

Comprehensive Groundwater Monitoring Event

Shell Hitchin

GSAP ID: 10019011



Prepared by:

URS Infrastructure &
Environment UK Limited

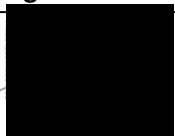
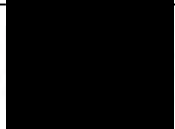
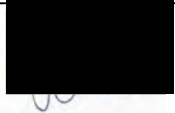
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Client Company Name: Shell UK Oil Products Ltd.
Issued By: URS Infrastructure & Environment UK Limited
St Georges House
5 St Georges Road
Wimbledon
SW19 4DR
UK

Document Production / Approval Record

Issue No: 02	Name	Signature	Date	Position
Prepared by	Guillem Badiella-Anglada		October 2014	Environmental Consultant
Checked by	Jocelyn Willis		October 2014	Project Manager
Approved by	Geoff Jones		October 2014	Project Director

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EXECUTIVE SUMMARY

Background and Objective

URS undertook a post construction Comprehensive Groundwater Monitoring Event (GME) at Shell Hitchin located on Bedford Road, Hitchin, Hertfordshire, SG5 2TY. This report has been collated to provide a status of groundwater quality beneath the site following redevelopment works in 2013.

Site Setting

The site is currently an active petrol filling station located in a mixed residential and commercial area. There are two (2) active tanks with four (4) compartments in use at the site installed during redevelopment works between March and August 2013.

Scope of Work

Two (2) GMEs were undertaken at the site in March and June 2014. The scope of work of each GME included groundwater sampling of five (5) monitoring wells and an assessment of potential risks to controlled waters and human health receptors.

Field Observations

Mild hydrocarbon odours were observed during purging of well BH102 located adjacent to the eastern site boundary during the March and June 2014 monitoring events. No evidence of hydrocarbon impact was observed in any other monitoring wells, including BH102A (located approximately 3m west of BH102 and closer to the tank farm). Phase-separate hydrocarbons (PSH) was not identified in any of the wells.

Geology and Hydrogeology

The Controlled Waters receptors for the site are the underlying Zig Zag Chalk (Principal Aquifer) and the superficial deposits of the Lowestoft Formation (Unproductive Strata) and Glaciofluvial Deposits (Secondary A Aquifer). The site is close to the edge of a significant buried valley feature with drift deposits reaching up to 80 metres (m) in thickness within 1 kilometre (km) to the north west, north and north east of the site.

The site is not located within a Source Protection Zone. There are no reported licensed or private groundwater abstractions within 1km of the site. The closest surface water feature is the Bearton Pond located approximately 200m north of the site. The River Hiz is located approximately 850m east of the site, the River Oughton is located 1km north of the site and the River Purwell is located approximately 1.2km north east of the site.

Groundwater was encountered in all five (5) groundwater monitoring wells at elevations ranging from 63.9m Above Ordnance Datum (AOD) to 65.1m AOD. The average depth to groundwater was 6.3m below ground level (bgl) with an inferred flow to the east in the direction of the River Purwell located approximately 1.2km north east of the site..

Conclusions

Groundwater results were compared to Stage 2 human health GAC and Stage 3 controlled waters SSAC. The principal conclusions were as follows:

- Potentially significant risks to human health receptors (on-site workers, off-site workers and off-site residents) have not been identified at the site,
- Potentially significant risks to the underlying Secondary A Aquifer or Principal Aquifer have not been identified at the site.

The site is considered suitable for on-going oil use.

1. INTRODUCTION

URS Infrastructure & Environment UK Limited (URS) was requested by Shell UK Oil Products (Shell) to undertake a Comprehensive Groundwater Monitoring Event (GME) at Shell Hitchin located at Bedford Road, Hitchin, Hertfordshire, SG5 2TY.

1.1. Objectives

This report has been collated to provide a status of groundwater quality beneath the site following redevelopment works in 2013.

1.2. Scope of Work

- Completion of two post construction groundwater monitoring events in March 2014 and June 2014 of the five (5) on-site groundwater monitoring wells.
- Assessment of the magnitude, type, extent and trend of chemicals of potential concern (COPC) present through the performance of laboratory and/or on-site analysis groundwater for various chemical indicators associated with operation as a petrol filling station.
- Screening of analytical results against appropriate Generic Assessment Criteria (GAC) to determine the requirement for a Detailed Quantitative Risk Assessment (DQRA).
- Completion and submission of this Comprehensive GME Report.

2. BACKGROUND INFORMATION

2.1. Site Identification Details

Table A – Site Information	
Site Name	Shell Hitchin
GSAP ID Number	10019011
Site Address	The site is located at Shell Hitchin, Bedford Road, Hitchin, Hertfordshire, SG5 2TY. Figure 1 provides a site location plan.
Grid Reference (easting and northing)	517920 (E), 229840 (N)
Reported Site Area	Approximately 1,500 square metres (m ²)
Freehold/Leasehold	Freehold. URS understands that the site is owned by Shell.
Site Use	The site is currently an active petroleum filling station.
Surrounding Land Use	North: A tyre dealership is situated approximately 5m north of the site beyond an access road. A three-storey apartment block with surrounding garden lies approximately 30 metres (m) north of the site. South: A hotel lies approximately 5m south of the site beyond a small car parking area. Residential properties are situated approximately 30m south of the site. East: The site is bounded to the east by the A550 Bedford Road. Hitchin Town FC football ground is approximately 20m east of the site. West: The site is bounded to the west by a garage and car park. Residential properties with gardens lie approximately 20m west the site.

2.2. Environmental Setting

Table B – Environmental Setting	
Surface Water Features and Surface Water Abstractions	The closest surface water feature is Bearton Pond, located approximately 200 m north of the site. The River Hiz is located approximately 850m east of the site, the River Oughton is located 1kilometre (km) north of the site and the River Purwell is located approximately 1.2km north east of the site. There is one active and one historical surface water abstraction identified within 1km of the site. • William Ransom and Sons between 835m and 1.1km south from the site, licensed to abstract water from the River Hiz for cooling. Status: Current. • G W Russell & Son 720m south east of the site, licensed to abstract water from the River Hiz for cooling. Status: Revoked. There are a further 4 additional current surface water abstractions between 1km and 2km from the site.
Geology	The site is shown to be underlain by the Lowestoft Formation, which forms an extensive sheet of chalky till, together with outwash sands and gravels, silts and clays. The Lowestoft Formation is shown on the 1:50,000 geological map to be underlain and surrounded by Glaciofluvial Deposits (classified as a Secondary A Aquifer). It has been assumed that the on-site boreholes are installed in the more sensitive Secondary A Aquifer as the vertical and horizontal extent of the Lowestoft Till and Glaciofluvial Deposit units within the permeable drift are not known. The site is close to the edge of a significant buried valley feature with drift deposits reaching up to 80m in thickness within 1km to the north west, north and north east of the site. The Bedrock Geology of the site is reported to be the Zig Zag Chalk Formation. This consists of mostly firm, pale grey to off-white blocky chalk with a lower part characterised by rhythmic alternations of marls and marly chalks with firm white chalk. Thin gritty, silty chalk beds act as markers in the sequence. The thickness is typically 35–50 m. During intrusive works by URS in September 2011 and February 2012, Chalk was encountered at a depth of 5.4m below ground level (bgl) at boreholes BH105 and BH106 located in the western area of the site and at 14.2m bgl at BH102A located in the eastern area of site.
Hydrogeology	The Environment Agency (EA) classifies the Lowestoft Formation as Unproductive Strata. The underlying Glaciofluvial Deposits are classified as a Secondary A Aquifer. The Zig Zag Chalk Formation is classified as a Principal Aquifer.
	The site is not located within a Source Protection Zone and there are no reported licensed or private groundwater abstractions within 1km of the site. SPZ's are present 2km west, 2km south and 4km to the east of the site.

Table B – Environmental Setting

	There are four current groundwater abstractions between 1 and 2km from the site: • Pilkington Farms 1.4km west of the site is licensed to abstract groundwater from chalk sourced from a well and borehole. Abstraction is currently unspecified but previous permit was for Household Water Supply: Drinking, Cooking, Sanitary, Washing; (Small Garden). Status: Perpetuity. • Environment Agency 1.7km south of the site is licensed to abstract groundwater from a well for Environmental use: Remedial/Wetland Support: Transfer Between Sources. Status: Not Supplied. • DPH Parker 2km north west of the site is licensed to abstract groundwater from chalk for General Farming and Domestic use. Status: Perpetuity. • Veolia Water Central Limited 2km west of the site is licensed to abstract groundwater from chalk for Public Water Supply: Potable Water Supply – Direct. Status: Perpetuity. License was previously held by Three Valleys Water Plc. It has been confirmed by North Hertfordshire District Council that there are no reported private water abstractions within 2km of the site.
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2.3. Chronology of Activities

Table C – Chronology of Activities	
Activity	Summary
Dates of accidental release or known source of Chemicals of Potential Concern (COPC)	Records held by the local Petroleum Officer do not indicate any significant accidental releases at the site. No significant wet stock variance reported.
Dates of closure, tank removal, soil removal etc	Information from the Petroleum Officer report dated August 2011 indicates that the site underwent development works in 2000 which consisted of a re-pump. Between March and August 2013 the site underwent further redevelopment where five active tanks (comprising seven compartments) and one solid filled decommissioned tank were removed from the site and replaced with two new double walled 65KL split compartment tanks.
Previous site investigations and/or remediation - 1999	<u>GeoDelft, Petroleum Risk Tier 1 report ref; C1402.SG474.8008, dated May 1999 (Ref.1)</u> A GeoDelft Tier 1 report identified no historical known pollution incidents at the site. Concentrations of VOC <50ppm were recorded at the site. Minimal impact was identified at the site.
2011	<u>URS Preliminary Phase I Investigation Report (Ref R46370079-001) Final Phase I; dated October 2011) (Ref.2)</u> A Phase 1 Investigation was undertaken by URS in September 2011 and included an initial desk based investigation and site walkover to provide information on the environmental site setting. The preliminary risk assessment identified a number of potential pollutant linkages, summarised as follows: Human Health • Migration of hydrocarbon vapours from potentially impacted shallow soils and/or groundwater to on-site workers within the shop area and off-site workers to the north and east of the site. • Permeation of hydrocarbons from potentially impacted soil into plastic water supply pipes followed by ingestion by on-site shop staff. Controlled Waters • Vertical migration of COPC from potentially impacted shallow soils into perched water and/or the shallow groundwater within the shallow Drift Deposits that border the site (Secondary A Aquifer), and potentially

Table C – Chronology of Activities	
Activity	Summary
	deeper groundwater in the underlying Zig Zag Chalk Formation (Principal Aquifer). Migration of COPC from potentially impacted shallow soils into perched water and/or the shallow groundwater followed by lateral migration to Surface Waters (Bearton Pond located 200m north of the site, The River Hiz located approximately 850m east of the site, the River Oughton located 1km north of the site and the River Purwell located approximately 1.2km north east of the site).
2012	<u>URS Phase 2 Environmental Site Investigation Report (Ref R46370079-002) Final; dated April 2012 (Ref.3)</u> A comprehensive investigation was undertaken by URS in December 2011. Intrusive works included the drilling and installation of 5 monitoring wells into the superficial deposits and 3 vapour wells at the site. A DQRA was carried out on available soil, groundwater and vapour data. The principal conclusions were: • No significant risks to human health (on-site workers or off-site residents) were identified • Potentially unacceptable risks to groundwater in the underlying superficial deposits were identified from reported concentrations of benzene, TPH Aromatics <C5-C7 and naphthalene in groundwater at a 50m compliance point. The 50m compliance point was selected based on the hazardous classification of these substances, the presence of the Principal Aquifer beneath the superficial deposits and the uncertainty in groundwater flow direction and gradient. Potentially unacceptable risks to groundwater in the underlying Chalk Principal aquifer were identified from reported concentrations of benzene at a 50m compliance point however this assessment was based on a number of assumptions in the absence of site specific data.
2013	<u>URS Phase 2 Comprehensive Environmental Site Assessment – Further Investigation (Ref R46370079-003) Final; dated February 2013) (Ref.4)</u> To refine the DQRA, URS completed further intrusive works including the installation of two monitoring wells into the Zig Zag Chalk Formation, and one monitoring well into the superficial deposits. URS conducted a Controlled Waters Detailed Quantitative Risk Assessment (DQRA) to assess the significance of identified potential pollutant linkages from soil and groundwater monitoring from both the December 2011 and

Table C – Chronology of Activities	
Activity	Summary
	February 2012 investigations and January 2013 GME. Two models were created for the site to assess potential risks to groundwater in the Chalk and groundwater in the Drift Deposits: The principal conclusions of the Controlled Waters DQRA are summarised below: <u>Model 1: Groundwater in the Chalk</u> Of the COPC groups assessed, soil concentrations of naphthalene and fluoranthene were simulated to present a theoretical risk to the Principal Aquifer at a 50m compliance point considering a 3.6m mixing zone. At 95% confidence the simulated controlled water hazard index (CWHI) for naphthalene and fluoranthene were 15.2 and 3.54 respectively. If additional dilution is considered within a 10m mixing zone, the hazard indices of the simulated concentrations decrease proportionally, indicating a marginal risk of naphthalene exceeding the GAC at 50m, and no risk of fluoranthene exceeding the withdrawn EEC MAC. No significant risks were identified from concentrations of COPC in groundwater to the underlying Principal Chalk aquifer at a 50m compliance point. <u>Model 2: Groundwater in the Drift Deposits</u> No significant risks were identified from concentrations of chemicals of potential concern (COPC) in soil to the drift deposits Secondary-A Aquifer. Of the COPC groups assessed, groundwater concentrations of benzene were simulated to present a theoretical risk at the 50m compliance point protective of the Secondary-A Aquifer at a 95% confidence level with a CWHI of 12.0. At the 50th percentile ('most likely'), the model did not simulate a risk from concentrations of benzene at the 50m compliance point with an HI of 0.371. No risks were simulated from benzene at the 100m compliance point. Given the low exploitation potential of the aquifer, an extended compliance point of 100m is considered appropriate. As no risks were simulated at the 95th percentile (worst case) at the extended compliance point, or at the 50th percentile ('most likely'), at the 50m compliance point, from a conservative DQRA, the theoretical risks

Table C – Chronology of Activities	
Activity	Summary
	simulated by the model were considered unlikely to pose a significant risk to controlled waters in the drift.
2013	<u>URS Environmental Strategy Plan (Ref R46370079-004) Final; dated March 2013) (Ref.5)</u> URS prepared an Environmental Remedial Strategy Plan (ESP) to support the environmental aspects of the planning process for a proposed site redevelopment. The ESP was submitted to the local Planning Department of North Hertfordshire District Council; this was accepted in March 2012 as an appropriate remedial strategy to manage identified impact. The findings of the site investigations and risk assessment indicate that no potentially significant risks to human health or controlled waters have been identified. Site investigation was unable to be undertaken in close proximity to the tanks or pump islands at the site. As such it was considered that during the site redevelopment works hydrocarbon-impacted material may be encountered within the excavations, particularly those associated with the removal of underground fuel tank farm. The following strategy was proposed in order to control the potential risks to site workers during the redevelopment phase; to improve the overall environmental condition of the site; and to allow for the assessment of material left in situ. The strategy was based on the assumption that the site would be remediated for Continued Oil Use, with redevelopment of the petrol station forecourt. • Removal of existing USTs as far as practically possible and installation of new USTs in the area; • Removal of potentially hydrocarbon-impacted groundwater that may ingress into excavations (if required); • Collection and chemical analysis of soil verification samples from the base and sides of excavations and from imported fill material, to characterise the material left in situ; • If required, risk assessment on material left in situ that could not be safely or practically removed; and • Validation reporting.

Table C – Chronology of Activities

Activity	Summary
2013	<u>URS Verification Report (Ref R46370079-005) Final; dated October 2013) (Ref.6)</u> URS provided environmental support during the construction programme where five active tanks (comprising seven compartments) and one solid filled decommissioned tank were removed from the site and replaced with two new double walled 65KL split compartment tanks. In conjunction with the fuel infrastructure removal, URS undertook validation sampling of excavations advanced for the removal of the underground storage tanks (USTs), the removal of the fuel infrastructure and the excavation for the new tank farm. A total of 59 soil samples were collected. In total approximately 1,705 m³ of material was excavated and disposed of as inert and non-hazardous waste. A total of about 11 m³ of asbestos impacted material was removed from site as hazardous waste. Resultant excavations were backfilled with approximately 1,070 m³ imported material (excluding poured concrete and tarmac). Following completion of the construction works post construction groundwater monitoring was undertaken at the site. No visual or olfactory signs of hydrocarbon impact were reported in any of the monitoring wells sampled. A risk assessment was undertaken on validation samples collected from soil left in-situ underlying the site and post construction groundwater monitoring data. No potentially significant risks to human health (protective of on-site workers and off-site residents) were identified. No potentially significant risks were identified to groundwater quality within the Drift Deposits Secondary-A Aquifer or the underlying Chalk Principal Aquifer. The site was considered suitable for on-going oil use.

2.4. Site Equipment

Table D: General Information Regarding Fuel Infrastructure Prior to and Post Site Redevelopment	
Site Features	Post Construction
Site Age	Information obtained from the URS Phase 1 Site Assessment Report (Ref. 2) shows the earliest recorded date as a petrol filling station was 1970.
Known Redevelopment on the site	2013
Number of Fuel Islands and Dispensers (Cars and HGVs)	Cars: Three fuel islands (six dispensers).
Gauge system currently operating	Gilbarco Veeder-Root TLS 350R
LPG on the site	Not present.
Number of above ground tanks, capacity and contents	None present.
Number of underground tanks / compartments	Two new USTs; two 65,000L split compartment tanks (20,000/45,000L and 40,000/25,000L).
Number of off-set fill points	Four offset fills for the USTs located to the south of the tank farm.
Evidence of abandoned underground tanks on-site	No evidence of abandoned underground tanks on site remaining.
Underground Tanks Installation Strata	The tanks and fuel infrastructure have been installed into the Superficial Drift Deposits at the site.
Design of the Tanks	Tanks 1 – 4 are doubled skinned steel
Tank Manholes	All tank access chambers are Franklin GRP
Site Interceptor	The interceptor in the north east of the site was replaced with a one chamber superceptor near the site exit. The car wash interceptor remained.

Table D: General Information Regarding Fuel Infrastructure Prior to and Post Site Redevelopment

Site Features	Post Construction
Interceptor Drainage	The interceptor at the north east of the site discharges surface drainage into the main sewer. The interceptor at the south of the site discharges car wash waste water into the main sewer.
Soakaway on the site	None Identified
Known accidental release on-site or wet stock variance	In May 2001 a release of approximately 10 litres of petrol on the forecourt was reported to the Petroleum Officer. This was cleaned up using 2 spill kits.

NOTES:

Origin of information – URS Phase I Environmental Site Investigation, September 2011

Table E: Summary of Fuel Tank / Compartments – Post Development				
Tank number or identification	Tank 1		Tank 2	
Compartment Number	T1	T2	T3	T4
Tank type	Double skinned steel	Double skinned steel	Double skinned steel	Double skinned steel
Tank size (L)	45,000	20,000	40,000	25,000
Product stored	Unleaded	VP Unleaded	Diesel	VP Diesel
Status	Operational	Operational	Operational	Operational
Date of installation	2013	2013	2013	2013
Pipeline details	Fill point is offset	Fill point is offset	Fill point is offset	Fill point is offset
Relative level (RL) of tank base (c)	Assumed to be 4.5 m bgl	Assumed to be 4.5 m bgl	Assumed to be 4.5 m bgl	Assumed to be 4.5 m bgl

Information obtained from Shell As-Built drawing 10019011-FIN-2013-D Finishes Drawing

2.5. Preliminary Conceptual Site Model

Following review of the available data regarding site history, environmental setting, and proposed future use, a preliminary conceptual site model (CSM) was developed, as presented in Table F below. The CSM illustrates the potentially viable source-pathway-receptor linkages which have been identified.

Table F – Preliminary Conceptual Site Model		
Source	Pathway	Receptor
Human Health		
- Impacted soils - Soil vapour - Impacted groundwater	- Lateral and vertical vapour migration and subsequent inhalation. - Particulate - Ingestion, inhalation, dermal contact, with soil particulates. - Permeation - Migration of hydrocarbon substances through plastic potable water supply pipes.	- On-site shop staff and site users. - Off-site workers in garages adjacent to the west and 5m north of the site and hotel 5m south of the site. - Residents of properties adjacent the southern site boundary, 30m to the north of the site and 20m to the west of the site. - Visiting contractors excavating ground.*
Controlled Waters		
- Impacted soils - Impacted groundwater	- Partitioning between soil and pore water. - Leaching of impacted soils. - Lateral migration of impacted groundwater.	- Groundwater within The Zig Zag Chalk Formation (Bedrock) Principal Aquifer and Superficial Deposits that border the site boundary - Bearton Pond approx. 200m north of the site, The River Hiz approx. 850m east of the site and the River Oughton approx. 1000m north of the site

* Potential risks to visiting contractors undertaking intrusive works should be managed by appropriate PPE, risk assessment and method statements. Risks to visiting contractors excavating the ground have therefore not been further assessed.

3. FIELD WORK

3.1. Summary of Field Work

Table G – Summary of Field Work			
Date of Field Work	Two GMEs were completed on the 31 st March 2014 and the 23 st June 2014.		
Site Activities	Field works included the following key tasks for each of the GMEs: - Groundwater level gauging of five (5) groundwater monitoring wells (BH102, BH102A, BH103, BH105A, BH106A). - Collection of field measurements of groundwater quality (pH, conductivity, temperature, redox potential, dissolved oxygen) from five (5) groundwater monitoring wells. - Purging and groundwater sample collection from five (5) groundwater monitoring wells.		
Details of Existing Monitoring Well Network	Five (5) groundwater monitoring wells were installed by URS in September 2011. Monitoring well BH102 was decommissioned during the 2013 construction works at the site and re-instated at the end of the construction programme. Borehole locations are shown on Figure 2. A summary of the well installation details is presented below:		
	Borehole ID	Location	Monitoring Well Screening Depth
	BH102	Eastern boundary of the site.	5.8m – 9.0m
	BH102A	Eastern boundary of the site.	11.3m – 13.5m
	BH103	Southern corner of the site.	5.8m – 9.0m
	BH105A	Northern corner of the site.	6.3m – 8.5m
	BH106A	Western area of the site.	4.8m – 8.5m
Surveying	The elevations of groundwater monitoring well standpipes by URS were surveyed to National Grid coordinates and m AOD by ADP Group Ltd.		

Table G – Summary of Field Work

Groundwater gauging and sampling	Groundwater level gauging and sampling was undertaken on the 31st March 2014 and the 23rd June 2014. Prior to sampling, the depth to groundwater and phase separate hydrocarbons (PSH) (if present) was gauged using a portable oil / water interface probe. Groundwater gauging results are presented in Appendix A. Groundwater wells (BH102, BH102A, BH103, BH105A and BH106A) were purged and sampled using a low-flow sampling method incorporating a flow through cell and dedicated tubing. During well purging activities, water was periodically monitored for temperature, pH, conductivity, dissolved oxygen (DO), and oxidation/reduction potential (ORP or Redox) using a water quality meter to determine when representative formation waters were being encountered. Following sufficient recharge, groundwater samples were collected. All groundwater samples were collected into laboratory supplied containers, labelled and placed on ice.
Potable water sampling	Potable water samples were not collected this time.
Field quality control sampling	The following field quality control samples were collected as part of this GME: Groundwater: one (1) duplicate sample, one (1) trip blank, and one (1) equipment blank.
Sustainability	In implementing the scope of works outlined above, URS made the following considerations of sustainability: Field work was staffed from local URS office to reduce travel impact.

Table H – Field Screening			
Groundwater Observations	Groundwater was encountered in all the monitoring wells installed at the site. Slight hydrocarbon odours were noted during the purging of BH102 during both GMEs.		
Phase Separate Hydrocarbons (PSH)	PSH was not observed in any of the groundwater monitoring wells during March and June 2014 GMEs.		
Field Groundwater Quality Parameters	Groundwater parameters were collected during the GMEs (presented in Appendix A) and the following was noted:		
		March 2014 GME	June 2014 GME
	Redox potential (corrected to a Standard Hydrogen Electrode) (mV)	From 112 (BH102) to 435 (BH102A)	From 99 (BH102) to 523 (BH102A)
	Electrical conductivity (µS/cm)	From 587 (BH106A) to 794 (BH105A)	From 732 (BH106A) to 1003 (BH105A)
	PH	From 6.61 (BH103) to 7.13 (BH106A)	From 6.17 (BH102A) to 6.99 (BH102)
	Temperature (°C)	From 12.8 (BH103) to 13.1 (BH102)	From 12.9 (BH106A) to 13.59 (BH103)
	Dissolved oxygen (mg/L)	From 0.13 (BH102) and 5.2 (BH103)	From 0.30 (BH102) and 6.11 (BH103)

3.3. Geological/Hydrogeological Information

Table I – Hydrogeological Information

Depth to Groundwater	Drift Deposits: BH102 and BH103 are installed within the drift deposits. Groundwater was encountered within both wells during the March and June 2014 GMEs. Groundwater was reported in BH102 at a depth of 6.42m bgl in March 2014 and 6.78m bgl in June 2014. Groundwater within BH103 was reported at a depth of 6.53m bgl during March 2014 and 6.91 during June 2014. Chalk: BH105A and BH106A are installed within the putty Chalk beneath the site. The overlying drift deposits were reported to be dry during the drilling of these locations. Groundwater was encountered at a depth of 6.04m bgl and 6.33m bgl in BH105A during the March and June 2014 GMEs, and at 6.01m bgl and 6.30m bgl in BH106A. BH102A is located approximately 3m west of BH102 and screened at a deeper depth (11.5m bgl - 13.5m bgl) across the top of the Chalk and the overlying drift deposits. Groundwater was reported at a depth of 5.78m bgl and 6.07m bgl during the March and June 2014 GMEs. During the drilling of this well a 1.3m band of stiff Clay was encountered between 10m and 11.3m bgl which appears to separate the groundwater body encountered within the drift deposits in BH102 and BH103 screened between 7.5m bgl and 9m bgl. This band of Clay was not proven in any other borehole at the site due to the depth of drilling. Its lateral extent across the site is therefore unknown and it is assumed that groundwater within the drift deposits and Chalk may be in continuity. This is further discussed in Section 4.3 below.
Inferred Groundwater Flow	Groundwater was encountered in all boreholes and was found to flow to the east of the site towards the River Purwell.
Hydraulic Conductivity	Rising and falling head tests using a slug were conducted in wells BH102A, BH105A and BH106A within the superficial deposits and Chalk during the February 2012 Comprehensive ESA (Ref.4). The data were interpreted using the Bouwer Rice method. Groundwater within the drift deposits at the site was found to have a hydraulic conductivity of 038m/day. Groundwater within the Chalk had a hydraulic conductivity of 1.54m/day.

3.4. Analytical Schedules & QA/QC

Table J – Analytical Information		
Analytical Laboratory	Groundwater and vapour samples were analysed by Alcontrol Laboratories of Chester. Copies of the Chain of Custodies (COCs) and laboratory certificates are presented in Appendix B .	
Analytical Schedule	The following schedule of analysis was completed for this GME. The results and details of the analytical methodology are presented in Appendix B .	
	Analysis	Number of Groundwater Samples
	Total Petroleum Hydrocarbons (TPH) Health risk fractions	10
	Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) compounds	10
	Fuel Oxygenates (methyl tertiary butyl ether (MTBE), tert-butyl ethyl ether (ETBE), di-isopropyl ether (DIPE), tert butanol (TBA), tert-amyl methyl ether (TAME), Ethanol)	10
	Polycyclic Aromatic Hydrocarbons (PAH) 16 Speciated	10
	2-methylnaphthalene	10
	n-hexane	10
Field and laboratory quality control sampling	The analytical data have been reviewed for quality assurance and control purposes (QA/QC), the results of which are presented in Appendix B. • The recommended holding times for groundwater samples were within acceptable limits. • The surrogate data were reported within acceptable limits. • The relative percentage difference (RPD) between detected concentrations in the groundwater duplicate sample (DUP01) and the parent sample (BH102) were within acceptable limits. • The laboratory blanks were within acceptable limits. • COPC were not detected in the equipment blank with the exception of naphthalene which was marginally above the MDL. In general, the data are considered appropriate for reporting.	

4. STAGE 2 GENERIC QUANTITATIVE RISK ASSESSMENT

4.1. Introduction

The risk based methodology adopted in this report is based upon the UK Defra and EA "best practice" in regard to the assessment of contaminated land. An overview of the methodologies adopted as part of this assessment is provided in URS Technical Document 'Shell UK Controlled Waters & Human Health Risk Assessment Method'¹. The approach taken reflects that promoted in CLR11² and R&D Publication 66³ and the supporting guidance referenced within them.

4.2. Assessment Criteria – Human Health

Analytical results for groundwater samples recovered are tabulated in **Appendix C** and have been compared against Stage 2 Generic Assessment Criteria (GAC), protective of:

- On-site and off-site workers (including Shell shop staff, site users and off-site workers) using a continued petroleum use (CPU) end use scenario.
- Off-site residents to the north and west of the site and live-in hotel staff in Firs Hotel to the south of the site using a high density residential (HDR) end use scenario.

4.3. Assessment Criteria – Controlled Waters

Potential risks to groundwater underlying the site were assessed in the URS February CW DQRA (Ref.4) using two separate models:

- Model 1: Groundwater in the Chalk - Primary Receptor
- Model 2: Groundwater in the Drift Deposits – Secondary Receptor

Model 1 – Groundwater in the Chalk Principal aquifer

The Controlled Waters receptors for the site are the underlying Zig Zag Chalk (Principal Aquifer) and the Superficial Deposits. Although the site is underlain by superficial deposits of the Lowestoft Formation which are described by the EA as Unproductive Strata, the formation is shown on the 1:50,000 geological map to be underlain and surrounded by Glaciofluvial Deposits (classified as a Secondary-A Aquifer). It has been assumed for the model that the boreholes are installed in the more sensitive Secondary-A Aquifer as the vertical and horizontal extent of the Lowestoft Till and Glaciofluvial Deposit units within the permeable drift are not known. The site is close to the edge of a significant buried valley feature with drift deposits reaching up to 80m in thickness within 1km to the north west, north and north east of the site.

¹ URS Technical Document – 'Shell UK Controlled Waters & Human Health Risk Assessment Method', Dated September 2010, Ref: Issue 1.

² Model Procedures for the Management of Land Contamination, Contaminated Land Report (CLR) 11, Environment Agency & DEFRA, Dated September 2004.

³ Guidance for the Safe Development of Housing on Land Affected by Contamination, R&D Publication 66: 2008 (Volume 1), NHBC and the Environment Agency 2008.

Local flow in the Chalk Principal aquifer in the area has been inferred towards the east towards the River Hiz which feeds into the River Purwell. The 1:50,000 geological map indicates that the increasingly thick drift sequence may be directly underlain by the Gault Clay, with the Lower Chalk absent, within 300m of the west of the site, and within 1km to the north and north east.

Groundwater flowing laterally in the Chalk in the area of the site is therefore likely to discharge laterally to the drift sequence, as the top of the Chalk becomes increasingly deeper, for example the groundwater in the Chalk on site is assumed to flow eastwards with a gradient of approximately 0.005 at approximately 6.2m bgl however the depth to the Chalk increases from 5.4m bgl in the western area of the site to 14.2m bgl at BH102A located in the eastern area of site.

Groundwater in the underlying Zig Zag Chalk formation was selected as the primary compliance point for the assessment and was modelled assuming that impacted pore water from soils and groundwater could migrate into the Principal Aquifer at a rate equal to infiltration, followed by horizontal migration within the aquifer. A Compliance Point of 50m was selected to model the potential risks from hazardous substances to groundwater.

Model 2 – Groundwater in the Drift Secondary A Aquifer

Groundwater in the superficial deposits underlying the site has been selected as the secondary compliance point. For the purpose of this assessment it has been conservatively assumed that the wells installed in the drift are installed in a Secondary-A Aquifer, as the vertical and horizontal extent of the Lowestoft Formation and Glaciofluvial Deposits is not known.

Although the drift deposits are considered a controlled waters receptor, there are physical constraints on the ability to use the groundwater resource. The exploitation potential of the drift deposits beneath the site is considered likely to be low for the following reasons:

- Field tests indicate the drift deposits below the site are only slowly permeable
- There are no reported licensed groundwater abstractions within 1km of the site and no reported private groundwater abstractions within 2km of the site. The nearest surface water abstraction is located 835m south of the site; and
- The down-gradient area is a residential area with mains water supply.

An arbitrary Compliance Point of 50m in the drift deposits has been selected to be protective of the Secondary A Aquifer, however due to the low exploitation of the aquifer an extended compliance point of 100m has also been considered in the assessment to provide an indication of potential risks to the wider aquifer.

4.4. Analytical Results Screening

Comparison of groundwater analytical results to Stage 2 GAC is provided in **Appendix C** and GAC and SSAC exceedances are summarised in the table below:

Table K – GAC/SSAC Exceedances																
Receptor Type	Screening Criteria	Media	Benzene / TPH Aromatic C5-C7	TEX / TPH Aromatic C7-C10	Other Aromatic TPH	Aliphatic TPH	MTBE / TBA	Other Oxygenates	n-hexane	EDB/EDC	TPH Hazard Index	Other VOCs (vapour)	Naphthalene	Benzo(a)pyrene	Other PAHs (incl. 2-methyl naphthalene)	Metals
Human Health	CPU GAC	Groundwater	✖	✖	✖	✖	✖	✖	✖	✖	✖	n/a	✖	✖	✖	n/a
	HDR GAC		✖	✓	✖	✖	✖	✖	✖	✖	✓	n/a	✖	✖	✖	n/a
Controlled Waters	Drift Model SSAC 50m compliance point		✓	✖	✖	✖	✖	✖	✖	✖	n/a	n/a	✖	✖	✖	✖
	Chalk Model SSAC 50m compliance point		✖	✖	✖	✖	✖	✖	✖	✖	n/a	n/a	✖	✖	✖	✖

Notes:

✓ = Measured in excess of GAC/SSAC

✖ = Not measured in excess of GAC/SSAC

n/a = not applicable

4.5. Discussion of Key Exceedances

Human Health

Reported concentrations of TPH from groundwater samples collected and analysed from BH102 have not been assessed further for potential human health risks to off-site residents for the following reasons:

- 1) Groundwater sampled from BH102 exceeded the human health HDR GAC by a factor of 1.81 in March 2014, and 1.95 in June 2014. These exceedances are considered marginal.
- 2) The groundwater GAC were derived assuming a depth to the groundwater table of 1.0m bgl. The average depth to groundwater measured by URS in March and June 2014 was 6.30m bgl. As such, the CSM assumed for the GAC is likely to overestimate potential risks relative actual conditions present at the site. A greater unsaturated zone thickness will typically allow a greater degradation of vapours and ground gas oxygen concentrations appear indicative of such degradation conditions.
- 3) The primary exposure pathway for risks to off-site residents from TPH in groundwater is via vapour migration and subsequent inhalation. The nearest residents to the site are located approximately 5m from the southern boundary of the site in the Firs Hotel. The groundwater impacts identified at BH102 are located approximately 25m north of these off-site residents. The potential attenuation of vapours over a minimum compliance point distance of 25m has also not been included within the generic assessment. This would be expected to result in significant vapour attenuation and resultant significant decrease in potential risk.
- 4) The data from on-site vapour wells (VP101 to VP103) were three orders of magnitude lower than the soil vapour GAC during the December 2011 vapour monitoring event. The results from VP102, located 12m south of BH102, provides an indication of the degree to which the groundwater GAC overestimate vapour intrusion risk at this particular site. Furthermore, the soil and groundwater GAC assume no degradation. Ground gas results show oxygen above the critical 5% and hence biodegradation is likely to be occurring at the site.

Controlled Waters

Benzene was detected in concentrations greater than the controlled waters SSAC at a 50m compliance point protective of the drift deposits underlying the site in groundwater sampled from BH102 with a maximum reported hazard Index (HI) of 5.46.

It has been assumed that the aquifer is aerobic based on the geology, depth to groundwater, ferrous iron, nitrate and sulphate concentrations and field groundwater measurements.

Although the drift deposits are considered a controlled waters receptor, there are physical constraints on the ability to use the groundwater resource. The exploitation potential of the drift deposits beneath the site is considered likely to be low as discussed in Section 4.3 above. Given the low exploitation potential of the aquifer, an extended compliance point of 100m is considered appropriate with a benzene water target value of 1000 µg/l.

As no risks are simulated at the at the extended compliance point, and hazard indices are only marginal at the 50m compliance point from a conservative DQRA (Ref.4), the theoretical risks simulated by the model are considered unlikely to pose a significant risk to controlled waters in the drift. It should be noted that concentrations of benzene in BH102 have significantly decreased since the start of sampling in October 2011 from a concentration of 1,460 µg/l to concentrations of 303 µg/l in the September 2013 GME; 92.8 µg/l in the March 2014 GME and 348 µg/l in the June 2014. Table L below provides a summary of BTEX concentrations from October 2011 to June 2014 in BH102:

Table L - BTEX concentrations over time in BH102						
Analyte	Concentration (µg/l)					
	12/10/2011	27/02/2012	22/01/2013	04/09/2013	31/03/2013	23/06/2014
Benzene	1460	1100	282	303	92.8	348
Toluene	465	150	241	35	5.54	17.7
Ethylbenzene	2350	3600	3760	756	437	801
M_P_Xylene	6480	9330	12400	1570	303	547
O_Xylene	2460	4380	4500	389	41.1	148

COPC in groundwater sampled from BH102a (located approximately 3m west of BH102 closer to the tank farm and installed in the deeper chalk geology) were all reported below the laboratory detection limit. No risks have been simulated to groundwater quality within the Chalk Principal aquifer from post construction groundwater concentrations at the site.

4.6. Summary

The identified exceedances of the human health GAC and controlled waters SSAC are not considered to be significant and have not been assessed further.

5. CONCEPTUAL SITE MODEL

The Conceptual Site Model (CSM) presented here is based on the information provided in the historic reports prepared for the site, on observations made during the URS GME, and on the subsequent URS risk assessments.

5.1. Potential Sources, Pathways, and Receptors

The following is a list of potential sources of impact on-site:

- Operational underground storage tanks.
- Accidental releases to ground from off-set fill points and fuel dispensers.
- Accidental releases from fuel lines and vent lines.
- Site interceptor and drainage.
- Made ground.

Based on the presence of these potential sources, a GME has been completed. The GME has indicated that the COPC listed in Section 4.6 are present in the areas of the site which were investigated. These COPC have been assessed in Tables M and N below.

The potential pathways and receptors identified for assessment at Stage 2 and Stage 3 are listed in Tables M and N below.

5.2. Review of Potential Source-Pathway-Receptor Linkages

The following pollutant linkages were evaluated at Stage 2 and Stage 3. These are also detailed on **Figure 4**.

Table M – Human Health CSM			
Source	Pathway	Receptor	Likelihood of Pollutant Linkage Presenting an Unacceptable Risk
- Potentially impacted groundwater. - Potentially impacted soils	Lateral and vertical vapour migration and subsequent inhalation.	On-site shop staff, visiting staff and general public.	Unlikely: Vapour monitoring at the site was reported below the Stage 2 GAC protective of on-site workers or off-site residents during the URS CESA Report (Ref.3).
		Off-site workers in adjacent commercial properties.	
		Off-site residents	
	Particulate - Ingestion, inhalation, dermal contact with soil particulates.	Visiting on-site contractors excavating ground.	Possible*
	Permeation – Migration of hydrocarbon substances through plastic potable water supply pipes.	On-site shop staff (ingestion of drinking water on-site).	Unlikely: COPC were reported at concentrations below the drinking water standards in potable water samples recovered from the shop during the URS CESA Report (Ref.3)..

* Potential risks to visiting contractors undertaking intrusive works should be managed by appropriate PPE, risk assessment and method statements. Risks to visiting contractors excavating the ground were therefore not assessed within the scope of the DQRA.

Table N – Controlled Waters CSM

Source	Pathway	Receptor	Likelihood of Pollutant Linkage Presenting an Unacceptable Risk
- Potentially impacted groundwater. - Potentially impacted soils	- Partitioning between soil and pore water. - Leaching of impacted soils into groundwater. - Lateral migration of impacted groundwater.	Superficial Deposits (Secondary A Aquifer) Zig Zag Chalk Formation (Principal Aquifer)	Unlikely: No significant risks were identified from concentrations of COPC in post-construction groundwater to the underlying Drift Deposits Secondary A Aquifer or underlying Principal Chalk Aquifer.
		Surface water within the Bearton Pond located approximately 200m north and the River Hiz located approximately 850m east of the site.	

6. CONCLUSIONS

The following conclusions have been made based on the groundwater data collected, and on the Stage 2 and Stage 3 risk assessments completed as part of this Comprehensive GME.

Field Work

Five (5) groundwater monitoring wells (BH102, BH102A, BH103, BH105A and BH106A) were monitored and sampled at the site in March 2014 and June 2014. Groundwater was encountered in all five (5) groundwater monitoring wells at elevations ranging from 63.9m AOD to 65.1m AOD. The average depth to groundwater was 6.3m bgl. Groundwater is inferred to flow in a north easterly direction.

Mild hydrocarbon odours were observed during purging of well BH102 located adjacent to the eastern site boundary during the March and June 2014 monitoring events. No evidence of hydrocarbon impact was observed in any other monitoring wells, including BH102A (located approximately 3m west of BH102 and closer to the tank farm). PSH was not identified in any of the wells.

Risk Assessment Results

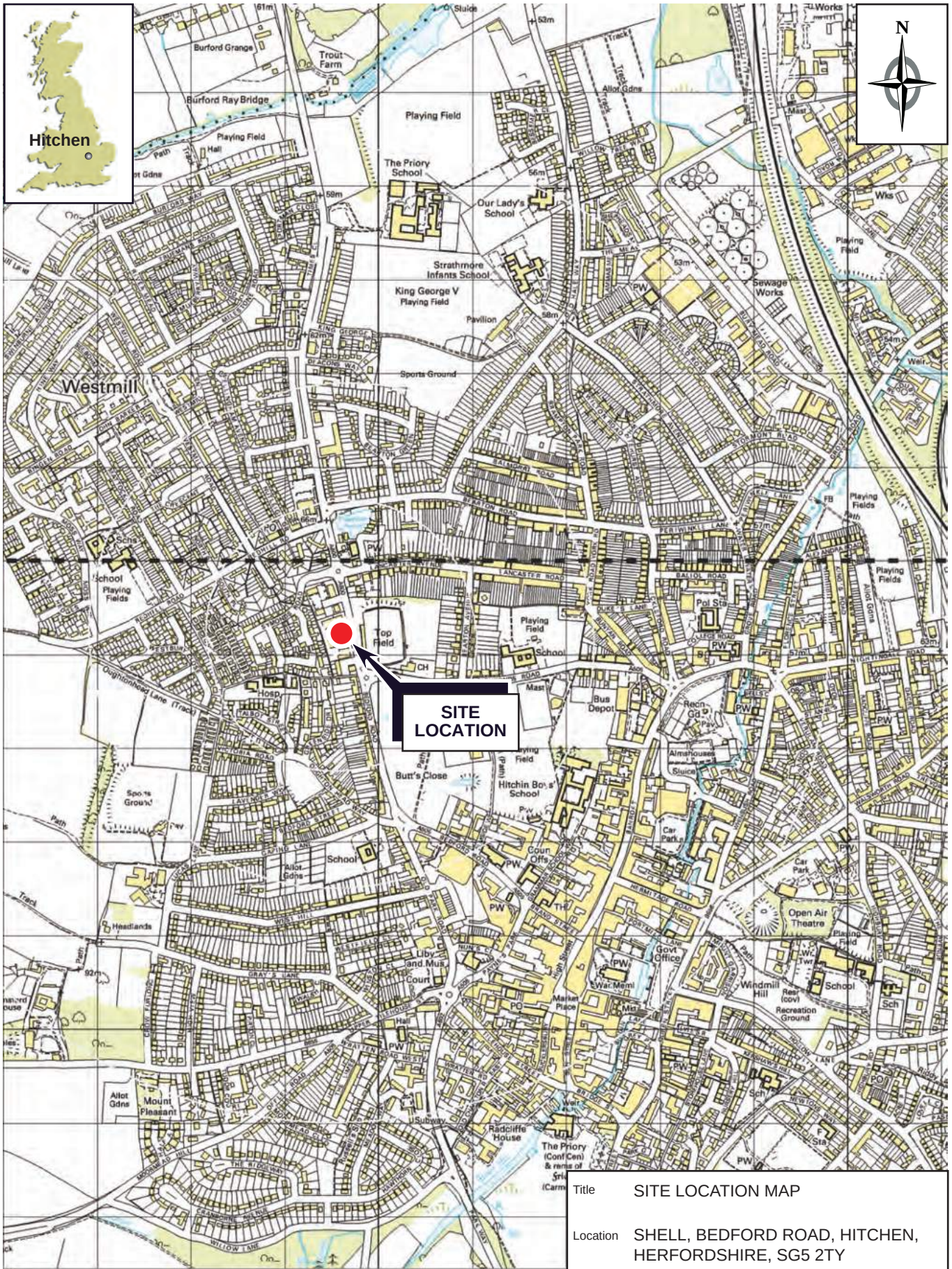
Post construction groundwater results were compared against Stage 2 human health GAC and Stage 3 controlled waters SSAC. No potentially significant risks to human health (protective of on-site workers, off-site workers and off-site residents) were identified. No potentially significant risks were identified to groundwater quality within the Drift Deposits Secondary A Aquifer or the underlying Chalk Principal Aquifer.

The site is considered suitable for on-going oil use.

