282402 | | | | | | | |
| **AGS Reference** | | | | | | | | |
| **Component** | **LOD/Units** | **Method** | | | | | | |
| 2-Chlorophenol | <100 µg/kg | TM157 | <100 | | | | | |
| 2,6-Dinitrotoluene | <100 µg/kg | TM157 | <100 | | | | | |
| 2,4-Dinitrotoluene | <100 µg/kg | TM157 | <100 | | | | | |
| 2,4-Dimethylphenol | <100 µg/kg | TM157 | <100 | | | | | |
| 2,4-Dichlorophenol | <100 µg/kg | TM157 | <100 | | | | | |
| 2,4,6-Trichlorophenol | <100 µg/kg | TM157 | <100 | | | | | |
| 2,4,5-Trichlorophenol | <100 µg/kg | TM157 | <100 | | | | | |
| 1,4-Dichlorobenzene | <100 µg/kg | TM157 | <100 | | | | | |
| 1,3-Dichlorobenzene | <100 µg/kg | TM157 | <100 | | | | | |
| 1,2-Dichlorobenzene | <100 µg/kg | TM157 | <100 | | | | | |
| 2-Chloronaphthalene | <100 µg/kg | TM157 | <100 | | | | | |
| 2-Methylnaphthalene | <100 µg/kg | TM157 | <100 | | | | | |
| Benzo(a)anthracene | <100 µg/kg | TM157 | <100 | | | | | |
| Chrysene | <100 µg/kg | TM157 | <100 | | | | | |
| Naphthalene | <100 µg/kg | TM157 | <100 | | | | | |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 140514-91 | **Location:** | Cole Green | **Order Number:** | 9Y0074-103-100 |
| **Job:** | H_RHASKON_PTB-82 | **Customer:** | Royal Haskoning | **Report Number:** | 270988 |
| **Client Reference:** | 9Y0074 103 100 | **Attention:** | Declan Fives | **Superseded Report:** | |

## TPH CWG (S)

| Results Legend | |
|---|---|
| # | ISO17025 accredited. |
| M | *m*CERTS accredited. |
| aq | Aqueous / settled sample. |
| diss.filt | Dissolved / filtered sample. |
| tot.unfilt | Total / unfiltered sample. |
| * | Subcontracted test. |
| ** | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |
| (F) | Trigger breach confirmed |
| 1-5&+§@ | Sample deviation (see appendix) |

| Component | LOD/Units | Method | Customer Sample R | BH11 | BH11 | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Depth (m) | 1.00 | 5.00 | | | | |
| | | | Sample Type | Soil/Solid | Soil/Solid | | | | |
| | | | Date Sampled | 12/05/2014 | 12/05/2014 | | | | |
| | | | Sampled Time | . | . | | | | |
| | | | Date Received | 14/05/2014 | 14/05/2014 | | | | |
| | | | SDG Ref | 140514-91 | 140514-91 | | | | |
| | | | Lab Sample No.(s) | 9282402 | 9282406 | | | | |
| | | | AGS Reference | | | | | | |
| GRO Surrogate % recovery** | % | TM089 | | 122 | 71 | | | | |
| GRO TOT (Moisture Corrected) | <44 µg/kg | TM089 | | <44 M | <44 M | | | | |
| Methyl tertiary butyl ether (MTBE) | <5 µg/kg | TM089 | | <5 M | <5 M | | | | |
| Benzene | <10 µg/kg | TM089 | | <10 M | <10 M | | | | |
| Toluene | <2 µg/kg | TM089 | | <2 M | <2 M | | | | |
| Ethylbenzene | <3 µg/kg | TM089 | | <3 M | <3 M | | | | |
| m,p-Xylene | <6 µg/kg | TM089 | | <6 M | <6 M | | | | |
| o-Xylene | <3 µg/kg | TM089 | | <3 M | <3 M | | | | |
| sum of detected mpo xylene by GC | <9 µg/kg | TM089 | | <9 | <9 | | | | |
| sum of detected BTEX by GC | <24 µg/kg | TM089 | | <24 | <24 | | | | |
| Aliphatics >C5-C6 | <10 µg/kg | TM089 | | <10 | <10 | | | | |
| Aliphatics >C6-C8 | <10 µg/kg | TM089 | | <10 | <10 | | | | |
| Aliphatics >C8-C10 | <10 µg/kg | TM089 | | <10 | <10 | | | | |
| Aliphatics >C10-C12 | <10 µg/kg | TM089 | | 16.7 | <10 | | | | |
| Aliphatics >C12-C16 | <100 µg/kg | TM173 | | <100 | <100 | | | | |
| Aliphatics >C16-C21 | <100 µg/kg | TM173 | | <100 | <100 | | | | |
| Aliphatics >C21-C35 | <100 µg/kg | TM173 | | <100 | <100 | | | | |
| Aliphatics >C35-C44 | <100 µg/kg | TM173 | | <100 | <100 | | | | |
| Total Aliphatics >C12-C44 | <100 µg/kg | TM173 | | <100 | <100 | | | | |
| Aromatics >EC5-EC7 | <10 µg/kg | TM089 | | <10 | <10 | | | | |
| Aromatics >EC7-EC8 | <10 µg/kg | TM089 | | <10 | <10 | | | | |
| Aromatics >EC8-EC10 | <10 µg/kg | TM089 | | <10 | <10 | | | | |
| Aromatics >EC10-EC12 | <10 µg/kg | TM089 | | 10.7 | <10 | | | | |
| Aromatics >EC12-EC16 | <100 µg/kg | TM173 | | <100 | 1690 | | | | |
| Aromatics >EC16-EC21 | <100 µg/kg | TM173 | | <100 | 1220 | | | | |
| Aromatics >EC21-EC35 | <100 µg/kg | TM173 | | 3560 | 3060 | | | | |
| Aromatics >EC35-EC44 | <100 µg/kg | TM173 | | 979 | 2100 | | | | |
| Aromatics >EC40-EC44 | <100 µg/kg | TM173 | | <100 | 597 | | | | |
| Total Aromatics >EC12-EC44 | <100 µg/kg | TM173 | | 4540 | 8070 | | | | |
| Total Aliphatics & Aromatics >C5-C44 | <100 µg/kg | TM173 | | 4560 | 8070 | | | | |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 140514-91 | **Location:** | Cole Green | **Order Number:** | 9Y0074-103-100 |
| **Job:** | H_RHASKON_PTB-82 | **Customer:** | Royal Haskoning | **Report Number:** | 270988 |
| **Client Reference:** | 9Y0074 103 100 | **Attention:** | Declan Fives | **Superseded Report:** | |

## VOC MS (S)

**Results Legend**

| | |
|---|---|
| # | ISO17025 accredited. |
| M | *m*CERTS accredited. |
| aq | Aqueous / settled sample. |
| diss.filt | Dissolved / filtered sample. |
| tot.unfilt | Total / unfiltered sample. |
| * | Subcontracted test. |
| ** | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |
| (F) | Trigger breach confirmed |
| 1-5&+§@ | Sample deviation (see appendix) |

| | |
|---|---|
| **Customer Sample R** | BH11 |
| **Depth (m)** | 1.00 |
| **Sample Type** | Soil/Solid |
| **Date Sampled** | 12/05/2014 |
| **Sampled Time** | . |
| **Date Received** | 14/05/2014 |
| **SDG Ref** | 140514-91 |
| **Lab Sample No.(s)** | 9282402 |
| **AGS Reference** | |

| Component | LOD/Units | Method | |
|---|---|---|---|
| Dibromofluoromethane** | % | TM116 | 105 |
| Toluene-d8** | % | TM116 | 100 |
| 4-Bromofluorobenzene** | % | TM116 | 91.5 |
| Dichlorodifluoromethane | <4 µg/kg | TM116 | <4 # |
| Chloromethane | <7 µg/kg | TM116 | <7 |
| Vinyl Chloride | <10 µg/kg | TM116 | <10 |
| Bromomethane | <13 µg/kg | TM116 | <13 # |
| Chloroethane | <14 µg/kg | TM116 | <14 M |
| Trichlorofluorormethane | <6 µg/kg | TM116 | <6 # |
| 1,1-Dichloroethene | <10 µg/kg | TM116 | <10 M |
| Carbon Disulphide | <7 µg/kg | TM116 | <7 M |
| Dichloromethane | <10 µg/kg | TM116 | <10 # |
| Methyl Tertiary Butyl Ether | <11 µg/kg | TM116 | <11 |
| trans-1,2-Dichloroethene | <11 µg/kg | TM116 | <11 # |
| 1,1-Dichloroethane | <8 µg/kg | TM116 | <8 M |
| cis-1,2-Dichloroethene | <5 µg/kg | TM116 | <5 M |
| 2,2-Dichloropropane | <12 µg/kg | TM116 | <12 |
| Bromochloromethane | <14 µg/kg | TM116 | <14 # |
| Chloroform | <8 µg/kg | TM116 | <8 M |
| 1,1,1-Trichloroethane | <7 µg/kg | TM116 | <7 M |
| 1,1-Dichloropropene | <11 µg/kg | TM116 | <11 M |
| Carbontetrachloride | <14 µg/kg | TM116 | <14 M |
| 1,2-Dichloroethane | <5 µg/kg | TM116 | <5 # |
| Benzene | <9 µg/kg | TM116 | <9 M |
| Trichloroethene | <9 µg/kg | TM116 | <9 M |
| 1,2-Dichloropropane | <12 µg/kg | TM116 | <12 M |
| Dibromomethane | <9 µg/kg | TM116 | <9 # |
| Bromodichloromethane | <7 µg/kg | TM116 | <7 M |
| cis-1,3-Dichloropropene | <14 µg/kg | TM116 | <14 |
| Toluene | <5 µg/kg | TM116 | <5 M |
| trans-1,3-Dichloropropene | <100 µg/kg | TM116 | <100 |
| 1,1,2-Trichloroethane | <10 µg/kg | TM116 | <10 # |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 140514-91 | **Location:** | Cole Green | **Order Number:** | 9Y0074-103-100 |
| **Job:** | H_RHASKON_PTB-82 | **Customer:** | Royal Haskoning | **Report Number:** | 270988 |
| **Client Reference:** | 9Y0074 103 100 | **Attention:** | Declan Fives | **Superseded Report:** | |

## VOC MS (S)

| Results Legend | |
|---|---|
| # | ISO17025 accredited. |
| M | *m*CERTS accredited. |
| aq | Aqueous / settled sample. |
| diss.filt | Dissolved / filtered sample. |
| tot.unfilt | Total / unfiltered sample. |
| * | Subcontracted test. |
| ** | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery |
| (F) | Trigger breach confirmed |
| 1-5&+§@ | Sample deviation (see appendix) |

| Component | LOD/Units | Method | Customer Sample R | |
|---|---|---|---|---|
| | | | Depth (m) | 1.00 |
| | | | Sample Type | Soil/Solid |
| | | | Date Sampled | 12/05/2014 |
| | | | Sampled Time | . |
| | | | Date Received | 14/05/2014 |
| | | | SDG Ref | 140514-91 |
| | | | Lab Sample No.(s) | 9282402 |
| | | | AGS Reference | |
| 1,3-Dichloropropane | <7 µg/kg | TM116 | <7 # | |
| Tetrachloroethene | <5 µg/kg | TM116 | <5 # | |
| Dibromochloromethane | <13 µg/kg | TM116 | <13 # | |
| 1,2-Dibromoethane | <12 µg/kg | TM116 | <12 # | |
| Chlorobenzene | <5 µg/kg | TM116 | <5 M | |
| 1,1,1,2-Tetrachloroethane | <10 µg/kg | TM116 | <10 M | |
| Ethylbenzene | <4 µg/kg | TM116 | <4 # | |
| p/m-Xylene | <14 µg/kg | TM116 | <14 # | |
| o-Xylene | <10 µg/kg | TM116 | <10 # | |
| Styrene | <10 µg/kg | TM116 | <10 # | |
| Bromoform | <10 µg/kg | TM116 | <10 # | |
| Isopropylbenzene | <5 µg/kg | TM116 | <5 # | |
| 1,1,2,2-Tetrachloroethane | <10 µg/kg | TM116 | <10 # | |
| 1,2,3-Trichloropropane | <17 µg/kg | TM116 | <17 # | |
| Bromobenzene | <10 µg/kg | TM116 | <10 M | |
| Propylbenzene | <11 µg/kg | TM116 | <11 # | |
| 2-Chlorotoluene | <9 µg/kg | TM116 | <9 # | |
| 1,3,5-Trimethylbenzene | <8 µg/kg | TM116 | <8 # | |
| 4-Chlorotoluene | <12 µg/kg | TM116 | <12 # | |
| tert-Butylbenzene | <12 µg/kg | TM116 | <12 # | |
| 1,2,4-Trimethylbenzene | <9 µg/kg | TM116 | <9 # | |
| sec-Butylbenzene | <10 µg/kg | TM116 | <10 # | |
| 4-Isopropyltoluene | <11 µg/kg | TM116 | <11 # | |
| 1,3-Dichlorobenzene | <6 µg/kg | TM116 | <6 # | |
| 1,4-Dichlorobenzene | <5 µg/kg | TM116 | <5 M | |
| n-Butylbenzene | <10 µg/kg | TM116 | <10 # | |
| 1,2-Dichlorobenzene | <12 µg/kg | TM116 | <12 M | |
| 1,2-Dibromo-3-chloropropane | <14 µg/kg | TM116 | <14 # | |
| Tert-amyl methyl ether | <15 µg/kg | TM116 | <15 | |
| 1,2,4-Trichlorobenzene | <6 µg/kg | TM116 | <6 # | |
| Hexachlorobutadiene | <12 µg/kg | TM116 | <12 | |
| Naphthalene | <13 µg/kg | TM116 | <13 # | |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 140514-91 | **Location:** | Cole Green | **Order Number:** | 9Y0074-103-100 |
| **Job:** | H_RHASKON_PTB-82 | **Customer:** | Royal Haskoning | **Report Number:** | 270988 |
| **Client Reference:** | 9Y0074 103 100 | **Attention:** | Declan Fives | **Superseded Report:** | |