7. REFERENCES

- Reference 1 - GeoDelft, Petroleum Risk Tier 1 report ref; C1402.SG474.8008, dated May 1999
- Reference 2 - URS Preliminary Phase I Investigation Report (Ref R46370079-001) Final Phase I; dated October 2011)
- Reference 3 - URS Phase 2 Environmental Site Investigation Report (Ref R46370079-002) Final; dated April 2012
- Reference 4 – URS Phase 2 Comprehensive Environmental Site Assessment – Further Investigation (Ref R46370079-003) Final; dated February 2013)
- Reference 5 - URS Environmental Strategy Plan (Ref R46370079-004) Final; dated March 2013)
- Reference 6 - URS Verification Report (Ref R46370079-005) Final; dated October 2013)

Figures



**SITE
LOCATION**

Title SITE LOCATION MAP

Location SHELL, BEDFORD ROAD, HITCHEN,
HERFORDSHIRE, SG5 2TY

Client SHELL UK OIL PRODUCTS LTD

Based upon an Ordnance Survey map with the
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URS

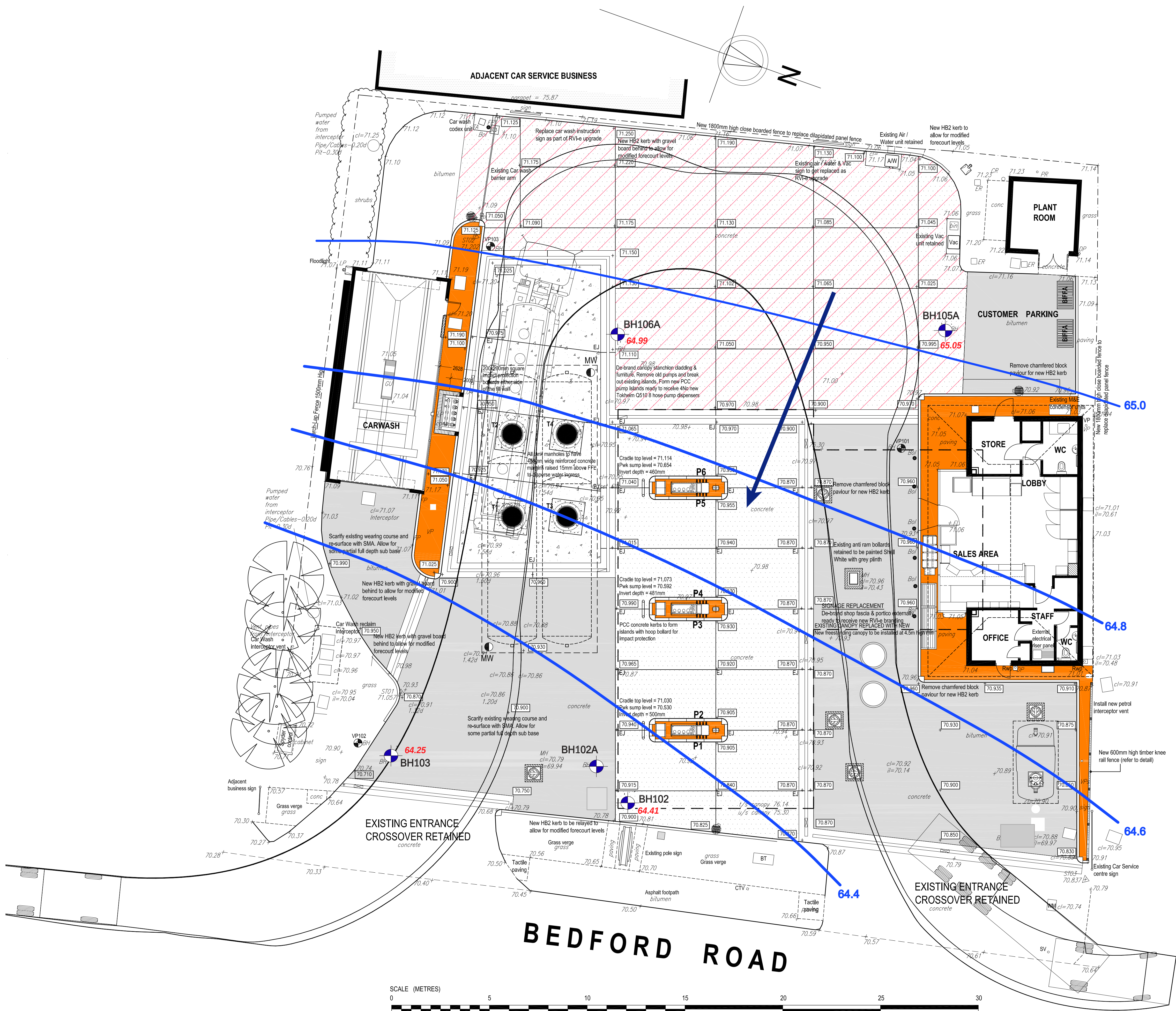
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Status: FINAL	Ref: BS/LON/LCH/DCF		
Scale: AS SHOWN	Job No: 46370079		
Date: SEPT 2011	FIGURE 1		

URS Monitoring Well



SCALE	DRG No.	REV.
AS SHOWN	46370079/FIGURE 2	

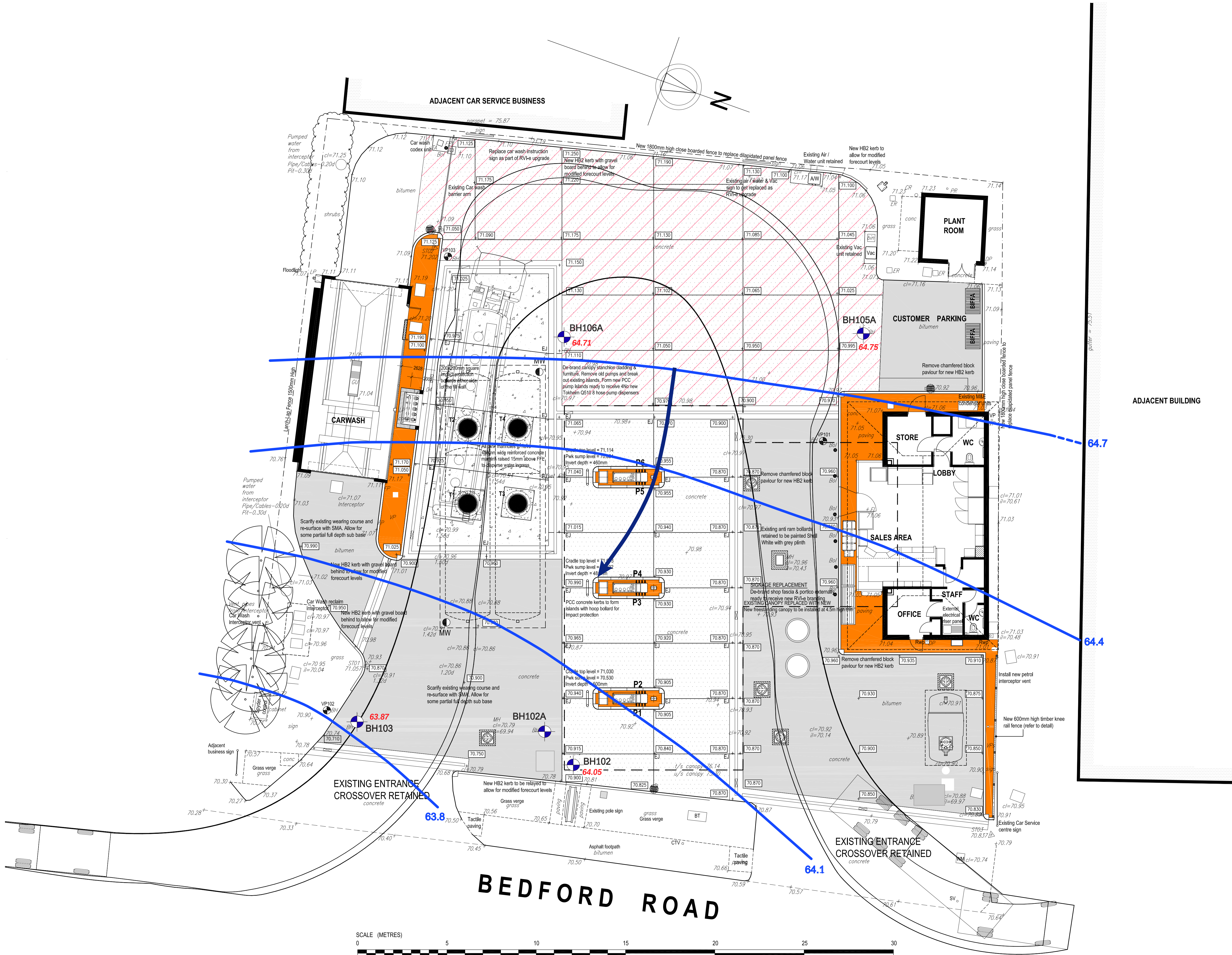
SCALE	DRG No.	REV.
AS SHOWN	46370079/FIGURE 2	



KEY

- URS Monitoring Well
- 65.05** Groundwater Elevation in MAOD
- Groundwater Flow Direction

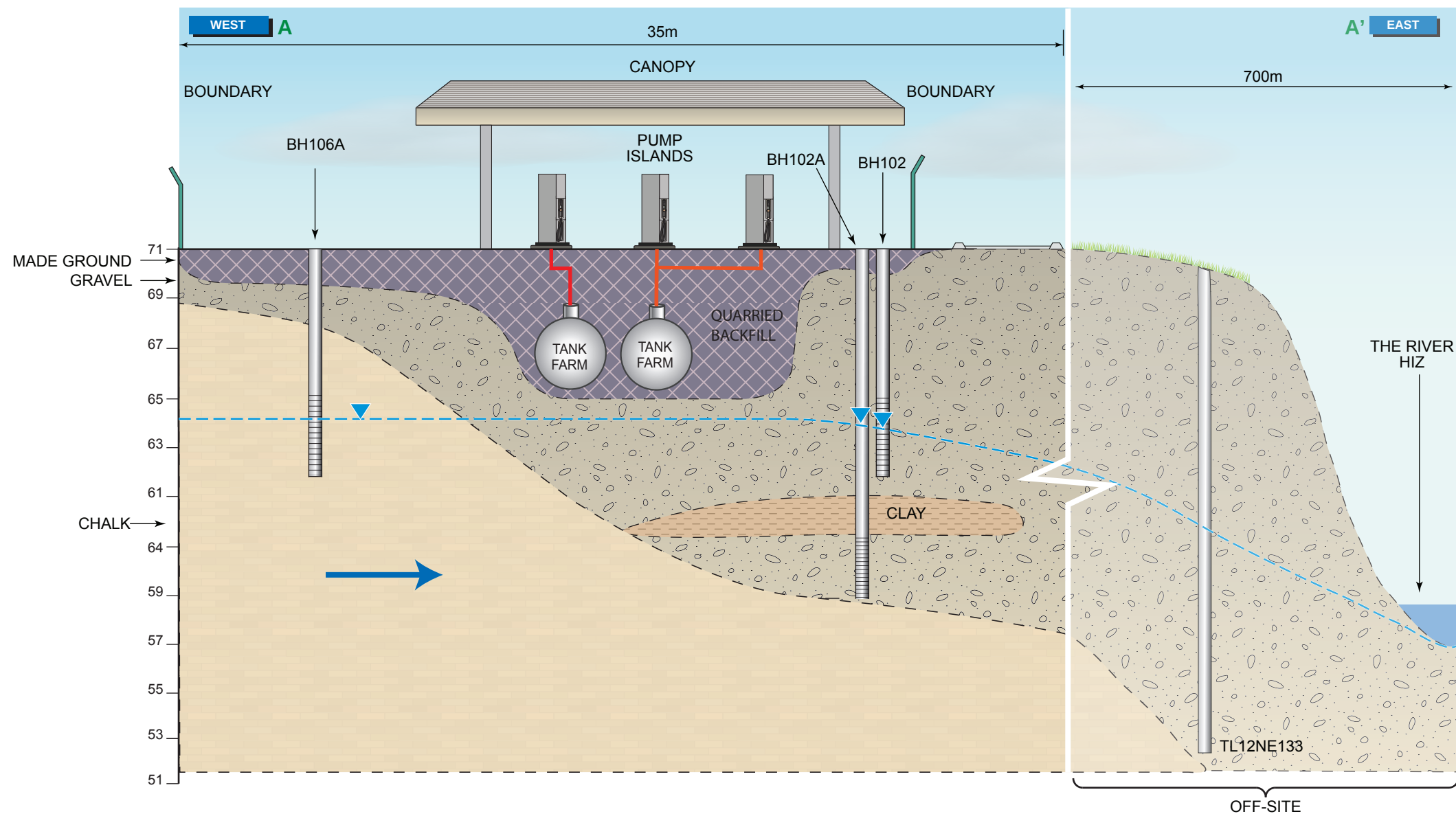
	DESCRIPTION	DRAWN	APPROVED	DATE
STATUS		FINAL		
CONSULTING ENGINEERS				
				
URS Infrastructure & Environment UK LTD St George's House, 3rd Floor 5 St George's Road, Wimbledon, London SW19 4DR Tel: 020 7963 9800 Fax: 020 7963 9801				
CLIENT SHELL UK OIL PRODUCTS LIMITED				
PROJECT SHELL HITHCIN Bedford Road, Hitchin, Hertfordshire, SG5 2TY				
DRAWING TITLE FIGURE 3a- Potentiometric Surface Map- March 2014				
DRAWN AM	DESIGNED AM	CHECKED JW	APPROVED JW	DATE Sept 2014
SCALE AS SHOWN	DRG. No. 46370079/FIGURE 3a		REV.	



KEY

- URS Monitoring Well
- 65.05 Groundwater Elevation in MAOD
- Groundwater Flow Direction

DESCRIPTION	DRAWN	APPROVED	DATE	
STATUS				
FINAL				
CONSULTING ENGINEERS				
URS				
URS Infrastructure & Environment UK LTD St George's House, 3rd Floor 5 St George's Road, Wimbledon, London SW19 4DR Tel: 020 7963 9800 Fax: 020 7963 9801				
CLIENT				
SHELL UK OIL PRODUCTS LIMITED				
PROJECT				
SHELL HITHCIN Bedford Road, Hitchin, Hertfordshire, SG5 2TY				
DRAWING TITLE				
FIGURE 3b- Potentiometric Surface Map- June 2014				
DRAWN	DESIGNED	CHECKED	APPROVED	DATE
AM	AM	JW	JW	Sept 2014
SCALE		REV.		
AS SHOWN		46370079/FIGURE 3b		



AREA OF POTENTIAL CONCERN

On-site

Historical

- Historical use of the site as a petrol filling station since 1970.
- Leaking and joints were noted during an inspection of the pumps and pipework by the Petroleum Officer in October 1986.
- A leak on pump 8/9 noted by the Petroleum Officer in January 1991.

Current

- Operational underground storage tanks (URSSW understands there are no historic / decommissioned storage tanks on-site).
- Accidental releases to ground from off-set fill points, located to the south of the forecourt.
- Accidental releases to ground from dispenser pumps: 3 car fuel islands under the canopy and cracks in concrete surface of the forecourt.
- Accidental releases from fuel lines: Present between the tanks, offset fill points and fuel islands.
- Site interceptors (main forecourt interceptor located at the north east of the site, and interceptor associated with the car wash at the south of the site) and associated drainage lines.
- Drainage from the car wash.

Off-site

Historical

- An Aboveground Storage Tank (AST) associated with a warehouse is shown approximately 30m north of the site boundary.
- Garage (later shown as depot) approximately 5m north of the site boundary.
- Current
- Garage adjacent to the site boundary at the west of the site.
- Tyre Centre/Garage approximately 5m north of the site boundary.

CHEMICALS OF POTENTIAL CONCERN

Historical

- Metals – arsenic, boron, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium and zinc.
- VOCs

Current

- TPH - Petroleum hydrocarbons.
- BTEX- Benzene, toluene, ethylbenzene and xylenes.
- Petroleum Additives- Methyl tertiary butyl ether (MTBE) and tertiary amyl methyl ether (TAME).
- PAHs- Polycyclic aromatic hydrocarbons.
- Metals – arsenic, boron, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium and zinc.

POTENTIAL PATHWAYS

Human Health

- Vapours – Migration of vapours through made ground to above ground buildings.
- Particulate – Ingestion, inhalation, dermal contact, with soil particulates.
- Permeation – Migration of hydrocarbon substances through plastic potable water supply pipes.

Controlled Waters

- Leaching – Migration of hydrocarbon substances from soils into shallow (and potentially deep) aquifers.
- Migration of impacted perched water into shallow (and potentially deep) aquifers

POTENTIAL RECEPTORS

Human Health

- Shop staff.
- The general public and visiting staff (such as contractors, including those conducting excavation works).
- Workers in the garage adjacent to the east of the site, tyre centre approximately 5m north of the site and workers and guests at the Fir Hotel approximately 5m south of the site.
- Occupants of residential properties approximately 30m north and south of the site and 20m to the west of the site

Controlled Waters

- Groundwater within the Superficial Deposits on-site (Potentially a Secondary A Aquifer).
- Groundwater within the Zig Zag Chalk Formation (Principal Aquifer).

Human Health

- Potentially impacted shallow soils / groundwater, followed by vapour migration to on-site workers within the shop area and off-site workers to the north and east of the site.
- Potentially impacted shallow soils / groundwater, followed by permeation through plastic pipes into the site potable water supply.

Controlled Waters

- Potentially impacted shallow soils / groundwater, followed by vertical migration into the shallow groundwater within the shallow Drift Deposits that border the site, and potentially deeper groundwater in the underlying Zig Zag Chalk Formation Principal Aquifer
- Potentially impacted shallow soils / groundwater: migration of chemicals of potential concern (COPC) from soils into shallow groundwater.

POTENTIALLY COMPLETE POLLUTANT LINKAGES:

- None identified.

NOTES

	DESCRIPTION	DRAWN	APPROVED	DATE
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STATUS

FINAL

CONSULTING ENGINEERS

URS

URS Infrastructure & Environment UK LTD,
 St George's House, 2nd Floor
 5 St George's Road, Wimbledon, London SW19 4DR
 Tel :020 8944 3300 Fax: 020 8944 3301

CLIENT

SHELL UK OIL PRODUCTS LIMITED

PROJECT

SHELL, BEDFORD ROAD, HITCHEN,
 HERFORDSHIRE, SG5 2TY

DRAWING TITLE

Conceptual Site Model –
 Figure 4

DRAWN LCH	DESIGNED JT	CHECKED JT	APPROVED JT	DATE MARCH 2012
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SCALE NTS	DRG. No. 46370079/FIGURE 4	REV.
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Appendix A - Field Data Tables

TABLE 1
GROUNDWATER ELEVATIONS AND QUALITY MEASUREMENTS

Site	Shell Hitchin
Sample Round	March & June 2014

Borehole	Screened Section	Depth to base (mb TOC)	Depth to water (mb TOC)	Borehole elevation (m AOD)	Groundwater elevation (m AOD)	Sample Date	Purge Volume (l)	pH	Temperature (°C)	Conductivity (mS/cm)	ORP (mV)	ORP (mV) Corrected	Dissolved Oxygen (mg/L)	TDS (g/L)	Comments	
BH102	7.5 - 9.0	9.045	6.423	70.830	64.407	31/03/2014	7	7.22	13.0	645	-94.2	122.8	0.23	0.544	Good Recovery, light orange, Clear after 5L, Light HC odour	
					13	6.60	13.1	646	-102.5	114.5	0.18	0.543				
					20	6.66	13.1	645	-104.6	112.4	0.13	0.543				
		8.95	6.776		64.054	23/06/2014	6	7.00	13.25	921	-112.7	104.3	0.71	0.77	Clear, light HC odours and sheen	
					10	6.89	13.22	924	-110	107	0.46	0.78				
					17	6.99	13.17	926	-117.8	99.2	0.30	0.78				
BH102A	11.5 - 13.5	12.863	5.782	70.830	65.048	31/03/2014	11	7.07	12.9	622	226.4	443.4	4.13	0.527	Good recovery, Orange , turbid, NVO, Duplicated	
					22	7.07	12.9	622	221.1	438.1	4.23	0.527				
					33	7.08	12.9	619	224.3	441.3	4.29	0.523				
					45	7.08	12.9	620	221.9	438.9	4.30	0.524				
					57	7.08	12.9	618	218.6	435.6	4.44	0.523				
					12.865	6.074	64.756	23/06/2014	15	6.32	13.15	824	274.9	491.9	6.21	0.69
		32	6.17				13.14	822	308.4	525.4	6.12	0.69				
		50	6.17				13.14	826	306.8	523.8	5.24	0.69				
		7	7.05				12.8	688	85.5	302.5	5.61	0.584				
		BH103	7.5 - 9.0		8.367	6.530	70.780	64.250	31/03/2014	12	7.06	12.6	691	100.2	317.2	5.20
20	6.61			12.8				688	110.0	327	5.20	0.581				
5	6.78			13.61				734	121.6	338.6	6.41	0.63				
8.32	6.910			63.870	23/06/2014	8		6.92	13.57	748	138.8	355.8	6.39	0.62	Orange, slightly turbid, NVO	
				12	6.96	13.59		756	159	376	6.11	0.63				
				7	6.92	13.0		787	106.9	323.9	2.59	0.644				
BH105A	6.5 - 8.5	8.427	6.035	71.030	64.995	31/03/2014	15	6.92	12.9	787	113.7	330.7	2.53	0.665	Good recovery, creamy white, NVO	
					27	6.91	12.9	794	118.4	335.4	2.42	0.672				
					4	6.74	13.45	1000	157.4	374.4	5.21	0.837				
		8.405	6.325		64.705	23/06/2014	8	6.71	13.1	1002	164.1	381.1	4.63	0.84	Creamy white, NVO	
					15	6.72	13	1003	165.7	382.7	4.31	0.846				
					7	7.15	13.0	579	96.2	313.2	3.18	0.448				
BH106A	6.5 - 8.5	8.250	6.005	71.050	65.045	31/03/2014	14	7.14	13.0	584	101.2	318.2	3.20	0.489	Slow recovery, Light orange, clear after 5L, NVO	
					25	7.13	12.9	587	98.7	315.7	3.25	0.498				
					5	7.01	13.01	725	169.2	386.2	5.58	0.61				
					10	6.89	12.85	729	156.1	373.1	4.69	0.62				
		8.21	6.301		64.749	23/06/2014	15	6.89	12.9	732	145.7	362.7	4.65	0.62	Creamy white, NVO	

Legend

°C - degrees celsius
L - Litres
m AOD - metres Above Ordinance Datum
NVO - no visible or olfactory evidence of impact

mb TOC - metres below Top of Casing
mg/L - milligrams per litre
mS - milli siemens
mV - milli volts

ORP - Oxidation Reduction Potential
pH - potential of Hydrogen (dimensionless)

Notes

Borehole elevations were measured to mAOD by URS subcontractor Glover GB.

Appendix B - Laboratory Analytical Results Certificates



URS Corporation Limited
St. George's House
2nd Floor
5 St. George's Road
Wimbledon
Greater London
SW19 4DR

Attention: Jocelyn Willis

CERTIFICATE OF ANALYSIS

Date: 07 April 2014
Customer: H_URS_WIM
Sample Delivery Group (SDG): 140401-28
Your Reference: 46370079
Location: Shell Hitchin
Report No: 265839

We received 8 samples on Tuesday April 01, 2014 and 8 of these samples were scheduled for analysis which was completed on Monday April 07, 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





SDG:	140401-28	Location:	Shell Hitchin	Order Number:	
Job:	H_URS_WIM-174	Customer:	URS Corporation Limited	Report Number:	265839
Client Reference:	46370079	Attention:	Jocelyn Willis	Superseded Report:	

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
9072865	BH102		0.00	31/03/2014
9072866	BH103		0.00	31/03/2014
9072864	BH102A		0.00	31/03/2014
9072867	BH105A		0.00	31/03/2014
9072868	BH106A		0.00	31/03/2014
9072870	Dup		0.00	31/03/2014
9072871	EB		0.00	31/03/2014
9072872	Trip Blank (9199)		0.00	31/03/2014

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



SDG: 140401-28
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS Corporation Limited
Attention: Jocelyn Willis

Order Number:
Report Number: 265839
Superseded Report:

LIQUID Results Legend X Test N No Determination Possible	Lab Sample No(s)		Customer Sample Reference		AGS Reference		Depth (m)		Container	
	9072872	9072871	Tip Blank (9199)	EB			0.00	0.00	Vial (ALE297)	
									HCl Filtered (ALE25)	
									11 Glass bottle (ALE25)	
									Vial (ALE297)	
Anions by Kone (w)	All	NDPs: 0 Tests: 7								
EPH CWG (Aliphatic) Aqueous GC (W)	All	NDPs: 0 Tests: 7								
EPH CWG (Aromatic) Aqueous GC (W)	All	NDPs: 0 Tests: 7								
Ferrous Iron	All	NDPs: 0 Tests: 7								
GRO by GC-FID (W)	All	NDPs: 0 Tests: 7								
Oxygenates (W)	All	NDPs: 0 Tests: 7								
PAH Spec MS - Aqueous (W)	All	NDPs: 0 Tests: 7								
VOC MS (W)	All	NDPs: 0 Tests: 8								

Order Number:
Report Number: 265839
Superseded Report:

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Order Number:
Report Number: 265839
Superseded Report:

14:14:27 07/04/2014

Order Number:
Report Number: 265839
Superseded Report:

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Order Number:
Report Number: 265839
Superseded Report:

Page 7 of 44

Order Number:
Report Number: 265839
Superseded Report:

Page 8 of 44

Order Number:
Report Number: 265839
Superseded Report:

Page 9 of 44

Order Number:
Report Number: 265839
Superseded Report:

Page 10 of 44

SDG:	140401-28
Job:	H_URS_WIM-174
Client Reference:	46370079

Location: Shell Hitchin
Customer: URS Corporation Limited
Attention: Jocelyn Willis

Order Number:
Report Number: 265839
Superseded Report:

GRO by GC-FID (W)

[illegible]

Order Number:
Report Number: 265839
Superseded Report:

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Order Number:
Report Number: 265839
Superseded Report:

Page 13 of 44

Order Number:
Report Number: 265839
Superseded Report:

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Order Number:
Report Number: 265839
Superseded Report:

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SDG:	140401-28	Location:	Shell Hitchin	Order Number:	
Job:	H_URS_WIM-174	Customer:	URS Corporation Limited	Report Number:	265839
Client Reference:	46370079	Attention:	Jocelyn Willis	Superseded Report:	

Table of Results - Appendix

Method No	Reference	Description	Wet/Dry Sample ¹	Surrogate Corrected
TM061	Method for the Determination of EPH,Massachusetts Dept.of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)		
TM125	DIN 38405 D17	Determination of Ferrous Iron		
TM174	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Waters by GC-FID		
TM178	Modified: US EPA Method 8100	Determination of Polynuclear Aromatic Hydrocarbons (PAH) by GC-MS in Waters		
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers		
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters		
TM245	By GC-FID	Determination of GRO by Headspace in waters		
TM289		Determination of Oxygenates in Waters by Headspace/GC-MS		

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



SDG:	140401-28	Location:	Shell Hitchin	Order Number:	
Job:	H_URS_WIM-174	Customer:	URS Corporation Limited	Report Number:	265839
Client Reference:	46370079	Attention:	Jocelyn Willis	Superseded Report:	

Test Completion Dates

Lab Sample No(s)	9072865	9072866	9072864	9072867	9072868	9072870	9072871	9072872
Customer Sample Ref.	BH102	BH103	BH102A	BH105A	BH106A	Dup	EB	Trip Blank (9199)
AGS Ref.								
Depth	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Type	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID

Anions by Kone (w)	04-Apr-2014	04-Apr-2014	04-Apr-2014	04-Apr-2014	04-Apr-2014	04-Apr-2014	04-Apr-2014	
EPH CWG (Aliphatic) Aqueous GC (W)	03-Apr-2014	03-Apr-2014	03-Apr-2014	03-Apr-2014	03-Apr-2014	03-Apr-2014	03-Apr-2014	
EPH CWG (Aromatic) Aqueous GC (W)	03-Apr-2014	03-Apr-2014	03-Apr-2014	03-Apr-2014	03-Apr-2014	03-Apr-2014	03-Apr-2014	
Ferrous Iron	02-Apr-2014	02-Apr-2014	02-Apr-2014	02-Apr-2014	02-Apr-2014	02-Apr-2014	02-Apr-2014	
GRO by GC-FID (W)	02-Apr-2014	02-Apr-2014	02-Apr-2014	03-Apr-2014	02-Apr-2014	02-Apr-2014	03-Apr-2014	
Nitrite by Kone (w)	02-Apr-2014	02-Apr-2014	02-Apr-2014	02-Apr-2014	02-Apr-2014	02-Apr-2014	02-Apr-2014	
Oxygenates (W)	03-Apr-2014	03-Apr-2014	03-Apr-2014	03-Apr-2014	03-Apr-2014	03-Apr-2014	03-Apr-2014	
PAH Spec MS - Aqueous (W)	07-Apr-2014	07-Apr-2014	07-Apr-2014	07-Apr-2014	07-Apr-2014	07-Apr-2014	07-Apr-2014	
TPH CWG (W)	03-Apr-2014	03-Apr-2014	03-Apr-2014	03-Apr-2014	03-Apr-2014	03-Apr-2014	03-Apr-2014	
VOC MS (W)	02-Apr-2014	02-Apr-2014	02-Apr-2014	02-Apr-2014	02-Apr-2014	02-Apr-2014	02-Apr-2014	02-Apr-2014



SDG: 140401-28
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS Corporation Limited
Attention: Jocelyn Willis

Order Number:
Report Number: 265839
Superseded Report:

ASSOCIATED AQC DATA

Anions by Kone (w)

Component	Method Code	QC 90
Chloride	TM184	102.0 94.64 : 106.82
Phosphate (Ortho as PO4)	TM184	95.87 : 107.76
Sulphate (soluble)	TM184	98.8 96.47 : 104.74
TON as NO3	TM184	102.0 93.05 : 112.12

EPH CWG (Aliphatic) Aqueous GC (W)

Component	Method Code	QC 93
Total Aliphatics >C12-C35	TM174	88.96 77.43 : 102.04

EPH CWG (Aromatic) Aqueous GC (W)

Component	Method Code	QC 90
Total Aromatics >EC12-EC35	TM174	86.0 79.98 : 106.68

Ferrous Iron

Component	Method Code	QC 96
Ferrous Iron	TM125	96.33 92.73 : 101.21

GRO by GC-FID (W)

Component	Method Code	QC 97	QC 92
Benzene by GC	TM245	108.5 79.00 : 121.00	97.0 80.84 : 115.93
Ethylbenzene by GC	TM245	104.5 79.00 : 121.00	92.0 79.81 : 116.18
m & p Xylene by GC	TM245	102.75 79.00 : 121.00	89.5 79.42 : 117.01
MTBE GC-FID	TM245	108.5 79.00 : 121.00	97.5 80.59 : 117.01
o Xylene by GC	TM245	104.0 79.00 : 121.00	92.5 79.72 : 114.71
QC	TM245	94.25 73.05 : 136.50	91.95 69.98 : 114.76



SDG: 140401-28
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS Corporation Limited
Attention: Jocelyn Willis

Order Number:
Report Number: 265839
Superseded Report:

GRO by GC-FID (W)

		QC 97	QC 92
Toluene by GC	TM245	106.5 79.00 : 121.00	95.0 80.35 : 115.51

Oxygenates (W)

Component	Method Code	QC 99
Benzene	TM289	117.0 89.98 : 121.26
Diisopropyl ether	TM289	109.0 86.70 : 122.79
Ethanol	TM289	133.8 60.84 : 141.13
Ethylbenzene	TM289	110.0 76.16 : 122.57
o-Xylene	TM289	110.5 86.21 : 116.06
p/m-Xylene	TM289	112.0 87.53 : 119.02
tert Butanol	TM289	131.0 70.51 : 143.48
tert-amyl methyl ether	TM289	109.5 78.92 : 124.29
tert-butyl ethyl ether	TM289	104.0 78.17 : 124.34
tert-butyl methyl ether	TM289	112.5 87.75 : 127.35
Toluene	TM289	112.0 79.08 : 122.51

PAH Spec MS - Aqueous (W)

Component	Method Code	QC 92
Acenaphthene by GCMS	TM178	101.0 93.50 : 119.00
Acenaphthylene by GCMS	TM178	94.5 83.00 : 113.00
Anthracene by GCMS	TM178	101.0 91.25 : 113.75
Benz(a)anthracene by GCMS	TM178	96.5 85.75 : 111.25
Benzo(a)pyrene by GCMS	TM178	112.5 86.63 : 118.58
Benzo(b)fluoranthene by GCMS	TM178	111.0 90.00 : 117.00
Benzo(ghi)perylene by GCMS	TM178	107.0 82.05 : 112.05
Benzo(k)fluoranthene by GCMS	TM178	117.0 96.64 : 122.46
Chrysene by GCMS	TM178	105.0 90.25 : 117.25
Dibenzo(ah)anthracene by GCMS	TM178	105.5 82.81 : 122.26
Fluoranthene by GCMS	TM178	99.0 90.00 : 120.00



CERTIFICATE OF ANALYSIS

SDG: 140401-28
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS Corporation Limited
Attention: Jocelyn Willis

Order Number:
Report Number: 265839
Superseded Report:

PAH Spec MS - Aqueous (W)

		QC 92
Fluorene by GCMS	TM178	102.0 95.00 : 119.00
Indeno(123cd)pyrene by GCMS	TM178	113.5 90.97 : 118.18
Naphthalene by GCMS	TM178	101.0 92.50 : 115.00
Phenanthrene by GCMS	TM178	100.5 93.75 : 116.25
Pyrene by GCMS	TM178	99.0 91.25 : 113.75

VOC MS (W)

Component	Method Code	QC 92
1,1,1,2-Tetrachloroethane	TM208	98.5 77.50 : 122.50
1,1,1-Trichloroethane	TM208	99.0 77.50 : 122.50
1,1-Dichloroethane	TM208	103.5 77.50 : 122.50
1,2-Dichloroethane	TM208	97.0 77.50 : 122.50
2-Chlorotoluene	TM208	99.0 77.50 : 122.50
4-Chlorotoluene	TM208	100.5 77.50 : 122.50
Benzene	TM208	106.0 77.50 : 122.50
Bromomethane	TM208	104.5 75.87 : 132.10
Carbontetrachloride	TM208	99.0 77.50 : 122.50
Chlorobenzene	TM208	100.0 77.50 : 122.50
Chloroform	TM208	100.0 77.50 : 122.50
Chloromethane	TM208	102.5 75.10 : 151.63
Cis-1,2-Dichloroethene	TM208	98.0 77.50 : 122.50
Dichloromethane	TM208	99.5 77.50 : 122.50
Ethylbenzene	TM208	98.0 79.83 : 110.69
Hexachlorobutadiene	TM208	90.0 77.50 : 122.50
o-Xylene	TM208	99.5 77.50 : 122.50
p/m-Xylene	TM208	98.5 77.50 : 122.50
Tert-butyl methyl ether	TM208	100.0 68.24 : 122.50
Tetrachloroethene	TM208	96.0 77.50 : 122.50



SDG:	140401-28	Location:	Shell Hitchin	Order Number:	
Job:	H_URS_WIM-174	Customer:	URS Corporation Limited	Report Number:	265839
Client Reference:	46370079	Attention:	Jocelyn Willis	Superseded Report:	

VOC MS (W)

		QC 92
Toluene	TM208	101.5 77.50 : 122.50
Trichloroethene	TM208	99.5 77.50 : 122.50
Vinyl Chloride	TM208	95.5 71.25 : 145.19

The above information details the reference name of the analytical quality control sample (AQC) that has been run with the samples contained in this report for the different methods of analysis.

The figure detailed is the percentage recovery result for the AQC.

The subscript numbers below are the percentage recovery lower control limit (LCL) and the upper control limit (UCL). The percentage recovery result for the AQC should be between these limits to be statistically in control.



SDG: 140401-28
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS Corporation Limited
Attention: Jocelyn Willis

Order Number:
Report Number: 265839
Superseded Report:

Chromatogram

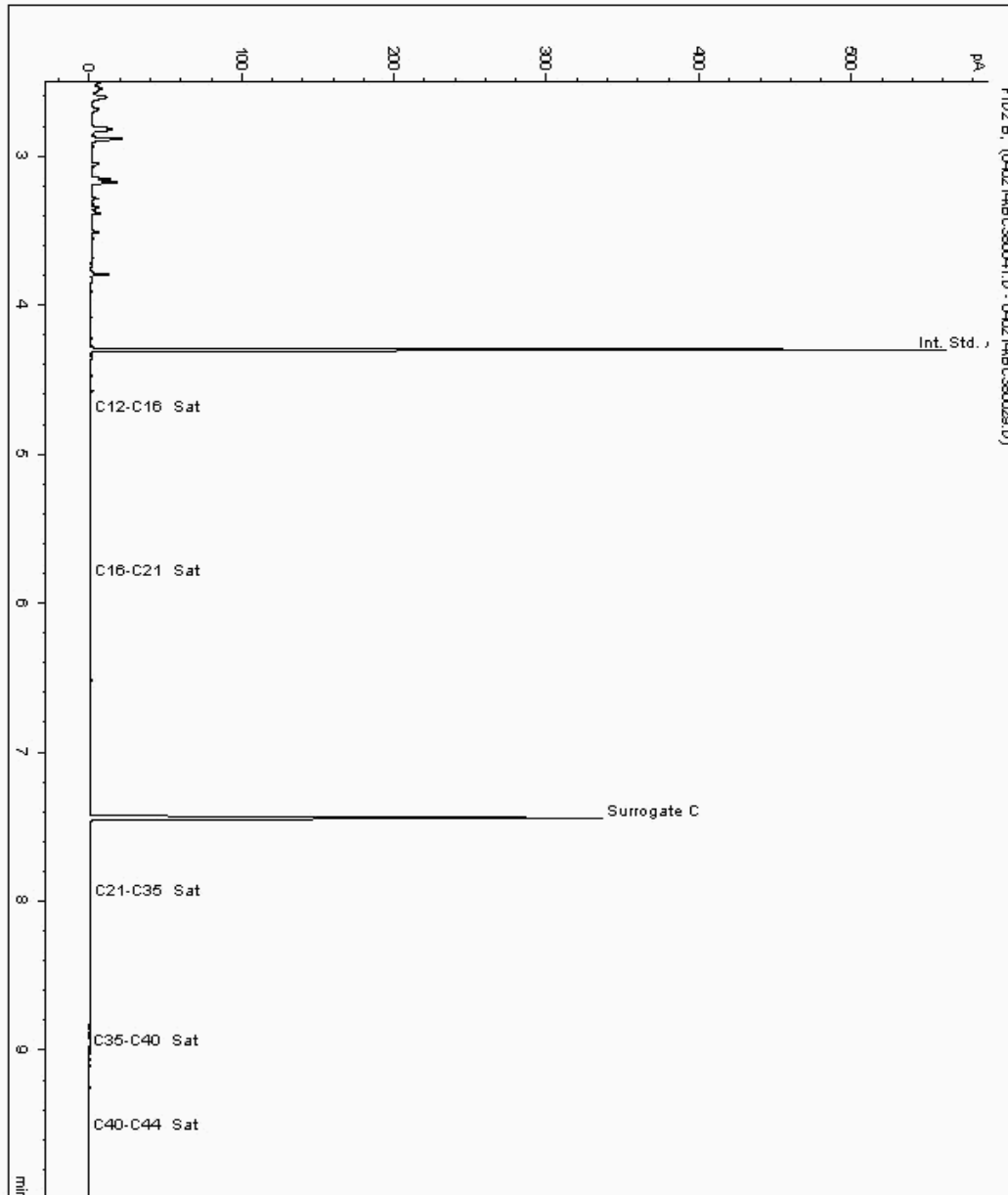
Analysis: EPH CWG (Aliphatic) Aqueous GC (W)

Sample No : 9077028
Sample ID : BH103

Depth : 0.00

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS (C12 - C40)

Sample Identity: 8628892-9077028
Date Acquired : 03/04/14 04:42:36 PM
Units : ppb
Dilution :
CF : 1
Multiplier : 0.008





SDG: 140401-28
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS Corporation Limited
Attention: Jocelyn Willis

Order Number:
Report Number: 265839
Superseded Report:

Chromatogram

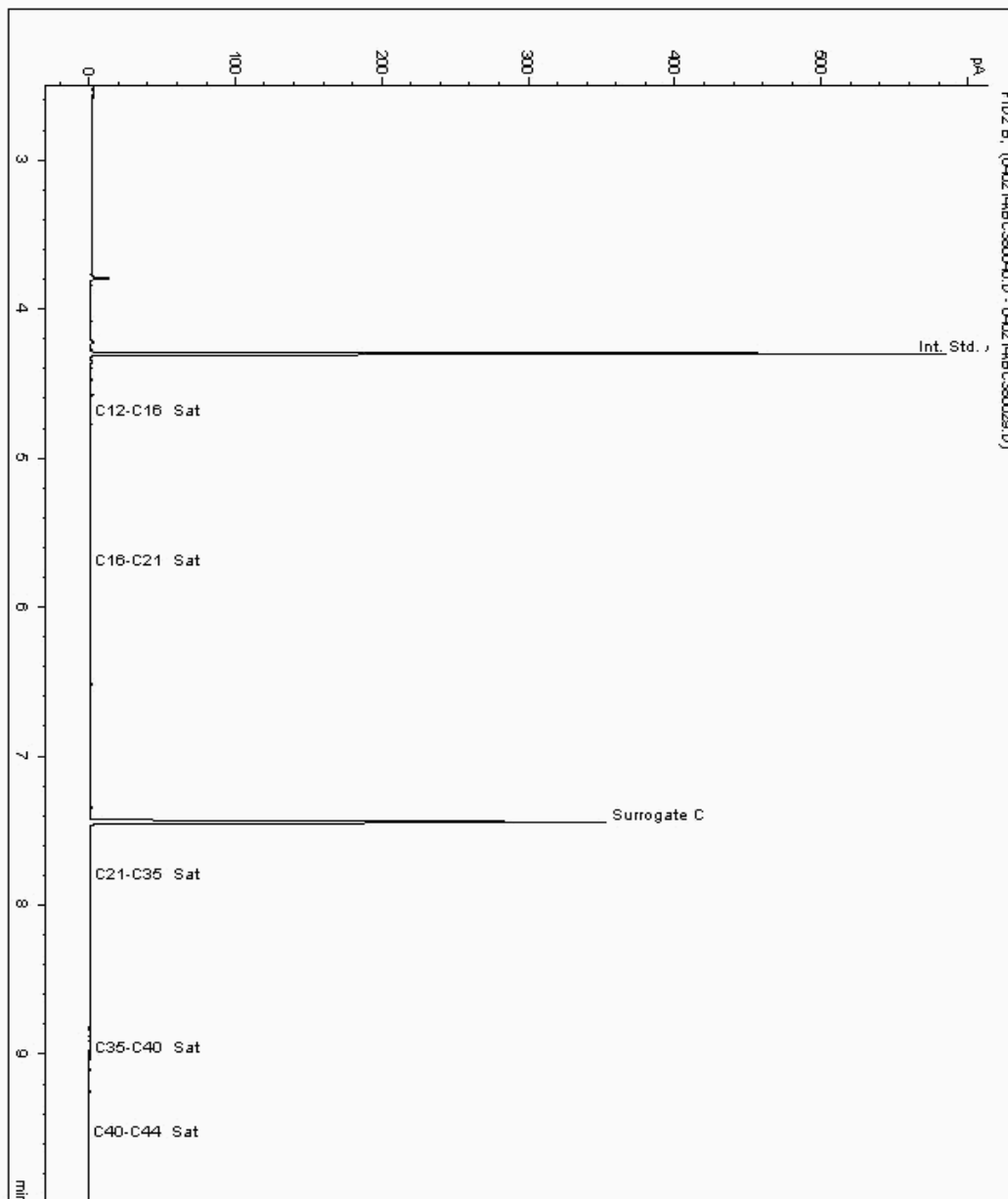
Analysis: EPH CWG (Aliphatic) Aqueous GC (W)

Sample No : 9077030
Sample ID : BH102A

Depth : 0.00

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS (C12 - C40)

Sample Identity: 8628871-9077030
Date Acquired : 03/04/14 04:23:53 PM
Units : ppb
Dilution :
CF : 1
Multiplier : 0.008





SDG: 140401-28
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS Corporation Limited
Attention: Jocelyn Willis

Order Number:
Report Number: 265839
Superseded Report:

Chromatogram

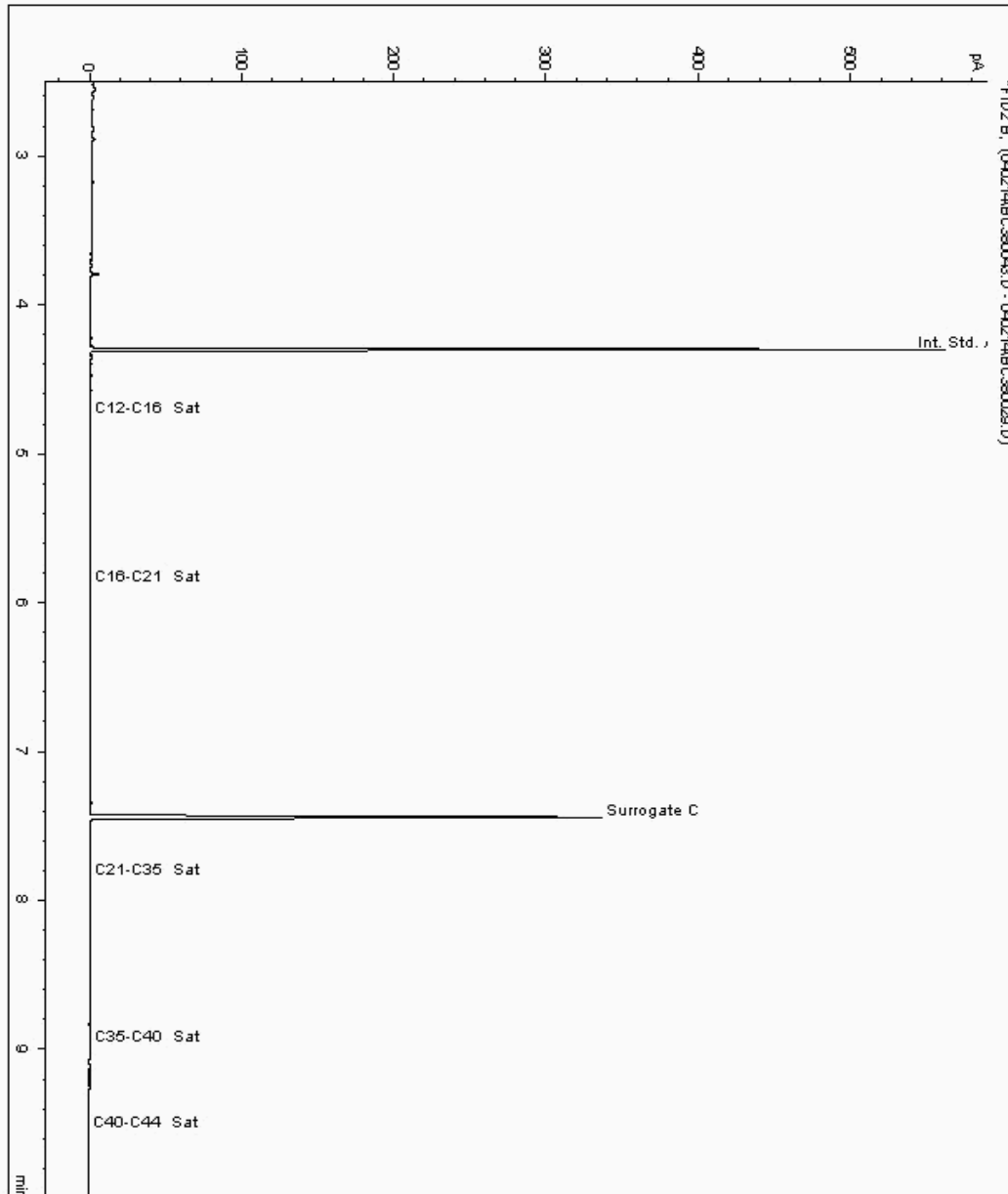
Analysis: EPH CWG (Aliphatic) Aqueous GC (W)