## VOC MS (S)

| Results Legend | | Customer Sample R | BH11 |
|---|---|---|---|
| # | ISO17025 accredited. | | |
| M | *m*CERTS accredited. | | |
| aq | Aqueous / settled sample. | | |
| diss.filt | Dissolved / filtered sample. | | |
| tot.unfilt | Total / unfiltered sample. | | |
| * | Subcontracted test. | | |
| ** | % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery | | |
| (F) | Trigger breach confirmed | | |
| 1-5&+§@ | Sample deviation (see appendix) | | |
| | | Depth (m) | 1.00 |
| | | Sample Type | Soil/Solid |
| | | Date Sampled | 12/05/2014 |
| | | Sampled Time | . |
| | | Date Received | 14/05/2014 |
| | | SDG Ref | 140514-91 |
| | | Lab Sample No.(s) | 9282402 |
| | | AGS Reference | |

| Component | LOD/Units | Method | |
|---|---|---|---|
| 1,2,3-Trichlorobenzene | <6 µg/kg | TM116 | <6 # |

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 140514-91 | **Location:** | Cole Green | **Order Number:** | 9Y0074-103-100 |
| **Job:** | H_RHASKON_PTB-82 | **Customer:** | Royal Haskoning | **Report Number:** | 270988 |
| **Client Reference:** | 9Y0074 103 100 | **Attention:** | Declan Fives | **Superseded Report:** | |

## Table of Results - Appendix

| Method No | Reference | Description | Wet/Dry Sample [1] | Surrogate Corrected |
|---|---|---|---|---|
| PM001 | | Preparation of Samples for Metals Analysis | | |
| PM024 | Modified BS 1377 | Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material | | |
| TM089 | Modified: US EPA Methods 8020 & 602 | Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12) | | |
| TM116 | Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602 | Determination of Volatile Organic Compounds by Headspace / GC-MS | | |
| TM132 | In - house Method | ELTRA CS800 Operators Guide | | |
| TM133 | BS 1377: Part 3 1990;BS 6068-2.5 | Determination of pH in Soil and Water using the GLpH pH Meter | | |
| TM157 | HP 6890 Gas Chromatograph (GC) system and HP 5973 Mass Selective Detector (MSD). | Determination of SVOC in Soils by GC-MS extracted by sonication in DCM/Acetone | | |
| TM173 | Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria | Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GC-FID | | |
| TM181 | US EPA Method 6010B | Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES | | |
| TM218 | Microwave extraction – EPA method 3546 | Microwave extraction - EPA method 3546 | | |
| TM222 | In-House Method | Determination of Hot Water Soluble Boron in Soils (10:1 Water:soil) by IRIS Emission Spectrometer | | |

[1] Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.

# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 140514-91 | **Location:** | Cole Green | **Order Number:** | 9Y0074-103-100 |
| **Job:** | H_RHASKON_PTB-82 | **Customer:** | Royal Haskoning | **Report Number:** | 270988 |
| **Client Reference:** | 9Y0074 103 100 | **Attention:** | Declan Fives | **Superseded Report:** | |

## Test Completion Dates

| **Lab Sample No(s)** | 9282402 | 9282406 |
|---|---|---|
| **Customer Sample Ref.** | BH11 | BH11 |
| **AGS Ref.** | | |
| **Depth** | 1.00 | 5.00 |
| **Type** | SOLID | SOLID |
| Boron Water Soluble | 21-May-2014 | 21-May-2014 |
| EPH CWG (Aliphatic) GC (S) | 19-May-2014 | 19-May-2014 |
| EPH CWG (Aromatic) GC (S) | 19-May-2014 | 19-May-2014 |
| GRO by GC-FID (S) | 23-May-2014 | 22-May-2014 |
| Metals in solid samples by OES | 20-May-2014 | 20-May-2014 |
| PAH by GCMS | 20-May-2014 | 20-May-2014 |
| pH | 19-May-2014 | 16-May-2014 |
| Sample description | 15-May-2014 | 15-May-2014 |
| Semi Volatile Organic Compounds | 23-May-2014 | |
| Total Organic Carbon | 22-May-2014 | 22-May-2014 |
| TPH CWG GC (S) | 23-May-2014 | 22-May-2014 |
| VOC MS (S) | 22-May-2014 | |

# CERTIFICATE OF ANALYSIS

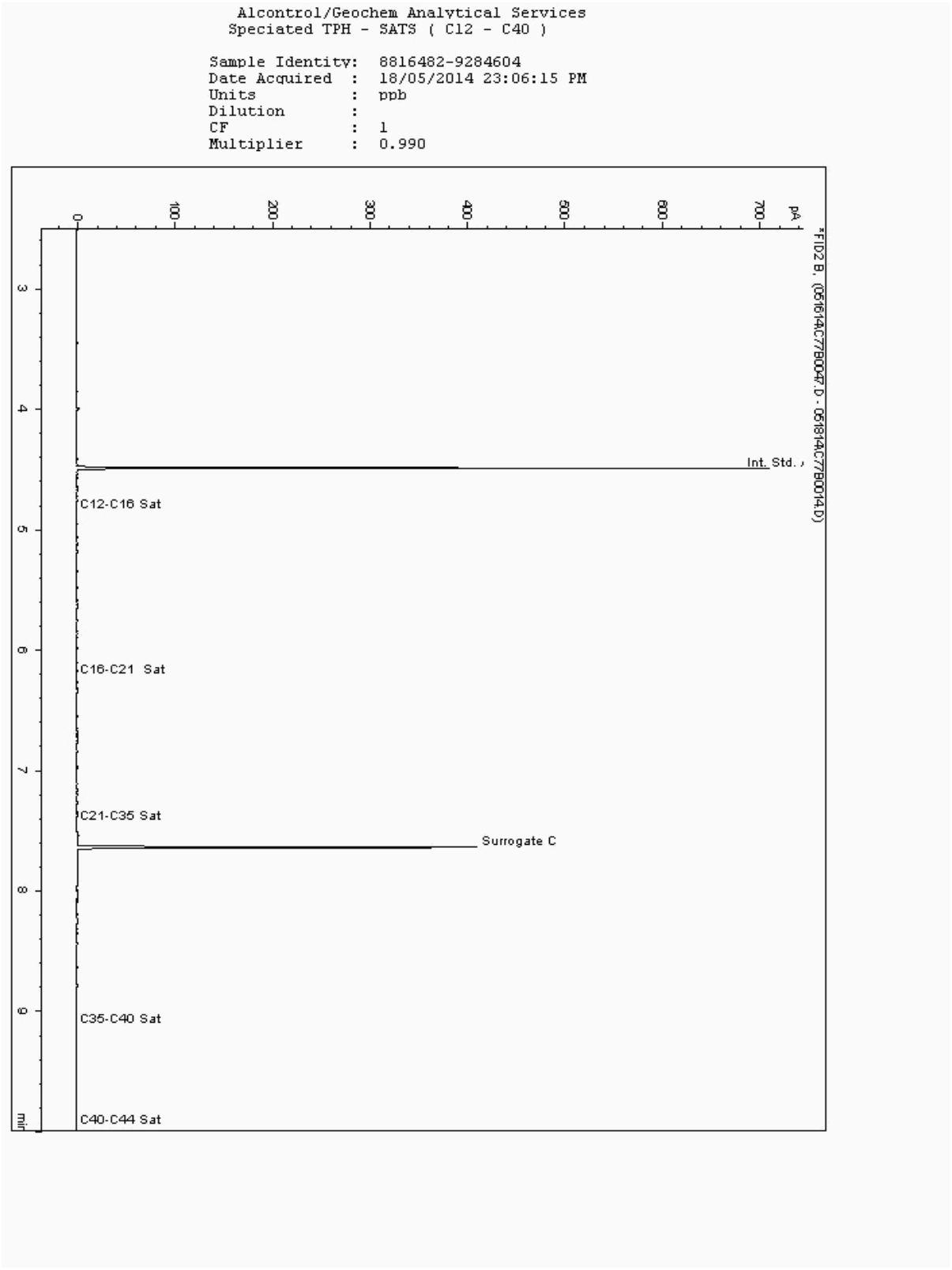
| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 140514-91 | **Location:** | Cole Green | **Order Number:** | 9Y0074-103-100 |
| **Job:** | H_RHASKON_PTB-82 | **Customer:** | Royal Haskoning | **Report Number:** | 270988 |
| **Client Reference:** | 9Y0074 103 100 | **Attention:** | Declan Fives | **Superseded Report:** | |

## Chromatogram

**Analysis:** EPH CWG (Aliphatic) GC (S)

**Sample No :** 9284604
**Sample ID :** BH11

**Depth :** 5.00



# CERTIFICATE OF ANALYSIS

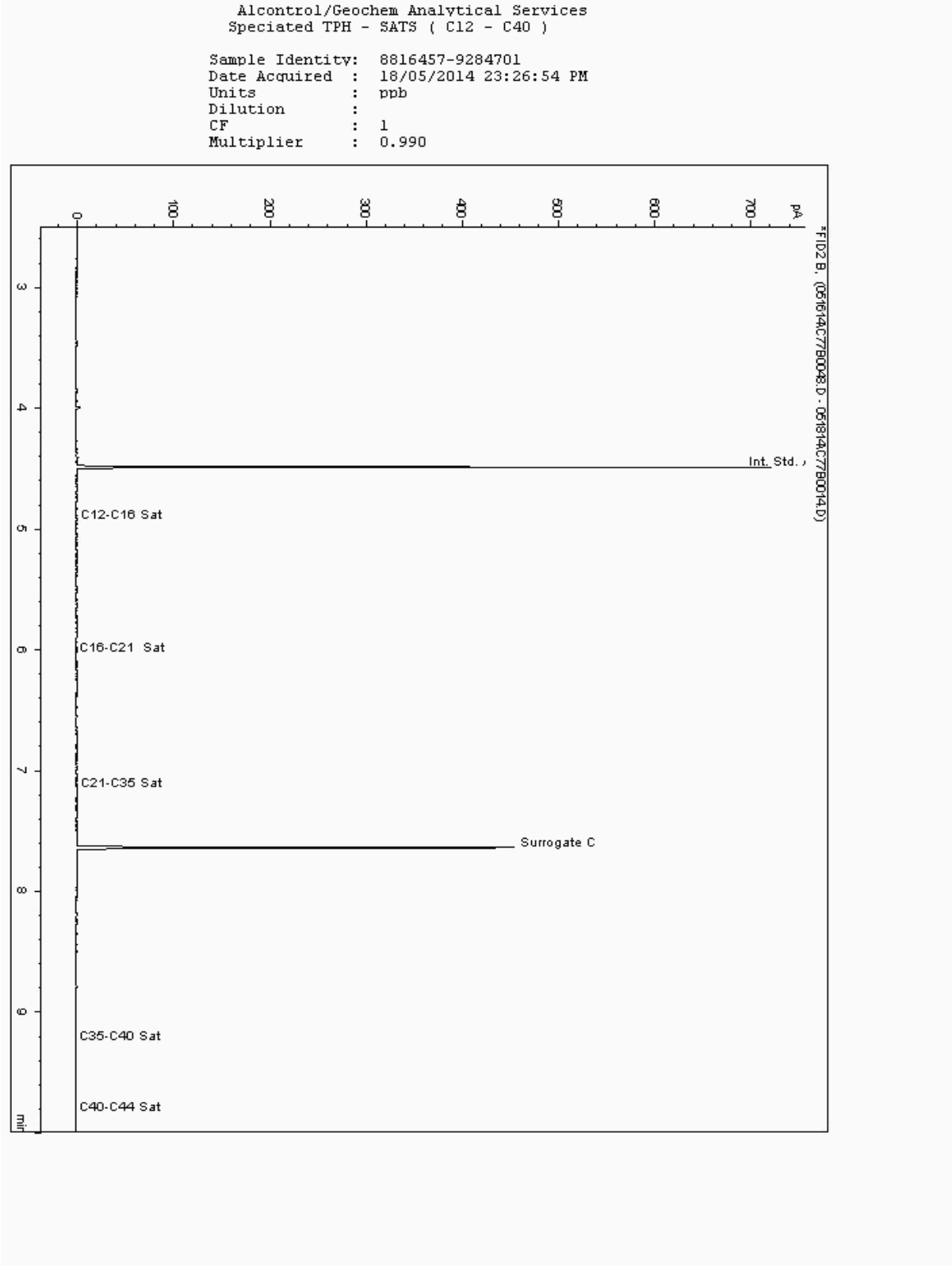
| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 140514-91 | **Location:** | Cole Green | **Order Number:** | 9Y0074-103-100 |
| **Job:** | H_RHASKON_PTB-82 | **Customer:** | Royal Haskoning | **Report Number:** | 270988 |
| **Client Reference:** | 9Y0074 103 100 | **Attention:** | Declan Fives | **Superseded Report:** | |