Sample No : 9077034
Sample ID : BH102

Depth : 0.00

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS (C12 - C40)

Sample Identity: 8628882-9077034
Date Acquired : 03/04/14 05:20:14 PM
Units : ppb
Dilution :
CF : 1
Multiplier : 0.008





SDG: 140401-28
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS Corporation Limited
Attention: Jocelyn Willis

Order Number:
Report Number: 265839
Superseded Report:

Chromatogram

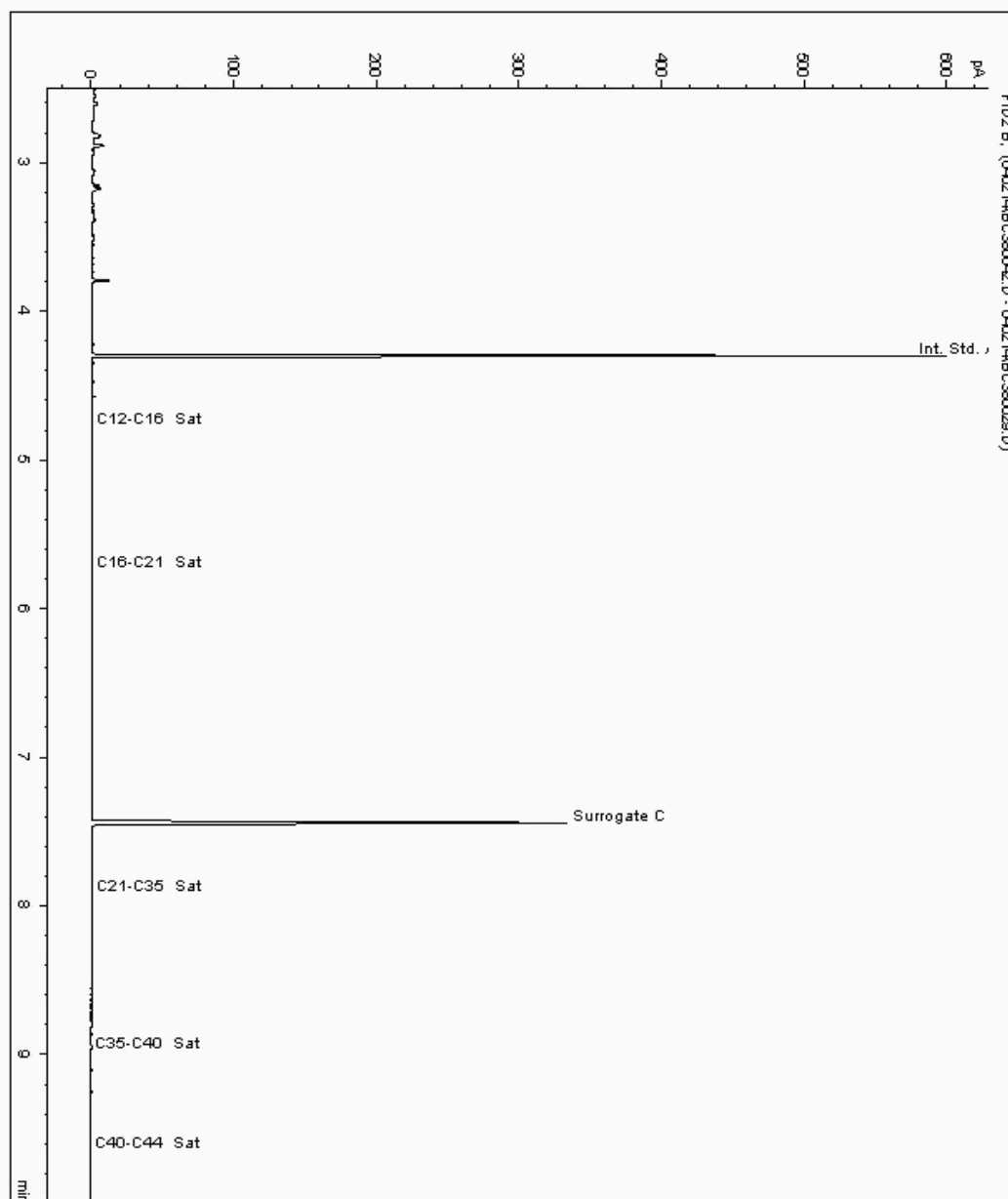
Analysis: EPH CWG (Aliphatic) Aqueous GC (W)

Sample No : 9077093
Sample ID : BH105A

Depth : 0.00

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS (C12 - C40)

Sample Identity: 8628903-9077093
Date Acquired : 03/04/14 05:01:31 PM
Units : ppb
Dilution :
CF : 1
Multiplier : 0.008





CERTIFICATE OF ANALYSIS

SDG: 140401-28
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS Corporation Limited
Attention: Jocelyn Willis

Order Number:
Report Number: 265839
Superseded Report:

Chromatogram

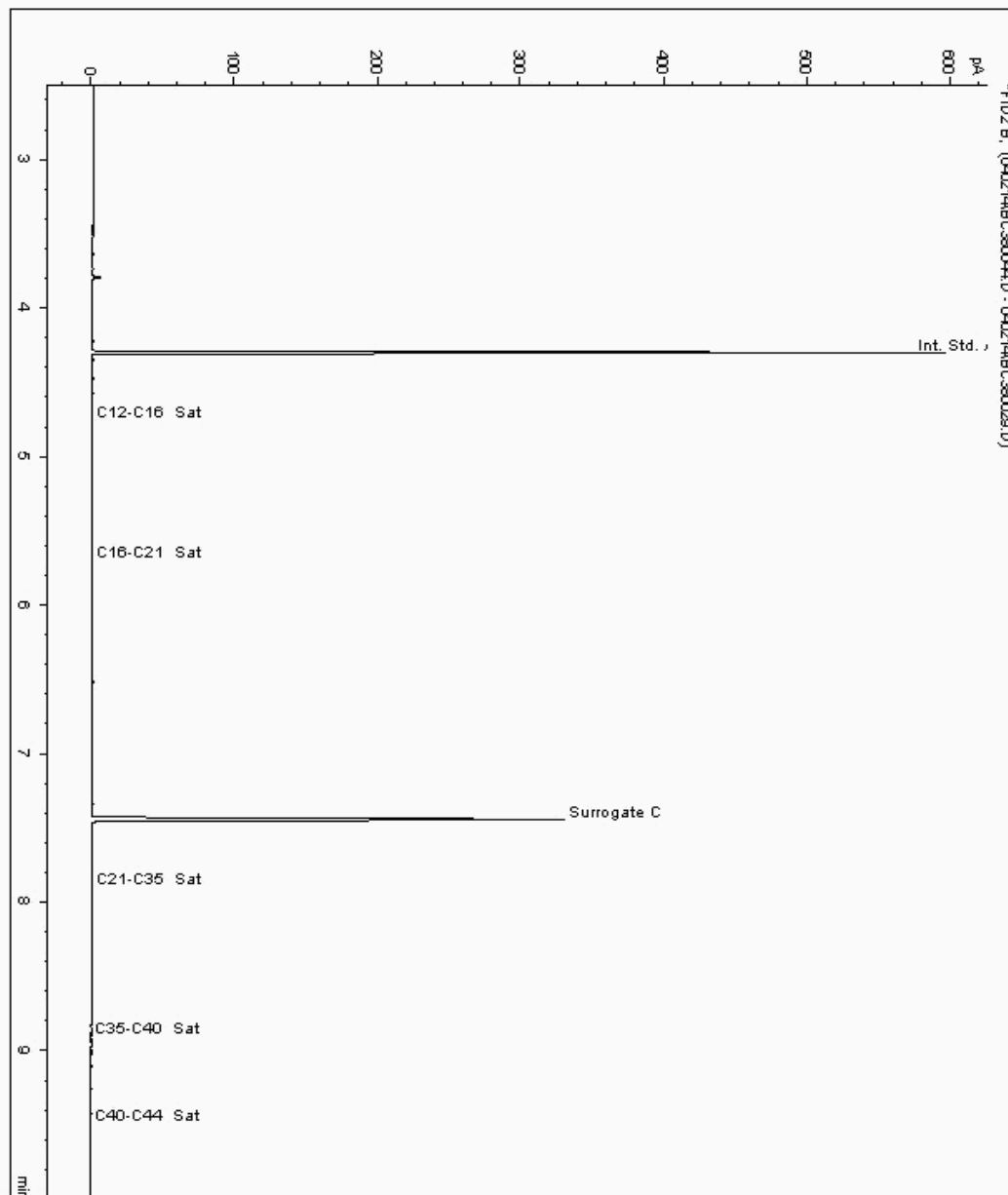
Analysis: EPH CWG (Aliphatic) Aqueous GC (W)

Sample No : 9077096
Sample ID : EB

Depth : 0.00

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS (C12 - C40)

Sample Identity: 8628933-9077096
Date Acquired : 03/04/14 05:38:58 PM
Units : ppb
Dilution :
CF : 1
Multiplier : 0.008





SDG: 140401-28
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS Corporation Limited
Attention: Jocelyn Willis

Order Number:
Report Number: 265839
Superseded Report:

Chromatogram

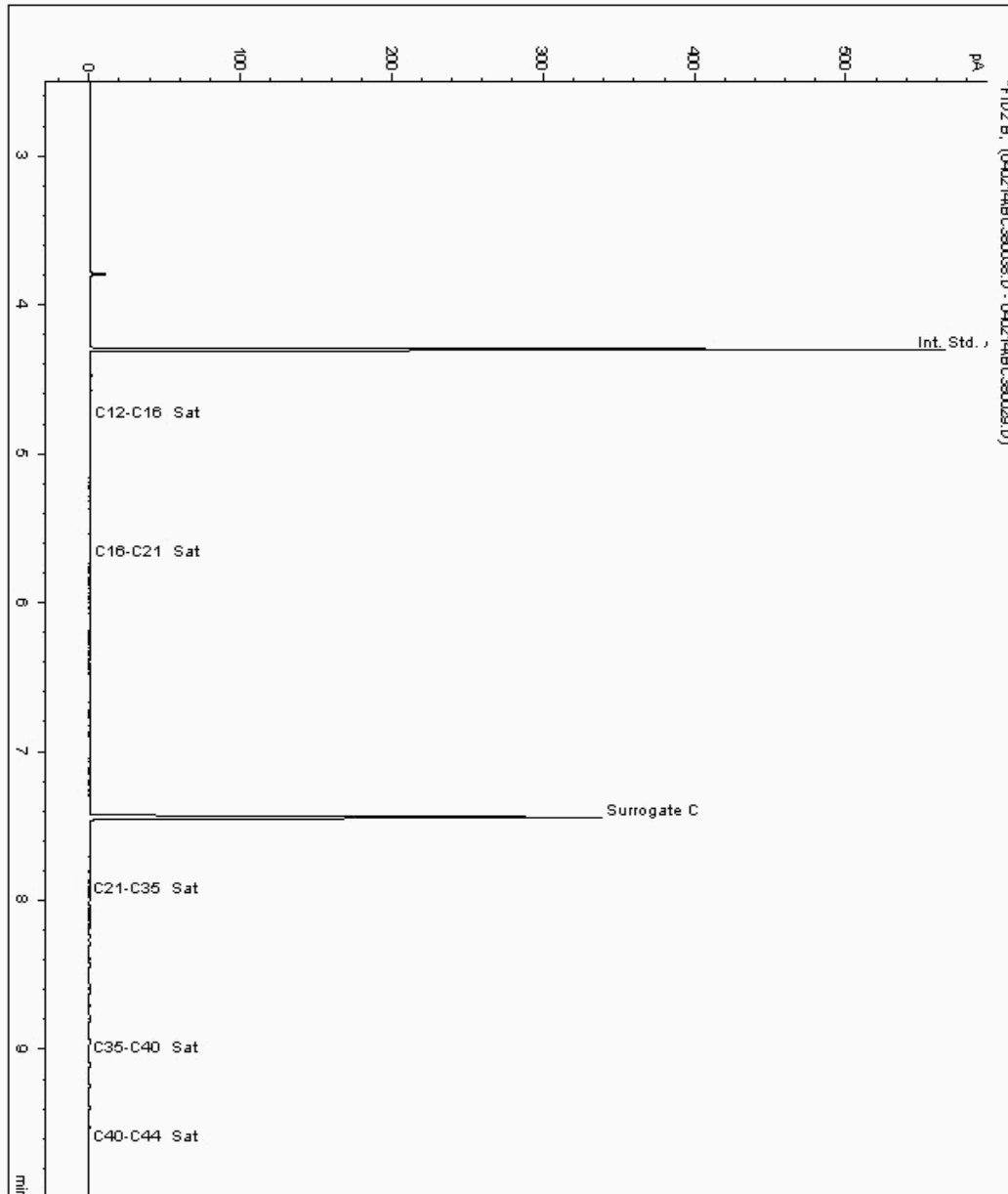
Analysis: EPH CWG (Aliphatic) Aqueous GC (W)

Sample No : 9077101
Sample ID : BH106A

Depth : 0.00

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS (C12 - C40)

Sample Identity: 8628913-9077101
Date Acquired : 03/04/14 03:46:25 PM
Units : ppb
Dilution :
CF : 1
Multiplier : 0.008





CERTIFICATE OF ANALYSIS

SDG: 140401-28
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS Corporation Limited
Attention: Jocelyn Willis

Order Number:
Report Number: 265839
Superseded Report:

Chromatogram

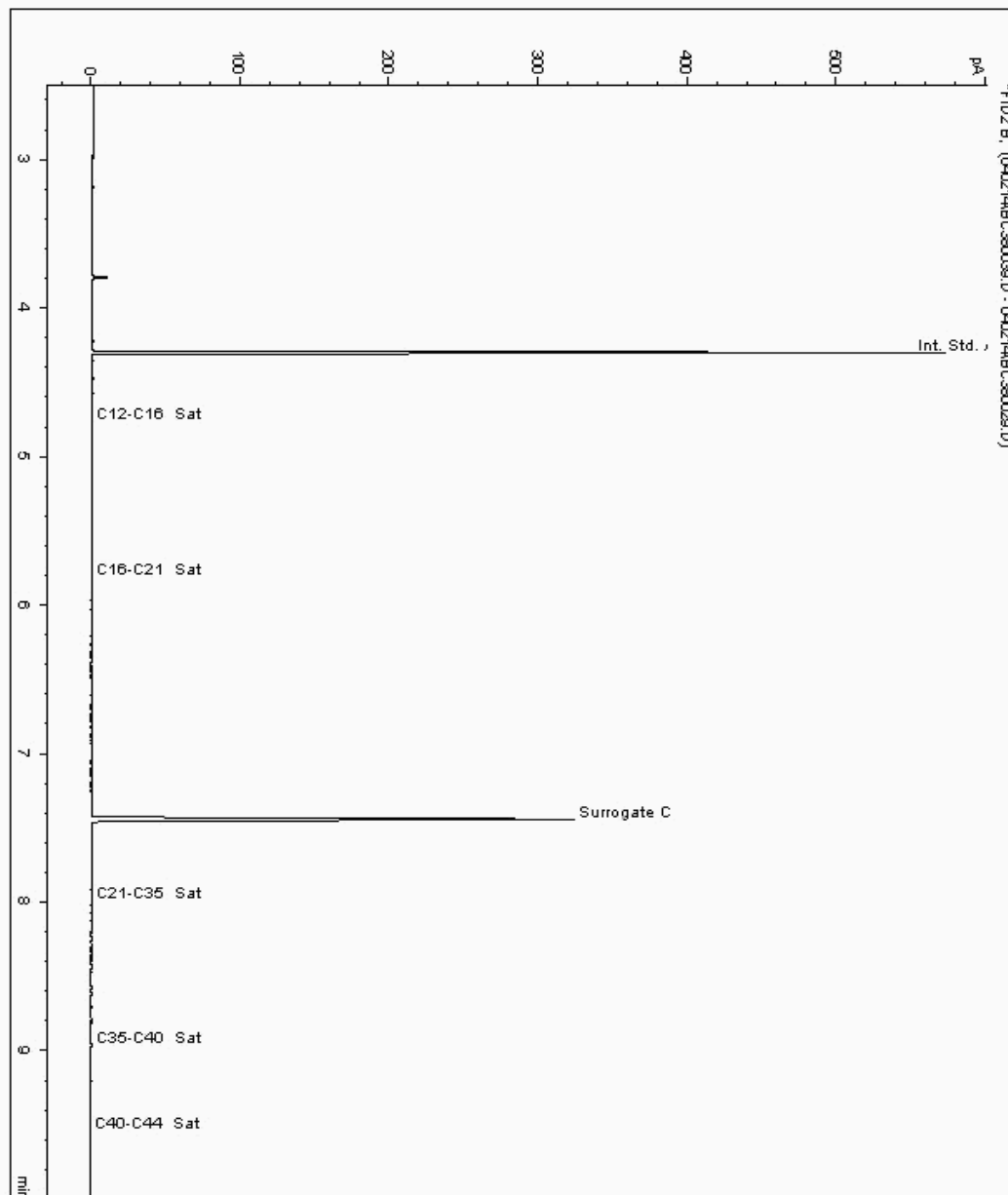
Analysis: EPH CWG (Aliphatic) Aqueous GC (W)

Sample No : 9077105
Sample ID : Dup

Depth : 0.00

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS (C12 - C40)

Sample Identity: 8628923-9077105
Date Acquired : 03/04/14 04:05:08 PM
Units : ppb
Dilution :
CF : 1
Multiplier : 0.008





SDG: 140401-28
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS Corporation Limited
Attention: Jocelyn Willis

Order Number:
Report Number: 265839
Superseded Report:

Chromatogram

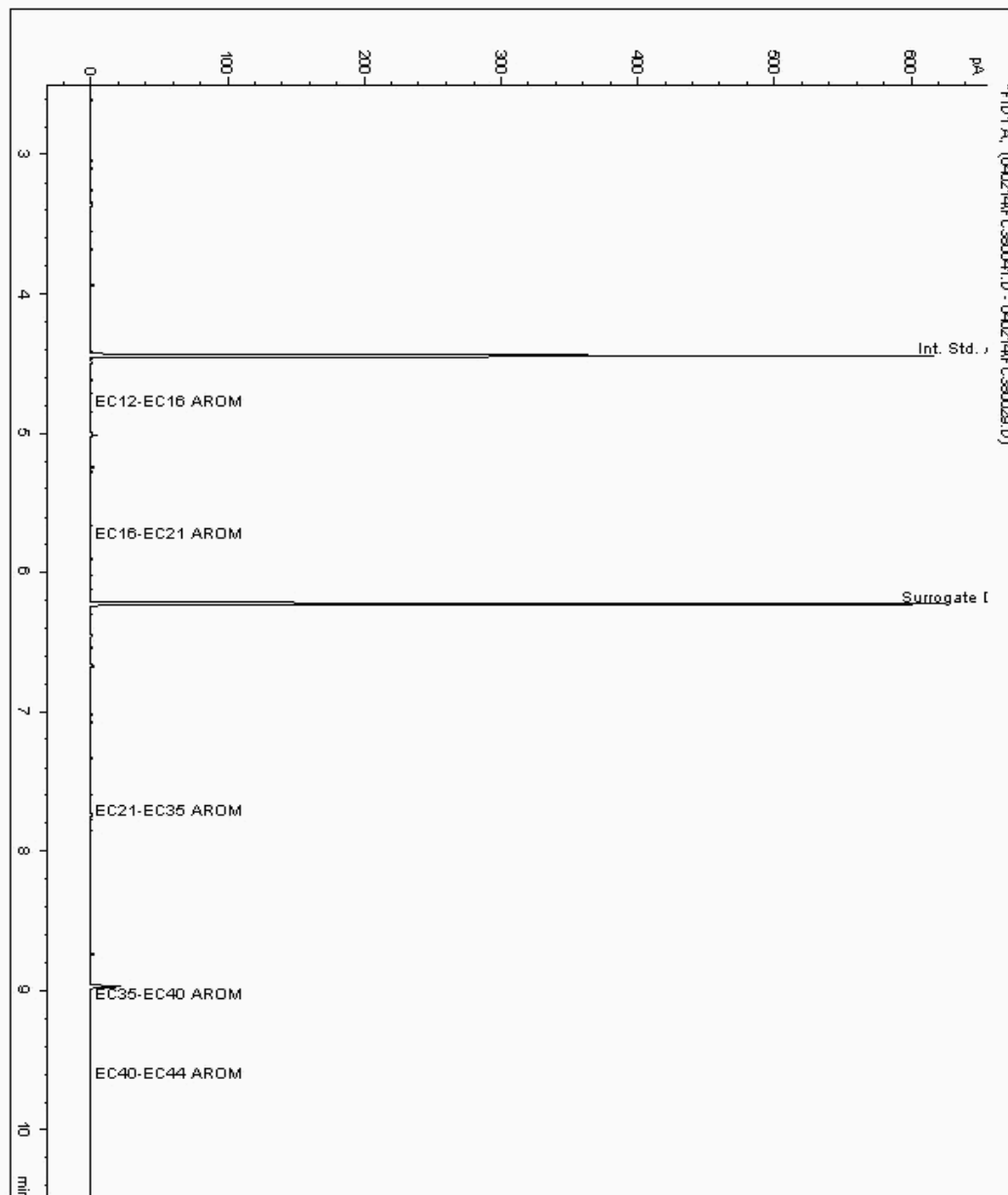
Analysis: EPH CWG (Aromatic) Aqueous GC (W)

Sample No : 9077028
Sample ID : BH103

Depth : 0.00

Alcontrol/Geochem Analytical Services
Speciated TPH - AROM (C12 - C40)

Sample Identity: 8628893-9077028
Date Acquired : 03/04/14 04:42:36 PM
Units : ppb
Dilution :
CF : 1
Multiplier : 0.008

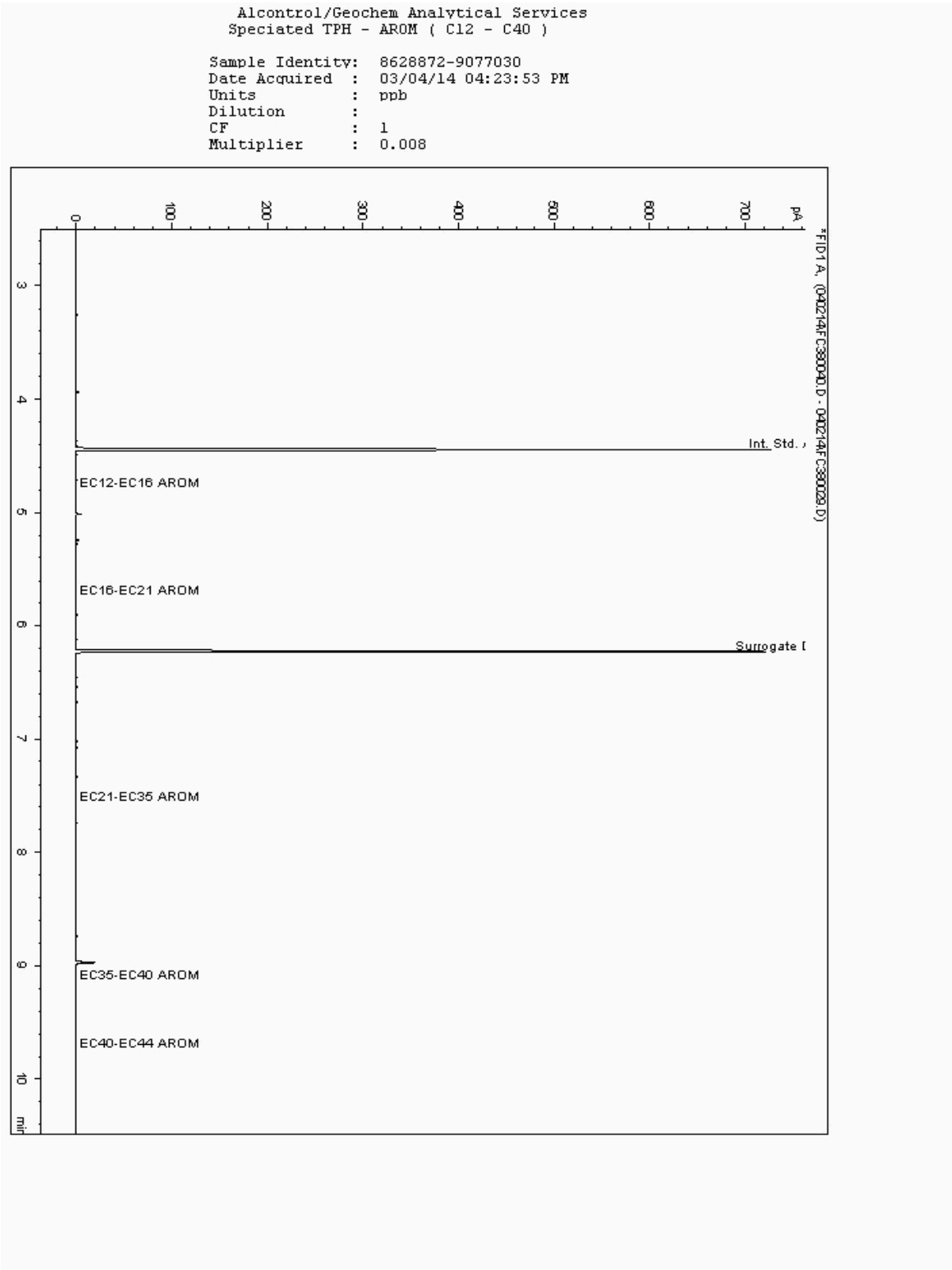




SDG:	140401-28	Location:	Shell Hitchin	Order Number:	
Job:	H_URS_WIM-174	Customer:	URS Corporation Limited	Report Number:	265839
Client Reference:	46370079	Attention:	Jocelyn Willis	Superseded Report:	

Chromatogram

Analysis:	EPH CWG (Aromatic) Aqueous GC (W)	Sample No :	9077030	Depth :	0.00
		Sample ID :	BH102A		





CERTIFICATE OF ANALYSIS

SDG: 140401-28
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS Corporation Limited
Attention: Jocelyn Willis

Order Number:
Report Number: 265839
Superseded Report:

Chromatogram

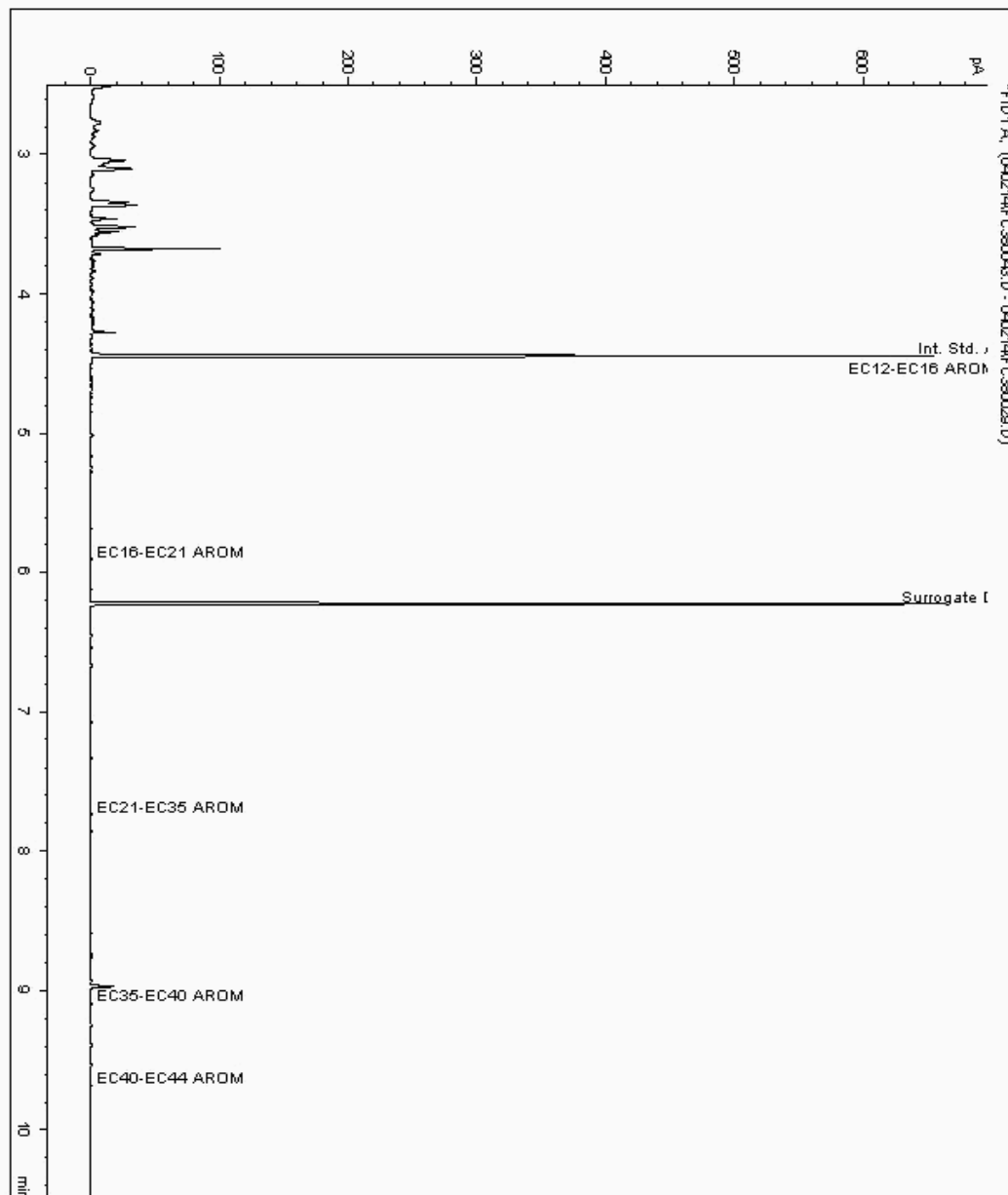
Analysis: EPH CWG (Aromatic) Aqueous GC (W)

Sample No : 9077034
Sample ID : BH102

Depth : 0.00

Alcontrol/Geochem Analytical Services
Speciated TPH - AROM (C12 - C40)

Sample Identity: 8628883-9077034
Date Acquired : 03/04/14 05:20:14 PM
Units : ppb
Dilution :
CF : 1
Multiplier : 0.008





SDG: 140401-28
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS Corporation Limited
Attention: Jocelyn Willis

Order Number:
Report Number: 265839
Superseded Report:

Chromatogram

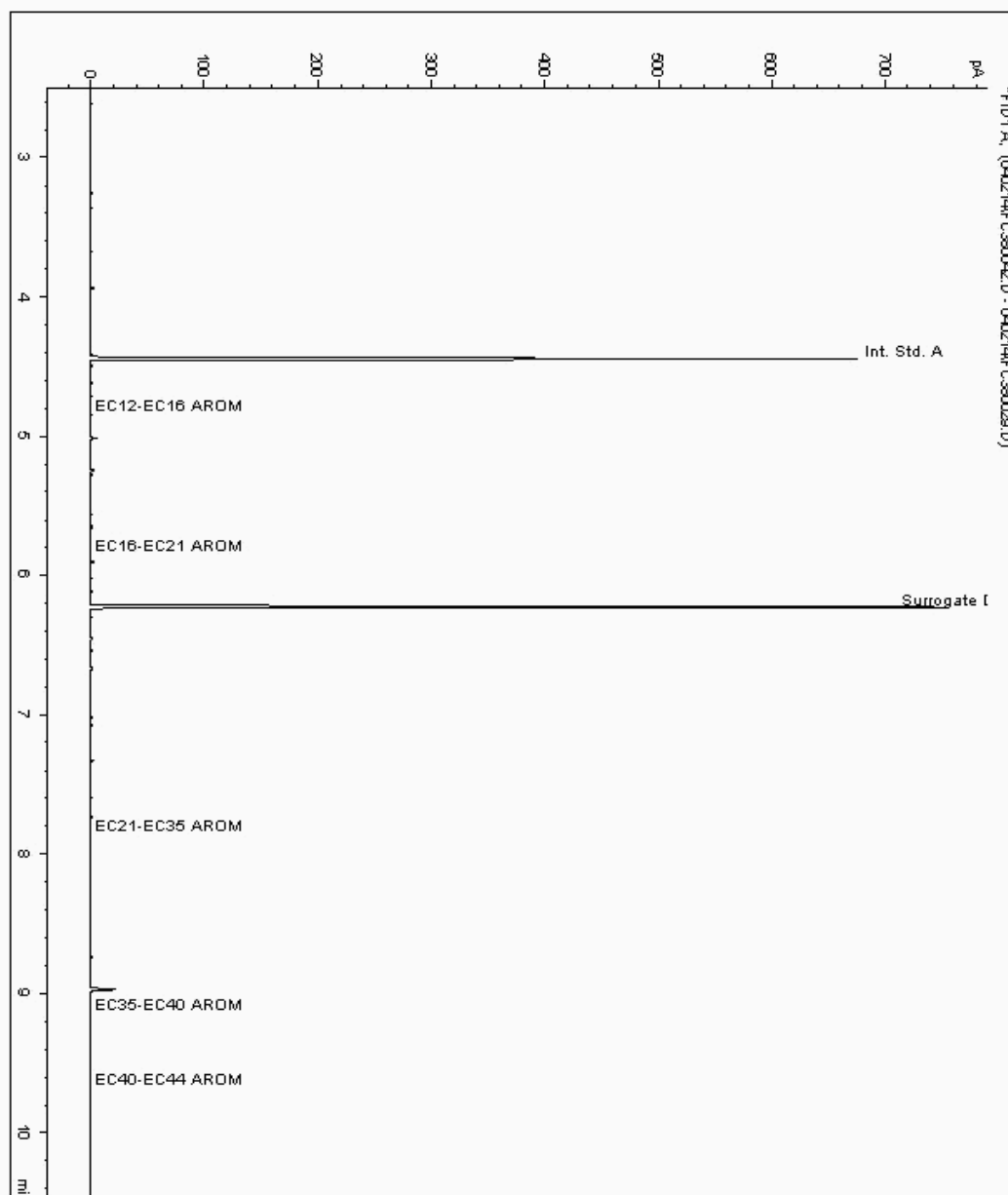
Analysis: EPH CWG (Aromatic) Aqueous GC (W)

Sample No : 9077093
Sample ID : BH105A

Depth : 0.00

Alcontrol/Geochem Analytical Services
Speciated TPH - AROM (C12 - C40)

Sample Identity: 8628904-9077093
Date Acquired : 03/04/14 05:01:31 PM
Units : ppb
Dilution :
CF : 1
Multiplier : 0.008





SDG: 140401-28
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS Corporation Limited
Attention: Jocelyn Willis

Order Number:
Report Number: 265839
Superseded Report:

Chromatogram

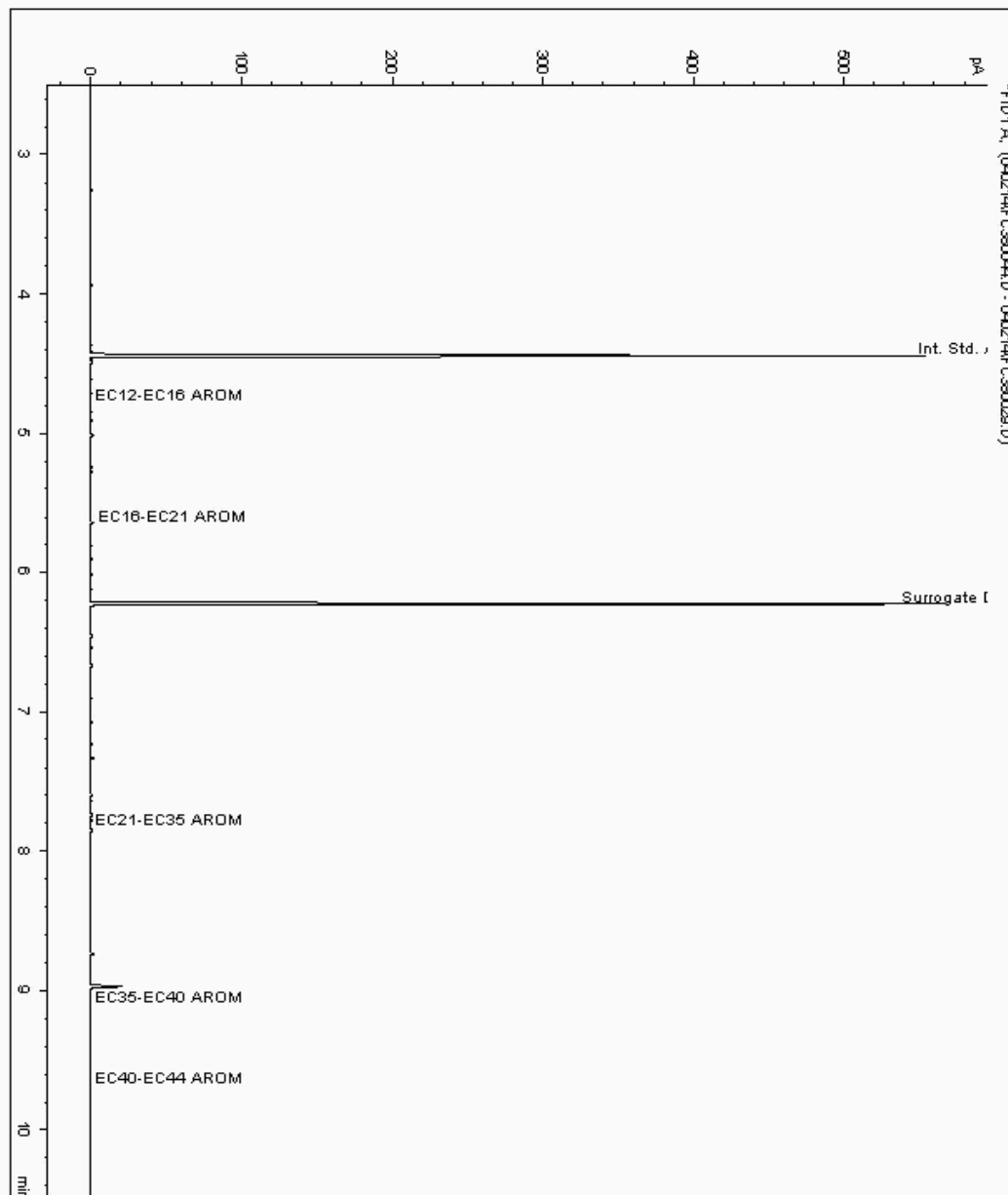
Analysis: EPH CWG (Aromatic) Aqueous GC (W)

Sample No : 9077096
Sample ID : EB

Depth : 0.00

Alcontrol/Geochem Analytical Services
Speciated TPH - AROM (C12 - C40)

Sample Identity: 8628934-9077096
Date Acquired : 03/04/14 05:38:58 PM
Units : ppb
Dilution :
CF : 1
Multiplier : 0.008





CERTIFICATE OF ANALYSIS

SDG: 140401-28
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS Corporation Limited
Attention: Jocelyn Willis

Order Number:
Report Number: 265839
Superseded Report:

Chromatogram

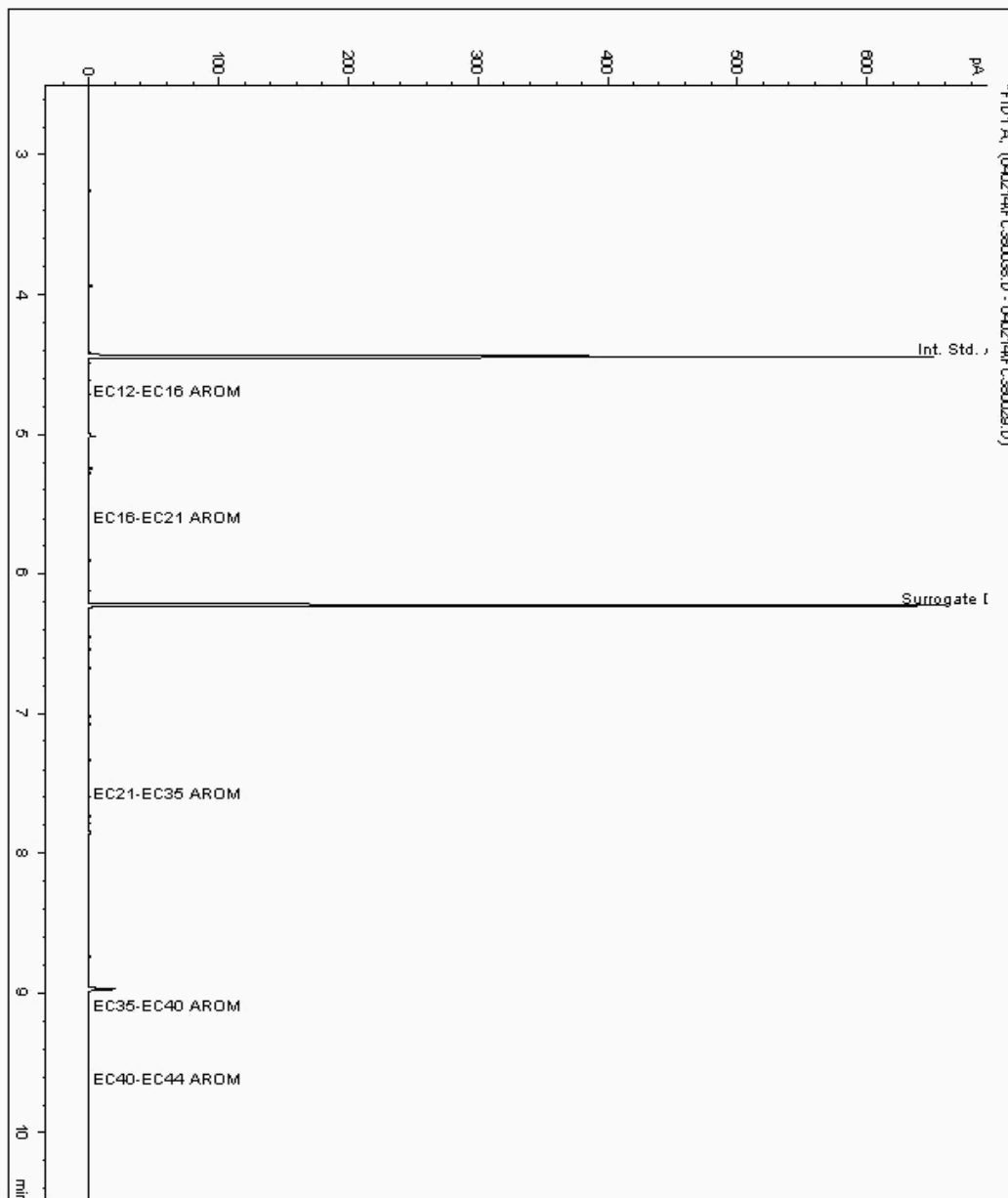
Analysis: EPH CWG (Aromatic) Aqueous GC (W)

Sample No : 9077101
Sample ID : BH106A

Depth : 0.00

Alcontrol/Geochem Analytical Services
Speciated TPH - AROM (C12 - C40)

Sample Identity: 8628914-9077101
Date Acquired : 03/04/14 03:46:24 PM
Units : ppb
Dilution :
CF : 1
Multiplier : 0.008





SDG: 140401-28
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS Corporation Limited
Attention: Jocelyn Willis

Order Number:
Report Number: 265839
Superseded Report:

Chromatogram

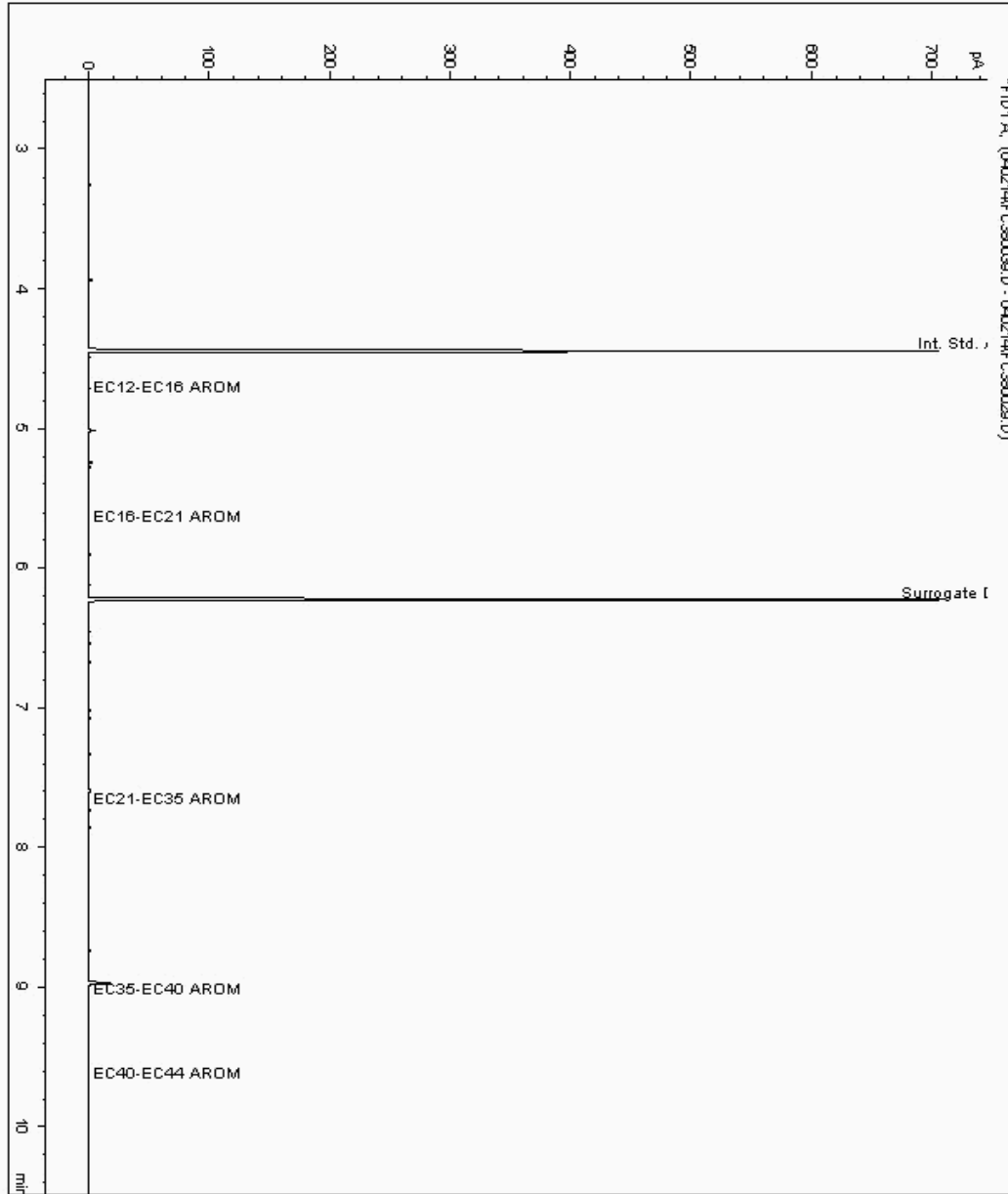
Analysis: EPH CWG (Aromatic) Aqueous GC (W)

Sample No : 9077105
Sample ID : Dup

Depth : 0.00

Alcontrol/Geochem Analytical Services
Speciated TPH - AROM (C12 - C40)