## Chromatogram

**Analysis:** EPH CWG (Aliphatic) GC (S)

**Sample No :** 9284701
**Sample ID :** BH11

**Depth :** 1.00



# CERTIFICATE OF ANALYSIS

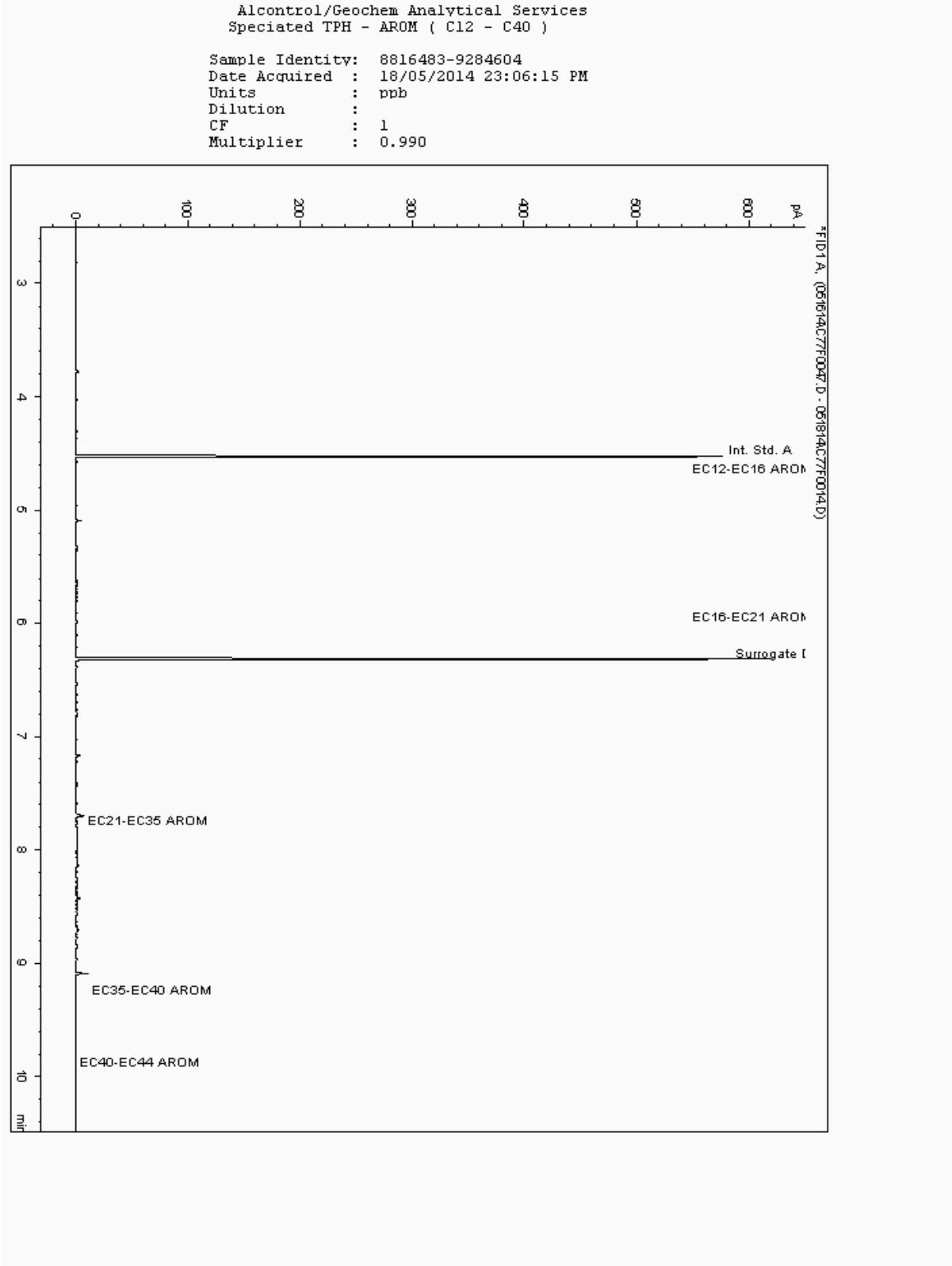
| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 140514-91 | **Location:** | Cole Green | **Order Number:** | 9Y0074-103-100 |
| **Job:** | H_RHASKON_PTB-82 | **Customer:** | Royal Haskoning | **Report Number:** | 270988 |
| **Client Reference:** | 9Y0074 103 100 | **Attention:** | Declan Fives | **Superseded Report:** | |