Sample Identity: 8628924-9077105
Date Acquired : 03/04/14 04:05:09 PM
Units : ppb
Dilution :
CF : 1
Multiplier : 0.008





SDG: 140401-28
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS Corporation Limited
Attention: Jocelyn Willis

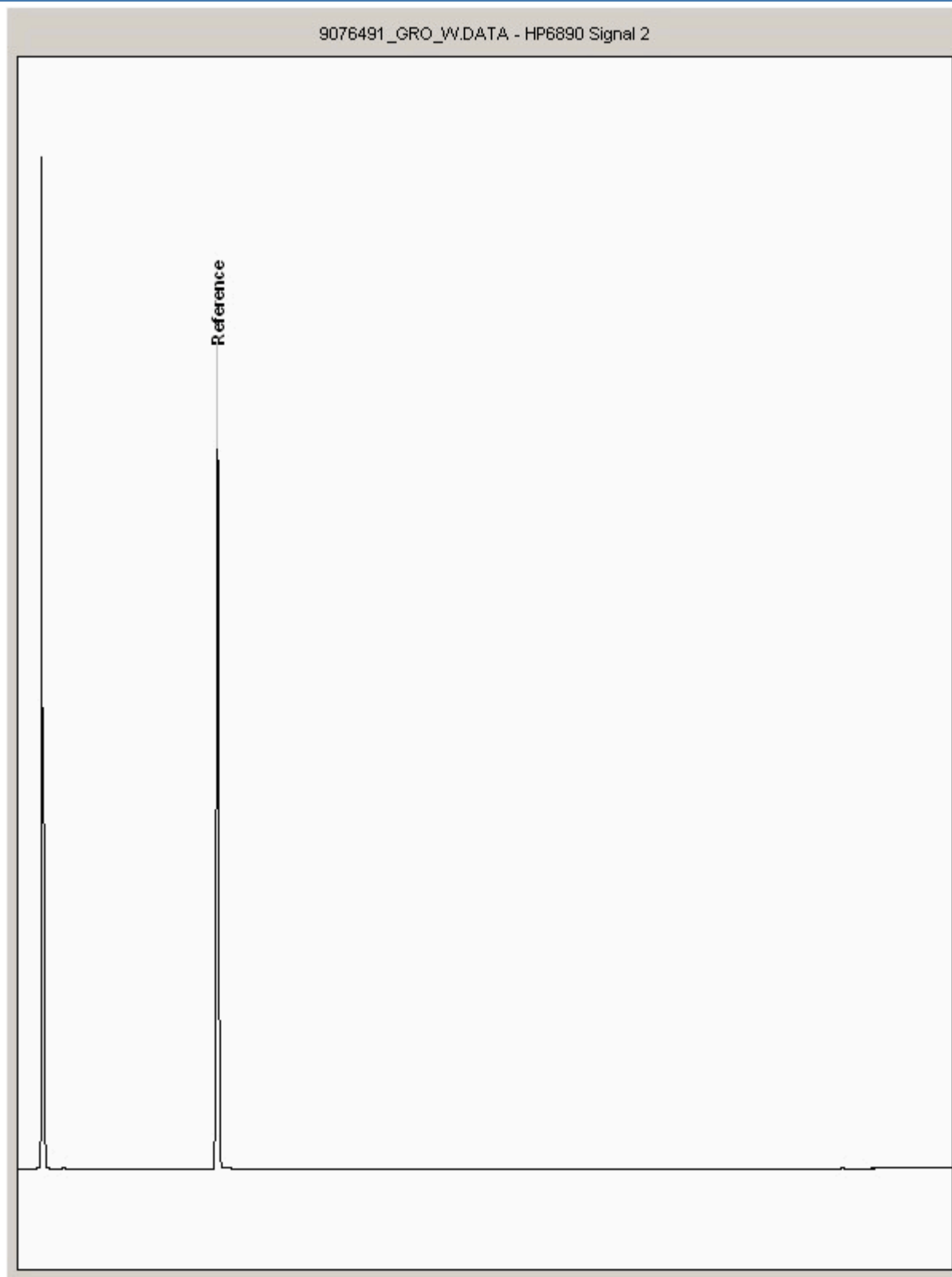
Order Number:
Report Number: 265839
Superseded Report:

Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 9076491
Sample ID : BH103

Depth : 0.00





SDG: 140401-28
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS Corporation Limited
Attention: Jocelyn Willis

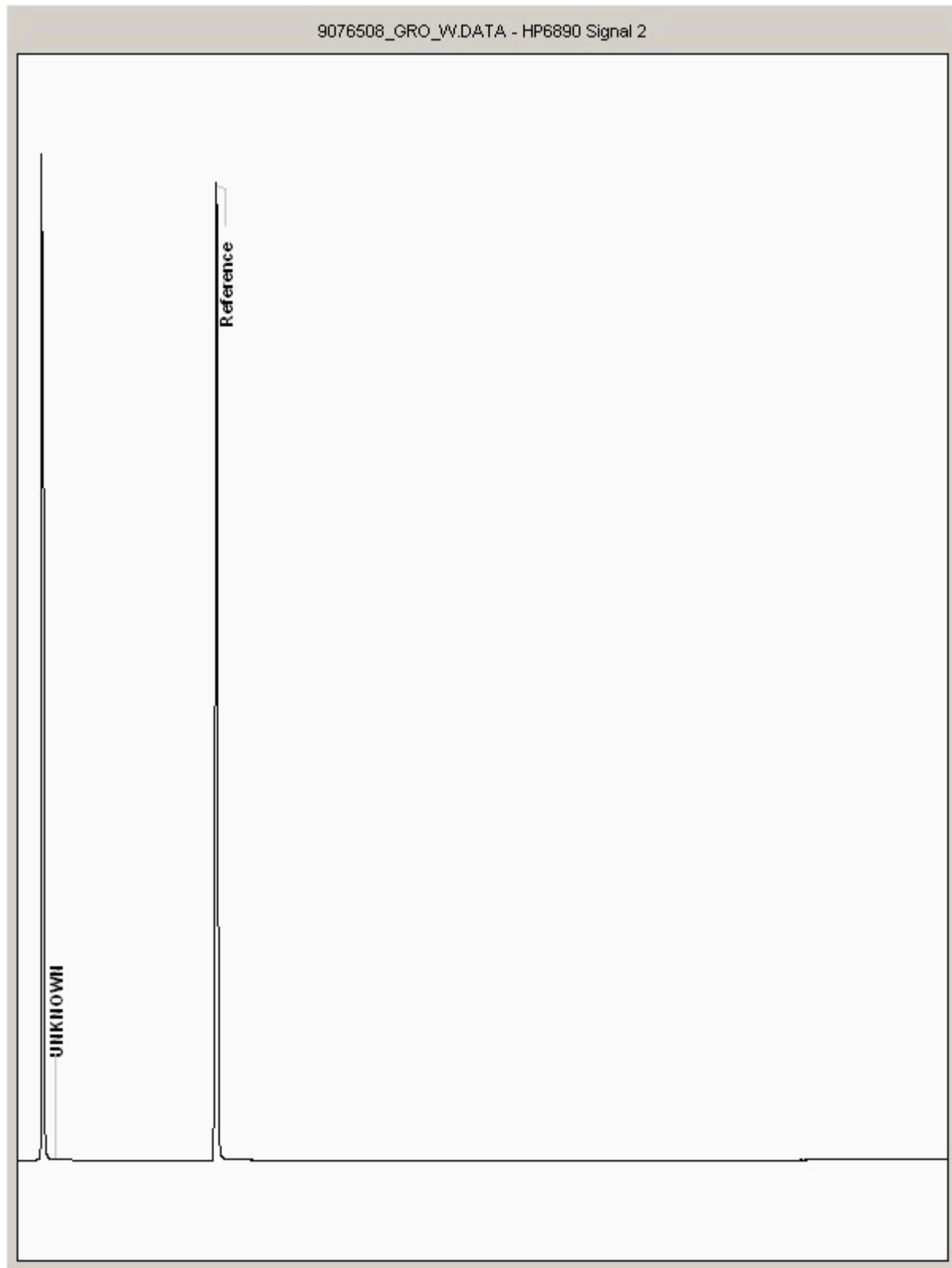
Order Number:
Report Number: 265839
Superseded Report:

Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 9076508
Sample ID : BH106A

Depth : 0.00





SDG: 140401-28
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS Corporation Limited
Attention: Jocelyn Willis

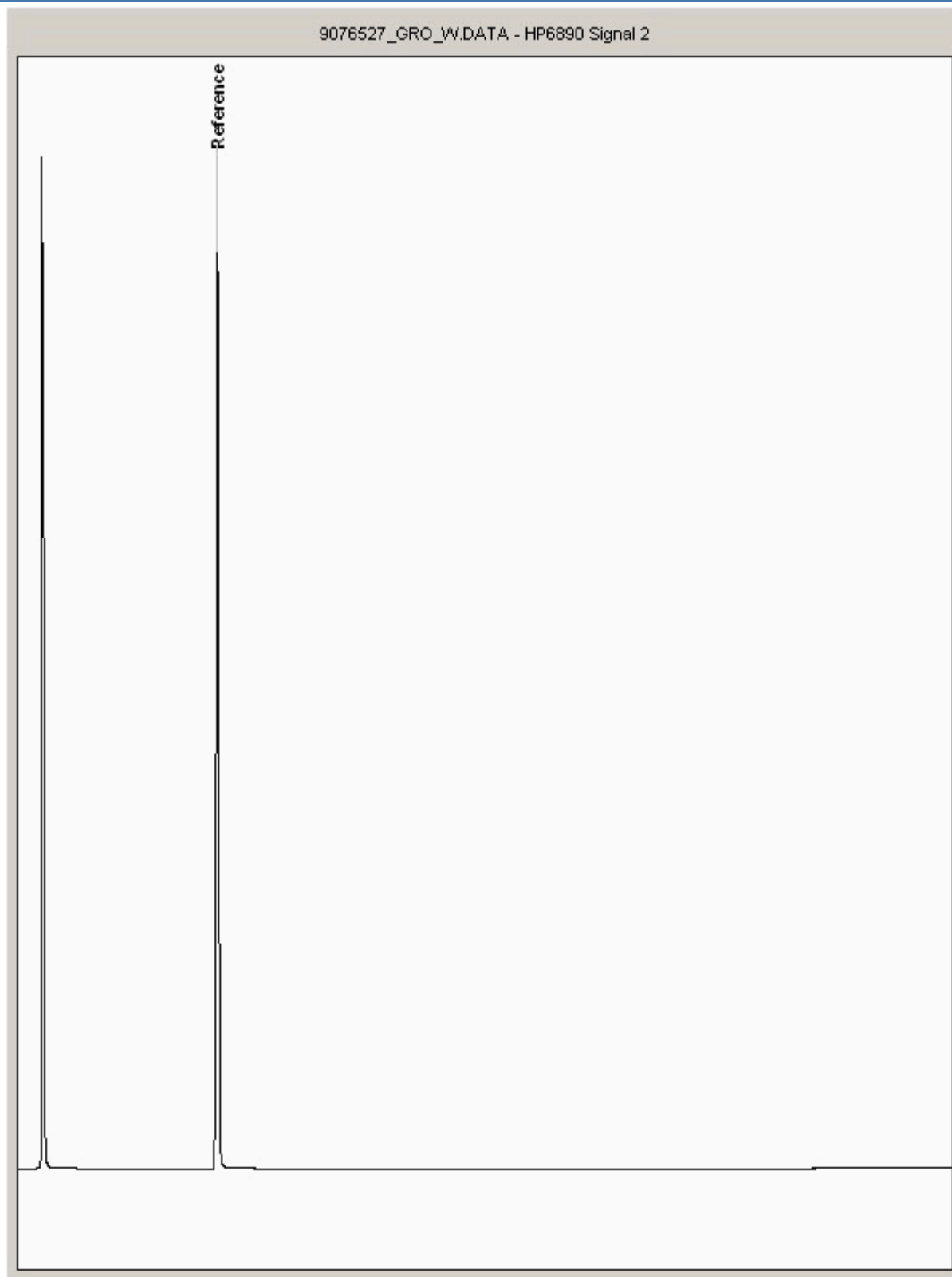
Order Number:
Report Number: 265839
Superseded Report:

Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 9076527
Sample ID : Dup

Depth : 0.00





SDG: 140401-28
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS Corporation Limited
Attention: Jocelyn Willis

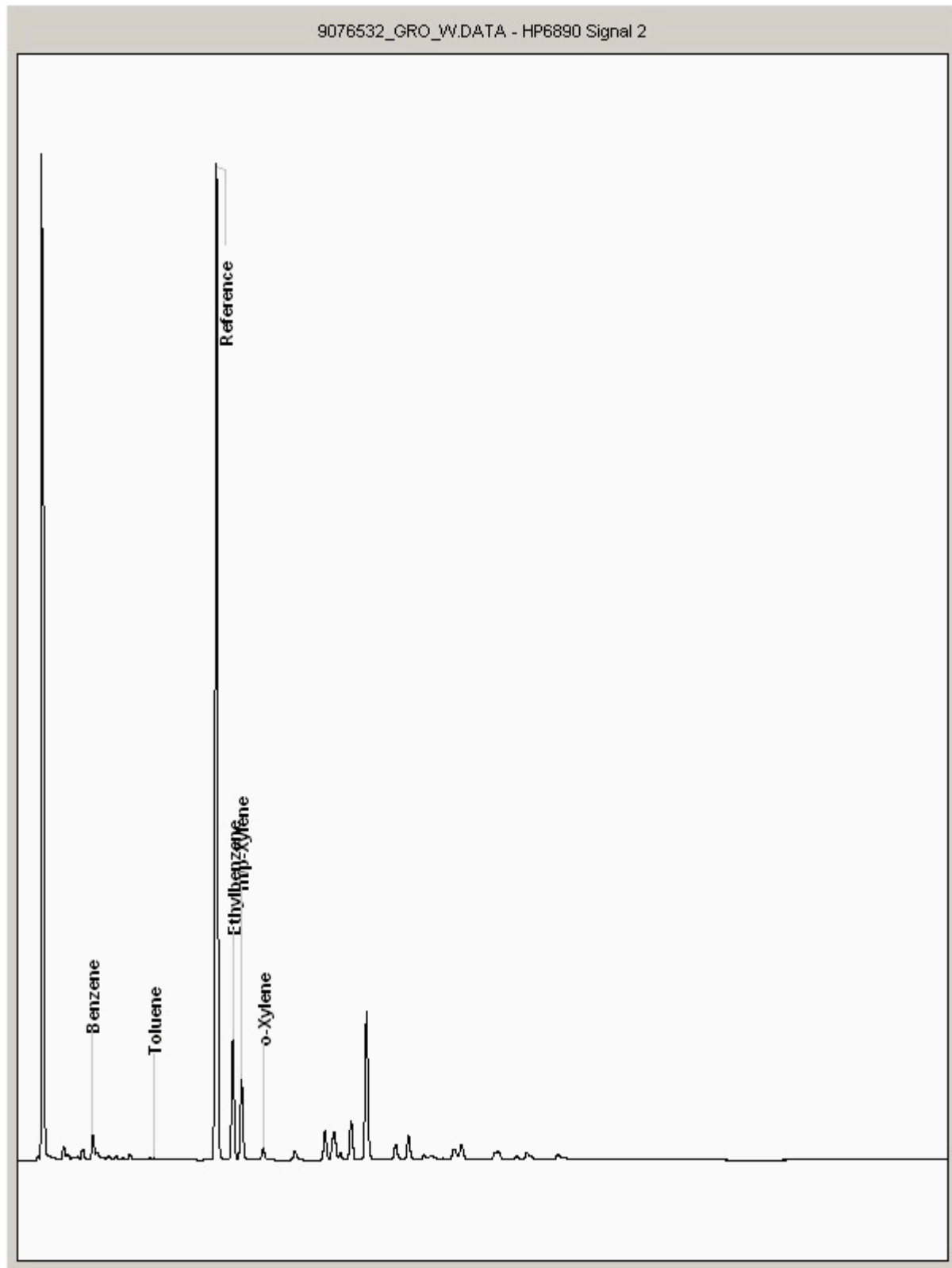
Order Number:
Report Number: 265839
Superseded Report:

Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 9076532
Sample ID : BH102

Depth : 0.00





CERTIFICATE OF ANALYSIS

SDG: 140401-28
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS Corporation Limited
Attention: Jocelyn Willis

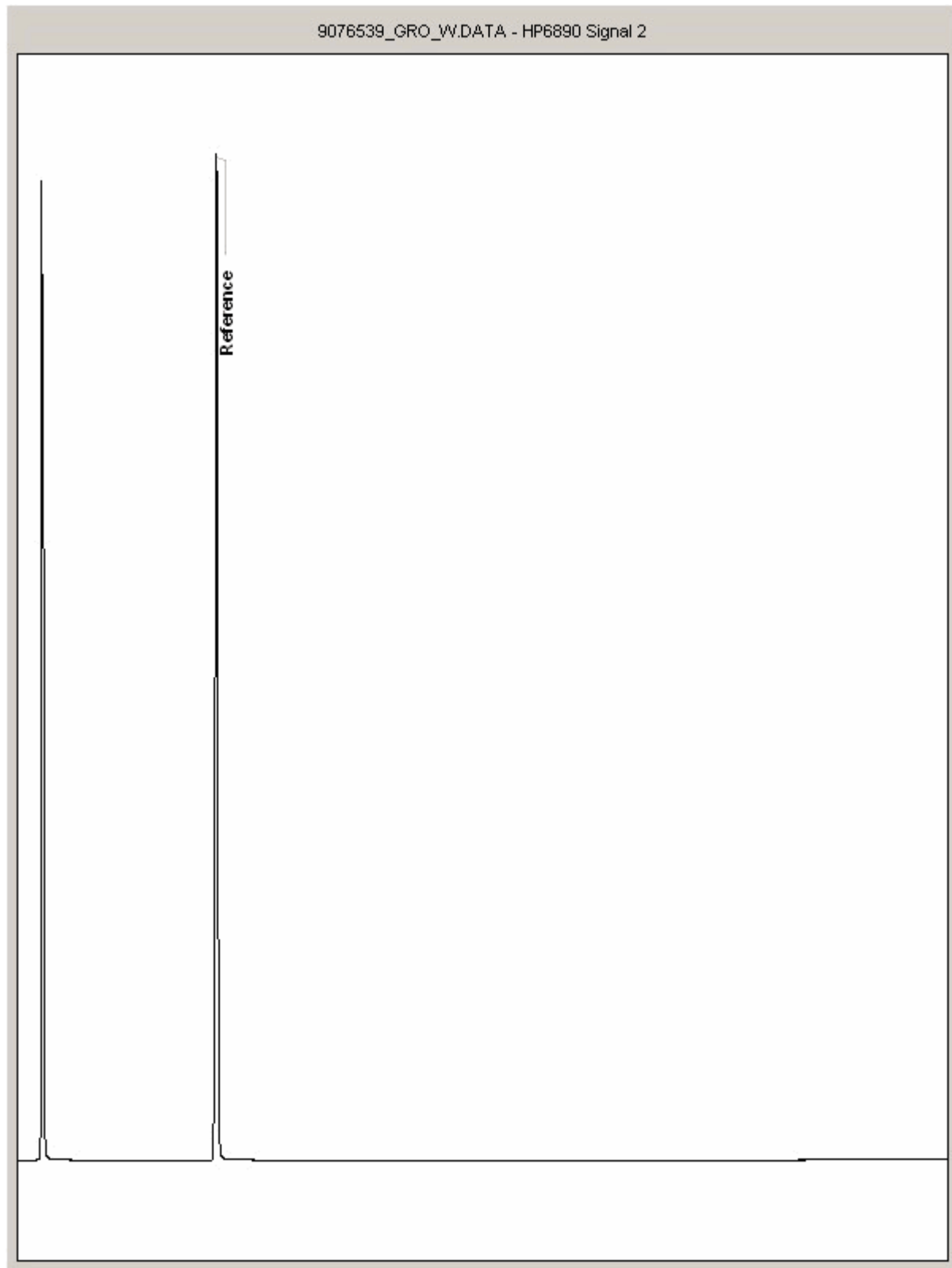
Order Number:
Report Number: 265839
Superseded Report:

Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 9076539
Sample ID : BH102A

Depth : 0.00





SDG: 140401-28
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS Corporation Limited
Attention: Jocelyn Willis

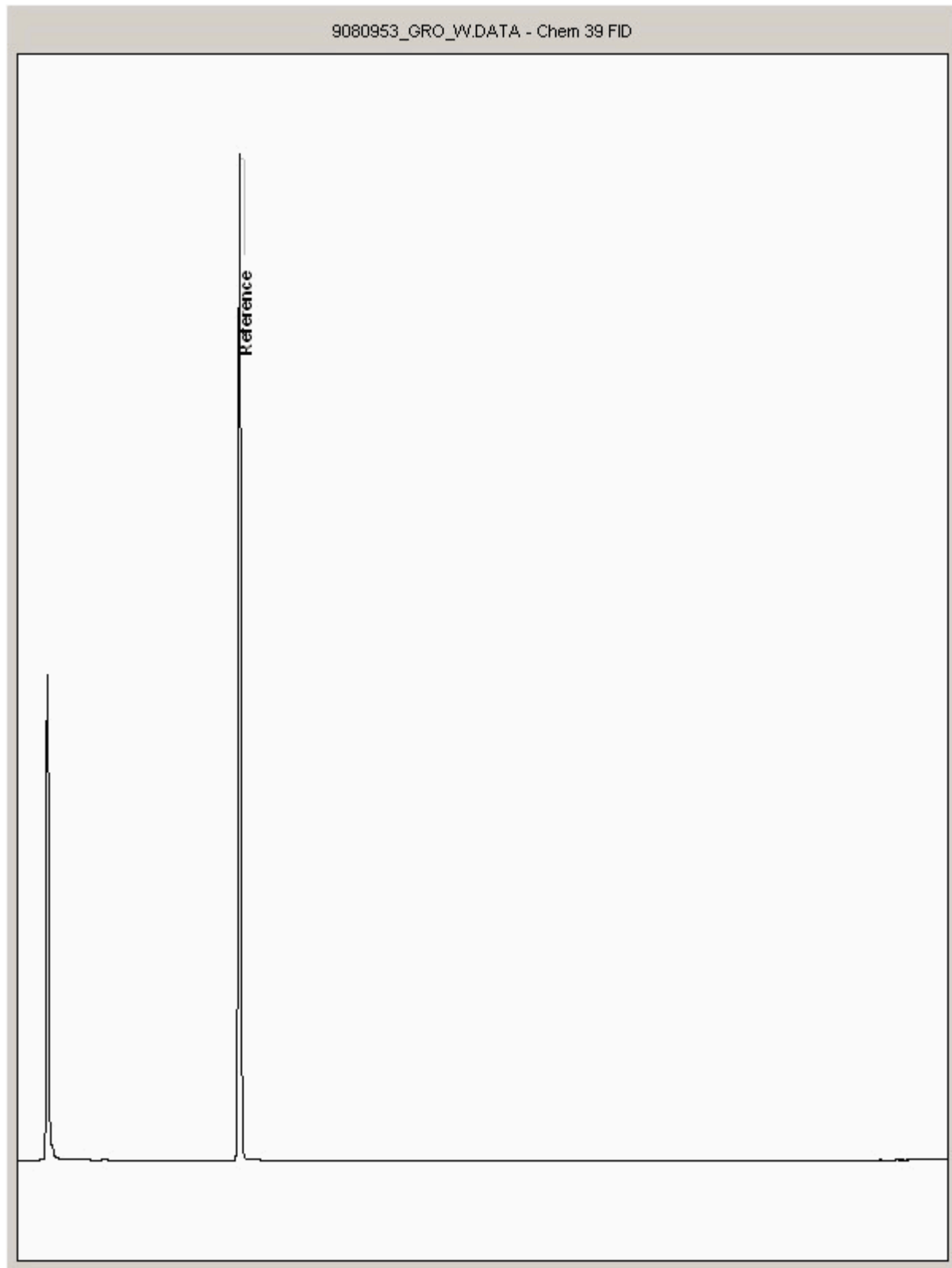
Order Number:
Report Number: 265839
Superseded Report:

Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 9080953
Sample ID : EB

Depth : 0.00





SDG: 140401-28
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS Corporation Limited
Attention: Jocelyn Willis

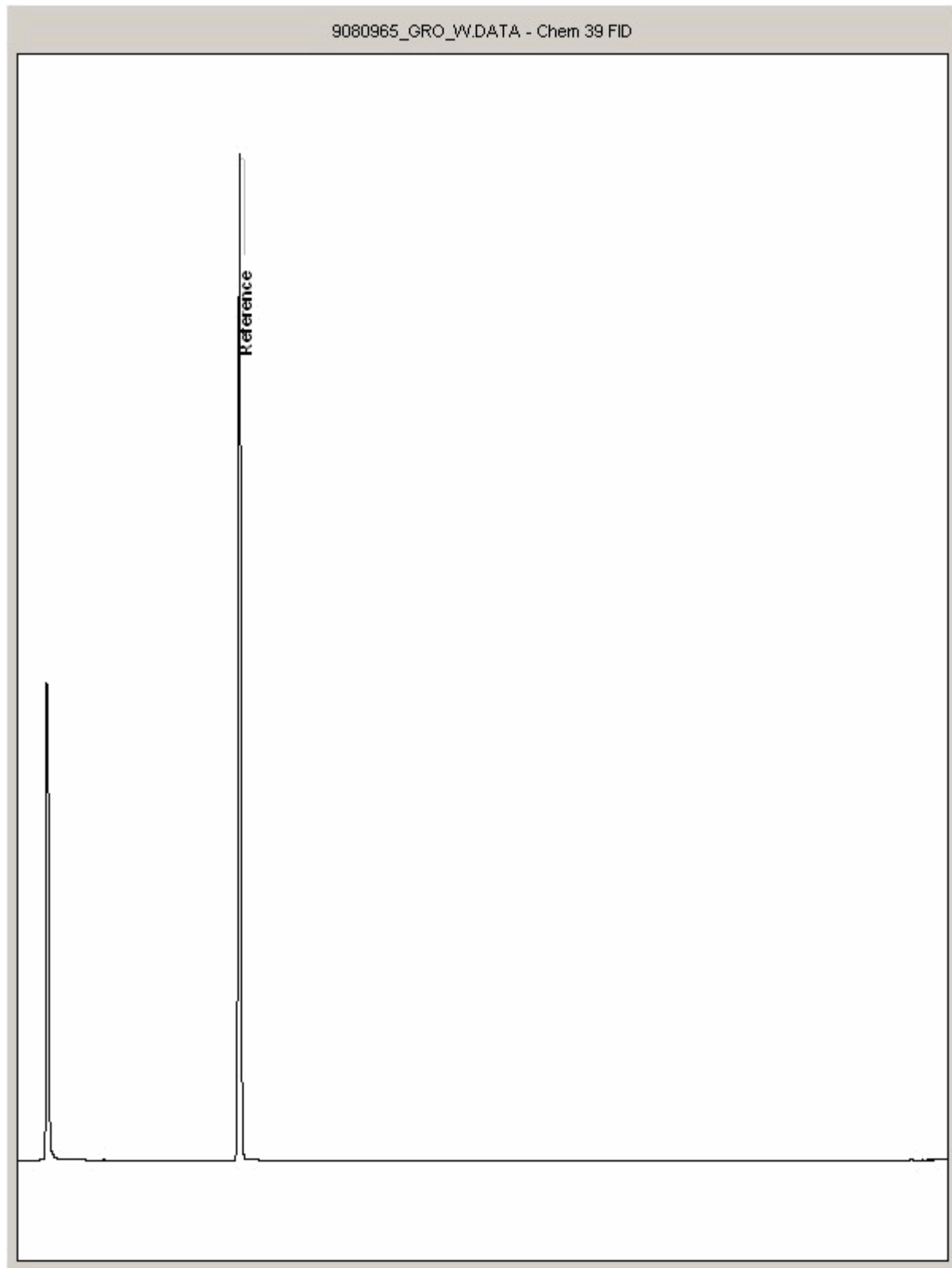
Order Number:
Report Number: 265839
Superseded Report:

Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 9080965
Sample ID : BH105A

Depth : 0.00





SDG: 140401-28
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS Corporation Limited
Attention: Jocelyn Willis

Order Number:
Report Number: 265839
Superseded Report:

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) 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 Dimethylphenol, 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 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.

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	DOM	SOX THERM	GRAVIMETRIC
CYCLOHEXANE EXT. MATTER	D&C	CYCLOHEXANE	SOX THERM	GRAVIMETRIC
THIN LAYER CHROMATOGRAPHY	D&C	DOM	SOX THERM	ATROSCAN
ELEMENTAL SULPHUR	D&C	DOM	SOX THERM	HPLC
PHENOLS BY GCMS	WET	DOM	SOX THERM	GCMS
HERBICIDES	D&C	HEXANE ACETONE	SOX THERM	GCMS
PESTICIDES	D&C	HEXANE ACETONE	SOX THERM	GCMS
EPH (DRO)	D&C	HEXANE ACETONE	END OVER END	GCFID
EPH (MINOL)	D&C	HEXANE ACETONE	END OVER END	GCFID
EPH (CLEANED UP)	D&C	HEXANE ACETONE	END OVER END	GCFID
EPH CWS BY GC	D&C	HEXANE ACETONE	END OVER END	GCFID
PCB TOT / PCB CON	D&C	HEXANE ACETONE	END OVER END	GCMS
POLYAROMATIC HYDROCARBONS (MS)	WET	HEXANE ACETONE	MICROWAVE TM218	GCMS
C8-C40 (C6-C40) EZ FLASH	WET	HEXANE ACETONE	SHAKER	GCEZ
POLYAROMATIC HYDROCARBONS RAPID GC	WET	HEXANE ACETONE	SHAKER	GCEZ
SEM VOLATILE ORGANIC COMPOUNDS	WET	DOM ACETONE	SONICATE	GCMS

LIQUID MATRICES EXTRACTION SUMMARY

ANALYSIS	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
PAHMS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GCMS
EPH	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GCFID
EPH CWS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GCFID
MINERAL OIL	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GCFID
PCB 70 CONGENERS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GCMS
PCB TOTAL	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GCMS
SVOC	DOM	LIQUID/LIQUID SHAKE	GCMS
FREESULPHUR	DOM	SOLID PHASE EXTRACTION	HPLC
PEST COC/OPP	DOM	LIQUID/LIQUID SHAKE	GCMS
TRIAZINE HERBS	DOM	LIQUID/LIQUID SHAKE	GCMS
PHENOLS MS	DOM	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).

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.



SDG: 140401-28
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS Corporation Limited
Attention: Jocelyn Willis

Order Number:
Report Number: 265839
Superseded Report:

Appendix General

1. Results are expressed on a dry weight basis (dried at 35°C) 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 Dimethylphenol, 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 preservation 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.



URS
St. George's House
2nd Floor
5 St. George's Road
Wimbledon
Greater London
SW19 4DR

Attention: Jocelyn Willis

CERTIFICATE OF ANALYSIS

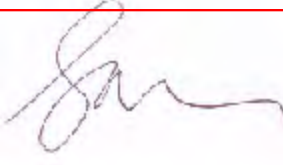
Date: 27 June 2014
Customer: H_URS_WIM
Sample Delivery Group (SDG): 140624-42
Your Reference: 46370079
Location: Shell Hitchin
Report No: 274961

We received 8 samples on Tuesday June 24, 2014 and 8 of these samples were scheduled for analysis which was completed on Friday June 27, 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





SDG:	140624-42	Location:	Shell Hitchin	Order Number:	
Job:	H_URS_WIM-174	Customer:	URS	Report Number:	274961
Client Reference:	46370079	Attention:	Jocelyn Willis	Superseded Report:	

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
9495232	BH102			23/06/2014
9495234	BH103			23/06/2014
9495233	BH102A			23/06/2014
9495235	BH105A			23/06/2014
9495236	BH106A			23/06/2014
9495238	DUP			23/06/2014
9495239	EB			23/06/2014
9495240	TB			23/06/2014

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



SDG: 140624-42
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS
Attention: Jocelyn Willis

Order Number:
Report Number: 274961
Superseded Report:

LIQUID			Results Legend									
			X Test N No Determination Possible									
Lab Sample No(s)			9495232	9495234	9495233	9495235	9495236	9495238	9495239	9495240		
Customer Sample Reference			BH102	BH103	BH102A	BH105A	BH106A	DUP	EB	TB		
AGS Reference												
Depth (m)												
Container			HCl Filtered (ALE26 500ml Plastic (ALE Vial (ALE297) HCl Filtered (ALE26 500ml Plastic (ALE 11 Glass bottle (ALE	HCl Filtered (ALE26 500ml Plastic (ALE Vial (ALE297) HCl Filtered (ALE26 500ml Plastic (ALE 11 Glass bottle (ALE	HCl Filtered (ALE26 500ml Plastic (ALE Vial (ALE297) HCl Filtered (ALE26 500ml Plastic (ALE 11 Glass bottle (ALE	HCl Filtered (ALE26 500ml Plastic (ALE Vial (ALE297) HCl Filtered (ALE26 500ml Plastic (ALE 11 Glass bottle (ALE	HCl Filtered (ALE26 500ml Plastic (ALE Vial (ALE297) HCl Filtered (ALE26 500ml Plastic (ALE 11 Glass bottle (ALE	HCl Filtered (ALE26 500ml Plastic (ALE Vial (ALE297) HCl Filtered (ALE26 500ml Plastic (ALE 11 Glass bottle (ALE	HCl Filtered (ALE26 500ml Plastic (ALE Vial (ALE297) HCl Filtered (ALE26 500ml Plastic (ALE 11 Glass bottle (ALE	HCl Filtered (ALE26 500ml Plastic (ALE Vial (ALE297) HCl Filtered (ALE26 500ml Plastic (ALE 11 Glass bottle (ALE		
Anions by Kone (w)	All	NDPs: 0 Tests: 7	X	X	X	X	X	X	X	X		
EPH CWG (Aliphatic) Aqueous GC (W)	All	NDPs: 0 Tests: 7	X	X	X	X	X	X	X	X		
EPH CWG (Aromatic) Aqueous GC (W)	All	NDPs: 0 Tests: 7	X	X	X	X	X	X	X	X		
Ferrous Iron	All	NDPs: 0 Tests: 7	X	X	X	X	X	X	X	X		
GRO by GC-FID (W)	All	NDPs: 0 Tests: 7		X	X	X	X	X	X	X		
Oxygenates (W)	All	NDPs: 0 Tests: 7		X	X	X	X	X	X	X		
PAH Spec MS - Aqueous (W)	All	NDPs: 0 Tests: 7	X	X	X	X	X	X	X	X		
VOC MS (W)	All	NDPs: 0 Tests: 8		X	X	X	X	X	X	X	X	X

CERTIFICATE OF ANALYSIS

SDG: 140624-42
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS
Attention: Jocelyn Willis

Order Number:
Report Number: 274961
Superseded Report:

[illegible]

Order Number:
Report Number: 274961
Superseded Report:

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SDG: 140624-42
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS
Attention: Jocelyn Willis

Order Number:
Report Number: 274961
Superseded Report:

EPH CWG (Aliphatic) Aqueous GC (W)

[illegible]

Order Number:
Report Number: 274961
Superseded Report:

13:25:30 27/06/2014

Order Number:
Report Number: 274961
Superseded Report:

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Order Number:
Report Number: 274961
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Report Number: 274961
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Order Number:
Report Number: 274961
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Order Number:
Report Number: 274961
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Order Number:
Report Number: 274961
Superseded Report:

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CERTIFICATE OF ANALYSIS

SDG: 140624-42
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS
Attention: Jocelyn Willis

Order Number:
Report Number: 274961
Superseded Report:

VOC MS (W)

[illegible]

Order Number:
Report Number: 274961
Superseded Report:

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SDG:	140624-42	Location:	Shell Hitchin	Order Number:	
Job:	H_URS_WIM-174	Customer:	URS	Report Number:	274961
Client Reference:	46370079	Attention:	Jocelyn Willis	Superseded Report:	

Table of Results - Appendix

Method No	Reference	Description	Wet/Dry Sample ¹	Surrogate Corrected
TM061	Method for the Determination of EPH,Massachusetts Dept.of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)		
TM125	DIN 38405 D17	Determination of Ferrous Iron		
TM174	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Waters by GC-FID		
TM178	Modified: US EPA Method 8100	Determination of Polynuclear Aromatic Hydrocarbons (PAH) by GC-MS in Waters		
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers		
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters		
TM245	By GC-FID	Determination of GRO by Headspace in waters		
TM289		Determination of Oxygenates in Waters by Headspace/GC-MS		

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



SDG:	140624-42	Location:	Shell Hitchin	Order Number:	
Job:	H_URS_WIM-174	Customer:	URS	Report Number:	274961
Client Reference:	46370079	Attention:	Jocelyn Willis	Superseded Report:	

Test Completion Dates

Lab Sample No(s)	9495232	9495234	9495233	9495235	9495236	9495238	9495239	9495240
Customer Sample Ref.	BH102	BH103	BH102A	BH105A	BH106A	DUP	EB	TB
AGS Ref.								
Depth								
Type	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID

Anions by Kone (w)	26-Jun-2014	26-Jun-2014	26-Jun-2014	26-Jun-2014	26-Jun-2014	26-Jun-2014	26-Jun-2014	
EPH CWG (Aliphatic) Aqueous GC (W)	26-Jun-2014	27-Jun-2014	27-Jun-2014	27-Jun-2014	27-Jun-2014	26-Jun-2014	27-Jun-2014	
EPH CWG (Aromatic) Aqueous GC (W)	26-Jun-2014	27-Jun-2014	27-Jun-2014	27-Jun-2014	27-Jun-2014	26-Jun-2014	27-Jun-2014	
Ferrous Iron	25-Jun-2014	25-Jun-2014	25-Jun-2014	25-Jun-2014	25-Jun-2014	25-Jun-2014	25-Jun-2014	
GRO by GC-FID (W)	25-Jun-2014	25-Jun-2014	25-Jun-2014	25-Jun-2014	25-Jun-2014	25-Jun-2014	25-Jun-2014	
Nitrite by Kone (w)	26-Jun-2014	26-Jun-2014	26-Jun-2014	26-Jun-2014	26-Jun-2014	26-Jun-2014	26-Jun-2014	
Oxygenates (W)	26-Jun-2014	26-Jun-2014	26-Jun-2014	26-Jun-2014	26-Jun-2014	26-Jun-2014	26-Jun-2014	
PAH Spec MS - Aqueous (W)	27-Jun-2014	27-Jun-2014	27-Jun-2014	27-Jun-2014	27-Jun-2014	27-Jun-2014	27-Jun-2014	
TPH CWG (W)	26-Jun-2014	27-Jun-2014	27-Jun-2014	27-Jun-2014	27-Jun-2014	26-Jun-2014	27-Jun-2014	
VOC MS (W)	26-Jun-2014	25-Jun-2014	25-Jun-2014	25-Jun-2014	25-Jun-2014	26-Jun-2014	25-Jun-2014	25-Jun-2014



SDG: 140624-42
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS
Attention: Jocelyn Willis

Order Number:
Report Number: 274961
Superseded Report:

ASSOCIATED AQC DATA

Anions by Kone (w)

Component	Method Code	QC 95
Chloride	TM184	100.0 94.64 : 106.82
Phosphate (Ortho as PO4)	TM184	102.0 96.40 : 108.40
Sulphate (soluble)	TM184	102.0 96.47 : 104.74
TON as NO3	TM184	105.5 93.05 : 112.12

EPH CWG (Aliphatic) Aqueous GC (W)

Component	Method Code	QC 98	QC 94
Total Aliphatics >C12-C35	TM174	90.21 74.16 : 102.40	94.79 77.01 : 102.75

EPH CWG (Aromatic) Aqueous GC (W)

Component	Method Code	QC 99	QC 99
Total Aromatics >EC12-EC35	TM174	92.0 77.73 : 108.59	100.0 77.59 : 111.33

Ferrous Iron

Component	Method Code	QC 94	QC 91
Ferrous Iron	TM125	98.0 92.73 : 101.21	98.33 92.73 : 101.21

GRO by GC-FID (W)

Component	Method Code	QC 93
Benzene by GC	TM245	94.5 70.00 : 130.00
Ethylbenzene by GC	TM245	91.5 70.00 : 130.00
m & p Xylene by GC	TM245	89.75 70.00 : 130.00
MTBE GC-FID	TM245	94.0 70.00 : 130.00
o Xylene by GC	TM245	92.5 70.00 : 130.00
QC	TM245	109.11 70.00 : 130.00



SDG: 140624-42
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS
Attention: Jocelyn Willis

Order Number:
Report Number: 274961
Superseded Report:

GRO by GC-FID (W)

		QC 93
Toluene by GC	TM245	95.0 70.00 : 130.00

Oxygenates (W)

Component	Method Code	QC 95
Benzene	TM289	109.0 87.69 : 119.72
Diisopropyl ether	TM289	103.0 86.70 : 122.79
Ethanol	TM289	104.0 60.84 : 141.13
Ethylbenzene	TM289	102.0 76.16 : 122.57
o-Xylene	TM289	102.0 84.40 : 112.41
p/m-Xylene	TM289	103.25 83.20 : 115.01
tert Butanol	TM289	98.0 70.51 : 143.48
tert-amyl methyl ether	TM289	101.5 78.92 : 124.29
tert-butyl ethyl ether	TM289	101.5 78.17 : 124.34
tert-butyl methyl ether	TM289	103.5 87.75 : 127.35
Toluene	TM289	104.5 79.08 : 122.51

PAH Spec MS - Aqueous (W)

Component	Method Code	QC 92
Acenaphthene by GCMS	TM178	104.0 93.50 : 119.00
Acenaphthylene by GCMS	TM178	103.0 83.00 : 113.00
Anthracene by GCMS	TM178	102.0 91.25 : 113.75
Benz(a)anthracene by GCMS	TM178	104.0 85.75 : 111.25
Benzo(a)pyrene by GCMS	TM178	107.5 86.63 : 118.58
Benzo(b)fluoranthene by GCMS	TM178	103.5 90.00 : 117.00
Benzo(ghi)perylene by GCMS	TM178	95.0 82.05 : 112.05
Benzo(k)fluoranthene by GCMS	TM178	107.5 96.64 : 122.46
Chrysene by GCMS	TM178	103.0 90.25 : 117.25
Dibenzo(ah)anthracene by GCMS	TM178	95.0 82.81 : 122.26
Fluoranthene by GCMS	TM178	104.0 90.00 : 120.00



SDG: 140624-42
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS
Attention: Jocelyn Willis

Order Number:
Report Number: 274961
Superseded Report:

PAH Spec MS - Aqueous (W)

		QC 92
Fluorene by GCMS	TM178	105.5 95.00 : 119.00
Indeno(123cd)pyrene by GCMS	TM178	98.0 90.97 : 118.18
Naphthalene by GCMS	TM178	104.0 92.50 : 115.00
Phenanthrene by GCMS	TM178	106.0 93.75 : 116.25
Pyrene by GCMS	TM178	105.0 91.25 : 113.75

VOC MS (W)

Component	Method Code	QC 92	QC 95
1,1,1,2-Tetrachloroethane	TM208	99.5 84.25 : 114.84	91.5 84.25 : 114.84
1,1,1-Trichloroethane	TM208	96.5 77.50 : 122.50	92.5 77.50 : 122.50
1,1-Dichloroethane	TM208	98.0 80.19 : 121.45	96.5 80.19 : 121.45
1,2-Dichloroethane	TM208	91.5 77.68 : 127.05	88.0 77.68 : 127.05
2-Chlorotoluene	TM208	99.0 77.50 : 122.50	89.5 77.50 : 122.50
4-Chlorotoluene	TM208	100.0 77.50 : 122.50	89.5 77.50 : 122.50
Benzene	TM208	101.5 85.72 : 123.57	98.0 85.72 : 123.57
Bromomethane	TM208	96.5 78.40 : 131.50	92.0 78.40 : 131.50
Carbontetrachloride	TM208	98.5 77.50 : 122.50	91.5 77.50 : 122.50
Chlorobenzene	TM208	99.0 77.50 : 122.50	92.0 77.50 : 122.50
Chloroform	TM208	92.0 84.84 : 119.97	87.0 84.84 : 119.97
Chloromethane	TM208	110.5 67.96 : 156.88	106.5 67.96 : 156.88
Cis-1,2-Dichloroethene	TM208	92.0 81.65 : 120.44	89.0 81.65 : 120.44
Dichloromethane	TM208	91.0 79.31 : 122.56	88.5 79.31 : 122.56
Ethylbenzene	TM208	98.0 77.50 : 122.50	89.5 77.50 : 122.50
Hexachlorobutadiene	TM208	97.5 68.91 : 121.59	89.5 68.91 : 121.59
o-Xylene	TM208	96.5 77.50 : 122.50	89.5 77.50 : 122.50
p/m-Xylene	TM208	96.0 80.94 : 113.51	88.5 80.94 : 113.51
Tert-butyl methyl ether	TM208	89.5 59.77 : 129.51	95.0 59.77 : 129.51
Tetrachloroethene	TM208	99.5 77.50 : 122.50	88.0 77.50 : 122.50



SDG:	140624-42	Location:	Shell Hitchin	Order Number:	
Job:	H_URS_WIM-174	Customer:	URS	Report Number:	274961
Client Reference:	46370079	Attention:	Jocelyn Willis	Superseded Report:	

VOC MS (W)

		QC 92	QC 95
Toluene	TM208	100.0 77.50 : 122.50	90.5 77.50 : 122.50
Trichloroethene	TM208	98.5 83.50 : 113.50	90.5 83.50 : 113.50
Vinyl Chloride	TM208	110.5 71.81 : 133.37	105.5 71.81 : 133.37

The above information details the reference name of the analytical quality control sample (AQC) that has been run with the samples contained in this report for the different methods of analysis.

The figure detailed is the percentage recovery result for the AQC.

The subscript numbers below are the percentage recovery lower control limit (LCL) and the upper control limit (UCL). The percentage recovery result for the AQC should be between these limits to be statistically in control.



SDG: 140624-42
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS
Attention: Jocelyn Willis

Order Number:
Report Number: 274961
Superseded Report:

Chromatogram

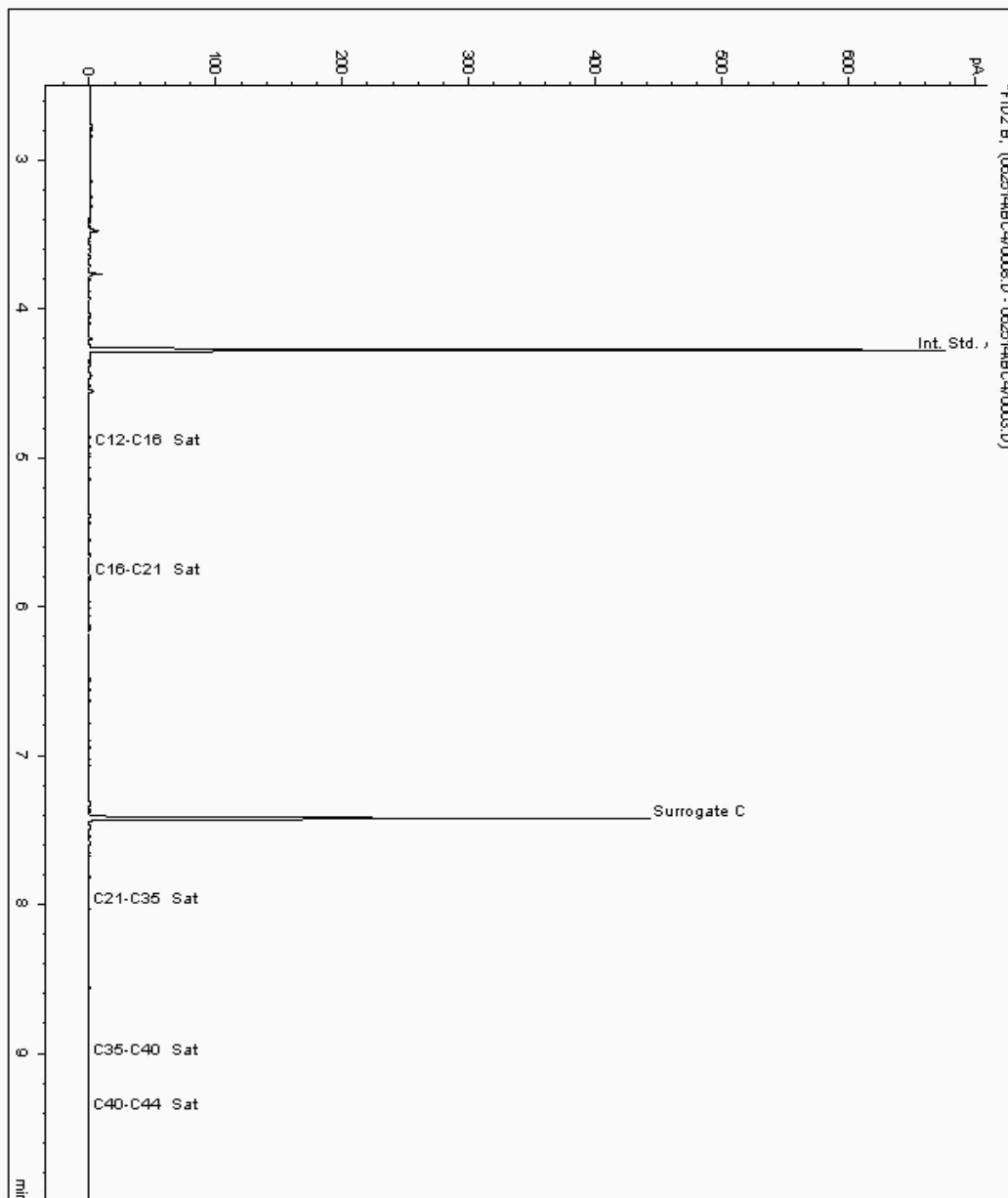
Analysis: EPH CWG (Aliphatic) Aqueous GC (W)

Sample No : 9498474
Sample ID : BH102

Depth :

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS (C12 - C40)

Sample Identity: 9018003-9498474
Date Acquired : 25/06/14 18:44:41 PM
Units : ppb
Dilution :
CF : 1
Multiplier : 0.008





SDG: 140624-42
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS
Attention: Jocelyn Willis

Order Number:
Report Number: 274961
Superseded Report:

Chromatogram

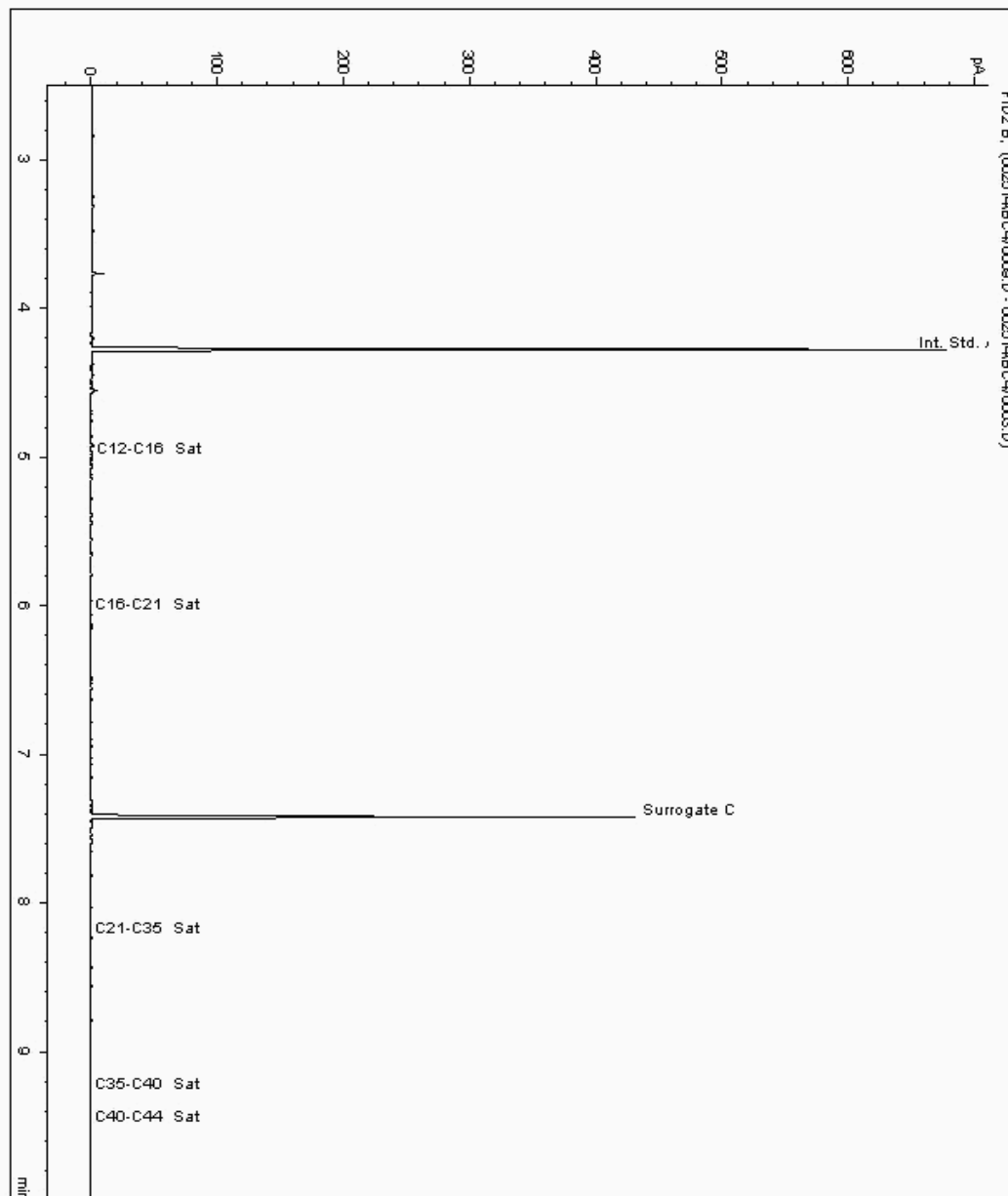
Analysis: EPH CWG (Aliphatic) Aqueous GC (W)

Sample No : 9498486
Sample ID : DUP

Depth :

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS (C12 - C40)

Sample Identity: 9018059-9498486
Date Acquired : 25/06/14 19:03:41 PM
Units : ppb
Dilution :
CF : 1
Multiplier : 0.008





SDG: 140624-42
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS
Attention: Jocelyn Willis

Order Number:
Report Number: 274961
Superseded Report:

Chromatogram

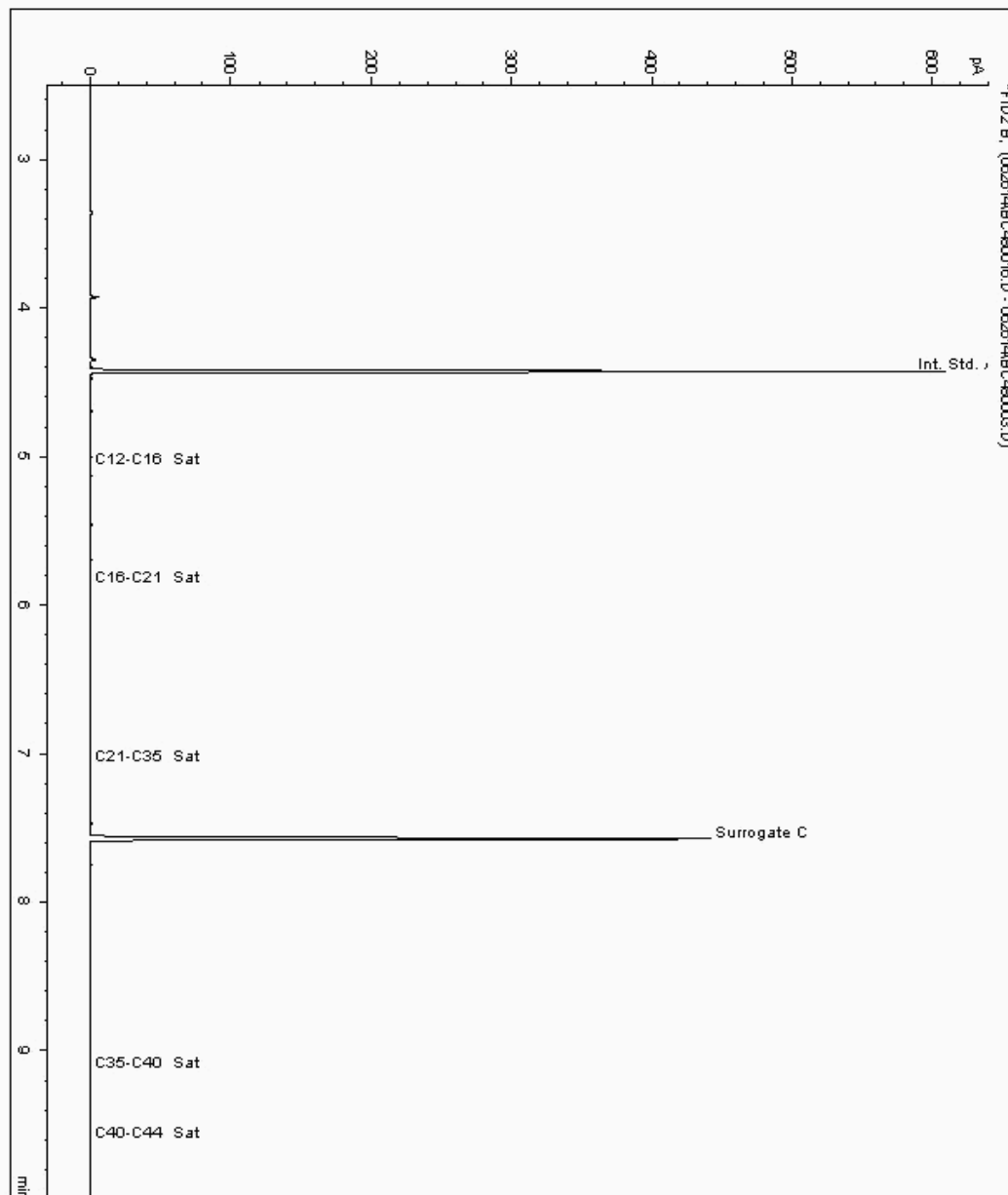
Analysis: EPH CWG (Aliphatic) Aqueous GC (W)

Sample No : 9498512
Sample ID : EB

Depth :

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS (C12 - C40)

Sample Identity: 9018069-9498512
Date Acquired : 26/06/2014 21:16:31 PM
Units : ppb
Dilution :
CF : 1
Multiplier : 0.008





SDG: 140624-42
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS
Attention: Jocelyn Willis

Order Number:
Report Number: 274961
Superseded Report:

Chromatogram

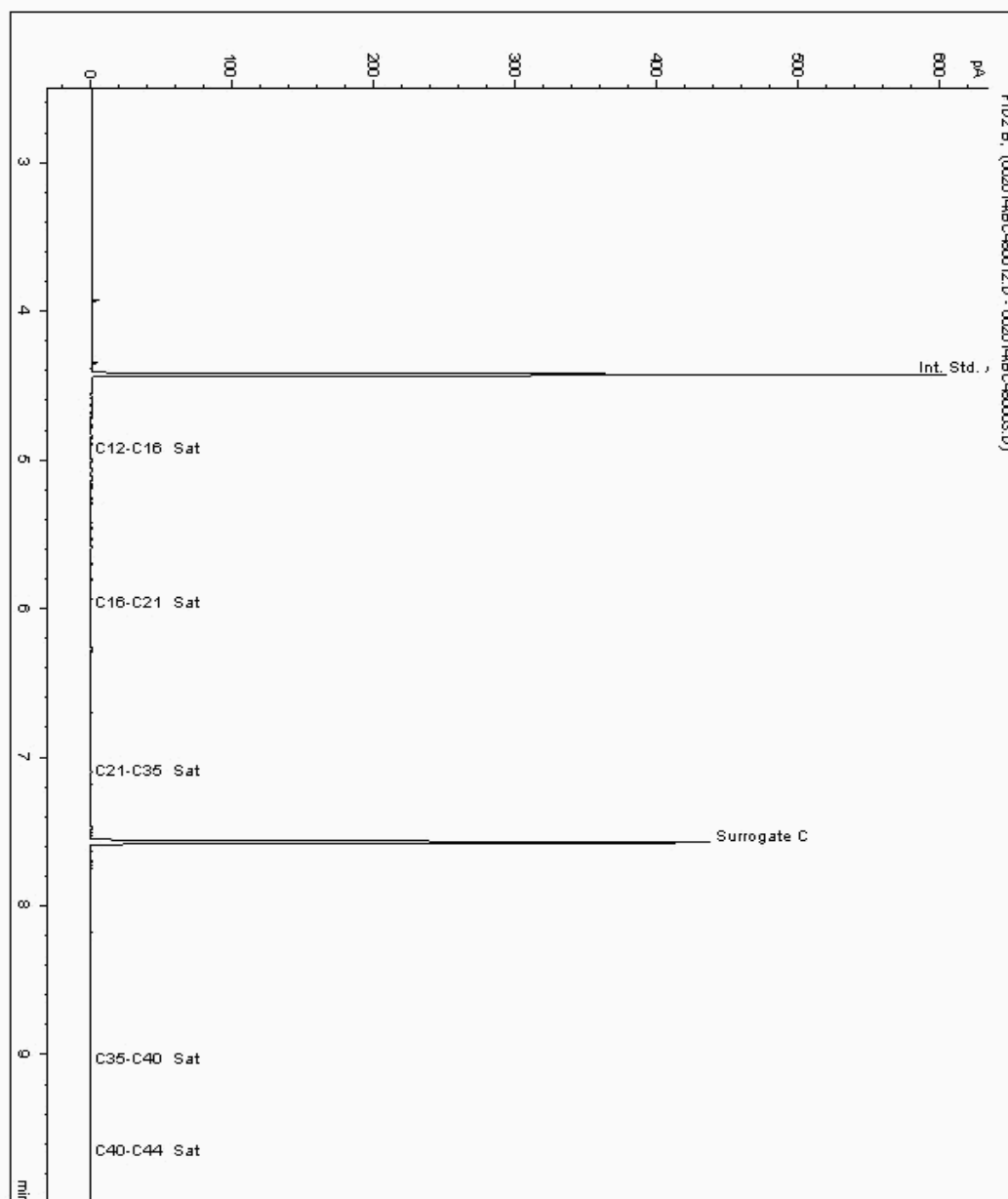
Analysis: EPH CWG (Aliphatic) Aqueous GC (W)

Sample No : 9498539
Sample ID : BH106A

Depth :

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS (C12 - C40)

Sample Identity: 9018049-9498539
Date Acquired : 26/06/2014 20:01:07 PM
Units : ppb
Dilution :
CF : 1
Multiplier : 0.008





SDG: 140624-42
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS
Attention: Jocelyn Willis

Order Number:
Report Number: 274961
Superseded Report:

Chromatogram

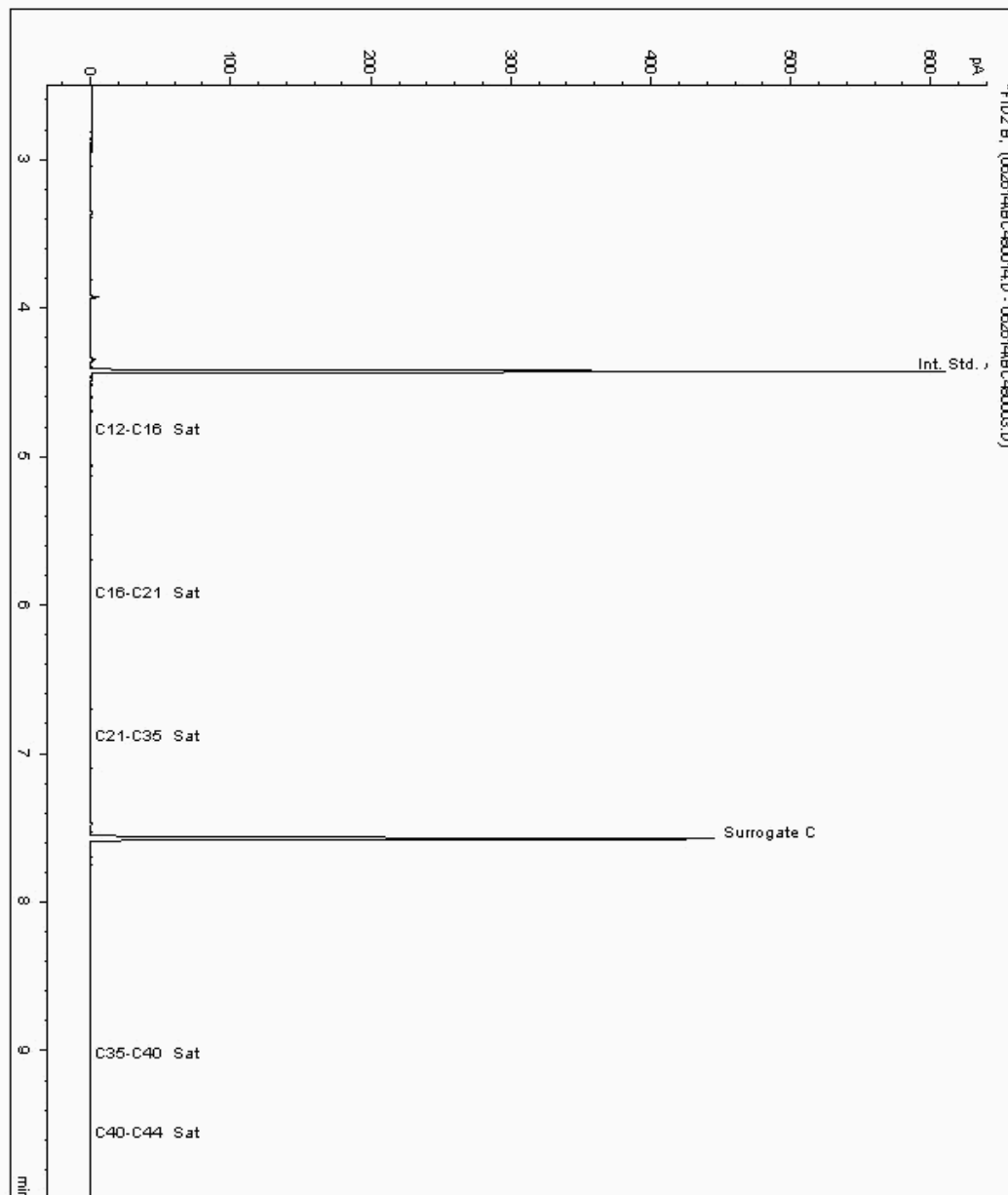
Analysis: EPH CWG (Aliphatic) Aqueous GC (W)

Sample No : 9498557
Sample ID : BH105A

Depth :

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS (C12 - C40)

Sample Identity: 9018039-9498557
Date Acquired : 26/06/2014 20:38:44 PM
Units : ppb
Dilution :
CF : 1
Multiplier : 0.008





SDG: 140624-42
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS
Attention: Jocelyn Willis

Order Number:
Report Number: 274961
Superseded Report:

Chromatogram

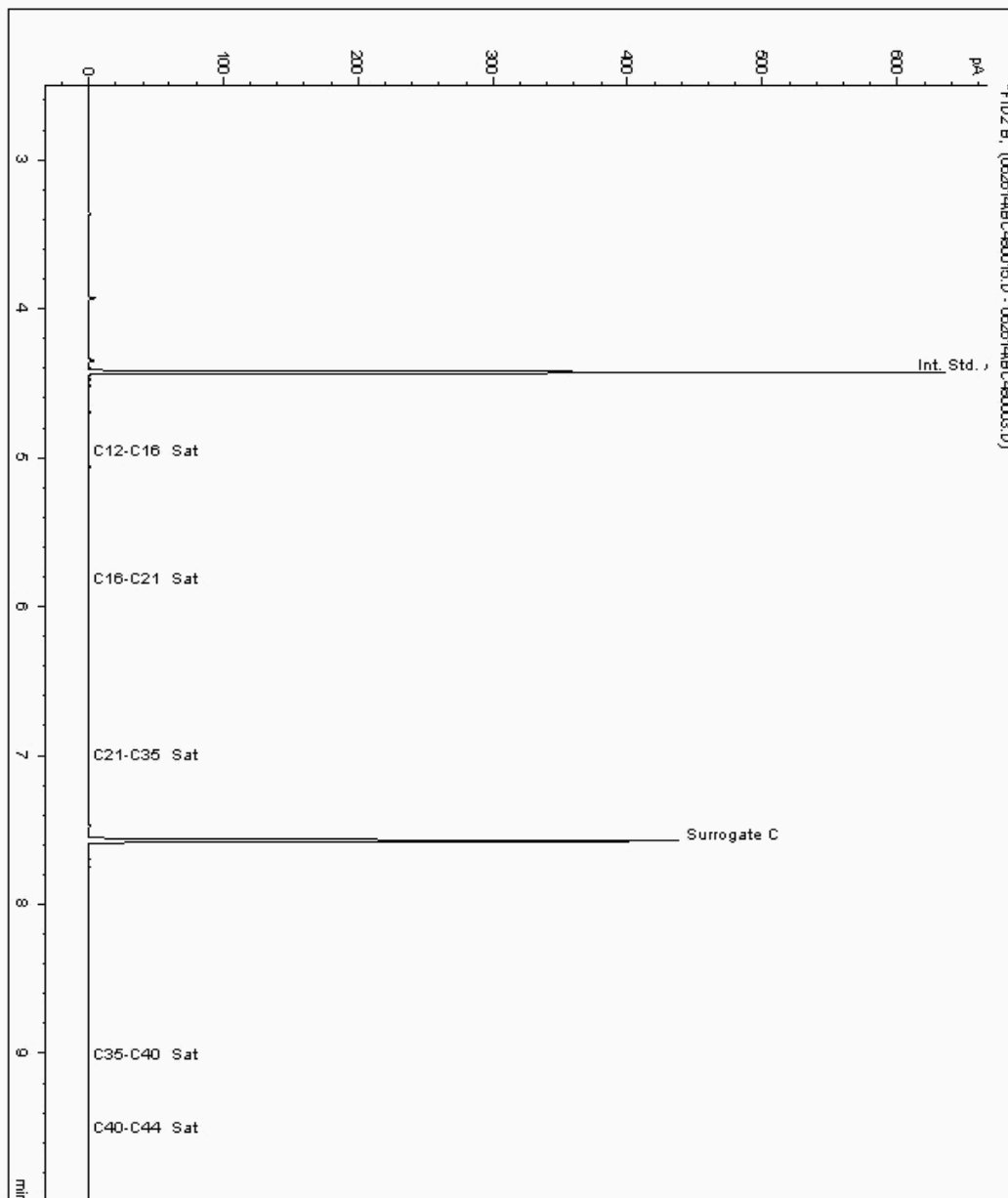
Analysis: EPH CWG (Aliphatic) Aqueous GC (W)

Sample No : 9498586
Sample ID : BH102A

Depth :

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS (C12 - C40)

Sample Identity: 9018013-9498586
Date Acquired : 26/06/2014 20:57:31 PM
Units : ppb
Dilution :
CF : 1
Multiplier : 0.008





SDG: 140624-42
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS
Attention: Jocelyn Willis

Order Number:
Report Number: 274961
Superseded Report:

Chromatogram

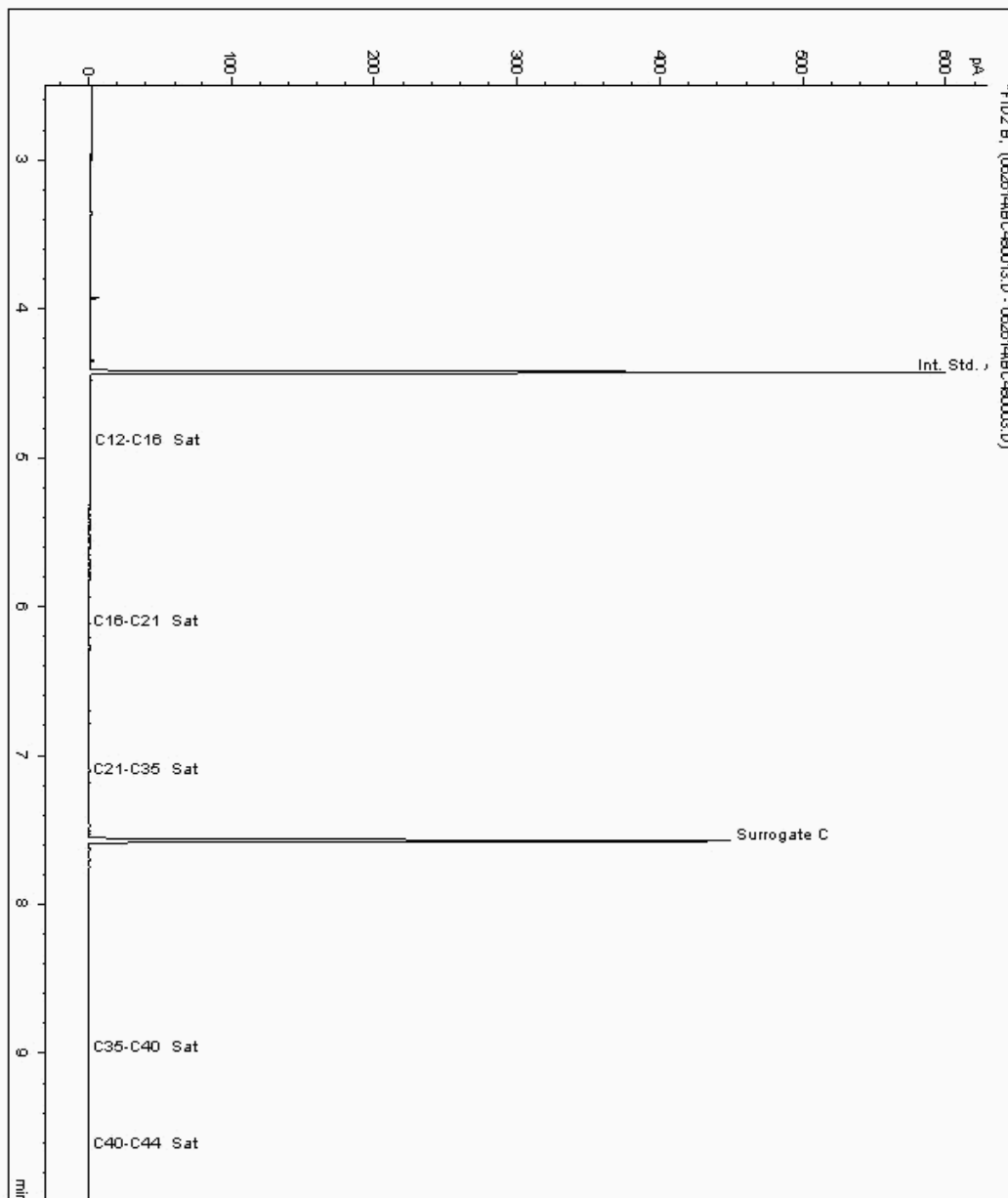
Analysis: EPH CWG (Aliphatic) Aqueous GC (W)

Sample No : 9498601
Sample ID : BH103

Depth :

Alcontrol/Geochem Analytical Services
Speciated TPH - SATS (C12 - C40)

Sample Identity: 9018029-9498601
Date Acquired : 26/06/2014 20:19:57 PM
Units : ppb
Dilution :
CF : 1
Multiplier : 0.008





SDG: 140624-42
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS
Attention: Jocelyn Willis

Order Number:
Report Number: 274961
Superseded Report:

Chromatogram

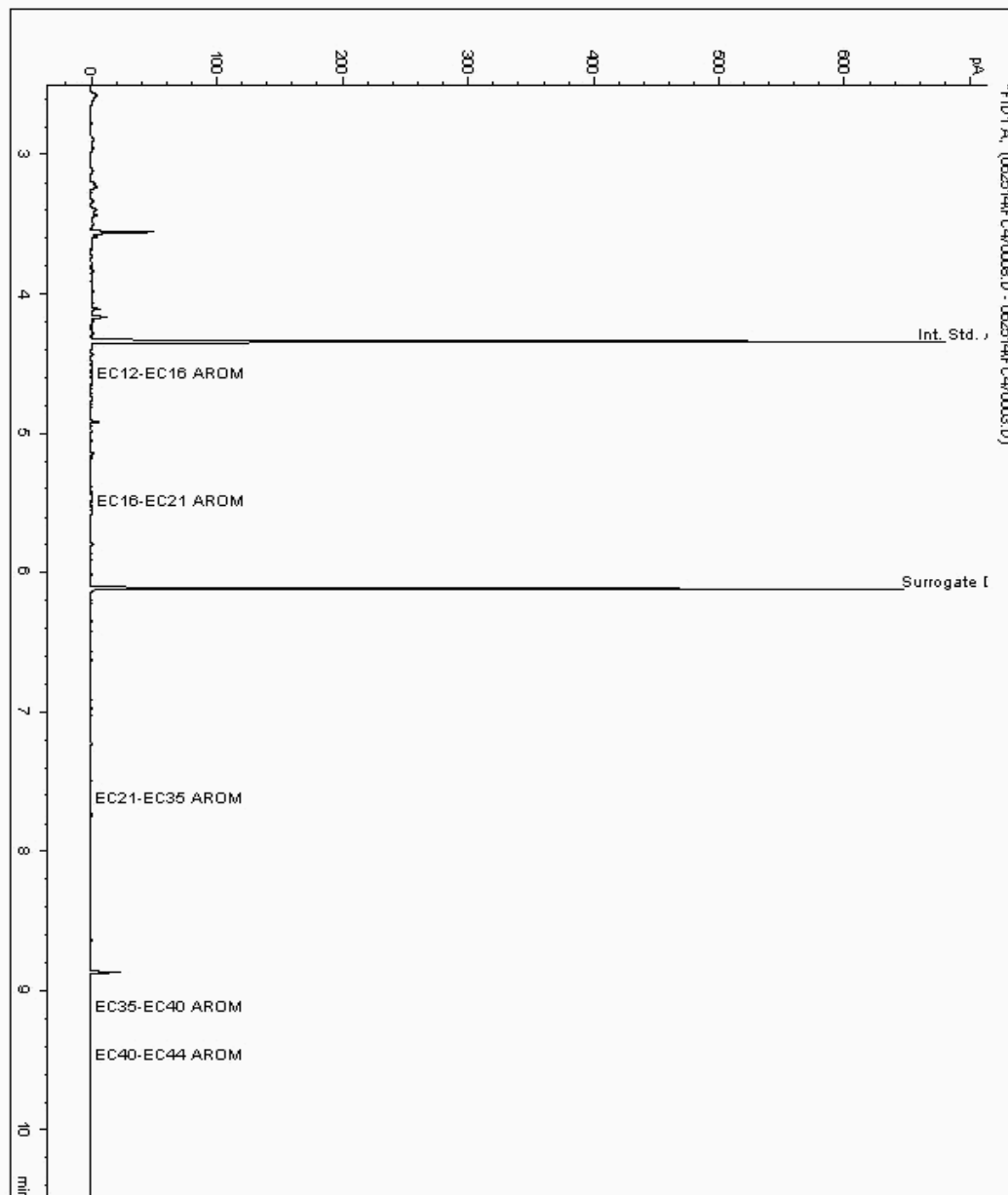
Analysis: EPH CWG (Aromatic) Aqueous GC (W)

Sample No : 9498474
Sample ID : BH102

Depth :

Alcontrol/Geochem Analytical Services
Speciated TPH - AROM (C12 - C40)

Sample Identity: 9018004-9498474
Date Acquired : 25/06/14 18:44:41 PM
Units : ppb
Dilution :
CF : 1
Multiplier : 0.008





SDG: 140624-42
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS
Attention: Jocelyn Willis

Order Number:
Report Number: 274961
Superseded Report:

Chromatogram

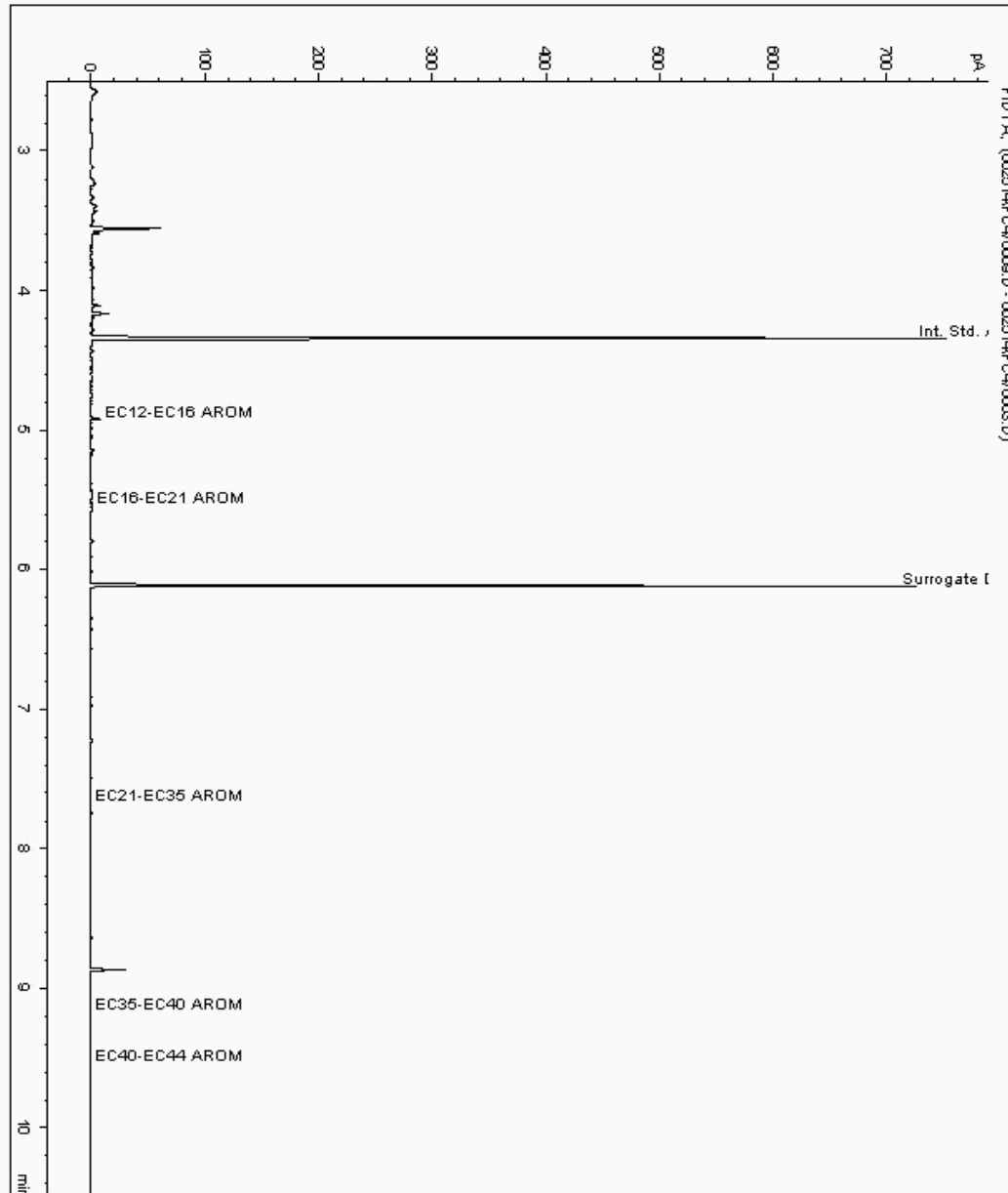
Analysis: EPH CWG (Aromatic) Aqueous GC (W)

Sample No : 9498486
Sample ID : DUP

Depth :

Alcontrol/Geochem Analytical Services
Speciated TPH - AROM (C12 - C40)

Sample Identity: 9018060-9498486
Date Acquired : 25/06/14 19:03:41 PM
Units : ppb
Dilution :
CF : 1
Multiplier : 0.008





SDG: 140624-42
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS
Attention: Jocelyn Willis

Order Number:
Report Number: 274961
Superseded Report:

Chromatogram

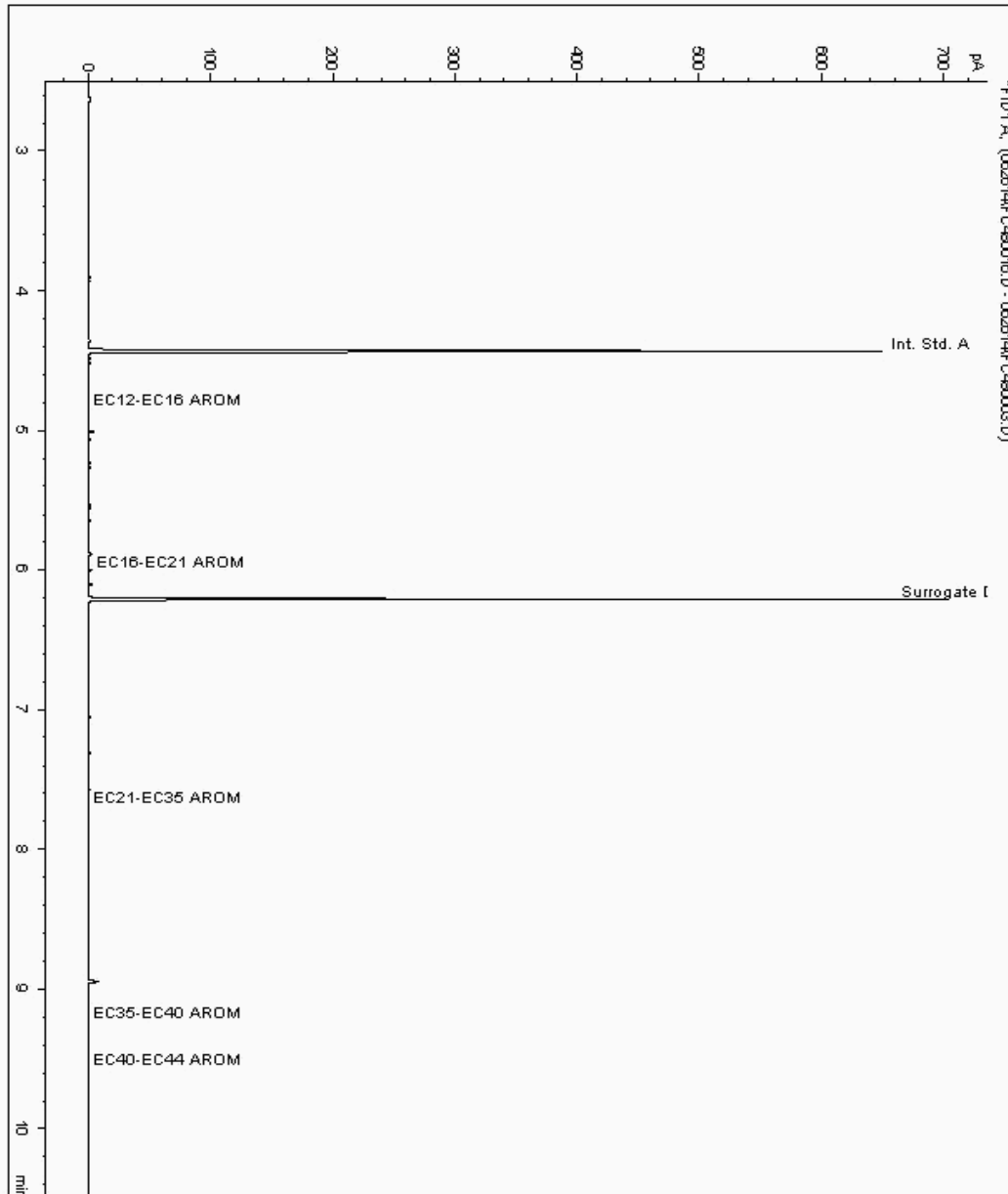
Analysis: EPH CWG (Aromatic) Aqueous GC (W)

Sample No : 9498512
Sample ID : EB

Depth :

Alcontrol/Geochem Analytical Services
Speciated TPH - AROM (C12 - C40)

Sample Identity: 9018070-9498512
Date Acquired : 26/06/2014 21:16:31 PM
Units : ppb
Dilution :
CF : 1
Multiplier : 0.008





SDG: 140624-42
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS
Attention: Jocelyn Willis

Order Number:
Report Number: 274961
Superseded Report:

Chromatogram

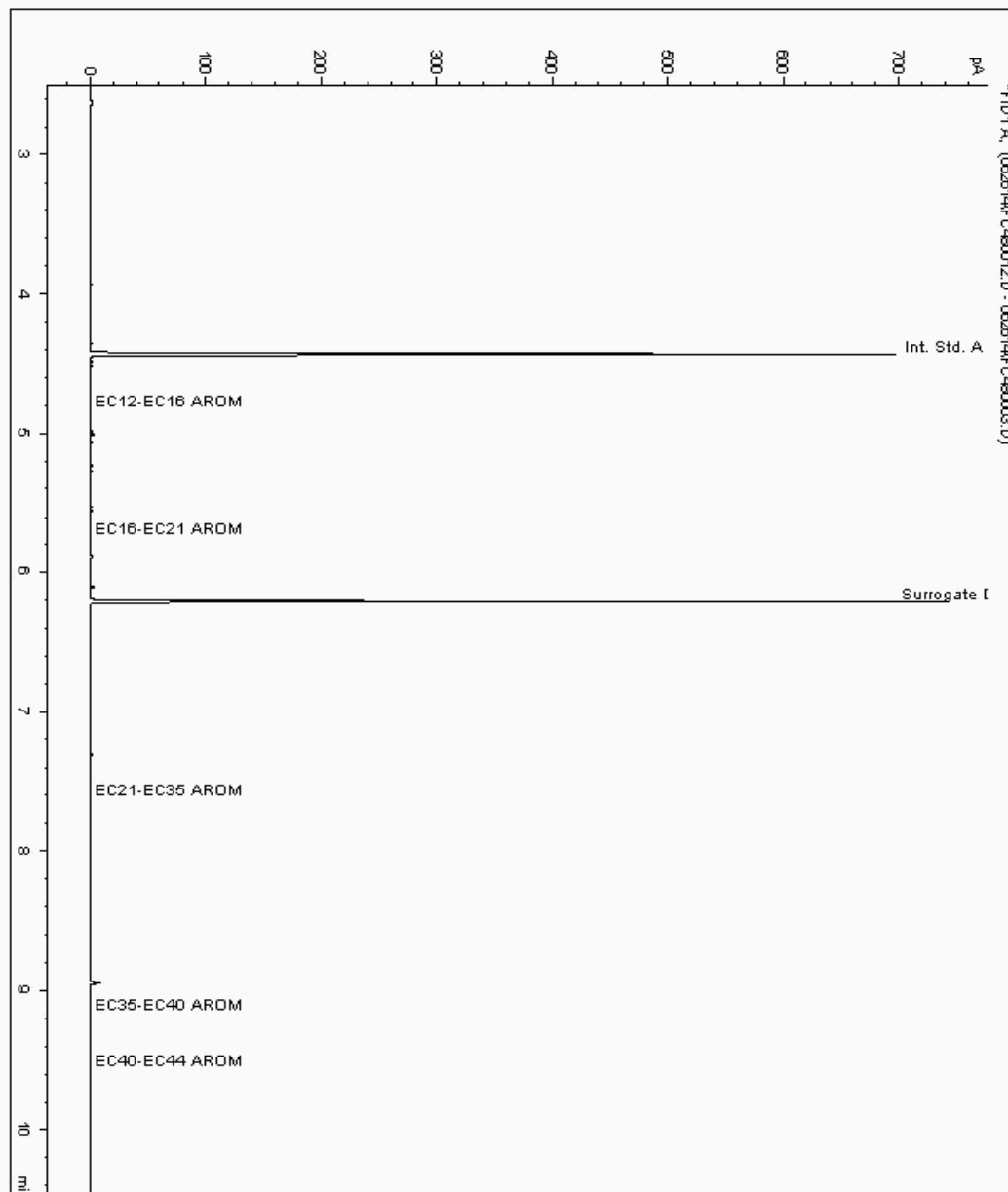
Analysis: EPH CWG (Aromatic) Aqueous GC (W)

Sample No : 9498539
Sample ID : BH106A

Depth :

Alcontrol/Geochem Analytical Services
Speciated TPH - AROM (C12 - C40)

Sample Identity: 9018050-9498539
Date Acquired : 26/06/2014 20:01:07 PM
Units : ppb
Dilution :
CF : 1
Multiplier : 0.008





SDG: 140624-42
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS
Attention: Jocelyn Willis

Order Number:
Report Number: 274961
Superseded Report:

Chromatogram

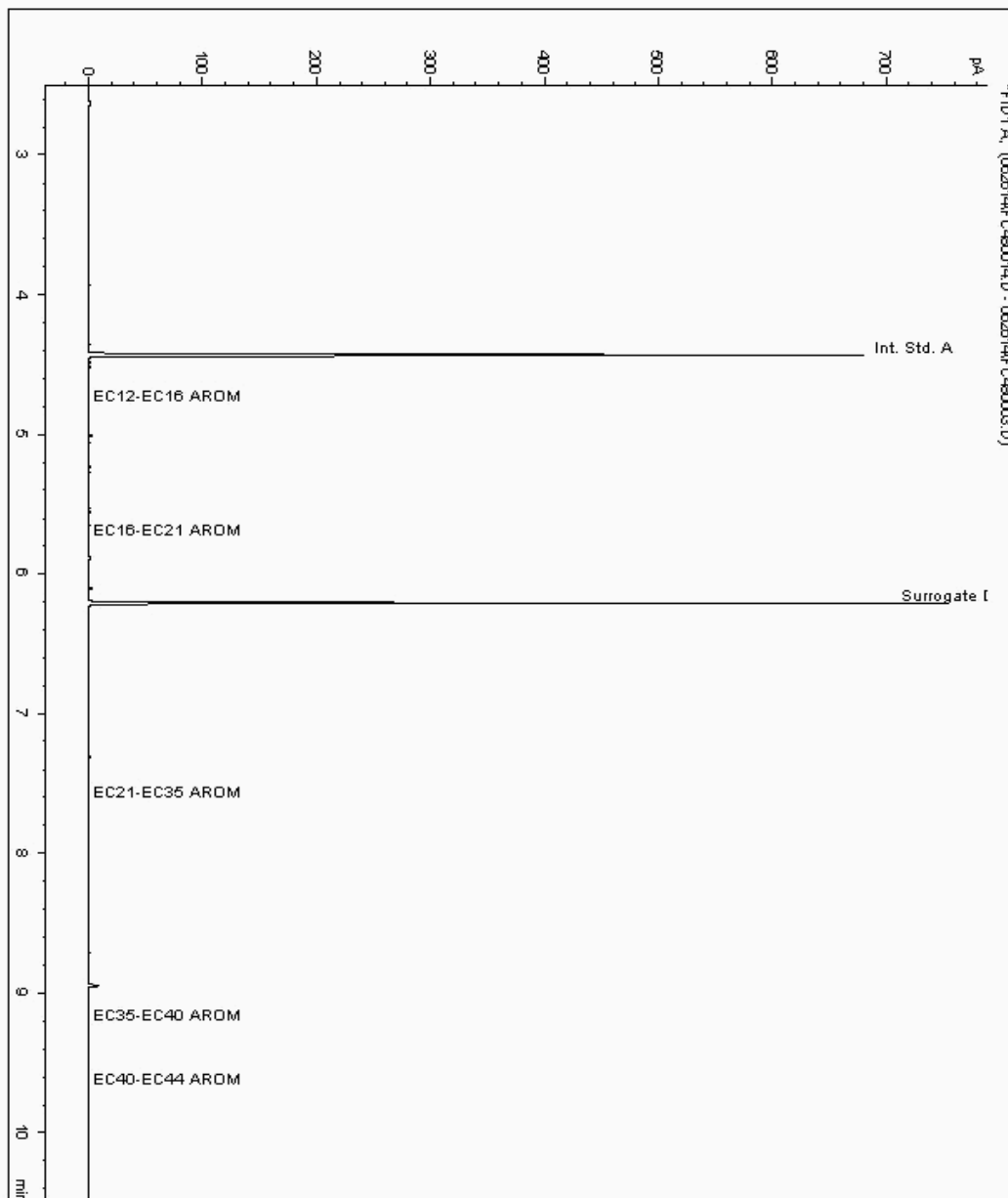
Analysis: EPH CWG (Aromatic) Aqueous GC (W)

Sample No : 9498557
Sample ID : BH105A

Depth :

Alcontrol/Geochem Analytical Services
Speciated TPH - AROM (C12 - C40)

Sample Identity: 9018040-9498557
Date Acquired : 26/06/2014 20:38:44 PM
Units : ppb
Dilution :
CF : 1
Multiplier : 0.008





SDG: 140624-42
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS
Attention: Jocelyn Willis

Order Number:
Report Number: 274961
Superseded Report:

Chromatogram

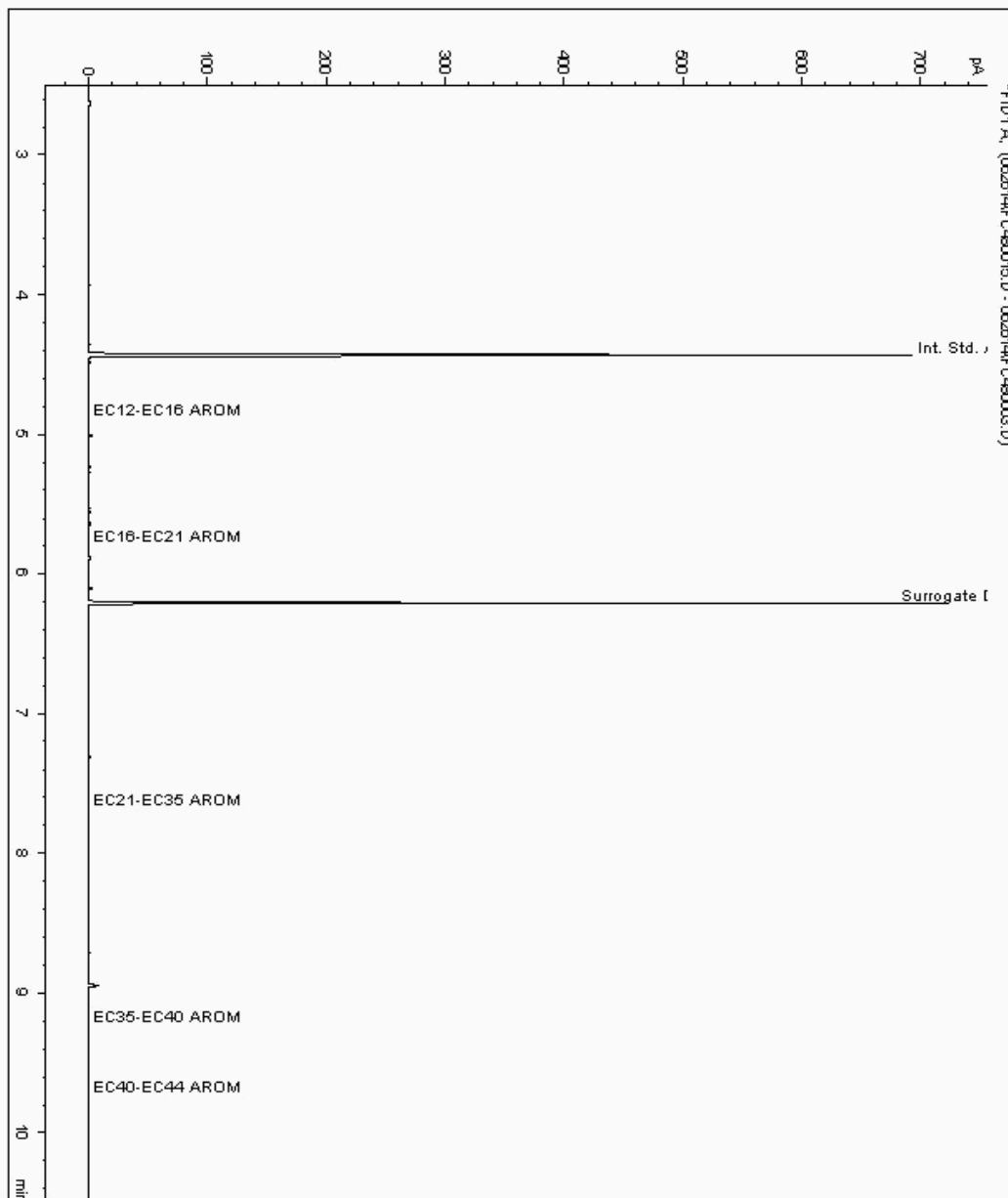
Analysis: EPH CWG (Aromatic) Aqueous GC (W)

Sample No : 9498586
Sample ID : BH102A

Depth :

Alcontrol/Geochem Analytical Services
Speciated TPH - AROM (C12 - C40)

Sample Identity: 9018014-9498586
Date Acquired : 26/06/2014 20:57:31 PM
Units : ppb
Dilution :
CF : 1
Multiplier : 0.008





SDG: 140624-42
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS
Attention: Jocelyn Willis

Order Number:
Report Number: 274961
Superseded Report:

Chromatogram

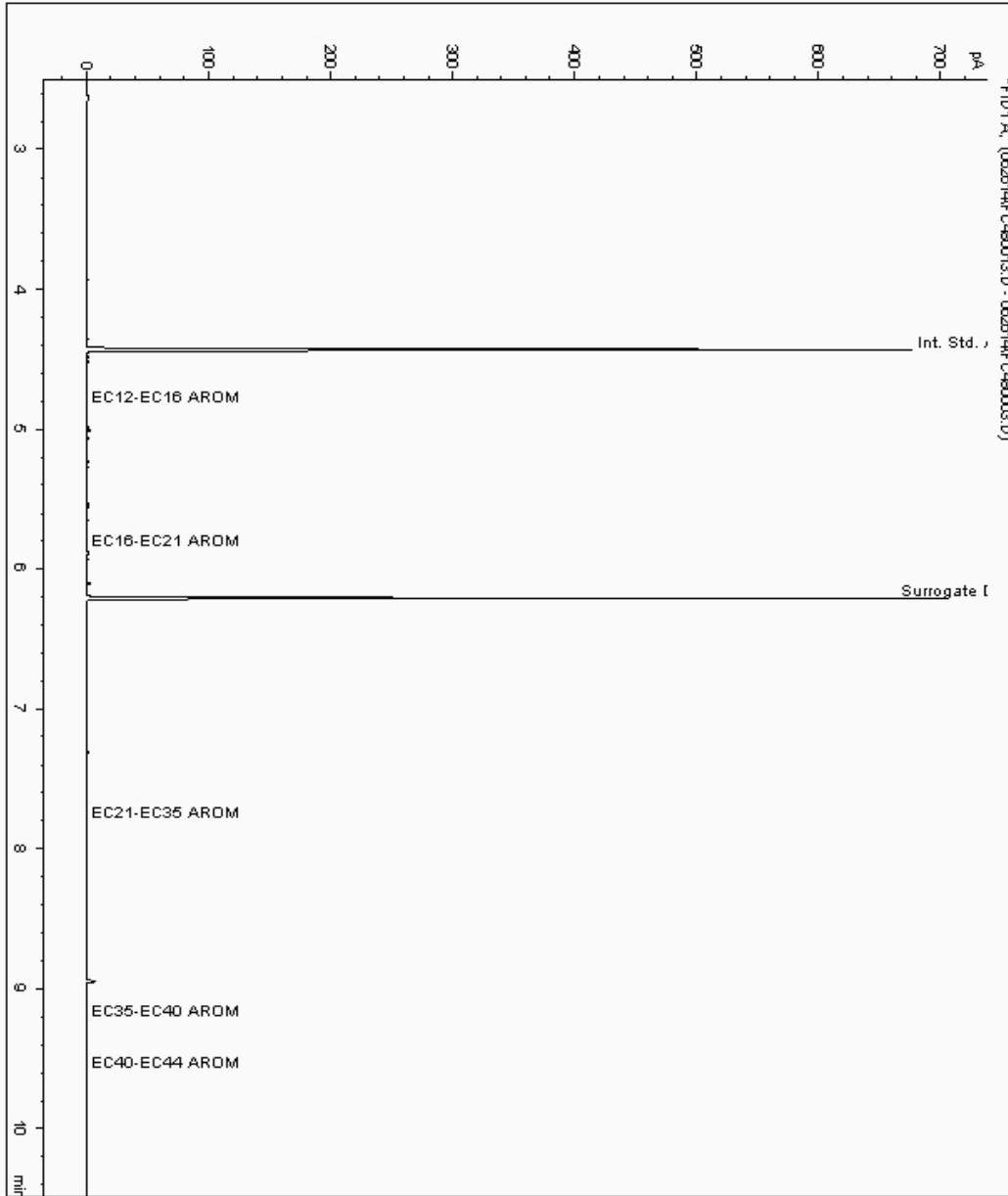
Analysis: EPH CWG (Aromatic) Aqueous GC (W)

Sample No : 9498601
Sample ID : BH103

Depth :

Alcontrol/Geochem Analytical Services
Speciated TPH - AROM (C12 - C40)

Sample Identity: 9018030-9498601
Date Acquired : 26/06/2014 20:19:57 PM
Units : ppb
Dilution :
CF : 1
Multiplier : 0.008





SDG: 140624-42
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS
Attention: Jocelyn Willis

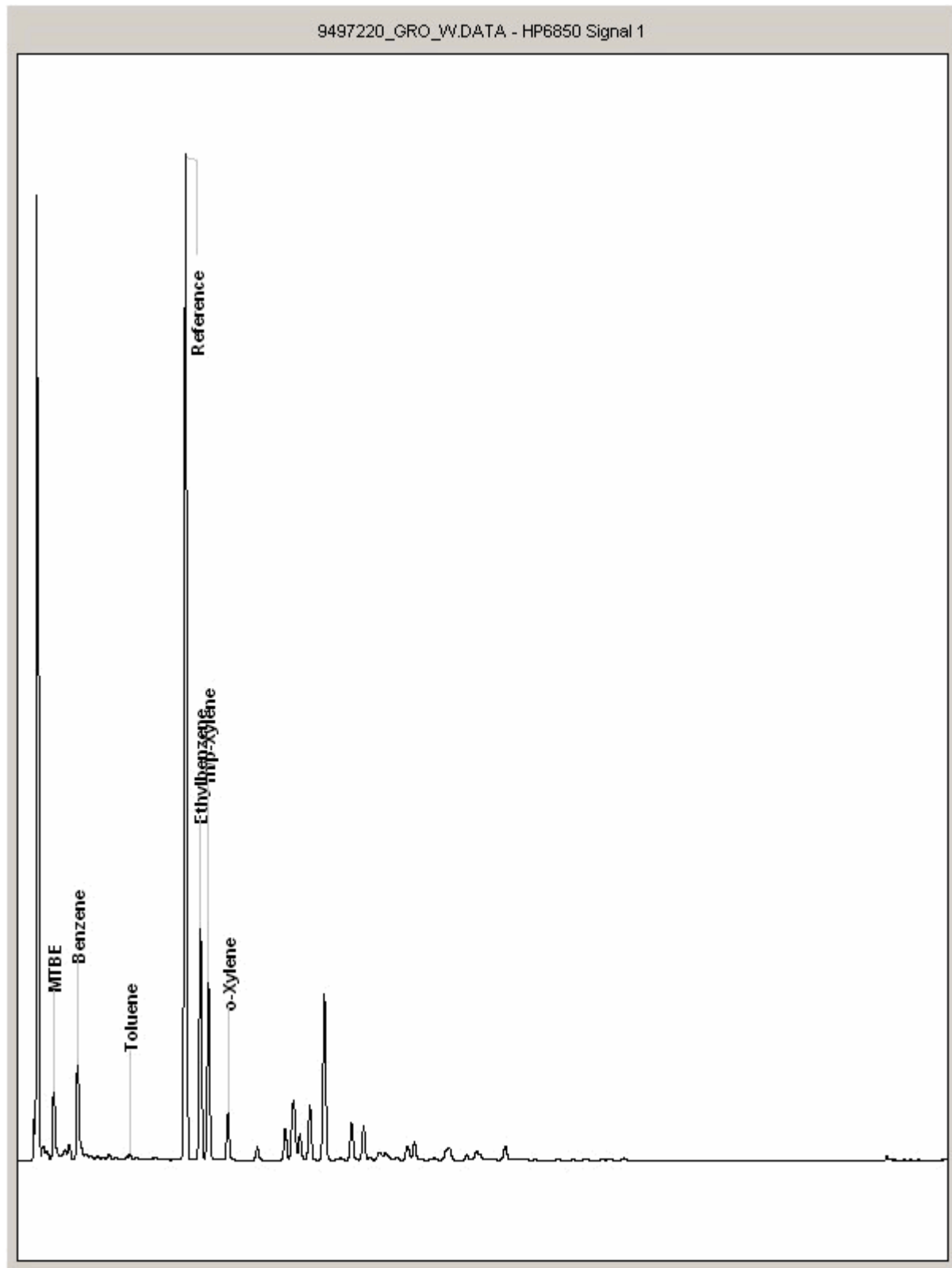
Order Number:
Report Number: 274961
Superseded Report:

Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 9497220
Sample ID : BH102

Depth :





SDG: 140624-42
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS
Attention: Jocelyn Willis

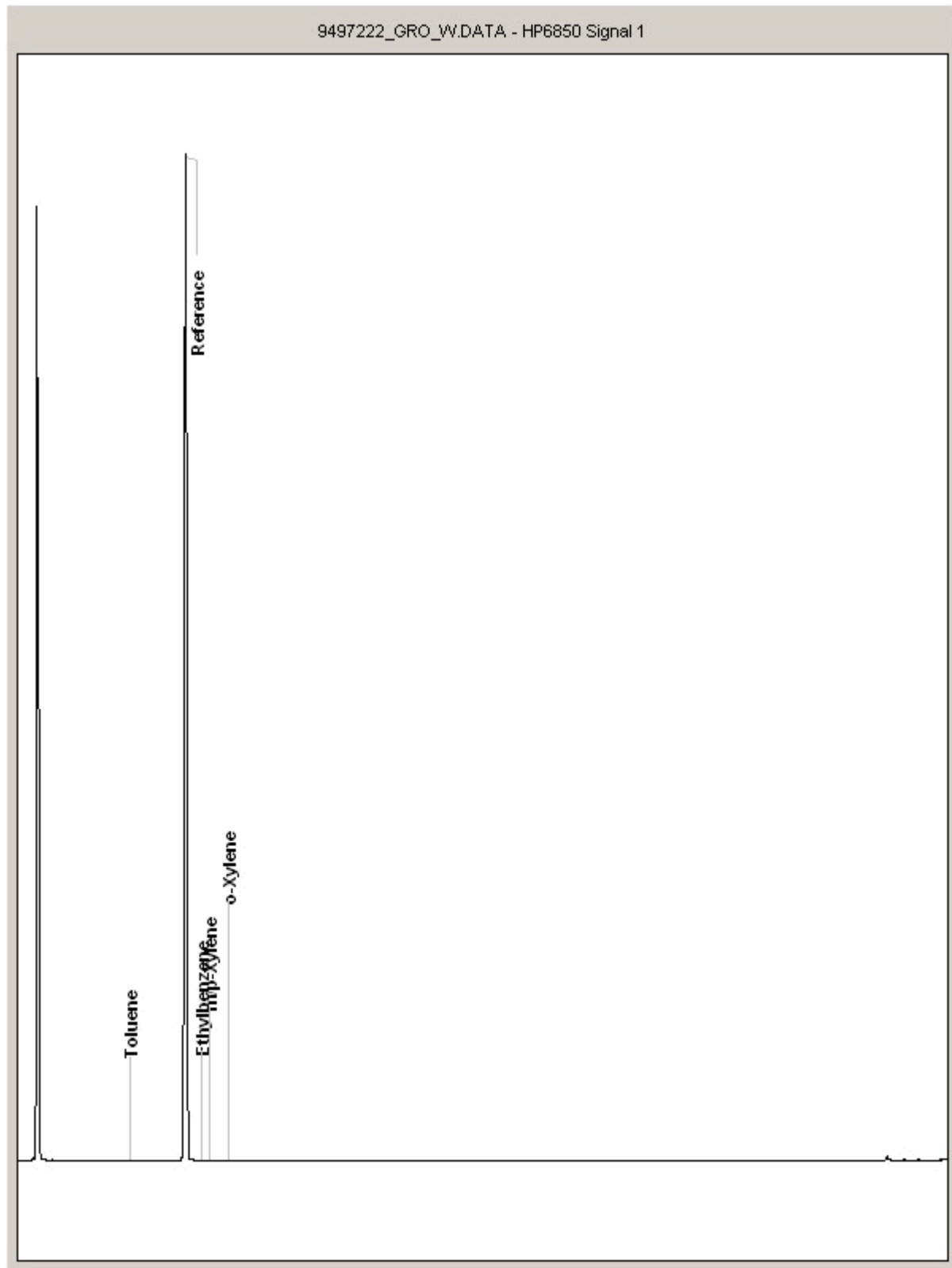
Order Number:
Report Number: 274961
Superseded Report:

Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 9497222
Sample ID : BH106A

Depth :





SDG: 140624-42
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS
Attention: Jocelyn Willis

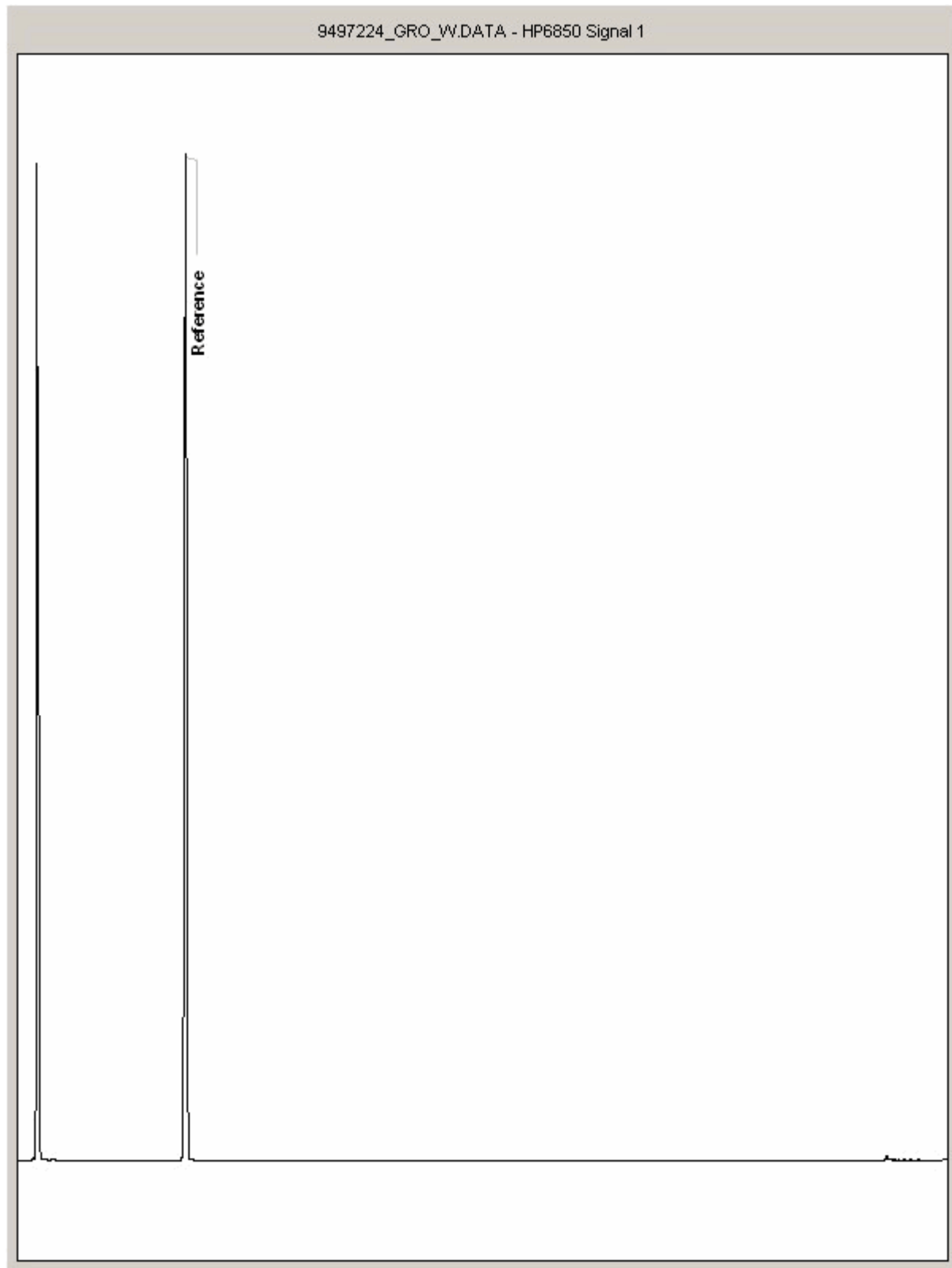
Order Number:
Report Number: 274961
Superseded Report:

Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 9497224
Sample ID : BH103

Depth :





SDG: 140624-42
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS
Attention: Jocelyn Willis

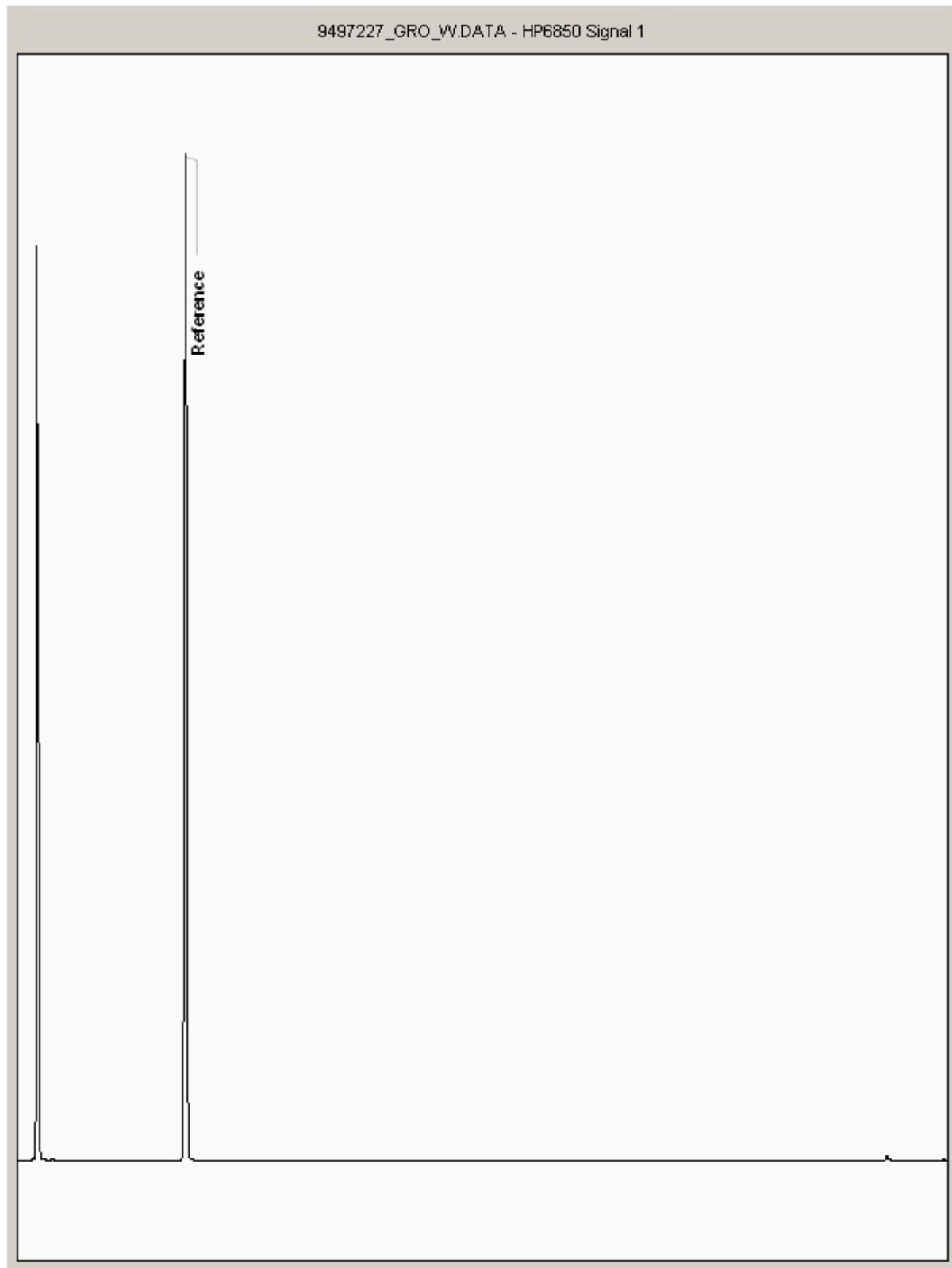
Order Number:
Report Number: 274961
Superseded Report:

Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 9497227
Sample ID : BH102A

Depth :





SDG: 140624-42
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS
Attention: Jocelyn Willis

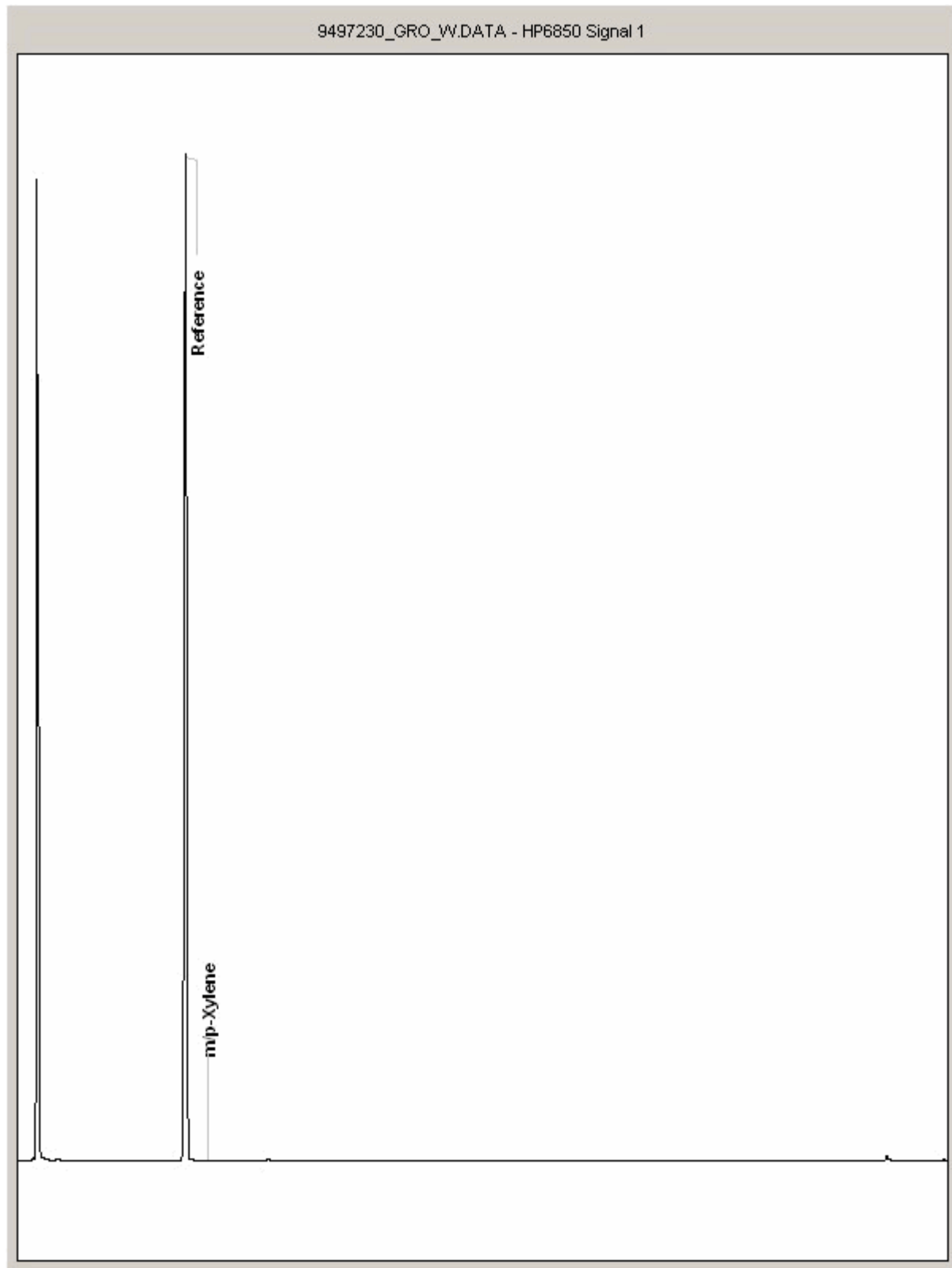
Order Number:
Report Number: 274961
Superseded Report:

Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 9497230
Sample ID : EB

Depth :





SDG: 140624-42
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS
Attention: Jocelyn Willis

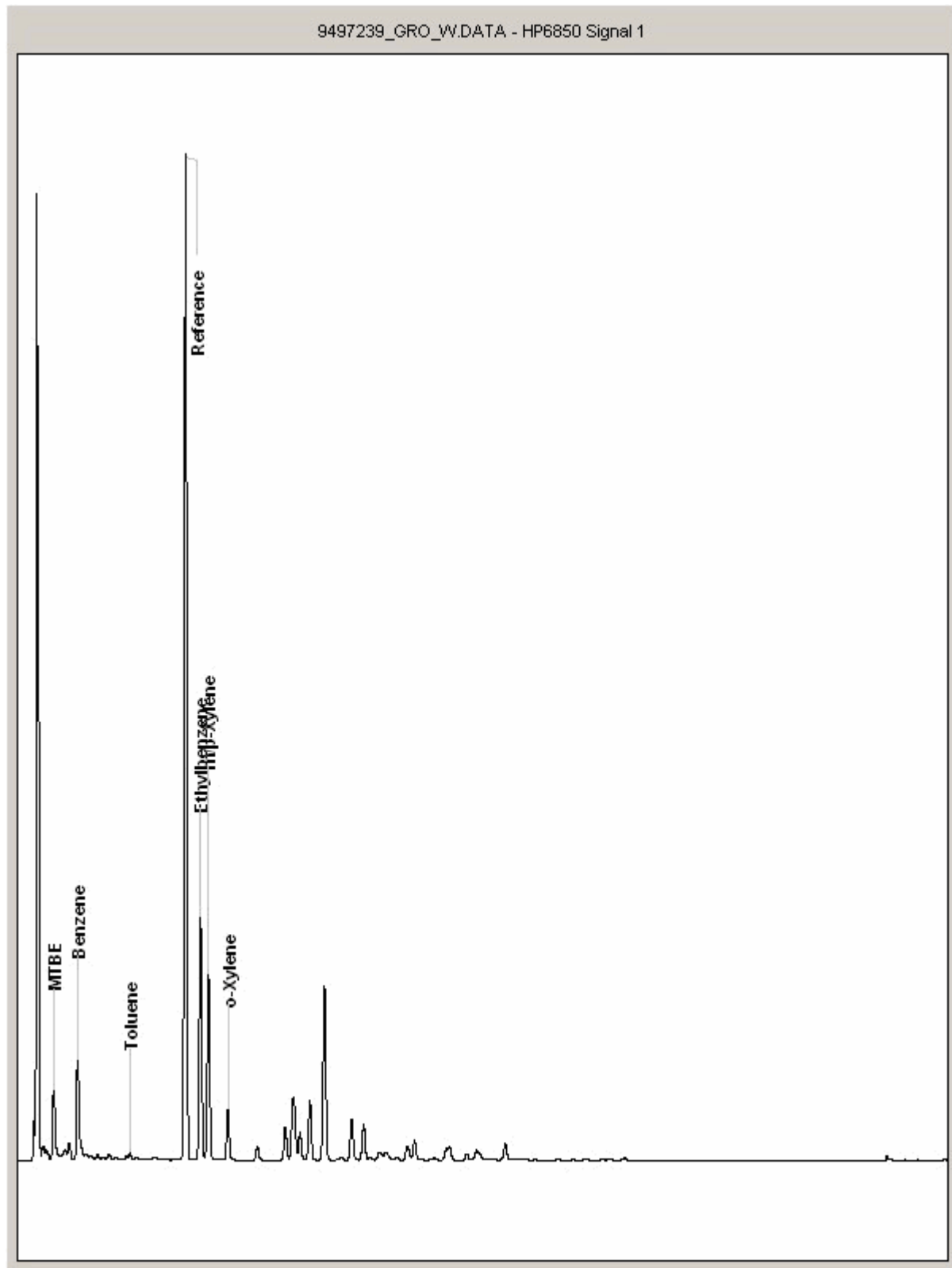
Order Number:
Report Number: 274961
Superseded Report:

Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 9497239
Sample ID : DUP

Depth :





SDG: 140624-42
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS
Attention: Jocelyn Willis

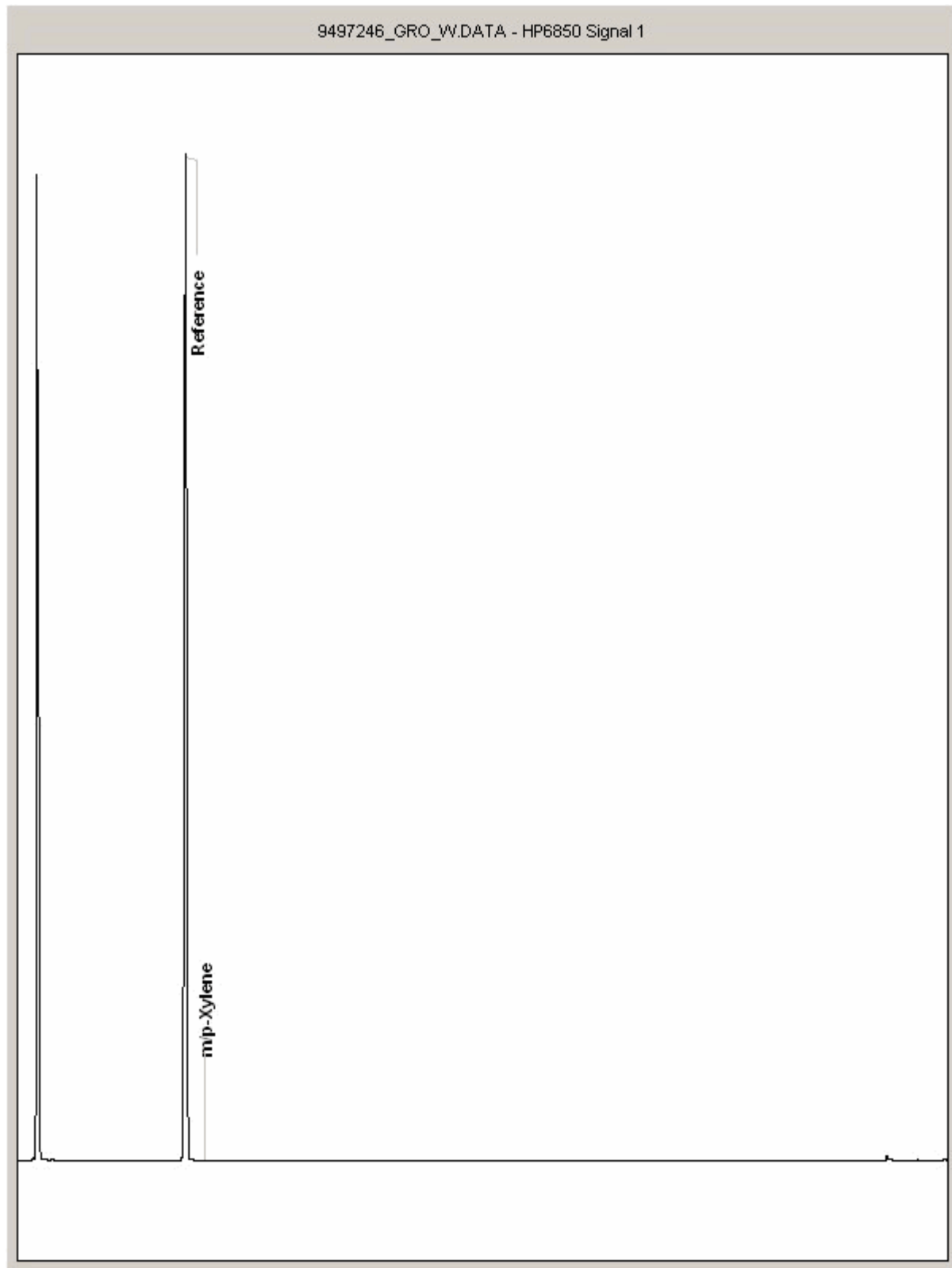
Order Number:
Report Number: 274961
Superseded Report:

Chromatogram

Analysis: GRO by GC-FID (W)

Sample No : 9497246
Sample ID : BH105A

Depth :





SDG: 140624-42
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS
Attention: Jocelyn Willis

Order Number:
Report Number: 274961
Superseded Report:

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) 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 Dimethylphenol, 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 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.

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	DOM	SOX THERM	GRAVIMETRIC
CYCLOHEXANE EXT. MATTER	D&C	CYCLOHEXANE	SOX THERM	GRAVIMETRIC
THIN LAYER CHROMATOGRAPHY	D&C	DOM	SOX THERM	ATROSCAN
ELEMENTAL SULPHUR	D&C	DOM	SOX THERM	HPLC
PHENOLS BY GC/MS	WET	DOM	SOX THERM	GC/MS
HERBICIDES	D&C	HEXANE/ACETONE	SOX THERM	GC/MS
PESTICIDES	D&C	HEXANE/ACETONE	SOX THERM	GC/MS
EPH (DRO)	D&C	HEXANE/ACETONE	END OVER END	GCFID
EPH (MINOL)	D&C	HEXANE/ACETONE	END OVER END	GCFID
EPH (CLEANED UP)	D&C	HEXANE/ACETONE	END OVER END	GCFID
EPH CWS BY GC	D&C	HEXANE/ACETONE	END OVER END	GCFID
PCB TOT / PCB CON	D&C	HEXANE/ACETONE	END OVER END	GC/MS
POLYAROMATIC HYDROCARBONS (MS)	WET	HEXANE/ACETONE	MICROWAVE TM218	GC/MS
C8-C40 (C6-C40) EZ FLASH	WET	HEXANE/ACETONE	SHAKER	GCEZ
POLYAROMATIC HYDROCARBONS RAPID GC	WET	HEXANE/ACETONE	SHAKER	GCEZ
SEM VOLATILE ORGANIC COMPOUNDS	WET	DOM/ACETONE	SONICATE	GC/MS

LIQUID MATRICES EXTRACTION SUMMARY

ANALYSIS	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
PAHMS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC/MS
EPH	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GCFID
EPH CWS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GCFID
MINERAL OIL	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GCFID
PCB 70 CONGENERS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC/MS
PCB TOTAL	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC/MS
SVOC	DOM	LIQUID/LIQUID SHAKE	GC/MS
FREESULPHUR	DOM	SOLID PHASE EXTRACTION	HPLC
PEST COC/OPP	DOM	LIQUID/LIQUID SHAKE	GC/MS
TRIAZINE HERB	DOM	LIQUID/LIQUID SHAKE	GC/MS
PHENOLS MS	DOM	SOLID PHASE EXTRACTION	GC/MS
TPH by INFRARED (IR)	TCE	LIQUID/LIQUID SHAKE	HPLC
MINERAL OIL by IR	TCE	LIQUID/LIQUID SHAKE	HPLC
GLYCOLS	NONE	DIRECT INJECTION	GC/MS

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).

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.



SDG: 140624-42
Job: H_URS_WIM-174
Client Reference: 46370079

Location: Shell Hitchin
Customer: URS
Attention: Jocelyn Willis

Order Number:
Report Number: 274961
Superseded Report:

Appendix General

1. Results are expressed on a dry weight basis (dried at 35°C) 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 Dimethylphenol, 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 preservation 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 Anthrophyllite	-
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.

Blank Detections

Sample Type: GAS mg/m3

BLANK Hitchin October 2011

Sample ID	Depth (m)	Analyte	Lab Sample	Sample Date	Amount	MDL
10019011_Environment	0	DECANE	4515255	13/10/2011	0.00359	0.001
10019011_Environment	0	A_1 METHYLNAPHTHALENE	4515255	13/10/2011	0.00032	0.003
10019011_Environment	0	NAPHTHALENE	4515255	13/10/2011	0.00083	0.001
10019011_Environment	0	DODECANE	4515255	13/10/2011	0.00137	0.002
10019011_Environment	0	OCTANE	4515255	13/10/2011	0.0031	0.002
10019011_Environment	0	BENZENE	4515255	13/10/2011	0.00989	0.002
10019011_Environment	0	ETHYLBENZENE	4515255	13/10/2011	0.01053	0.001
10019011_Environment	0	HEXANE	4515255	13/10/2011	0.01735	0.001
10019011_Environment	0	M_P_XYLENE	4515255	13/10/2011	0.03214	0.001
10019011_Environment	0	TOLUENE	4515255	13/10/2011	0.05834	0.001
10019011_Environment	0	O_XYLENE	4515255	13/10/2011	0.01234	0.001
10019011_Environment	0	A_1_2_3_TRIMETHYLBENZENE	4515255	13/10/2011	0.00192	0.002
10019011_Environment	0	TOTAL_VOC_C6_12	4515255	13/10/2011	0.59	0.022

Blank Detections

Sample Type: WATER $\mu\text{g/l}$

EQUIPMENT BLANK Hitchin Apr-June 2014

Sample ID	Depth (m)	Analyte	Lab Sample	Sample Date	Amount	MDL
10019011_EB	W	NAPHTHALENE	9495239	23/06/2014	0.362	0.1
10019011_EQUIPMENT BLANK	W	RISK_TPH_C7_C8_A ROM	4491079	12/10/2011	13	10
10019011_EQUIPMENT BLANK	W	BENZENE	6764106	11/01/2013	4.97	1
10019011_EQUIPMENT BLANK	W	TBA	6764106	11/01/2013	20.4	10

Blank Detections

Sample Type:

GAS

ng

TRIP BLANK

Hitchin October 2011

Sample ID	Depth (m)	Analyte	Lab Sample	Sample Date	Amount	MDL
10019011_Trip blank	0	TOTAL_VOC_C6_12	4515256	13/10/2011	124	67
10019011_Trip blank	0	ETHYLBENZENE	4515256	13/10/2011	0.32	2
10019011_Trip blank	0	DODECANE	4515256	13/10/2011	0.41	6
10019011_Trip blank	0	A_1 METHYLNAPHTHALENE	4515256	13/10/2011	0.54	8
10019011_Trip blank	0	M_P_XYLENE	4515256	13/10/2011	0.61	3
10019011_Trip blank	0	NAPHTHALENE	4515256	13/10/2011	1.1	4
10019011_Trip blank	0	HEXANE	4515256	13/10/2011	4.41	4
10019011_Trip blank	0	BENZENE	4515256	13/10/2011	4.63	5
10019011_Trip blank	0	TOLUENE	4515256	13/10/2011	1.04	2

The procedure for evaluating blanks should be as follows:

Confirm that blank data have been provided at the appropriate frequency as above:

- Identify whether there are any target or non-target compounds in the blank, noting that the following compounds are common laboratory contaminants:
 - Methylene chloride (Dichloromethane)
 - Chloroform (Trichloromethane)
 - Acetone
 - Cyclohexane
 - 2-butanone
 - Phthalates
- If there is a contaminant in the blank that does not occur in any of the samples, no action is required.
- If any of the above common laboratory contaminants is present in the laboratory blank, then any result that falls within 10 times the value reported in the laboratory blank should be treated as suspect and ideally reported as 'less than' this value. So for example, if 5µg/l of dichloromethane has been detected in the laboratory blank, a concentration of 45µg/l dichloromethane identified in a particular sample should be reported as <50µg/l.
- For any other compound that is present in the laboratory blank, then any result that falls within 5 times the value reported in the laboratory blank should be treated as suspect and ideally reported as 'less than' this value. So for example, if 0.5mg/l of nitrate has been detected in the laboratory blank, a concentration of 1mg/l dichloromethane identified in a particular sample should be reported as <2.5mg/l.

The tabulation of the data should therefore either report these values as <10x or <5x the blank value or, if it is preferred, indicate this as a footnote to the relevant tables:

'Due to the occurrence of dichloromethane within the blank sample at a concentration of 5µg/l, then based on USEPA CLP Functional Guidelines, concentrations below 50µg/l are not considered to represent positive identification of this compound'

There may however be instances where the elevated reporting limit falls above the initial screening criterion for a specific compound, but the actual value present in the sample falls below the latter. In such cases it is permissible in the report to refer to the reported value, in order that it may be eliminated from subsequent risk considerations, although reference should still be made to its occurrence in the blank.

A similar procedure should be adopted with regards to the trip blank, (taking the highest concentration in each of the blanks as the basis for comparison)

However in the case of the field blank, professional judgement should be used to evaluate the significance of any positive identifications and the effect on the usability and reporting of the sample data.