## Chromatogram

**Analysis:** EPH CWG (Aromatic) GC (S)

**Sample No :** 9284604
**Sample ID :** BH11

**Depth :** 5.00



# CERTIFICATE OF ANALYSIS

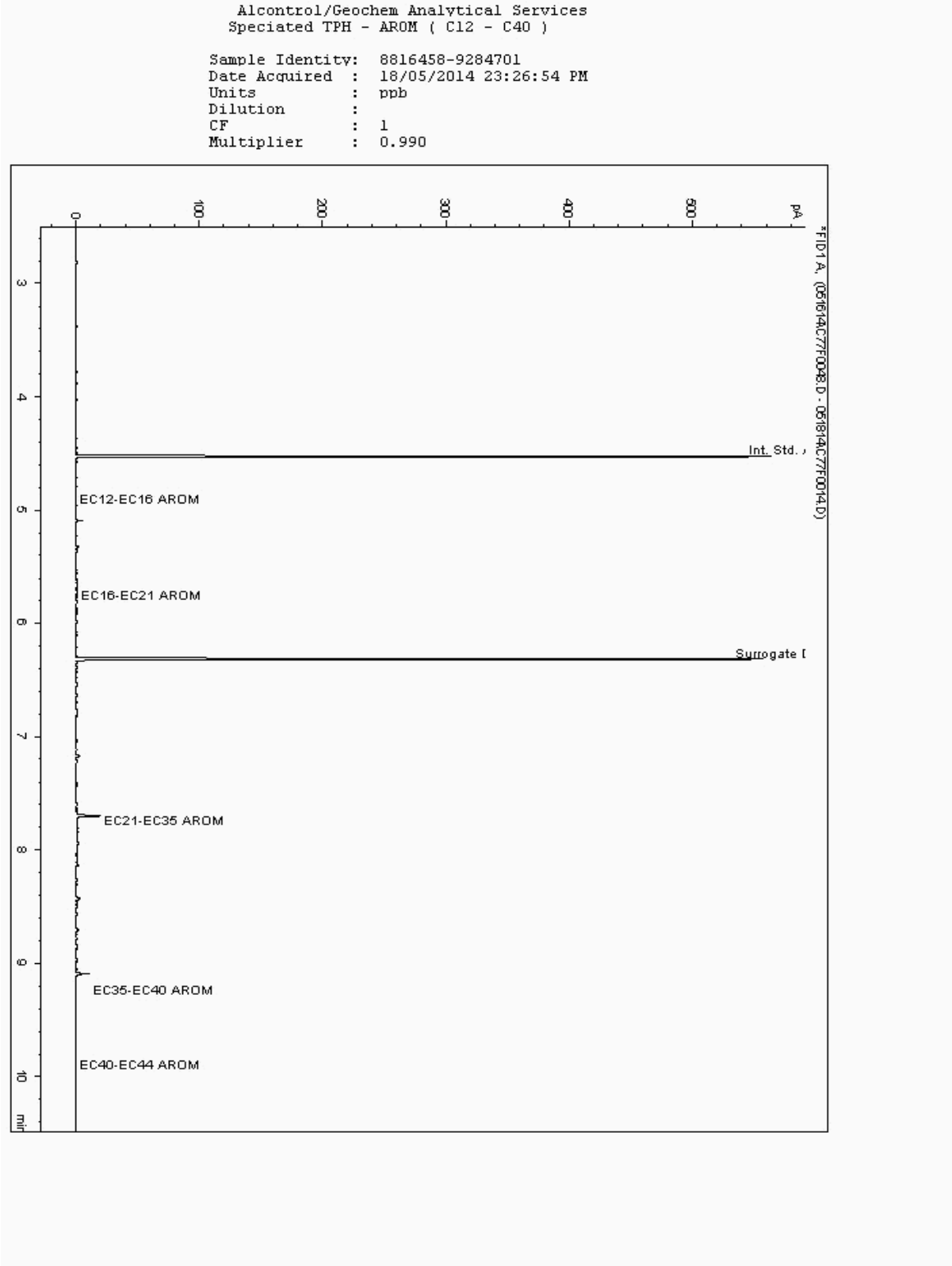
| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 140514-91 | **Location:** | Cole Green | **Order Number:** | 9Y0074-103-100 |
| **Job:** | H_RHASKON_PTB-82 | **Customer:** | Royal Haskoning | **Report Number:** | 270988 |
| **Client Reference:** | 9Y0074 103 100 | **Attention:** | Declan Fives | **Superseded Report:** | |

## Chromatogram

**Analysis:** EPH CWG (Aromatic) GC (S)

**Sample No :** 9284701
**Sample ID :** BH11

**Depth :** 1.00



# CERTIFICATE OF ANALYSIS

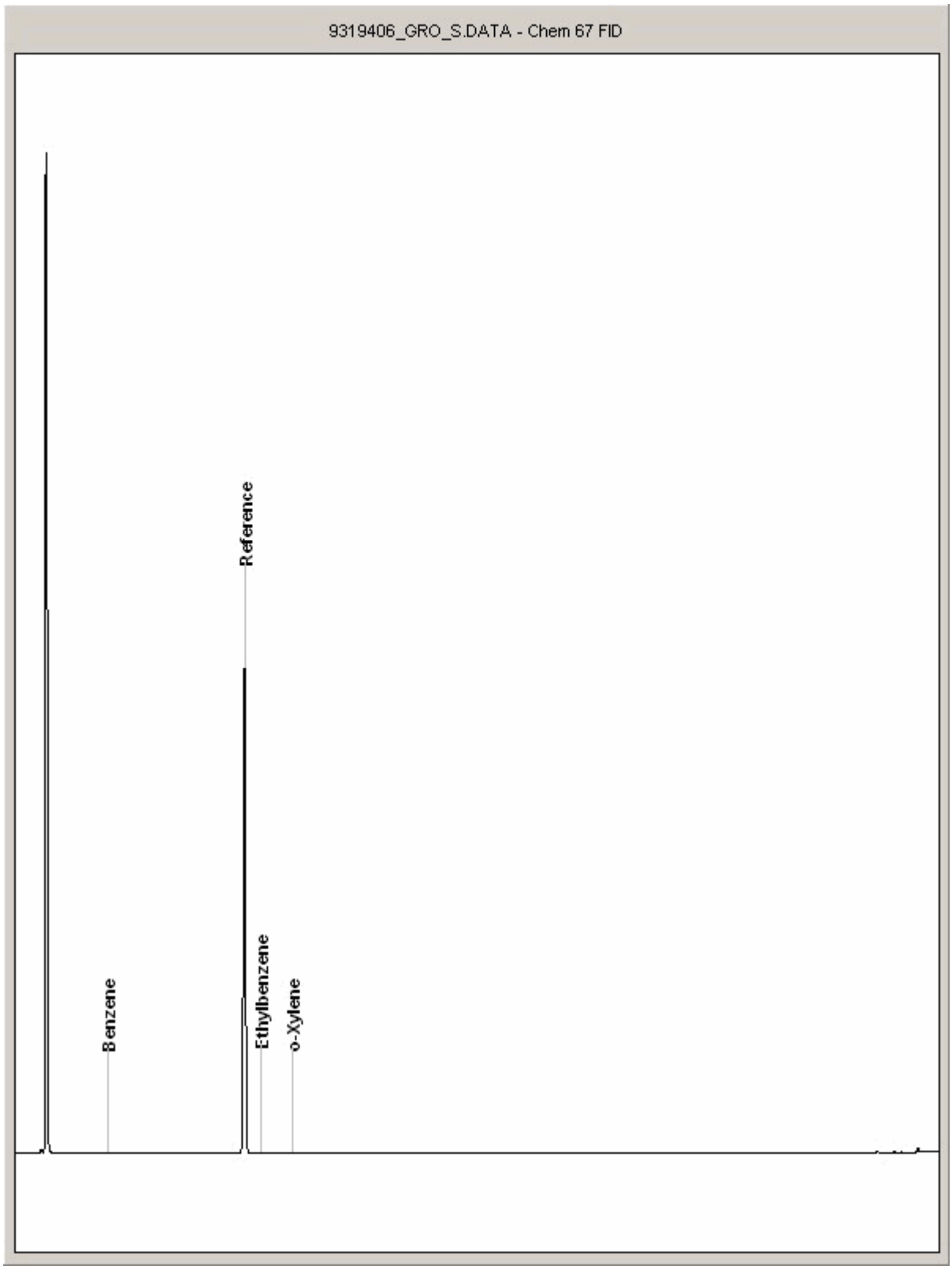
| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 140514-91 | **Location:** | Cole Green | **Order Number:** | 9Y0074-103-100 |
| **Job:** | H_RHASKON_PTB-82 | **Customer:** | Royal Haskoning | **Report Number:** | 270988 |
| **Client Reference:** | 9Y0074 103 100 | **Attention:** | Declan Fives | **Superseded Report:** | |