PM Notes

Project Manager:

Date:

Duplicate RPD Summary

Hitchin Apr-June 2014

10019011_BH102 W		WATER		µg/l		140624-42			
Chem Class	Analyte	MDL	Sample	Dup	MDL Ratio	RPD Limit	RPD Value	Comment	Pass/Fail
BTEX	BENZENE	1	348	361	361	30	-3.66714	Conc >20x MDL; RPD limit = 30%	OK
BTEX	ETHYLBENZENE	1	801	737	801	30	8.322497	Conc >20x MDL; RPD limit = 30%	OK
BTEX	M_P_XYLENE	1	547	601	601	30	-9.40767	Conc >20x MDL; RPD limit = 30%	OK
BTEX	O_XYLENE	1	148	162	162	30	-9.03226	Conc >20x MDL; RPD limit = 30%	OK
BTEX	TOLUENE	1	17.7	19	19	50	-7.08447	Conc >10x MDL but <20x MDL; RPD limit = 50%	OK
MISC	IRON FERROUS	100	7330	7650	76.5	30	-4.27236	Conc >20x MDL; RPD limit = 30%	OK
MISC	NITRATE_AS_N	300	3040	3150	10.5	50	-3.55412	Conc >10x MDL but <20x MDL; RPD limit = 50%	OK
MISC	SULPHATE SOLUBLE	2000	41700	41200	20.85	50	1.206273	Conc >10x MDL but <20x MDL; RPD limit = 50%	OK
PAH	ACENAPHTHENE	0.015	0.105	0.108	7.2	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	ACENAPHTHYLENE	0.011	0.0222	0.022	2.01818	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	ANTHRACENE	0.015	0.0252	0.0218	1.68	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	BENZO_A_ANTHRACENE	0.017	0.017	0.017	1	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	BENZO_A_PYRENE	0.009	0.009	0.009	1	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	BENZO_B_FLUORANTHENE	0.023	0.023	0.023	1	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	BENZO_G_H_I_PERYLENE	0.016	0.016	0.016	1	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	BENZO_K_FLUORANTHENE	0.027	0.027	0.027	1	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	CHRYSENE	0.013	0.013	0.013	1	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	DIBENZ_A_H_ANTHRACENE	0.016	0.016	0.016	1	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	FLUORANTHENE	0.017	0.017	0.017	1	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	FLUORENE	0.014	0.191	0.192	13.7143	50	-0.52219	Conc >10x MDL but <20x MDL; RPD limit = 50%	OK
PAH	INDENO_1_2_3_CD_PYRENE	0.014	0.014	0.014	1	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	NAPHTHALENE	0.1	116	113	1160	30	2.620087	Conc >20x MDL; RPD limit = 30%	OK
PAH	PHENANTHRENE	0.022	0.165	0.163	7.5	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	PYRENE	0.015	0.015	0.015	1	0	0	Conc <10x MDL; No RPD Limit	OK

Duplicate RPD Summary

Hitchin Apr-June 2014

10019011_BH102 W		WATER		µg/l		140624-42			
Chem Class	Analyte	MDL	Sample	Dup	MDL Ratio	RPD Limit	RPD Value	Comment	Pass/Fail
PAH	TOTAL PAH	0.344	116	114	337.209	30	1.739130	Conc >20x MDL; RPD limit = 30%	OK
RISKTPH	RISK_TPH_C10_C12_ALI	10	521	533	53.3	30	-2.27704	Conc >20x MDL; RPD limit = 30%	OK
RISKTPH	RISK_TPH_C10_C12_AROM	10	347	355	35.5	30	-2.27920	Conc >20x MDL; RPD limit = 30%	OK
RISKTPH	RISK_TPH_C12_C16_ALI	10	10	10	1	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C12_C16_AROM	10	49	40	4.9	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C16_C21_ALI	10	10	10	1	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C16_C21_AROM	10	10	10	1	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C21_C35_ALI	10	10	10	1	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C21_C35_AROM	10	10	10	1	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C5_C6_ALI	10	145	156	15.6	50	-7.30897	Conc >10x MDL but <20x MDL; RPD limit = 50%	OK
RISKTPH	RISK_TPH_C5_C7_AROM	10	318	320	32	30	-0.62696	Conc >20x MDL; RPD limit = 30%	OK
RISKTPH	RISK_TPH_C6_C8_ALI	10	527	523	52.7	30	0.761905	Conc >20x MDL; RPD limit = 30%	OK
RISKTPH	RISK_TPH_C7_C8_AROM	10	13	13	1.3	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C8_C10_ALI	10	1640	1700	170	30	-3.59281	Conc >20x MDL; RPD limit = 30%	OK
RISKTPH	RISK_TPH_C8_C10_AROM	10	2620	2710	271	30	-3.37711	Conc >20x MDL; RPD limit = 30%	OK
VOC	DIPE	1	1	1	1	0	0	Conc <10x MDL; No RPD Limit	OK
VOC	ETBE	1	35.1	36.7	36.7	30	-4.45682	Conc >20x MDL; RPD limit = 30%	OK
VOC	ETHANOL	50	50	50	1	0	0	Conc <10x MDL; No RPD Limit	OK
VOC	MTBE	1	361	357	361	30	1.114206	Conc >20x MDL; RPD limit = 30%	OK
VOC	TAME	1	1	1	1	0	0	Conc <10x MDL; No RPD Limit	OK
VOC	TBA	10	10	10	1	0	0	Conc <10x MDL; No RPD Limit	OK

Duplicate RPD Summary

Hitchin February 2012

10019011_BH102 W		WATER		µg/l		120228-13			
Chem Class	Analyte	MDL	Sample	Dup	MDL Ratio	RPD Limit	RPD Value	Comment	Pass/Fail
BTEX	BENZENE	1	1100	917	1100	30	18.14576	Conc >20x MDL; RPD limit = 30%	OK
BTEX	ETHYLBENZENE	1	3600	2960	3600	30	19.5122	Conc >20x MDL; RPD limit = 30%	OK
BTEX	M_P_XYLENE	1	9330	7800	9330	30	17.8634	Conc >20x MDL; RPD limit = 30%	OK
BTEX	O_XYLENE	1	4380	3790	4380	30	14.44308	Conc >20x MDL; RPD limit = 30%	OK
BTEX	TOLUENE	1	150	180	180	30	-18.1818	Conc >20x MDL; RPD limit = 30%	OK
PAH	ACENAPHTHENE	0.015	0.193	0.2	13.3333	50	-3.56234	Conc >10x MDL but <20x MDL; RPD limit = 50%	OK
PAH	ACENAPHTHYLENE	0.011	0.0456	0.0389	4.14545	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	ANTHRACENE	0.015	0.0315	0.0292	2.1	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	BENZO_A_ANTHRACENE	0.017	0.017	0.017	1	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	BENZO_A_PYRENE	0.009	0.009	0.009	1	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	BENZO_B_FLUORANTHENE	0.023	0.023	0.023	1	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	BENZO_G_H_I_PERYLENE	0.016	0.016	0.016	1	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	BENZO_K_FLUORANTHENE	0.027	0.027	0.027	1	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	CHRYSENE	0.013	0.013	0.013	1	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	DIBENZ_A_H_ANTHRACENE	0.016	0.016	0.016	1	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	FLUORANTHENE	0.017	0.0182	0.022	1.29412	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	FLUORENE	0.014	0.387	0.382	27.6429	50	1.300390	Conc >10x MDL but <20x MDL; RPD limit = 50%	OK
PAH	INDENO_1_2_3_CD_PYRENE	0.014	0.014	0.014	1	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	NAPHTHALENE	0.1	289	274	2890	30	5.328597	Conc >20x MDL; RPD limit = 30%	OK
PAH	PHENANTHRENE	0.022	0.146	0.112	6.63636	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	PYRENE	0.015	0.0234	0.0286	1.90667	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	TOTAL PAH	0.247	290	275	1174.09	30	5.309735	Conc >20x MDL; RPD limit = 30%	OK
RISKTPH	RISK_TPH_C10_C12_ALI	10	1400	1620	162	30	-14.5695	Conc >20x MDL; RPD limit = 30%	OK
RISKTPH	RISK_TPH_C10_C12_AROM	10	934	1080	108	30	-14.4985	Conc >20x MDL; RPD limit = 30%	OK

Duplicate RPD Summary

Hitchin February 2012

10019011_BH102 W		WATER		µg/l		120228-13			
Chem Class	Analyte	MDL	Sample	Dup	MDL Ratio	RPD Limit	RPD Value	Comment	Pass/Fail
RISKTPH	RISK_TPH_C12_C16_ALI	10	10	10	1	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C12_C16_AROM	10	306	283	30.6	30	7.809847	Conc >20x MDL; RPD limit = 30%	OK
RISKTPH	RISK_TPH_C16_C21_ALI	10	10	10	1	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C16_C21_AROM	10	17	26	2.6	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C21_C35_ALI	10	10	10	1	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C21_C35_AROM	10	10	10	1	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C5_C6_ALI	10	646	790	79	30	-20.0557	Conc >20x MDL; RPD limit = 30%	OK
RISKTPH	RISK_TPH_C6_C7_AROM	10	731	826	82.6	30	-12.203	Conc >20x MDL; RPD limit = 30%	OK
RISKTPH	RISK_TPH_C6_C8_ALI	10	1430	1780	178	30	-21.8069	Conc >20x MDL; RPD limit = 30%	OK
RISKTPH	RISK_TPH_C7_C8_AROM	10	131	155	15.5	50	-16.7832	Conc >10x MDL but <20x MDL; RPD limit = 50%	OK
RISKTPH	RISK_TPH_C8_C10_ALI	10	3250	4110	411	30	-23.3696	Conc >20x MDL; RPD limit = 30%	OK
RISKTPH	RISK_TPH_C8_C10_AROM	10	14500	18100	1810	30	-22.0859	Conc >20x MDL; RPD limit = 30%	OK
VOC	DIPE	1	1	1	1	0	0	Conc <10x MDL; No RPD Limit	OK
VOC	ETBE	1	1	1	1	0	0	Conc <10x MDL; No RPD Limit	OK
VOC	ETHANOL	50	50	50	1	0	0	Conc <10x MDL; No RPD Limit	OK
VOC	MTBE	1	1	1	1	0	0	Conc <10x MDL; No RPD Limit	OK
VOC	TAME	1	1	1	1	0	0	Conc <10x MDL; No RPD Limit	OK
VOC	TBA	10	10	10	1	0	0	Conc <10x MDL; No RPD Limit	OK
VOC	TOLUENE-D8 (SUR)	0	103	101	#Div/0!	#Div/0!	#Div/0!	#Div/0!	#Div/0!

Duplicate RPD Summary

Hitchin October 2011

10019011_BH102		W	WATER		µg/l	111013-17			
Chem Class	Analyte	MDL	Sample	Dup	MDL Ratio	RPD Limit	RPD Value	Comment	Pass/Fail
BTEX	BENZENE	1	1460	1730	1730	30	-16.9279	Conc >20x MDL; RPD limit = 30%	OK
BTEX	ETHYLBENZENE	1	2350	2640	2640	30	-11.6232	Conc >20x MDL; RPD limit = 30%	OK
BTEX	M_P_XYLENE	1	6480	7270	7270	30	-11.4909	Conc >20x MDL; RPD limit = 30%	OK
BTEX	O_XYLENE	1	2460	2720	2720	30	-10.0386	Conc >20x MDL; RPD limit = 30%	OK
BTEX	TOLUENE	1	465	398	465	30	15.52723	Conc >20x MDL; RPD limit = 30%	OK
PAH	Acenaphthene	0.015	0.015	0.015	1	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	Acenaphthylene	0.011	0.011	0.011	1	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	Anthracene	0.015	0.015	0.015	1	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	BENZO_A_ANTHRACENE	0.017	0.017	0.017	1	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	BENZO_A_PYRENE	0.009	0.009	0.009	1	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	BENZO_B_FLUORANTHENE	0.023	0.023	0.023	1	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	BENZO_G_H_I_PERYLENE	0.016	0.016	0.016	1	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	BENZO_K_FLUORANTHENE	0.027	0.027	0.027	1	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	Chrysene	0.013	0.013	0.013	1	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	DIBENZ_A_H_ANTHRACENE	0.016	0.016	0.016	1	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	Fluoranthene	0.017	0.017	0.017	1	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	Fluorene	0.014	0.205	0.245	17.5	50	-17.7778	Conc >10x MDL but <20x MDL; RPD limit = 50%	OK
PAH	INDENO_1_2_3_CD_PYRENE	0.014	0.014	0.014	1	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	Naphthalene	0.1	175	186	1860	30	-6.09418	Conc >20x MDL; RPD limit = 30%	OK
PAH	Phenanthrene	0.022	0.022	0.022	1	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	Pyrene	0.015	0.015	0.015	1	0	0	Conc <10x MDL; No RPD Limit	OK
PAH	TOTAL_PAH	0.247	176	186	753.036	30	-5.52486	Conc >20x MDL; RPD limit = 30%	OK
RISKTPH	RISK_TPH_C10_C12_ALI	10	1510	1370	151	30	9.722222	Conc >20x MDL; RPD limit = 30%	OK
RISKTPH	RISK_TPH_C10_C12_AROM	10	1010	914	101	30	9.97921	Conc >20x MDL; RPD limit = 30%	OK

Duplicate RPD Summary

Hitchin October 2011

10019011_BH102 W		WATER		µg/l		111013-17			
Chem Class	Analyte	MDL	Sample	Dup	MDL Ratio	RPD Limit	RPD Value	Comment	Pass/Fail
RISKTPH	RISK_TPH_C12_C16_ALI	10	10	10	1	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C12_C16_AROM	10	143	151	15.1	50	-5.44218	Conc >10x MDL but <20x MDL; RPD limit = 50%	OK
RISKTPH	RISK_TPH_C16_C21_ALI	10	10	10	1	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C16_C21_AROM	10	10	10	1	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C21_C35_ALI	10	10	10	1	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C21_C35_AROM	10	10	10	1	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C5_C6_ALI	10	308	295	30.8	30	4.311774	Conc >20x MDL; RPD limit = 30%	OK
RISKTPH	RISK_TPH_C6_C7_AROM	10	1210	1160	121	30	4.219409	Conc >20x MDL; RPD limit = 30%	OK
RISKTPH	RISK_TPH_C6_C8_ALI	10	697	632	69.7	30	9.781791	Conc >20x MDL; RPD limit = 30%	OK
RISKTPH	RISK_TPH_C7_C8_AROM	10	392	400	40	30	-2.02020	Conc >20x MDL; RPD limit = 30%	OK
RISKTPH	RISK_TPH_C8_C10_ALI	10	3220	2900	322	30	10.45752	Conc >20x MDL; RPD limit = 30%	OK
RISKTPH	RISK_TPH_C8_C10_AROM	10	13300	12700	1330	30	4.615385	Conc >20x MDL; RPD limit = 30%	OK
VOC	DIPE	1	1	1	1	0	0	Conc <10x MDL; No RPD Limit	OK
VOC	ETBE	1	1	1	1	0	0	Conc <10x MDL; No RPD Limit	OK
VOC	ETHANOL	50	50	50	1	0	0	Conc <10x MDL; No RPD Limit	OK
VOC	MTBE	1	1	1	1	0	0	Conc <10x MDL; No RPD Limit	OK
VOC	TAME	1	1	1	1	0	0	Conc <10x MDL; No RPD Limit	OK
VOC	TBA	10	10	10	1	0	0	Conc <10x MDL; No RPD Limit	OK
VOC	TOLUENE_D8	0	100	102	#Div/0!	#Div/0!	#Div/0!	#Div/0!	#Div/0!

Duplicate RPD Summary

Hitchin October 2011

10019011_BH105 4.1		SOIL	mg/kg		110930-19				
Chem Class	Analyte	MDL	Sample	Dup	MDL Ratio	RPD Limit	RPD Value	Comment	Pass/Fail
BTEX	BENZENE	0.009	0.009	0.009	1	0	0	Conc <10x MDL; No RPD Limit	OK
BTEX	BENZENE	0.002	0.002	0.009	4.5	0	0	Conc <10x MDL; No RPD Limit	OK
BTEX	BENZENE	1	1	0.009	1	0	0	Conc <10x MDL; No RPD Limit	OK
BTEX	ETHYLBENZENE	0.002	0.002	0.004	2	0	0	Conc <10x MDL; No RPD Limit	OK
BTEX	ETHYLBENZENE	0.004	0.004	0.004	1	0	0	Conc <10x MDL; No RPD Limit	OK
BTEX	ETHYLBENZENE	1	1	0.004	1	0	0	Conc <10x MDL; No RPD Limit	OK
BTEX	M_P_XYLENE	1	1	0.014	1	0	0	Conc <10x MDL; No RPD Limit	OK
BTEX	M_P_XYLENE	0.002	0.002	0.014	7	0	0	Conc <10x MDL; No RPD Limit	OK
BTEX	M_P_XYLENE	0.014	0.014	0.014	1	0	0	Conc <10x MDL; No RPD Limit	OK
BTEX	O_XYLENE	1	1	0.01	1	0	0	Conc <10x MDL; No RPD Limit	OK
BTEX	O_XYLENE	0.002	0.002	0.01	5	0	0	Conc <10x MDL; No RPD Limit	OK
BTEX	O_XYLENE	0.01	0.01	0.01	1	0	0	Conc <10x MDL; No RPD Limit	OK
BTEX	TOLUENE	1	1	0.005	1	0	0	Conc <10x MDL; No RPD Limit	OK
BTEX	TOLUENE	0.002	0.002	0.005	2.5	0	0	Conc <10x MDL; No RPD Limit	OK
BTEX	TOLUENE	0.005	0.005	0.005	1	0	0	Conc <10x MDL; No RPD Limit	OK
MISC	Total_Organic_Carbon	0.2	0.2	0.2	1	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C10_C12_ALI	0.01	0.01	0.01	1	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C10_C12_AROM	0.01	0.01	0.01	1	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C12_C16_ALI	0.1	7.29	44.2	442	30	43.36764	Conc >20x MDL; RPD limit = 30%	FAIL
RISKTPH	RISK_TPH_C12_C16_ALI	0.02	0.02	44.2	2210	30	99.81909	Conc >20x MDL; RPD limit = 30%	FAIL
RISKTPH	RISK_TPH_C12_C16_ALI	10	10	44.2	4.42	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C12_C16_AROM	0.1	0.1	0.1	1	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C12_C16_AROM	0.02	0.02	0.1	5	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C12_C16_AROM	10	10	0.1	1	0	0	Conc <10x MDL; No RPD Limit	OK

Duplicate RPD Summary

Hitchin October 2011

10019011_BH105 4.1		SOIL	mg/kg		110930-19				
Chem Class	Analyte	MDL	Sample	Dup	MDL Ratio	RPD Limit	RPD Value	Comment	Pass/Fail
RISKTPH	RISK_TPH_C16_C21_ALI	10	10	1.98	1	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C16_C21_ALI	0.02	0.02	1.98	99	30	96	Conc >20x MDL; RPD limit = 30%	FAIL
RISKTPH	RISK_TPH_C16_C21_ALI	0.1	5.6	1.98	56	30	95.51451	Conc >20x MDL; RPD limit = 30%	FAIL
RISKTPH	RISK_TPH_C16_C21_AROM	10	10	0.1	1	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C16_C21_AROM	0.02	0.02	0.1	5	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C16_C21_AROM	0.1	0.1	0.1	1	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C21_C35_ALI	0.02	0.02	0.1	5	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C21_C35_ALI	0.1	0.1	0.1	1	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C21_C35_ALI	10	10	0.1	1	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C21_C35_AROM	0.1	0.1	0.1	1	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C21_C35_AROM	10	10	0.1	1	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C21_C35_AROM	0.02	0.02	0.1	5	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C35_C44_ALI	0.1	0.1	0.1	1	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C5_C6_ALI	0.01	0.01	0.01	1	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C6_C7_AROM	0.01	0.01	0.01	1	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C6_C8_ALI	0.01	0.01	0.01	1	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C7_C8_AROM	0.01	0.01	0.01	1	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C8_C10_ALI	0.01	0.01	0.01	1	0	0	Conc <10x MDL; No RPD Limit	OK
RISKTPH	RISK_TPH_C8_C10_AROM	0.01	0.01	0.01	1	0	0	Conc <10x MDL; No RPD Limit	OK
VOC	DIPE	0.001	0.001	0.001	1	0	0	Conc <10x MDL; No RPD Limit	OK
VOC	ETBE	0.001	0.001	0.001	1	0	0	Conc <10x MDL; No RPD Limit	OK
VOC	ETHANOL	0.05	0.05	0.05	1	0	0	Conc <10x MDL; No RPD Limit	OK
VOC	MTBE	0.011	0.011	0.011	1	0	0	Conc <10x MDL; No RPD Limit	OK
VOC	TAME	0.015	0.015	0.015	1	0	0	Conc <10x MDL; No RPD Limit	OK
VOC	TAME	0.002	0.002	0.015	7.5	0	0	Conc <10x MDL; No RPD Limit	OK

Duplicate RPD Summary

Hitchin October 2011

10019011_BH105 4.1		SOIL	mg/kg		110930-19				
Chem Class	Analyte	MDL	Sample	Dup	MDL Ratio	RPD Limit	RPD Value	Comment	Pass/Fail
VOC	TAME	1	1	0.015	1	0	0	Conc <10x MDL; No RPD Limit	OK
VOC	TBA	0.01	0.01	0.01	1	0	0	Conc <10x MDL; No RPD Limit	OK
VOCSURR	TOLUENE_D8	0	104	104	#Div/0!	#Div/0!	#Div/0!	#Div/0!	#Div/0!

A duplicate sample should be taken for every 20 samples or 1 per sampling event, if less than 20 samples are collected. It is best to avoid taking duplicates of samples that are likely to return concentrations close to the detection limit, and also samples where concentrations may be close to the solubility limit, e.g. where globules of free product are present. The duplicate must not be identified as such. Instead it should be assigned a reference number similar to the sample numbering notation such that it is unrecognisable to the laboratory as a duplicate. For example if nine boreholes, BH1 to BH9 are being sampled, and a duplicate of borehole BH5 is taken, this should be referred to as BH4 and not BH5A. The lab also needs to report the duplicate sample electronically as sample_type DUP so that the S&GW database can then be used to compare results.

On receipt of the laboratory data, the following assessment should be performed.

To evaluate the precision of the data, firstly calculate the Relative Percent Difference, RPD, as follows:

$$RPD = \frac{(S - D)}{\frac{(S + D)}{2}} \times 100$$

where S = Sample Result and D = Duplicate Result

Next, compare the RPD to the Reporting Limit, which should be provided on the laboratory certificate. As a guideline:

- If the sample concentration is less than 10 times the reporting limit, the RPD is not overly critical.
- If the sample concentration is between 10 times and 20 times the reporting limit, the RPD should be less than 50%.
- If the sample concentration is greater than 20 times the reporting limit, the RPD should be less than 30%.
- If the RPD falls outside these criteria, then professional judgement should be used to evaluate the acceptability of the data using the following criteria as guidance:
- If the sample is soil there is a strong possibility that the elevated RPD relates to a matrix effect, particularly with highly heterogeneous media, or where textural characteristics make homogenisation difficult (e.g. a stiff clay). Refer to borehole logs and field notes.
- If the sample is an aqueous sample check that the well has been adequately purged or whether only a limited volume of water was recoverable – e.g. with discontinuous perched groundwater. In this case some variation between samples may be expected.
- If the sample has entrained free product – this could relate to small globules, not a distinct layer – then small differences in the amount present could result in significant variation in concentrations measured, the latter not being truly reflective of 'dissolved phase' concentrations.
- If none of these are applicable and there is no additional reason to suppose that lesser or greater losses of the compound in question took place from the sample compared to its duplicate, as a result of handling issues, then an explanation should be sought from the laboratory, with the lab QA coordinator being copied on all correspondence.

PM Comments

Project Manager:

Date:

Holding Times >7 Days from Sample to Extraction

Sample Type: SOIL
Site: Hitchin

Sample ID	Depth (m)	Analyte	Lab Sample	Sample Date	Extraction Date	Holding Time (Days)
10019011_VA127	0.8	Total_Organic_Carbon	7233100	12/04/2013	23/04/2013	11
10019011_VA128	1.5	TBA	7233101	12/04/2013	22/04/2013	10
10019011_VA127	0.8	TBA	7233100	12/04/2013	22/04/2013	10
10019011_VA128	1.5	ETHANOL	7233101	12/04/2013	22/04/2013	10
10019011_VA128	1.5	ETBE	7233101	12/04/2013	22/04/2013	10
10019011_VA128	1.5	DIPE	7233101	12/04/2013	22/04/2013	10
10019011_VA129	2	TBA	7233104	12/04/2013	22/04/2013	10
10019011_VA132	1.2	ASB_QUANT_PCM	7246220	15/04/2013	25/04/2013	10
10019011_VA132	1.2	ASB_QUANT_GRAV	7246220	15/04/2013	25/04/2013	10
10019011_VA132	1.2	ASB_QUANT_TOT	7246220	15/04/2013	25/04/2013	10
10019011_VA108	6.7	TBA	7219167	09/04/2013	18/04/2013	9
10019011_VA107	6.8	TBA	7219165	09/04/2013	18/04/2013	9
10019011_VA105	6.5	TBA	7219162	09/04/2013	18/04/2013	9
10019011_VA105	6.5	ETHANOL	7219162	09/04/2013	18/04/2013	9
10019011_VA109	6.8	TBA	7219168	09/04/2013	18/04/2013	9
10019011_VA108	6.7	ETHANOL	7219167	09/04/2013	18/04/2013	9
10019011_VA108	6.7	ETBE	7219167	09/04/2013	18/04/2013	9
10019011_VA107	6.8	ETHANOL	7219165	09/04/2013	18/04/2013	9
10019011_VA108	6.7	DIPE	7219167	09/04/2013	18/04/2013	9
10019011_VA105	6.5	DIPE	7219162	09/04/2013	18/04/2013	9
10019011_VA109	6.8	DIPE	7219168	09/04/2013	18/04/2013	9
10019011_VA105	6.5	ETBE	7219162	09/04/2013	18/04/2013	9
10019011_VA109	6.8	ETHANOL	7219168	09/04/2013	18/04/2013	9
10019011_VA109	6.8	ETBE	7219168	09/04/2013	18/04/2013	9
10019011_VA107	6.8	ETBE	7219165	09/04/2013	18/04/2013	9
10019011_VA107	6.8	DIPE	7219165	09/04/2013	18/04/2013	9
10019011_VA115	6.5	TBA	7226591	10/04/2013	19/04/2013	9

Sample Type: SOIL
Site: Hitchin

Sample ID	Depth (m)	Analyte	Lab Sample	Sample Date	Extraction Date	Holding Time (Days)
10019011_VA115	6.5	DIPE	7226591	10/04/2013	19/04/2013	9
10019011_VA115	6.5	ETBE	7226591	10/04/2013	19/04/2013	9
10019011_VA115	6.5	ETHANOL	7226591	10/04/2013	19/04/2013	9
10019011_VA106	6.3	ETHANOL	7219163	09/04/2013	17/04/2013	8
10019011_VA101	4.5	ETHANOL	7219157	09/04/2013	17/04/2013	8
10019011_VA110	3	MTBE	7219170	09/04/2013	17/04/2013	8
10019011_VA109	6.8	MTBE	7219168	09/04/2013	17/04/2013	8
10019011_VA103	3	ETHANOL	7219159	09/04/2013	17/04/2013	8
10019011_VA110	3	ETHANOL	7219170	09/04/2013	17/04/2013	8
10019011_VA101	4.5	M_P_XYLENE	7219157	09/04/2013	17/04/2013	8
10019011_VA105	6.5	M_P_XYLENE	7219162	09/04/2013	17/04/2013	8
10019011_VA107	6.8	M_P_XYLENE	7219165	09/04/2013	17/04/2013	8
10019011_VA108	6.7	M_P_XYLENE	7219167	09/04/2013	17/04/2013	8
10019011_VA109	6.8	M_P_XYLENE	7219168	09/04/2013	17/04/2013	8
10019011_VA110	3	M_P_XYLENE	7219170	09/04/2013	17/04/2013	8
10019011_VA101	4.5	TAME	7219157	09/04/2013	17/04/2013	8
10019011_VA101	4.5	MTBE	7219157	09/04/2013	17/04/2013	8
10019011_VA110	3	TAME	7219170	09/04/2013	17/04/2013	8
10019011_VA102	3	ETHANOL	7219158	09/04/2013	17/04/2013	8
10019011_VA101	4.5	TOLUENE-D8 (SUR)	7219157	09/04/2013	17/04/2013	8
10019011_VA109	6.8	TOLUENE-D8 (SUR)	7219168	09/04/2013	17/04/2013	8
10019011_VA110	3	TOLUENE-D8 (SUR)	7219170	09/04/2013	17/04/2013	8
10019011_VA109	6.8	TAME	7219168	09/04/2013	17/04/2013	8
10019011_VA103	3	DIPE	7219159	09/04/2013	17/04/2013	8
10019011_VA109	6.8	TOLUENE	7219168	09/04/2013	17/04/2013	8
10019011_VA106	6.3	ETBE	7219163	09/04/2013	17/04/2013	8
10019011_VA110	3	ETHYLBENZENE	7219170	09/04/2013	17/04/2013	8
10019011_VA109	6.8	ETHYLBENZENE	7219168	09/04/2013	17/04/2013	8
10019011_VA108	6.7	ETHYLBENZENE	7219167	09/04/2013	17/04/2013	8
10019011_VA105	6.5	ETHYLBENZENE	7219162	09/04/2013	17/04/2013	8

Sample Type: SOIL
Site: Hitchin

Sample ID	Depth (m)	Analyte	Lab Sample	Sample Date	Extraction Date	Holding Time (Days)
10019011_VA101	4.5	ETHYLBENZENE	7219157	09/04/2013	17/04/2013	8
10019011_VA102	3	ETBE	7219158	09/04/2013	17/04/2013	8
10019011_VA110	3	TOLUENE	7219170	09/04/2013	17/04/2013	8
10019011_VA103	3	ETBE	7219159	09/04/2013	17/04/2013	8
10019011_VA104	6.5	DIPE	7219160	09/04/2013	17/04/2013	8
10019011_VA104	6.5	ETBE	7219160	09/04/2013	17/04/2013	8
10019011_VA106	6.3	DIPE	7219163	09/04/2013	17/04/2013	8
10019011_VA104	6.5	ETHANOL	7219160	09/04/2013	17/04/2013	8
10019011_VA110	3	ETBE	7219170	09/04/2013	17/04/2013	8
10019011_VA110	3	DIPE	7219170	09/04/2013	17/04/2013	8
10019011_VA102	3	DIPE	7219158	09/04/2013	17/04/2013	8
10019011_VA105	6.5	O_XYLENE	7219162	09/04/2013	17/04/2013	8
10019011_VA110	3	TBA	7219170	09/04/2013	17/04/2013	8
10019011_VA110	3	O_XYLENE	7219170	09/04/2013	17/04/2013	8
10019011_VA109	6.8	O_XYLENE	7219168	09/04/2013	17/04/2013	8
10019011_VA108	6.7	O_XYLENE	7219167	09/04/2013	17/04/2013	8
10019011_VA101	4.5	DIPE	7219157	09/04/2013	17/04/2013	8
10019011_VA101	4.5	TOLUENE	7219157	09/04/2013	17/04/2013	8
10019011_VA106	6.3	TBA	7219163	09/04/2013	17/04/2013	8
10019011_VA101	4.5	BENZENE	7219157	09/04/2013	17/04/2013	8
10019011_VA104	6.5	TBA	7219160	09/04/2013	17/04/2013	8
10019011_VA103	3	TBA	7219159	09/04/2013	17/04/2013	8
10019011_VA102	3	TBA	7219158	09/04/2013	17/04/2013	8
10019011_VA101	4.5	TBA	7219157	09/04/2013	17/04/2013	8
10019011_VA101	4.5	O_XYLENE	7219157	09/04/2013	17/04/2013	8
10019011_VA101	4.5	ETBE	7219157	09/04/2013	17/04/2013	8
10019011_VA110	3	BENZENE	7219170	09/04/2013	17/04/2013	8
10019011_VA109	6.8	BENZENE	7219168	09/04/2013	17/04/2013	8
10019011_VA107	6.8	O_XYLENE	7219165	09/04/2013	17/04/2013	8
10019011_VA118	3	ETHANOL	7226601	10/04/2013	18/04/2013	8

Sample Type: SOIL
Site: Hitchin

Sample ID	Depth (m)	Analyte	Lab Sample	Sample Date	Extraction Date	Holding Time (Days)
10019011_VA117	6.5	ETHANOL	7226600	10/04/2013	18/04/2013	8
10019011_VA116	6.5	ETHANOL	7226594	10/04/2013	18/04/2013	8
10019011_VA113	6.7	ETHANOL	7219173	10/04/2013	18/04/2013	8
10019011_VA113	6.7	ETBE	7219173	10/04/2013	18/04/2013	8
10019011_VA118	3	TBA	7226601	10/04/2013	18/04/2013	8
10019011_VA118	3	DIPE	7226601	10/04/2013	18/04/2013	8
10019011_VA117	6.5	DIPE	7226600	10/04/2013	18/04/2013	8
10019011_VA116	6.5	DIPE	7226594	10/04/2013	18/04/2013	8
10019011_VA117	6.5	ETBE	7226600	10/04/2013	18/04/2013	8
10019011_VA113	6.7	TBA	7219173	10/04/2013	18/04/2013	8
10019011_VA118	3	ETBE	7226601	10/04/2013	18/04/2013	8
10019011_VA113	6.7	DIPE	7219173	10/04/2013	18/04/2013	8
10019011_VA116	6.5	TBA	7226594	10/04/2013	18/04/2013	8
10019011_VA117	6.5	TBA	7226600	10/04/2013	18/04/2013	8
10019011_VA116	6.5	ETBE	7226594	10/04/2013	18/04/2013	8
10019011_VA125	3	DIPE	7233094	11/04/2013	19/04/2013	8
10019011_VA126	3	TBA	7233099	11/04/2013	19/04/2013	8
10019011_VA125	3	TBA	7233094	11/04/2013	19/04/2013	8
10019011_VA124	6.7	TBA	7233085	11/04/2013	19/04/2013	8
10019011_VA126	3	ETHANOL	7233099	11/04/2013	19/04/2013	8
10019011_VA124	6.7	ETHANOL	7233085	11/04/2013	19/04/2013	8
10019011_VA126	3	ETBE	7233099	11/04/2013	19/04/2013	8
10019011_VA126	3	DIPE	7233099	11/04/2013	19/04/2013	8
10019011_VA125	3	ETBE	7233094	11/04/2013	19/04/2013	8
10019011_VA124	6.7	ETBE	7233085	11/04/2013	19/04/2013	8
10019011_VA125	3	ETHANOL	7233094	11/04/2013	19/04/2013	8
10019011_VA124	6.7	DIPE	7233085	11/04/2013	19/04/2013	8
10019011_VA131	1.2	ETBE	7246219	15/04/2013	23/04/2013	8
10019011_VA135	6	ETBE	7251516	15/04/2013	23/04/2013	8
10019011_VA136	6	ETBE	7251518	15/04/2013	23/04/2013	8

Sample Type: SOIL
Site: Hitchin

Sample ID	Depth (m)	Analyte	Lab Sample	Sample Date	Extraction Date	Holding Time (Days)
10019011_VA137	6	DIPE	7251520	15/04/2013	23/04/2013	8
10019011_VA137	6	ETBE	7251520	15/04/2013	23/04/2013	8
10019011_VA134	6	TBA	7251514	15/04/2013	23/04/2013	8
10019011_VA135	6	TBA	7251516	15/04/2013	23/04/2013	8
10019011_VA137	6	TBA	7251520	15/04/2013	23/04/2013	8
10019011_VA131	1.2	DIPE	7246219	15/04/2013	23/04/2013	8
10019011_VA135	6	DIPE	7251516	15/04/2013	23/04/2013	8
10019011_VA132	1.2	DIPE	7246220	15/04/2013	23/04/2013	8
10019011_VA132	1.2	ETBE	7246220	15/04/2013	23/04/2013	8
10019011_VA133	1.2	DIPE	7246222	15/04/2013	23/04/2013	8
10019011_VA133	1.2	ETBE	7246222	15/04/2013	23/04/2013	8
10019011_VA134	6	ETHANOL	7251514	15/04/2013	23/04/2013	8
10019011_VA136	6	TBA	7251518	15/04/2013	23/04/2013	8
10019011_VA130	1.2	TBA	7246218	15/04/2013	23/04/2013	8
10019011_VA133	1.2	ETHANOL	7246222	15/04/2013	23/04/2013	8
10019011_VA132	1.2	ETHANOL	7246220	15/04/2013	23/04/2013	8
10019011_VA131	1.2	ETHANOL	7246219	15/04/2013	23/04/2013	8
10019011_VA130	1.2	ETHANOL	7246218	15/04/2013	23/04/2013	8
10019011_VA133	1.2	TBA	7246222	15/04/2013	23/04/2013	8
10019011_VA136	6	DIPE	7251518	15/04/2013	23/04/2013	8
10019011_VA131	1.2	TBA	7246219	15/04/2013	23/04/2013	8
10019011_VA134	6	ETBE	7251514	15/04/2013	23/04/2013	8
10019011_VA130	1.2	DIPE	7246218	15/04/2013	23/04/2013	8
10019011_VA137	6	ETHANOL	7251520	15/04/2013	23/04/2013	8
10019011_VA136	6	ETHANOL	7251518	15/04/2013	23/04/2013	8
10019011_VA130	1.2	ETBE	7246218	15/04/2013	23/04/2013	8
10019011_VA135	6	ETHANOL	7251516	15/04/2013	23/04/2013	8
10019011_VA134	6	DIPE	7251514	15/04/2013	23/04/2013	8
10019011_VA132	1.2	TBA	7246220	15/04/2013	23/04/2013	8
10019011_MW102	7	Total_Organic_Carbon	7926955	12/08/2013	20/08/2013	8

Sample Type: SOIL
Site: Hitchin

Sample ID	Depth (m)	Analyte	Lab Sample	Sample Date	Extraction Date	Holding Time (Days)
10019011_MW102	7	ETBE	7926955	12/08/2013	20/08/2013	8
10019011_MW102	7	DIPE	7926955	12/08/2013	20/08/2013	8
10019011_MW102	7	RISK_TPH_C6_C8_ALI	7926955	12/08/2013	20/08/2013	8
10019011_MW102	7	RISK_TPH_C8_C10_ALI	7926955	12/08/2013	20/08/2013	8
10019011_MW102	7	RISK_TPH_C10_C12_ALI	7926955	12/08/2013	20/08/2013	8
10019011_MW102	7	ETHANOL	7926955	12/08/2013	20/08/2013	8
10019011_MW102	7	RISK_TPH_C5_C6_ALI	7926955	12/08/2013	20/08/2013	8
10019011_MW102	7	RISK_TPH_C7_C8_AROM	7926955	12/08/2013	20/08/2013	8
10019011_MW102	7	RISK_TPH_C10_C12_AROM	7926955	12/08/2013	20/08/2013	8
10019011_MW102	7	RISK_TPH_C8_C10_AROM	7926955	12/08/2013	20/08/2013	8
10019011_MW102	7	RISK_TPH_C6_C7_AROM	7926955	12/08/2013	20/08/2013	8
10019011_MW102	7	TBA	7926955	12/08/2013	20/08/2013	8

Sample Type: SOIL
Site: Hitchin

Sample ID	Depth (m)	Analyte	Lab Sample	Sample Date	Extraction Date	Holding Time (Days)
10019011_BH102A	13.2	RISK_TPH_C21_C35_AROM	5194606	16/02/2012	24/02/2012	8
10019011_BH102A	13.6	RISK_TPH_C21_C35_AROM	5194607	16/02/2012	24/02/2012	8
10019011_BH102A	13.6	RISK_TPH_C16_C21_AROM	5194607	16/02/2012	24/02/2012	8
10019011_BH102A	13.6	RISK_TPH_C12_C16_AROM	5194607	16/02/2012	24/02/2012	8
10019011_BH102A	13.6	RISK_TPH_C35_C44_ALI	5194607	16/02/2012	24/02/2012	8
10019011_BH102A	13.6	RISK_TPH_C21_C35_ALI	5194607	16/02/2012	24/02/2012	8
10019011_BH102A	13.6	RISK_TPH_C16_C21_ALI	5194607	16/02/2012	24/02/2012	8
10019011_BH102A	13.6	RISK_TPH_C12_C16_ALI	5194607	16/02/2012	24/02/2012	8
10019011_BH102A	5.7	RISK_TPH_C16_C21_ALI	5194604	16/02/2012	24/02/2012	8
10019011_BH102A	5.7	RISK_TPH_C12_C16_ALI	5194604	16/02/2012	24/02/2012	8
10019011_BH102A	5.7	RISK_TPH_C35_C44_ALI	5194604	16/02/2012	24/02/2012	8
10019011_BH102A	13.2	RISK_TPH_C16_C21_AROM	5194606	16/02/2012	24/02/2012	8
10019011_BH102A	5.7	Total_Organic_Carbon	5194604	16/02/2012	24/02/2012	8
10019011_BH102A	13.2	Total_Organic_Carbon	5194606	16/02/2012	24/02/2012	8
10019011_BH102A	13.6	Total_Organic_Carbon	5194607	16/02/2012	24/02/2012	8
10019011_BH102A	5.7	RISK_TPH_C21_C35_ALI	5194604	16/02/2012	24/02/2012	8
10019011_BH102A	5.7	RISK_TPH_C12_C16_AROM	5194604	16/02/2012	24/02/2012	8
10019011_BH102A	13.2	RISK_TPH_C21_C35_ALI	5194606	16/02/2012	24/02/2012	8
10019011_BH102A	13.2	RISK_TPH_C12_C16_AROM	5194606	16/02/2012	24/02/2012	8
10019011_BH102A	13.2	RISK_TPH_C35_C44_ALI	5194606	16/02/2012	24/02/2012	8
10019011_BH102A	5.7	RISK_TPH_C16_C21_AROM	5194604	16/02/2012	24/02/2012	8
10019011_BH102A	13.2	RISK_TPH_C16_C21_ALI	5194606	16/02/2012	24/02/2012	8
10019011_BH102A	13.2	RISK_TPH_C12_C16_ALI	5194606	16/02/2012	24/02/2012	8
10019011_BH102A	5.7	RISK_TPH_C21_C35_AROM	5194604	16/02/2012	24/02/2012	8

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Sample ID	Depth (m)	Analyte	Lab Sample	Sample Date	Extraction Date	Holding Time (Days)
10019011_VAI54	1.2	RISK_TPH_C8_C10_AROM	7472298	22/05/2013	03/06/2013	12
10019011_VAI51	1.2	TBA	7472291	22/05/2013	03/06/2013	12
10019011_VAI53	1.2	ETHANOL	7472295	22/05/2013	03/06/2013	12
10019011_VAI54	1.2	ETHANOL	7472298	22/05/2013	03/06/2013	12
10019011_VAI51	1.2	ETHANOL	7472291	22/05/2013	03/06/2013	12
10019011_VAI55	3	TBA	7472300	22/05/2013	03/06/2013	12
10019011_VAI54	1.2	TBA	7472298	22/05/2013	03/06/2013	12
10019011_VAI54	1.2	RISK_TPH_C6_C7_AROM	7472298	22/05/2013	03/06/2013	12
10019011_VAI52	1.2	ETHANOL	7472293	22/05/2013	03/06/2013	12
10019011_VAI54	1.2	RISK_TPH_C10_C12_AROM	7472298	22/05/2013	03/06/2013	12
10019011_VAI54	1.2	RISK_TPH_C7_C8_AROM	7472298	22/05/2013	03/06/2013	12
10019011_VAI54	1.2	RISK_TPH_C5_C6_ALI	7472298	22/05/2013	03/06/2013	12
10019011_VAI54	1.2	RISK_TPH_C8_C10_ALI	7472298	22/05/2013	03/06/2013	12
10019011_VAI54	1.2	RISK_TPH_C6_C8_ALI	7472298	22/05/2013	03/06/2013	12
10019011_VAI54	1.2	RISK_TPH_C10_C12_ALI	7472298	22/05/2013	03/06/2013	12
10019011_VAI52	1.2	TBA	7472293	22/05/2013	03/06/2013	12
10019011_VAI55	3	ETHANOL	7472300	22/05/2013	03/06/2013	12
10019011_VAI51	1.2	DIPE	7472291	22/05/2013	03/06/2013	12
10019011_VAI53	1.2	TBA	7472295	22/05/2013	03/06/2013	12
10019011_VAI55	3	DIPE	7472300	22/05/2013	03/06/2013	12
10019011_VAI51	1.2	ETBE	7472291	22/05/2013	03/06/2013	12
10019011_VAI52	1.2	DIPE	7472293	22/05/2013	03/06/2013	12
10019011_VAI52	1.2	ETBE	7472293	22/05/2013	03/06/2013	12
10019011_VAI53	1.2	DIPE	7472295	22/05/2013	03/06/2013	12
10019011_VAI53	1.2	ETBE	7472295	22/05/2013	03/06/2013	12
10019011_VAI54	1.2	DIPE	7472298	22/05/2013	03/06/2013	12
10019011_VAI54	1.2	ETBE	7472298	22/05/2013	03/06/2013	12
10019011_VAI55	3	ETBE	7472300	22/05/2013	03/06/2013	12
10019011_VAI53	1.2	M_P_XYLENE	7472295	22/05/2013	02/06/2013	11