## Chromatogram

**Analysis:** GRO by GC-FID (S)

**Sample No :** 9319406
**Sample ID :** BH11

**Depth :** 5.00



# CERTIFICATE OF ANALYSIS

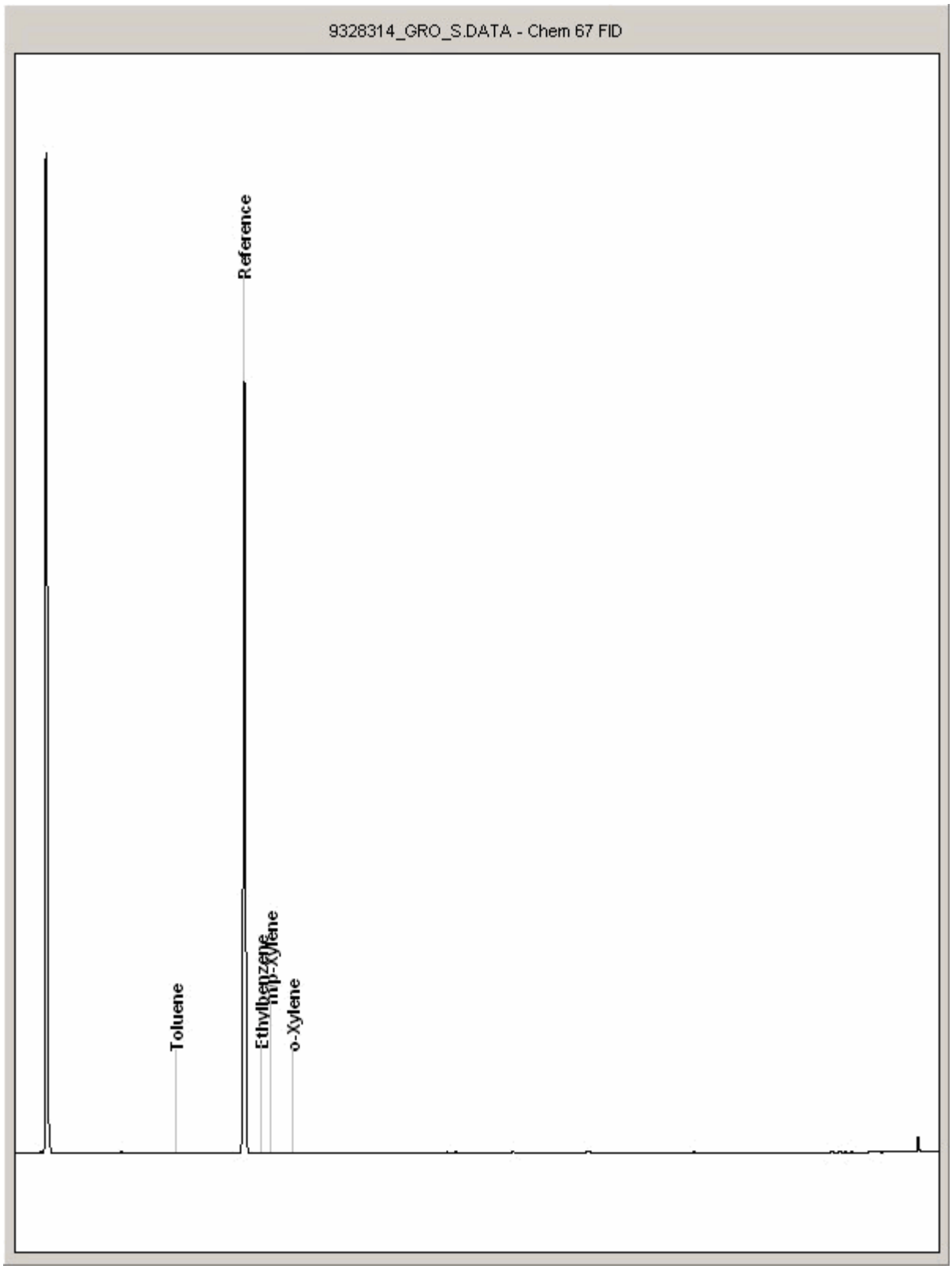
| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 140514-91 | **Location:** | Cole Green | **Order Number:** | 9Y0074-103-100 |
| **Job:** | H_RHASKON_PTB-82 | **Customer:** | Royal Haskoning | **Report Number:** | 270988 |
| **Client Reference:** | 9Y0074 103 100 | **Attention:** | Declan Fives | **Superseded Report:** | |

## Chromatogram

**Analysis:** GRO by GC-FID (S)

**Sample No :** 9328314
**Sample ID :** BH11

**Depth :** 1.00



# CERTIFICATE OF ANALYSIS

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 140514-91 | **Location:** | Cole Green | **Order Number:** | 9Y0074-103-100 |
| **Job:** | H_RHASKON_PTB-82 | **Customer:** | Royal Haskoning | **Report Number:** | 270988 |
| **Client Reference:** | 9Y0074 103 100 | **Attention:** | Declan Fives | **Superseded Report:** | |

# Appendix

1. Results are expressed on a dry weight basis (dried at 35ºC) for all soil analyses except for the following: NRA Leach tests, flash point, ammonium as NH4 by the BRE method, VOC TICS, SVOC TICS, TOF-MS SCAN/SEARCH and TOF-MS TICS.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for both soil jars, tubs and volatile jars. All waters and vials will be discarded 10 days after the analysis is completed (e-mailed). All material removed during an asbestos containing material screen and analysed for the presence of asbestos will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be screened in house for the presence of large asbestos containing material fragments/pieces. If no asbestos containing material is found this will be reported as 'no asbestos containing material detected'. If asbestos containing material is detected it will be removed and analysed by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If asbestos containing material is present no further analysis will be undertaken. At no point is the fibre content of the soil sample determined.

7. If no separate volatile sample is supplied by the client, the integrity of the data may be compromised if the laboratory is required to create a sub-sample from the bulk sample -similarly, if a headspace or sediment is present in the volatile sample. This will be flagged up as an invalid VOC on the test schedule or recorded on the log sheet.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP -No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals -total metals must be requested separately.

11. A table containing the date of analysis for each parameter is not routinely included with the report, but is available upon request.

12. Results relate only to the items tested

13. **Surrogate recoveries** -Most of our organic methods include surrogates, the recovery of which is monitored and reported. For EPH, MO, PAH, GRO and VOCs on soils the result is not surrogate corrected, but a percentage recovery is quoted. Acceptable limits for most organic methods are 70 -130 %.

14. **Product analyses** -Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors
employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethyphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 14).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. Our MCERTS accreditation for PAHs by GCMS applies to all product types apart from Kerosene, where naphthalene only is not
accredited.

19. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

20. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

21. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

22. For all leachate preparations (NRA, DIN, TCLP, BSEN 12457-1, 2, 3) volatile loss may occur, as we do not employ zero headspace extraction.

23. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials -whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute themajor part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

24. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C4 -C10 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

## SOLID MATRICES EXTRACTION SUMMARY

| ANALYSIS | D/C OR WET | EXTRACTION SOLVENT | EXTRACTION METHOD | ANALYSIS |
|---|---|---|---|---|
| SOLVENT EXTRACTABLE MATTER | D&C | DCM | SOXTHERM | GRAVIMETRIC |
| CYCLOHEXANE EXT. MATTER | D&C | CYCLOHEXANE | SOXTHERM | GRAVIMETRIC |
| THIN LAYER CHROMATOGRAPHY | D&C | DCM | SOXTHERM | IATROSCAN |
| ELEMENTAL SULPHUR | D&C | DCM | SOXTHERM | HPLC |
| PHENOLS BY GCMS | WET | DCM | SOXTHERM | GCMS |
| HERBICIDES | D&C | HEXANE/ACETONE | SOXTHERM | GCMS |
| PESTICIDES | D&C | HEXANE/ACETONE | SOXTHERM | GCMS |
| EPH (DRO) | D&C | HEXANE/ACETONE | END OVER END | GC-FID |
| EPH (MIN OIL) | D&C | HEXANE/ACETONE | END OVER END | GC-FID |
| EPH (CLEANED UP) | D&C | HEXANE/ACETONE | END OVER END | GC-FID |
| EPH CWG BY GC | D&C | HEXANE/ACETONE | END OVER END | GC-FID |
| PCB TOT / PCB CON | D&C | HEXANE/ACETONE | END OVER END | GCMS |
| POLYAROMATIC HYDROCARBONS (MS) | WET | HEXANE/ACETONE | MICROWAVE TM218. | GCMS |
| C8-C40 (C9C40) EZ FLASH | WET | HEXANE/ACETONE | SHAKER | GC-EZ |
| POLYAROMATIC HYDROCARBONS RAPID GC | WET | HEXANE/ACETONE | SHAKER | GC-EZ |
| SEMI VOLATILE ORGANIC COMPOUNDS | WET | DCM/ACETONE | SONICATE | GCMS |

## LIQUID MATRICES EXTRACTION SUMMARY

| ANALYSIS | EXTRACTION SOLVENT | EXTRACTION METHOD | ANALYSIS |
|---|---|---|---|
| PAH/MS | HEXANE | STIRRED EXTRACTION (STIR-BAR) | GCMS |
| EPH | HEXANE | STIRRED EXTRACTION (STIR-BAR) | GC FID |
| EPH CWG | HEXANE | STIRRED EXTRACTION (STIR-BAR) | GC FID |
| MINERAL OIL | HEXANE | STIRRED EXTRACTION (STIR-BAR) | GC FID |
| PCB 7 CONGENERS | HEXANE | STIRRED EXTRACTION (STIR-BAR) | GCMS |
| PCB TOTAL | HEXANE | STIRRED EXTRACTION (STIR-BAR) | GCMS |
| SVOC | DCM | LIQUID/LIQUID SHAKE | GCMS |
| FREE SULPHUR | DCM | SOLID PHASE EXTRACTION | HPLC |
| PEST OCP/OPP | DCM | LIQUID/LIQUID SHAKE | GCMS |
| TRIAZINE HERBS | DCM | LIQUID/LIQUID SHAKE | GCMS |
| PHENOLS/MS | DCM | SOLID PHASE EXTRACTION | GCMS |
| TPH by INFRARED (IR) | TCE | LIQUID/LIQUID SHAKE | HPLC |
| MINERAL OIL by IR | TCE | LIQUID/LIQUID SHAKE | HPLC |
| GLYCOLS | NONE | DIRECT INJECTION | GCMS |

**Identification of Asbestos in Bulk Materials**

**The results for asbestos identification for soil samples are obtained from possible Asbestos Containing Material, removed during the 'Screening of soils for Asbestos Containing Materials', which have been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).**

| Asbestos Type | Common Name |
|---|---|
| Chrysotile | White Asbestos |
| Amosite | Brown Asbestos |
| Crocidolite | Blue Asbestos |
| Fibrous Actinolite | - |
| Fibrous Anthophyllite | - |
| Fibrous Tremolite | - |

**Visual Estimation Of Fibre Content**

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: -
Trace -Where only one or two asbestos fibres were identified.

**Further guidance on typical asbestos fibre content of manufactured products can be found in MDHS 100.**

**The identification of asbestos containing materials falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.**

Last Updated : 2010/09/08

| | | | | | |
|---|---|---|---|---|---|
| **SDG:** | 140514-91 | **Location:** | Cole Green | **Order Number:** | 9Y0074-103-100 |
| **Job:** | H_RHASKON_PTB-82 | **Customer:** | Royal Haskoning | **Report Number:** | 270988 |
| **Client Reference:** | 9Y0074 103 100 | **Attention:** | Declan Fives | **Superseded Report:** | |

# Appendix
## General

1. Results are expressed on a dry weight basis (dried at 35ºC) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICS and SVOC TICS.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as “Not detected”. If no asbestos fibre types are found all will be reported as “Not detected” and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible. The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP -No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals -total metals must be requested separately.

11. Results relate only to the items tested.

12. LODs for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** -Most of our organic methods include surrogates, the recovery of which is monitored and reported. For EPH, MO, PAH, GRO and VOCs on soils the result is not surrogate corrected, but a percentage recovery is quoted. Acceptable limits for most organic methods are 70 -130 %.

14. **Product analyses** -Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors
employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethyphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

20. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

21. For all leachate preparations (NRA, DIN, TCLP, BSEN 12457-1, 2, 3) volatile loss may occur, as we do not employ zero headspace extraction.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

## Sample Deviations

| | |
|---|---|
| 1 | Container with Headspace provided for volatiles analysis |
| 2 | Incorrect container received |
| 3 | Deviation from method |
| 4 | Holding time exceeded before sample received |
| 5 | Samples exceeded holding time before presevation was performed |
| § | Sampled on date not provided |
| ♦ | Sample holding time exceeded in laboratory |
| @ | Sample holding time exceeded due to sampled on date |
| & | Sample Holding Time exceeded - Late arrival of instructions. |

## Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

| Asbestos Type | Common Name |
|---|---|
| Chrysotile | White Asbestos |
| Amosite | Brown Asbestos |
| Crocidolite | Blue Asbestos |
| Fibrous Actinolite | - |
| Fibrous Anthophyllite | - |
| Fibrous Tremolite | - |

**Visual Estimation Of Fibre Content**

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: -
Trace -Where only one or two asbestos fibres were identified.

**Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.**

**The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.**