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Sample ID	Depth (m)	Analyte	Lab Sample	Sample Date	Extraction Date	Holding Time (Days)
10019011_VAI55	3	RISK_TPH_C6_C8_ALI	7472300	22/05/2013	02/06/2013	11
10019011_VAI51	1.2	RISK_TPH_C10_C12_AROM	7472291	22/05/2013	02/06/2013	11
10019011_VAI52	1.2	O_XYLENE	7472293	22/05/2013	02/06/2013	11
10019011_VAI55	3	RISK_TPH_C10_C12_AROM	7472300	22/05/2013	02/06/2013	11
10019011_VAI53	1.2	TAME	7472295	22/05/2013	02/06/2013	11
10019011_VAI52	1.2	TAME	7472293	22/05/2013	02/06/2013	11
10019011_VAI55	3	RISK_TPH_C8_C10_AROM	7472300	22/05/2013	02/06/2013	11
10019011_VAI51	1.2	RISK_TPH_C6_C7_AROM	7472291	22/05/2013	02/06/2013	11
10019011_VAI52	1.2	MTBE	7472293	22/05/2013	02/06/2013	11
10019011_VAI51	1.2	RISK_TPH_C8_C10_AROM	7472291	22/05/2013	02/06/2013	11
10019011_VAI52	1.2	M_P_XYLENE	7472293	22/05/2013	02/06/2013	11
10019011_VAI53	1.2	MTBE	7472295	22/05/2013	02/06/2013	11
10019011_VAI51	1.2	RISK_TPH_C5_C6_ALI	7472291	22/05/2013	02/06/2013	11
10019011_VAI51	1.2	RISK_TPH_C8_C10_ALI	7472291	22/05/2013	02/06/2013	11
10019011_VAI51	1.2	RISK_TPH_C6_C8_ALI	7472291	22/05/2013	02/06/2013	11
10019011_VAI52	1.2	BENZENE	7472293	22/05/2013	02/06/2013	11
10019011_VAI53	1.2	BENZENE	7472295	22/05/2013	02/06/2013	11
10019011_VAI55	3	RISK_TPH_C6_C7_AROM	7472300	22/05/2013	02/06/2013	11
10019011_VAI53	1.2	O_XYLENE	7472295	22/05/2013	02/06/2013	11
10019011_VAI55	3	RISK_TPH_C10_C12_ALI	7472300	22/05/2013	02/06/2013	11
10019011_VAI53	1.2	TOLUENE	7472295	22/05/2013	02/06/2013	11
10019011_VAI52	1.2	TOLUENE	7472293	22/05/2013	02/06/2013	11
10019011_VAI53	1.2	ETHYLBENZENE	7472295	22/05/2013	02/06/2013	11
10019011_VAI52	1.2	ETHYLBENZENE	7472293	22/05/2013	02/06/2013	11
10019011_VAI51	1.2	RISK_TPH_C7_C8_AROM	7472291	22/05/2013	02/06/2013	11
10019011_VAI55	3	RISK_TPH_C8_C10_ALI	7472300	22/05/2013	02/06/2013	11
10019011_VAI55	3	RISK_TPH_C7_C8_AROM	7472300	22/05/2013	02/06/2013	11
10019011_VAI51	1.2	RISK_TPH_C10_C12_ALI	7472291	22/05/2013	02/06/2013	11
10019011_VAI55	3	RISK_TPH_C5_C6_ALI	7472300	22/05/2013	02/06/2013	11
10019011_VAI53	1.2	RISK_TPH_C8_C10_AROM	7472295	22/05/2013	01/06/2013	10

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Sample ID	Depth (m)	Analyte	Lab Sample	Sample Date	Extraction Date	Holding Time (Days)
10019011_VAI53	1.2	RISK_TPH_C7_C8_AROM	7472295	22/05/2013	01/06/2013	10
10019011_VAI53	1.2	RISK_TPH_C5_C6_ALI	7472295	22/05/2013	01/06/2013	10
10019011_VAI53	1.2	RISK_TPH_C8_C10_ALI	7472295	22/05/2013	01/06/2013	10
10019011_VAI53	1.2	RISK_TPH_C10_C12_AROM	7472295	22/05/2013	01/06/2013	10
10019011_VAI53	1.2	RISK_TPH_C6_C7_AROM	7472295	22/05/2013	01/06/2013	10
10019011_VAI53	1.2	RISK_TPH_C6_C8_ALI	7472295	22/05/2013	01/06/2013	10
10019011_VAI53	1.2	RISK_TPH_C10_C12_ALI	7472295	22/05/2013	01/06/2013	10
10019011_WAC 2	0	FIBROUS ANTHOPHYLLITE	7447497	20/05/2013	29/05/2013	9
10019011_WAC 2	0	AMOSITE (BROWN) ASBEST	7447497	20/05/2013	29/05/2013	9
10019011_WAC 2	0	FIBROUS ACTINOLITE	7447497	20/05/2013	29/05/2013	9
10019011_WAC 2	0	FIBROUS TREMOLITE	7447497	20/05/2013	29/05/2013	9
10019011_WAC 2	0	NON-ASBESTOS FIBRE	7447497	20/05/2013	29/05/2013	9
10019011_WAC 2	0	CHRYSTILE (WHITE) ASBE	7447497	20/05/2013	29/05/2013	9
10019011_WAC 2	0	AMOSITE (BROWN) ASBEST	7447497	20/05/2013	29/05/2013	9
10019011_WAC 2	0	CROCIDOLITE (BLUE) ASBE	7447497	20/05/2013	29/05/2013	9
10019011_WAC 2	0	FIBROUS ACTINOLITE	7447497	20/05/2013	29/05/2013	9
10019011_WAC 2	0	FIBROUS ANTHOPHYLLITE	7447497	20/05/2013	29/05/2013	9
10019011_WAC 2	0	FIBROUS TREMOLITE	7447497	20/05/2013	29/05/2013	9
10019011_WAC 2	0	NON-ASBESTOS FIBRE	7447497	20/05/2013	29/05/2013	9
10019011_WAC 2	0	CHRYSTILE (WHITE) ASBE	7447497	20/05/2013	29/05/2013	9
10019011_WAC 2	0	CROCIDOLITE (BLUE) ASBE	7447497	20/05/2013	29/05/2013	9
10019011_VAI54	1.2	ETHYLBENZENE	7472298	22/05/2013	31/05/2013	9
10019011_VAI51	1.2	BENZENE	7472291	22/05/2013	31/05/2013	9
10019011_VAI52	1.2	RISK_TPH_C10_C12_ALI	7472293	22/05/2013	31/05/2013	9
10019011_VAI52	1.2	RISK_TPH_C6_C8_ALI	7472293	22/05/2013	31/05/2013	9
10019011_VAI52	1.2	RISK_TPH_C8_C10_ALI	7472293	22/05/2013	31/05/2013	9
10019011_VAI51	1.2	M_P_XYLENE	7472291	22/05/2013	31/05/2013	9
10019011_VAI52	1.2	RISK_TPH_C5_C6_ALI	7472293	22/05/2013	31/05/2013	9
10019011_VAI51	1.2	ETHYLBENZENE	7472291	22/05/2013	31/05/2013	9
10019011_VAI52	1.2	RISK_TPH_C8_C10_AROM	7472293	22/05/2013	31/05/2013	9

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Sample ID	Depth (m)	Analyte	Lab Sample	Sample Date	Extraction Date	Holding Time (Days)
10019011_VAI51	1.2	O_XYLENE	7472291	22/05/2013	31/05/2013	9
10019011_VAI55	3	ETHYLBENZENE	7472300	22/05/2013	31/05/2013	9
10019011_VAI51	1.2	TOLUENE	7472291	22/05/2013	31/05/2013	9
10019011_VAI52	1.2	RISK_TPH_C7_C8_AROM	7472293	22/05/2013	31/05/2013	9
10019011_VAI52	1.2	RISK_TPH_C10_C12_AROM	7472293	22/05/2013	31/05/2013	9
10019011_VAI55	3	MTBE	7472300	22/05/2013	31/05/2013	9
10019011_VAI55	3	O_XYLENE	7472300	22/05/2013	31/05/2013	9
10019011_VAI54	1.2	MTBE	7472298	22/05/2013	31/05/2013	9
10019011_VAI55	3	BENZENE	7472300	22/05/2013	31/05/2013	9
10019011_VAI54	1.2	BENZENE	7472298	22/05/2013	31/05/2013	9
10019011_VAI51	1.2	MTBE	7472291	22/05/2013	31/05/2013	9
10019011_VAI54	1.2	O_XYLENE	7472298	22/05/2013	31/05/2013	9
10019011_VAI55	3	TOLUENE	7472300	22/05/2013	31/05/2013	9
10019011_VAI54	1.2	TOLUENE	7472298	22/05/2013	31/05/2013	9
10019011_VAI54	1.2	M_P_XYLENE	7472298	22/05/2013	31/05/2013	9
10019011_VAI55	3	M_P_XYLENE	7472300	22/05/2013	31/05/2013	9
10019011_VAI51	1.2	TAME	7472291	22/05/2013	31/05/2013	9
10019011_VAI54	1.2	TAME	7472298	22/05/2013	31/05/2013	9
10019011_VAI55	3	TAME	7472300	22/05/2013	31/05/2013	9
10019011_VAI52	1.2	RISK_TPH_C6_C7_AROM	7472293	22/05/2013	31/05/2013	9
10019011_VA148	6	RISK_TPH_C7_C8_AROM	7447489	20/05/2013	28/05/2013	8
10019011_FILL	0	TBA	7447496	20/05/2013	28/05/2013	8
10019011_VA148	6	RISK_TPH_C6_C8_ALI	7447489	20/05/2013	28/05/2013	8
10019011_VA149	6	NAPHTHALENE	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	BENZENE	7447490	20/05/2013	28/05/2013	8
10019011_VA148	6	RISK_TPH_C8_C10_ALI	7447489	20/05/2013	28/05/2013	8
10019011_VA149	6	TOLUENE	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	ACENAPHTHENE	7447490	20/05/2013	28/05/2013	8
10019011_VA148	6	RISK_TPH_C10_C12_ALI	7447489	20/05/2013	28/05/2013	8
10019011_VA149	6	RISK_TPH_C10_C12_ALI	7447490	20/05/2013	28/05/2013	8

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Sample ID	Depth (m)	Analyte	Lab Sample	Sample Date	Extraction Date	Holding Time (Days)
10019011_VA149	6	O_XYLENE	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	TBA	7447490	20/05/2013	28/05/2013	8
10019011_VA150	7	RISK_TPH_C10_C12_ALI	7447493	20/05/2013	28/05/2013	8
10019011_VA149	6	CHRYSENE	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	RISK_TPH_C6_C7_AROM	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	RISK_TPH_C8_C10_AROM	7447490	20/05/2013	28/05/2013	8
10019011_VA148	6	RISK_TPH_C5_C6_ALI	7447489	20/05/2013	28/05/2013	8
10019011_VA149	6	RISK_TPH_C10_C12_AROM	7447490	20/05/2013	28/05/2013	8
10019011_VA148	6	ETHYLBENZENE	7447489	20/05/2013	28/05/2013	8
10019011_VA149	6	RISK_TPH_C7_C8_AROM	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	RISK_TPH_C5_C6_ALI	7447490	20/05/2013	28/05/2013	8
10019011_VA150	7	DIPE	7447493	20/05/2013	28/05/2013	8
10019011_VA149	6	RISK_TPH_C6_C8_ALI	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	ETHYLBENZENE	7447490	20/05/2013	28/05/2013	8
10019011_FILL	0	DIPE	7447496	20/05/2013	28/05/2013	8
10019011_FILL	0	ETBE	7447496	20/05/2013	28/05/2013	8
10019011_VA148	6	DIPE	7447489	20/05/2013	28/05/2013	8
10019011_VA149	6	DIPE	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	FLUORENE	7447490	20/05/2013	28/05/2013	8
10019011_VA148	6	TBA	7447489	20/05/2013	28/05/2013	8
10019011_VA150	7	ETBE	7447493	20/05/2013	28/05/2013	8
10019011_VA148	6	O_XYLENE	7447489	20/05/2013	28/05/2013	8
10019011_VA148	6	RISK_TPH_C6_C7_AROM	7447489	20/05/2013	28/05/2013	8
10019011_VA148	6	RISK_TPH_C8_C10_AROM	7447489	20/05/2013	28/05/2013	8
10019011_VA148	6	RISK_TPH_C10_C12_AROM	7447489	20/05/2013	28/05/2013	8
10019011_VA148	6	ETBE	7447489	20/05/2013	28/05/2013	8
10019011_VA149	6	RISK_TPH_C8_C10_ALI	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	TOTAL_PAH	7447490	20/05/2013	28/05/2013	8
10019011_VA148	6	RISK_TPH_C10_C12_AROM	7447489	20/05/2013	28/05/2013	8
10019011_VA149	6	TAME	7447490	20/05/2013	28/05/2013	8

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Sample ID	Depth (m)	Analyte	Lab Sample	Sample Date	Extraction Date	Holding Time (Days)
10019011_VA149	6	Anthracene	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	Fluoranthene	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	INDENO_1_2_3_CD_PYRENE	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	DIBENZ_A_H_ANTHRACENE	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	BENZO_G_H_I_PERYLENE	7447490	20/05/2013	28/05/2013	8
10019011_FILL	0	ETHANOL	7447496	20/05/2013	28/05/2013	8
10019011_VA148	6	ETHANOL	7447489	20/05/2013	28/05/2013	8
10019011_VA149	6	PHENANTHRENE	7447490	20/05/2013	28/05/2013	8
10019011_VA150	7	ETHANOL	7447493	20/05/2013	28/05/2013	8
10019011_VA149	6	BENZO_B_FLUORANTHENE	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	RISK_TPH_C10_C12_AROM	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	RISK_TPH_C7_C8_AROM	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	RISK_TPH_C5_C6_ALI	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	RISK_TPH_C8_C10_ALI	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	RISK_TPH_C6_C8_ALI	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	RISK_TPH_C10_C12_ALI	7447490	20/05/2013	28/05/2013	8
10019011_VA148	6	TBA	7447489	20/05/2013	28/05/2013	8
10019011_VA148	6	O_XYLENE	7447489	20/05/2013	28/05/2013	8
10019011_VA148	6	RISK_TPH_C6_C7_AROM	7447489	20/05/2013	28/05/2013	8
10019011_VA148	6	RISK_TPH_C8_C10_AROM	7447489	20/05/2013	28/05/2013	8
10019011_VA149	6	ETHANOL	7447490	20/05/2013	28/05/2013	8
10019011_VA150	7	RISK_TPH_C10_C12_AROM	7447493	20/05/2013	28/05/2013	8
10019011_VA149	6	ETBE	7447490	20/05/2013	28/05/2013	8
10019011_VA150	7	RISK_TPH_C6_C8_ALI	7447493	20/05/2013	28/05/2013	8
10019011_VA149	6	RISK_TPH_C8_C10_AROM	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	RISK_TPH_C6_C7_AROM	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	FLUORENE	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	TBA	7447490	20/05/2013	28/05/2013	8
10019011_VA150	7	RISK_TPH_C10_C12_ALI	7447493	20/05/2013	28/05/2013	8
10019011_VA150	7	RISK_TPH_C6_C8_ALI	7447493	20/05/2013	28/05/2013	8

Sample Type: SOIL
Site: Hitchin

Sample ID	Depth (m)	Analyte	Lab Sample	Sample Date	Extraction Date	Holding Time (Days)
10019011_VA150	7	RISK_TPH_C8_C10_ALI	7447493	20/05/2013	28/05/2013	8
10019011_VA149	6	PYRENE	7447490	20/05/2013	28/05/2013	8
10019011_VA150	7	RISK_TPH_C7_C8_AROM	7447493	20/05/2013	28/05/2013	8
10019011_VA149	6	O_XYLENE	7447490	20/05/2013	28/05/2013	8
10019011_VA150	7	RISK_TPH_C8_C10_AROM	7447493	20/05/2013	28/05/2013	8
10019011_VA150	7	RISK_TPH_C6_C7_AROM	7447493	20/05/2013	28/05/2013	8
10019011_VA150	7	TBA	7447493	20/05/2013	28/05/2013	8
10019011_VA149	6	MTBE	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	ACENAPHTHYLENE	7447490	20/05/2013	28/05/2013	8
10019011_VA148	6	M_P_XYLENE	7447489	20/05/2013	28/05/2013	8
10019011_VA149	6	BENZO_A_ANTHRACENE	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	BENZO_K_FLUORANTHENE	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	M_P_XYLENE	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	BENZO_A_PYRENE	7447490	20/05/2013	28/05/2013	8
10019011_VA150	7	RISK_TPH_C5_C6_ALI	7447493	20/05/2013	28/05/2013	8
10019011_VA149	6	ACENAPHTHYLENE	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	DIBENZ_A_H_ANTHRACENE	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	INDENO_1_2_3_CD_PYRENE	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	Fluoranthene	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	TAME	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	PHENANTHRENE	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	BENZO_B_FLUORANTHENE	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	BENZO_A_PYRENE	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	M_P_XYLENE	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	BENZO_K_FLUORANTHENE	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	BENZO_G_H_I_PERYLENE	7447490	20/05/2013	28/05/2013	8
10019011_VA148	6	M_P_XYLENE	7447489	20/05/2013	28/05/2013	8
10019011_VA149	6	Anthracene	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	MTBE	7447490	20/05/2013	28/05/2013	8
10019011_VA150	7	TBA	7447493	20/05/2013	28/05/2013	8

Sample Type: SOIL
Site: Hitchin

Sample ID	Depth (m)	Analyte	Lab Sample	Sample Date	Extraction Date	Holding Time (Days)
10019011_VA150	7	RISK_TPH_C6_C7_AROM	7447493	20/05/2013	28/05/2013	8
10019011_VA150	7	RISK_TPH_C8_C10_AROM	7447493	20/05/2013	28/05/2013	8
10019011_VA150	7	RISK_TPH_C10_C12_AROM	7447493	20/05/2013	28/05/2013	8
10019011_VA150	7	RISK_TPH_C7_C8_AROM	7447493	20/05/2013	28/05/2013	8
10019011_VA150	7	RISK_TPH_C8_C10_ALI	7447493	20/05/2013	28/05/2013	8
10019011_VA150	7	RISK_TPH_C5_C6_ALI	7447493	20/05/2013	28/05/2013	8
10019011_VA149	6	CHRYSENE	7447490	20/05/2013	28/05/2013	8
10019011_VA148	6	RISK_TPH_C7_C8_AROM	7447489	20/05/2013	28/05/2013	8
10019011_VA149	6	BENZO_A_ANTHRACENE	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	TOLUENE	7447490	20/05/2013	28/05/2013	8
10019011_VA148	6	RISK_TPH_C5_C6_ALI	7447489	20/05/2013	28/05/2013	8
10019011_VA148	6	RISK_TPH_C8_C10_ALI	7447489	20/05/2013	28/05/2013	8
10019011_VA148	6	RISK_TPH_C6_C8_ALI	7447489	20/05/2013	28/05/2013	8
10019011_VA148	6	RISK_TPH_C10_C12_ALI	7447489	20/05/2013	28/05/2013	8
10019011_FILL	0	TBA	7447496	20/05/2013	28/05/2013	8
10019011_VA149	6	NAPHTHALENE	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	BENZENE	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	PYRENE	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	ACENAPHTHENE	7447490	20/05/2013	28/05/2013	8
10019011_FILL	0	ETHANOL	7447496	20/05/2013	28/05/2013	8
10019011_VA149	6	ETHYLBENZENE	7447490	20/05/2013	28/05/2013	8
10019011_VA148	6	ETHYLBENZENE	7447489	20/05/2013	28/05/2013	8
10019011_VA150	7	ETBE	7447493	20/05/2013	28/05/2013	8
10019011_VA149	6	TOTAL_PAH	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	ETBE	7447490	20/05/2013	28/05/2013	8
10019011_VA149	6	DIPE	7447490	20/05/2013	28/05/2013	8
10019011_VA148	6	ETBE	7447489	20/05/2013	28/05/2013	8
10019011_VA148	6	DIPE	7447489	20/05/2013	28/05/2013	8
10019011_FILL	0	ETBE	7447496	20/05/2013	28/05/2013	8
10019011_FILL	0	DIPE	7447496	20/05/2013	28/05/2013	8

Sample Type: SOIL
Site: Hitchin

Sample ID	Depth (m)	Analyte	Lab Sample	Sample Date	Extraction Date	Holding Time (Days)
10019011_VA150	7	DIPE	7447493	20/05/2013	28/05/2013	8
10019011_VA148	6	ETHANOL	7447489	20/05/2013	28/05/2013	8
10019011_VA150	7	ETHANOL	7447493	20/05/2013	28/05/2013	8
10019011_VA149	6	ETHANOL	7447490	20/05/2013	28/05/2013	8

Sample Type: SOIL
Site: Hitchin

Sample ID	Depth (m)	Analyte	Lab Sample	Sample Date	Extraction Date	Holding Time (Days)
10019011_VP103	0.7	RISK_TPH_C6_C7_AROM	4385419	26/09/2011	04/10/2011	8
10019011_VP103	0.7	ETBE	4385419	26/09/2011	04/10/2011	8
10019011_VP103	0.7	DIPE	4385419	26/09/2011	04/10/2011	8
10019011_VP103	0.7	TBA	4385419	26/09/2011	04/10/2011	8
10019011_VP103	0.7	MTBE	4385419	26/09/2011	04/10/2011	8
10019011_VP103	0.7	TAME	4385419	26/09/2011	04/10/2011	8
10019011_VP103	0.7	TOLUENE_D8	4385419	26/09/2011	04/10/2011	8
10019011_VP103	0.7	O_XYLENE	4385419	26/09/2011	04/10/2011	8
10019011_VP103	0.7	ETHANOL	4385419	26/09/2011	04/10/2011	8
10019011_VP103	0.7	RISK_TPH_C5_C6_ALI	4385419	26/09/2011	04/10/2011	8
10019011_VP103	0.7	M_P_XYLENE	4385419	26/09/2011	04/10/2011	8
10019011_VP103	0.7	ETHYLBENZENE	4385419	26/09/2011	04/10/2011	8
10019011_VP103	0.7	RISK_TPH_C10_C12_AROM	4385419	26/09/2011	04/10/2011	8
10019011_VP103	0.7	RISK_TPH_C8_C10_AROM	4385419	26/09/2011	04/10/2011	8
10019011_VP103	0.7	RISK_TPH_C8_C10_ALI	4385419	26/09/2011	04/10/2011	8
10019011_VP103	0.7	RISK_TPH_C7_C8_AROM	4385419	26/09/2011	04/10/2011	8
10019011_VP103	0.7	RISK_TPH_C6_C8_ALI	4385419	26/09/2011	04/10/2011	8
10019011_VP103	0.7	RISK_TPH_C10_C12_ALI	4385419	26/09/2011	04/10/2011	8
10019011_VP103	0.7	BENZENE	4385419	26/09/2011	04/10/2011	8
10019011_VP103	0.7	TOLUENE	4385419	26/09/2011	04/10/2011	8
10019011_VP102	0.4	TBA	4385423	27/09/2011	05/10/2011	8
10019011_VP102	0.4	ETHYLBENZENE	4385423	27/09/2011	05/10/2011	8
10019011_VP102	0.4	TOLUENE_D8	4385423	27/09/2011	05/10/2011	8
10019011_VP102	0.4	TAME	4385423	27/09/2011	05/10/2011	8
10019011_VP102	0.4	ETHANOL	4385423	27/09/2011	05/10/2011	8
10019011_VP102	0.4	M_P_XYLENE	4385423	27/09/2011	05/10/2011	8
10019011_VP102	0.4	BENZENE	4385423	27/09/2011	05/10/2011	8
10019011_VP102	0.4	MTBE	4385423	27/09/2011	05/10/2011	8
10019011_VP102	0.4	DIPE	4385423	27/09/2011	05/10/2011	8
10019011_VP102	0.4	TOLUENE	4385423	27/09/2011	05/10/2011	8

Sample Type: SOIL
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Sample ID	Depth (m)	Analyte	Lab Sample	Sample Date	Extraction Date	Holding Time (Days)
10019011_VP102	0.4	O_XYLENE	4385423	27/09/2011	05/10/2011	8
10019011_VP102	0.4	ETBE	4385423	27/09/2011	05/10/2011	8
10019011_BH106	0.5	ETHYLBENZENE	4401779	28/09/2011	06/10/2011	8
10019011_BH106	0.5	RISK_TPH_C8_C10_AROM	4401779	28/09/2011	06/10/2011	8
10019011_BH106	0.5	RISK_TPH_C5_C6_ALI	4401779	28/09/2011	06/10/2011	8
10019011_BH106	0.5	RISK_TPH_C6_C7_AROM	4401779	28/09/2011	06/10/2011	8
10019011_BH106	0.5	DIPE	4401779	28/09/2011	06/10/2011	8
10019011_UP101	0.6	DIPE	4401777	28/09/2011	06/10/2011	8
10019011_BH106	0.5	TOLUENE	4401779	28/09/2011	06/10/2011	8
10019011_UP101	0.6	ETBE	4401777	28/09/2011	06/10/2011	8
10019011_UP101	0.6	ETHYLBENZENE	4401777	28/09/2011	06/10/2011	8
10019011_BH106	0.5	RISK_TPH_C10_C12_AROM	4401779	28/09/2011	06/10/2011	8
10019011_BH106	0.5	RISK_TPH_C6_C8_ALI	4401779	28/09/2011	06/10/2011	8
10019011_BH106	0.5	ETBE	4401779	28/09/2011	06/10/2011	8
10019011_BH106	0.5	RISK_TPH_C8_C10_ALI	4401779	28/09/2011	06/10/2011	8
10019011_BH106	0.5	RISK_TPH_C7_C8_AROM	4401779	28/09/2011	06/10/2011	8
10019011_BH106	0.5	RISK_TPH_C6_C8_ALI	4401779	28/09/2011	06/10/2011	8
10019011_BH106	0.5	RISK_TPH_C10_C12_ALI	4401779	28/09/2011	06/10/2011	8
10019011_BH106	0.5	RISK_TPH_C6_C7_AROM	4401779	28/09/2011	06/10/2011	8
10019011_BH106	0.5	RISK_TPH_C5_C6_ALI	4401779	28/09/2011	06/10/2011	8
10019011_BH106	0.5	RISK_TPH_C8_C10_AROM	4401779	28/09/2011	06/10/2011	8
10019011_BH106	0.5	RISK_TPH_C10_C12_AROM	4401779	28/09/2011	06/10/2011	8
10019011_UP101	0.6	TOLUENE	4401777	28/09/2011	06/10/2011	8
10019011_BH106	0.5	RISK_TPH_C7_C8_AROM	4401779	28/09/2011	06/10/2011	8
10019011_UP101	0.6	RISK_TPH_C8_C10_ALI	4401777	28/09/2011	06/10/2011	8
10019011_BH106	0.5	RISK_TPH_C10_C12_ALI	4401779	28/09/2011	06/10/2011	8
10019011_UP101	0.6	TOLUENE_D8	4401777	28/09/2011	06/10/2011	8
10019011_BH106	0.5	RISK_TPH_C8_C10_ALI	4401779	28/09/2011	06/10/2011	8
10019011_BH106	0.5	RISK_TPH_C6_C7_AROM	4401779	28/09/2011	06/10/2011	8
10019011_BH106	0.5	TOLUENE_D8	4401779	28/09/2011	06/10/2011	8

Sample Type: SOIL
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Sample ID	Depth (m)	Analyte	Lab Sample	Sample Date	Extraction Date	Holding Time (Days)
10019011_UP101	0.6	ETHANOL	4401777	28/09/2011	06/10/2011	8
10019011_BH106	0.5	ETHANOL	4401779	28/09/2011	06/10/2011	8
10019011_UP101	0.6	TAME	4401777	28/09/2011	06/10/2011	8
10019011_BH106	0.5	TAME	4401779	28/09/2011	06/10/2011	8
10019011_UP101	0.6	M_P_XYLENE	4401777	28/09/2011	06/10/2011	8
10019011_BH106	0.5	M_P_XYLENE	4401779	28/09/2011	06/10/2011	8
10019011_UP101	0.6	MTBE	4401777	28/09/2011	06/10/2011	8
10019011_BH106	0.5	MTBE	4401779	28/09/2011	06/10/2011	8
10019011_UP101	0.6	TBA	4401777	28/09/2011	06/10/2011	8
10019011_BH106	0.5	TBA	4401779	28/09/2011	06/10/2011	8
10019011_UP101	0.6	O_XYLENE	4401777	28/09/2011	06/10/2011	8
10019011_UP101	0.6	RISK_TPH_C7_C8_AROM	4401777	28/09/2011	06/10/2011	8
10019011_UP101	0.6	RISK_TPH_C6_C7_AROM	4401777	28/09/2011	06/10/2011	8
10019011_BH106	0.5	BENZENE	4401779	28/09/2011	06/10/2011	8
10019011_UP101	0.6	RISK_TPH_C5_C6_ALI	4401777	28/09/2011	06/10/2011	8
10019011_BH106	0.5	RISK_TPH_C5_C6_ALI	4401779	28/09/2011	06/10/2011	8
10019011_UP101	0.6	RISK_TPH_C8_C10_AROM	4401777	28/09/2011	06/10/2011	8
10019011_BH106	0.5	RISK_TPH_C8_C10_AROM	4401779	28/09/2011	06/10/2011	8
10019011_UP101	0.6	RISK_TPH_C10_C12_AROM	4401777	28/09/2011	06/10/2011	8
10019011_BH106	0.5	RISK_TPH_C10_C12_AROM	4401779	28/09/2011	06/10/2011	8
10019011_BH106	0.5	RISK_TPH_C8_C10_ALI	4401779	28/09/2011	06/10/2011	8
10019011_BH106	0.5	RISK_TPH_C7_C8_AROM	4401779	28/09/2011	06/10/2011	8
10019011_UP101	0.6	RISK_TPH_C6_C8_ALI	4401777	28/09/2011	06/10/2011	8
10019011_BH106	0.5	RISK_TPH_C6_C8_ALI	4401779	28/09/2011	06/10/2011	8
10019011_UP101	0.6	RISK_TPH_C10_C12_ALI	4401777	28/09/2011	06/10/2011	8
10019011_BH106	0.5	RISK_TPH_C10_C12_ALI	4401779	28/09/2011	06/10/2011	8
10019011_UP101	0.6	BENZENE	4401777	28/09/2011	06/10/2011	8
10019011_BH106	0.5	O_XYLENE	4401779	28/09/2011	06/10/2011	8
10019011_BH106	3.9	ETHYLBENZENE	4433452	04/10/2011	12/10/2011	8
10019011_BH106	3.9	BENZENE	4433452	04/10/2011	12/10/2011	8

Sample Type: SOIL
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Sample ID	Depth (m)	Analyte	Lab Sample	Sample Date	Extraction Date	Holding Time (Days)
10019011_BH106	3.9	TOLUENE	4433452	04/10/2011	12/10/2011	8
10019011_BH106	3.9	TOLUENE_D8	4433452	04/10/2011	12/10/2011	8
10019011_BH106	3.9	TAME	4433452	04/10/2011	12/10/2011	8
10019011_BH106	3.9	M_P_XYLENE	4433452	04/10/2011	12/10/2011	8
10019011_BH106	3.9	MTBE	4433452	04/10/2011	12/10/2011	8
10019011_BH106	3.9	O_XYLENE	4433452	04/10/2011	12/10/2011	8
10019011_VP103	0	BENZENE	4515254	13/10/2011	21/10/2011	8
10019011_VP101	0	DECANE	4515249	13/10/2011	21/10/2011	8
10019011_VP101	0	HEXANE	4515249	13/10/2011	21/10/2011	8
10019011_VP101	0	ETHYLBENZENE	4515249	13/10/2011	21/10/2011	8
10019011_VP103	0	M_P_XYLENE	4515254	13/10/2011	21/10/2011	8
10019011_VP101	0	DODECANE	4515249	13/10/2011	21/10/2011	8
10019011_VP102	0	DODECANE	4515253	13/10/2011	21/10/2011	8
10019011_VP103	0	DECANE	4515254	13/10/2011	21/10/2011	8
10019011_VP102	0	M_P_XYLENE	4515253	13/10/2011	21/10/2011	8
10019011_VP101	0	M_P_XYLENE	4515249	13/10/2011	21/10/2011	8
10019011_VP102	0	ETHYLBENZENE	4515253	13/10/2011	21/10/2011	8
10019011_VP103	0	TOLUENE	4515254	13/10/2011	21/10/2011	8
10019011_VP102	0	TOLUENE	4515253	13/10/2011	21/10/2011	8
10019011_VP101	0	BENZENE	4515249	13/10/2011	21/10/2011	8
10019011_VP101	0	TOLUENE	4515249	13/10/2011	21/10/2011	8
10019011_VP103	0	ETBE	4515254	13/10/2011	21/10/2011	8
10019011_VP102	0	DECANE	4515253	13/10/2011	21/10/2011	8
10019011_VP103	0	HEXANE	4515254	13/10/2011	21/10/2011	8
10019011_VP102	0	HEXANE	4515253	13/10/2011	21/10/2011	8
10019011_VP102	0	OCTANE	4515253	13/10/2011	21/10/2011	8
10019011_VP101	0	OCTANE	4515249	13/10/2011	21/10/2011	8
10019011_VP103	0	TOTAL_VOC_C6_12	4515254	13/10/2011	21/10/2011	8
10019011_VP102	0	TOTAL_VOC_C6_12	4515253	13/10/2011	21/10/2011	8
10019011_VP101	0	TOTAL_VOC_C6_12	4515249	13/10/2011	21/10/2011	8

Sample Type: GAS
Site: Hitchin

Sample ID	Depth (m)	Analyte	Lab Sample	Sample Date	Extraction Date	Holding Time (Days)
10019011_VP103	0	OCTANE	4515254	13/10/2011	21/10/2011	8
10019011_VP101	0	DIPE	4515249	13/10/2011	21/10/2011	8
10019011_VP103	0	A_1_METHYLNAPHTHALENE	4515254	13/10/2011	21/10/2011	8
10019011_VP101	0	NAPHTHALENE	4515249	13/10/2011	21/10/2011	8
10019011_VP103	0	NAPHTHALENE	4515254	13/10/2011	21/10/2011	8
10019011_VP101	0	A_1_METHYLNAPHTHALENE	4515249	13/10/2011	21/10/2011	8
10019011_VP103	0	A_1_2_3_TRIMETHYLBENZE	4515254	13/10/2011	21/10/2011	8
10019011_VP102	0	A_1_METHYLNAPHTHALENE	4515253	13/10/2011	21/10/2011	8
10019011_VP102	0	NAPHTHALENE	4515253	13/10/2011	21/10/2011	8
10019011_VP102	0	A_1_2_3_TRIMETHYLBENZE	4515253	13/10/2011	21/10/2011	8
10019011_VP103	0	DODECANE	4515254	13/10/2011	21/10/2011	8
10019011_VP101	0	A_1_2_3_TRIMETHYLBENZE	4515249	13/10/2011	21/10/2011	8
10019011_VP103	0	ETHYLBENZENE	4515254	13/10/2011	21/10/2011	8
10019011_VP101	0	MTBE	4515249	13/10/2011	21/10/2011	8
10019011_VP101	0	O_XYLENE	4515249	13/10/2011	21/10/2011	8
10019011_VP101	0	ETBE	4515249	13/10/2011	21/10/2011	8
10019011_VP101	0	TAME	4515249	13/10/2011	21/10/2011	8
10019011_VP102	0	MTBE	4515253	13/10/2011	21/10/2011	8
10019011_VP102	0	DIPE	4515253	13/10/2011	21/10/2011	8
10019011_VP102	0	ETBE	4515253	13/10/2011	21/10/2011	8
10019011_VP102	0	TAME	4515253	13/10/2011	21/10/2011	8
10019011_VP103	0	MTBE	4515254	13/10/2011	21/10/2011	8
10019011_VP103	0	DIPE	4515254	13/10/2011	21/10/2011	8
10019011_VP103	0	TAME	4515254	13/10/2011	21/10/2011	8
10019011_VP102	0	BENZENE	4515253	13/10/2011	21/10/2011	8
10019011_VP102	0	O_XYLENE	4515253	13/10/2011	21/10/2011	8
10019011_VP103	0	O_XYLENE	4515254	13/10/2011	21/10/2011	8

Project Manager:

Date:

Surrogate Recovery Data

Hitchin October 2011

SDG:

4385970

10019011_BH101 0.8

SOIL

%

Analyte	Chem Class	Method	Result	Pass/Fail
ACENAPHTHENE	PAH	GCMS	89.5	OK
CHRYSENE	PAH	GCMS	83.8	OK
NAPHTHALENE	PAH	GCMS	90.5	OK
BENZO_G_H_I_PERYLENE	PAH	GCMS	87.3	OK
PHENANTHRENE	PAH	GCMS	87.9	OK
TPH_GRO	TPH	LEACH2	91	OK
TPH_GRO	TPH	VOLATILES	101	OK
TPH_GRO	TPH	VOLATILES	79	LOW
TPH_GRO	TPH	LEACH2	55	LOW
TPH_GRO	TPH	VOLATILES	108	OK
GRO SURROGATE	TPH	VOLATILES	94	OK
GRO SURROGATE	TPH	VOLATILES	97	OK
TOLUENE-D8 (SUR)	VOC	VOLATILES	100	OK

Surrogate Recovery Data

Hitchin October 2011

SDG:

4385968

10019011_BH102 0.8

SOIL

%

Analyte	Chem Class	Method	Result	Pass/Fail
TPH_GRO	TPH	VOLATILES	111	OK
GRO SURROGATE	TPH	VOLATILES	145	HIGH
TPH_GRO	TPH	VOLATILES	117	OK
GRO SURROGATE	TPH	VOLATILES	94	OK
GRO SURROGATE	TPH	VOLATILES	117	OK
TOLUENE-D8 (SUR)	VOC	VOLATILES	100	OK
GRO SURROGATE	TPH	VOLATILES	83	OK
GRO SURROGATE	TPH	VOLATILES	96	OK
TOLUENE-D8 (SUR)	VOC	VOLATILES	100	OK
GRO SURROGATE	TPH	VOLATILES	89	OK
TOLUENE-D8 (SUR)	VOC	VOLATILES	99.1	OK

Surrogate Recovery Data

Hitchin February 2012

SDG:

5194604

10019011_BH102A 5.7

SOIL

%

Analyte	Chem Class	Method	Result	Pass/Fail
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	87.8	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	86.9	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	97.5	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	94.5	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	87.2	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	97.2	OK
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	91.6	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	88	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	91	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	98	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	93	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	91.3	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	98.7	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	86.7	OK
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	91.5	OK
GRO SURROGATE	TPH	VOLATILES	125	HIGH
GRO SURROGATE	TPH	VOLATILES	145	HIGH
GRO SURROGATE	TPH	VOLATILES	127	HIGH
TOLUENE-D8 (SUR)	VOCSURR	VOLATILES	103	OK
TOLUENE-D8 (SUR)	VOCSURR	VOLATILES	103	OK
TOLUENE-D8 (SUR)	VOCSURR	VOLATILES	102	OK
GRO SURROGATE	TPH	VOLATILES	94	OK
GRO SURROGATE	TPH	VOLATILES	116	OK
TOLUENE-D8 (SUR)	VOC	VOLATILES	100	OK

Surrogate Recovery Data

Hitchin February 2012
10019011_BH102A 5.7 SOIL % SDG: 5194604

Analyte	Chem Class	Method	Result	Pass/Fail
GRO SURROGATE	TPH	VOLATILES	83	OK
GRO SURROGATE	TPH	VOLATILES	99	OK
TOLUENE-D8 (SUR)	VOC	VOLATILES	101	OK
GRO SURROGATE	TPH	VOLATILES	92	OK
TOLUENE-D8 (SUR)	VOC	VOLATILES	98.2	OK

Surrogate Recovery Data

Hitchin October 2011

SDG:

4385422

10019011_BH103 1

SOIL

%

Analyte	Chem Class	Method	Result	Pass/Fail
CHRYSENE	PAH	GCMS	91.7	OK
NAPHTHALENE	PAH	GCMS	97.1	OK
BENZO_G_H_I_PERYLENE	PAH	GCMS	97.3	OK
PHENANTHRENE	PAH	GCMS	94.6	OK
ACENAPHTHENE	PAH	GCMS	95.7	OK
TPH_GRO	TPH	VOLATILES	104	OK
TPH_GRO	TPH	LEACH2	94	OK
TPH_GRO	TPH	VOLATILES	134	HIGH
TPH_GRO	TPH	LEACH2	108	OK
TPH_GRO	TPH	VOLATILES	122	HIGH
GRO SURROGATE	TPH	VOLATILES	92	OK
GRO SURROGATE	TPH	VOLATILES	98	OK
TOLUENE-D8 (SUR)	VOC	VOLATILES	101	OK
GRO SURROGATE	TPH	VOLATILES	82	OK
GRO SURROGATE	TPH	VOLATILES	103	OK
TOLUENE-D8 (SUR)	VOC	VOLATILES	101	OK
GRO SURROGATE	TPH	VOLATILES	88	OK
TOLUENE-D8 (SUR)	VOC	VOLATILES	101	OK

Surrogate Recovery Data

Hitchin October 2011

SDG:

4385418

10019011_BH105 0.6

SOIL

%

Analyte	Chem Class	Method	Result	Pass/Fail
CHRYSENE	PAH	GCMS	83.8	OK
BENZO_G_H_I_PERYLENE	PAH	GCMS	90.4	OK
PHENANTHRENE	PAH	GCMS	101	OK
ACENAPHTHENE	PAH	GCMS	99.4	OK
NAPHTHALENE	PAH	GCMS	98.5	OK
TPH_GRO	TPH	VOLATILES	61	LOW
TPH_GRO	TPH	LEACH2	94	OK
TPH_GRO	TPH	LEACH2	107	OK
TPH_GRO	TPH	VOLATILES	124	HIGH
TPH_GRO	TPH	VOLATILES	110	OK

Surrogate Recovery Data

Hitchin February 2012

SDG:

5239898

10019011_BH105A W

WATER

%

Analyte	Chem Class	Method	Result	Pass/Fail
GRO SURROGATE	TPH	VOLATILES	107	OK
GRO SURROGATE	TPH	VOLATILES	94	OK
TOLUENE-D8 (SUR)	VOC	VOLATILES	100	OK
GRO SURROGATE	TPH	VOLATILES	80	OK
GRO SURROGATE	TPH	VOLATILES	95	OK
TOLUENE-D8 (SUR)	VOC	VOLATILES	99.7	OK
GRO SURROGATE	TPH	VOLATILES	86	OK
TOLUENE-D8 (SUR)	VOC	VOLATILES	99	OK

Surrogate Recovery Data

Hitchin October 2011

SDG:

4401779

10019011_BH106 0.5

SOIL

%

Analyte	Chem Class	Method	Result	Pass/Fail
PHENANTHRENE	PAH	GCMS	94.9	OK
ACENAPHTHENE	PAH	GCMS	93	OK
BENZO_G_H_I_PERYLENE	PAH	GCMS	87.3	OK
NAPHTHALENE	PAH	GCMS	94.7	OK
CHRYSENE	PAH	GCMS	81.7	OK
TPH_GRO	TPH	LEACH2	101	OK
TPH_GRO	TPH	VOLATILES	108	OK
TPH_GRO	TPH	VOLATILES	148	HIGH
TPH_GRO	TPH	LEACH2	95	OK

Surrogate Recovery Data

Hitchin February 2012

SDG:

5180218

10019011_BH106A 1.5

SOIL

%

Analyte	Chem Class	Method	Result	Pass/Fail
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	96.6	OK
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	99	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	98	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	99.4	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	92.8	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	100	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	90.8	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	97.4	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	86.6	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	88.3	OK
GRO SURROGATE	TPH	VOLATILES	137	HIGH
GRO SURROGATE	TPH	VOLATILES	128	HIGH
TOLUENE-D8 (SUR)	VOCSURR	VOLATILES	99.6	OK
TOLUENE-D8 (SUR)	VOCSURR	VOLATILES	99.9	OK
GRO SURROGATE	TPH	VOLATILES	94	OK
GRO SURROGATE	TPH	VOLATILES	111	OK
TOLUENE-D8 (SUR)	VOC	VOLATILES	100	OK
GRO SURROGATE	TPH	VOLATILES	82	OK
GRO SURROGATE	TPH	VOLATILES	95	OK
TOLUENE-D8 (SUR)	VOC	VOLATILES	101	OK
GRO SURROGATE	TPH	VOLATILES	91	OK
TOLUENE-D8 (SUR)	VOC	VOLATILES	98.7	OK

Surrogate Recovery Data					
Hitchin September 2013			SDG:	8050298	
10019011_DUP	0	WATER	%		
Analyte	Chem Class		Method		Result
GRO SURROGATE	TPH		VOLATILES		88
					OK

8050298

%

Analyte	Chem Class	Method	Result	Pass/Fail
GRO SURROGATE	TPH	VOLATILES	88	OK

Surrogate Recovery Data

Hitchin September 2013

SDG: 8050300

10019011_EB 0 WATER

%

Analyte	Chem Class	Method	Result	Pass/Fail
GRO SURROGATE	TPH	VOLATILES	81	OK
GRO SURROGATE	TPH	VOLATILES	93	OK
TOLUENE-D8 (SUR)	VOC	VOLATILES	99.9	OK
GRO SURROGATE	TPH	VOLATILES	91	OK
TOLUENE-D8 (SUR)	VOC	VOLATILES	98.1	OK

Surrogate Recovery Data

Hitchin October 2011

SDG: 4491079

10019011_EQUIP W WATER %

Analyte	Chem Class	Method	Result	Pass/Fail
TPH_GRO	TPH	VOLATILES	118	OK
GRO SURROGATE	TPH	VOLATILES	100	OK
GRO SURROGATE	TPH	VOLATILES	102	OK
TOLUENE-D8 (SUR)	VOC	VOLATILES	100	OK

Surrogate Recovery Data

Hitchin May 2013

SDG:

7447496

10019011_FILL

0

SOIL

%

Analyte	Chem Class	Method	Result	Pass/Fail
PHENANTHRENE	PAH	ORG_S	98.1	OK
BENZO_G_H_I_PERYLENE	PAH	ORG_S	93.7	OK
CHRYSENE	PAH	ORG_S	91.2	OK
ACENAPHTHENE	PAH	ORG_S	99.6	OK
NAPHTHALENE	PAH	ORG_S	97.3	OK
BENZO_G_H_I_PERYLENE	PAH	ORG_S	93.7	OK
CHRYSENE	PAH	ORG_S	91.2	OK
NAPHTHALENE	PAH	ORG_S	97.3	OK
PHENANTHRENE	PAH	ORG_S	98.1	OK
ACENAPHTHENE	PAH	ORG_S	99.6	OK
TPH_GRO	TPH	VOLATILES	122	HIGH
TPH_GRO	TPH	VOLATILES	122	HIGH
TOLUENE_D8	VOCSURR	VOLATILES	99.6	OK
TOLUENE_D8	VOCSURR	VOLATILES	99.6	OK

Surrogate Recovery Data

Hitchin April 2013

SDG:

7926955

10019011_MW102 7

SOIL

%

Analyte	Chem Class	Method	Result	Pass/Fail
CHRYSENE-D12 SURROGATE RECOVERY	PAH	ORG_S	84.3	OK
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	ORG_S	92	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	ORG_S	96.5	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	ORG_S	93.6	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	ORG_S	81.5	OK
GRO SURROGATE	TPH	VOLATILES	133	HIGH
TOLUENE-D8 (SUR)	VOCSURR	VOLATILES	102	OK

Surrogate Recovery Data					
Hitchin October 2011			SDG:	4401777	
10019011_UP101	0.6	SOIL	%		
Analyte	Chem Class		Method		Pass/Fail
TPH_GRO	TPH		VOLATILES		135
					HIGH

4401777

%

Analyte	Chem Class	Method	Result	Pass/Fail
TPH_GRO	TPH	VOLATILES	135	HIGH

Surrogate Recovery Data

Hitchin April 2013
10019011_VA101 4.5 SOIL % SDG: 7219157

Analyte	Chem Class	Method	Result	Pass/Fail
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	95.5	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	95.8	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	91.4	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	95.4	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	89.5	OK
GRO SURROGATE	TPH	VOLATILES	119	OK

Surrogate Recovery Data

Hitchin April 2013

SDG:

7219158

10019011_VA102 3

SOIL

%

Analyte	Chem Class	Method	Result	Pass/Fail
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	84.9	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	94.9	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	86.7	OK
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	87.2	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	92.7	OK
GRO SURROGATE	TPH	VOLATILES	99	OK

Surrogate Recovery Data

Hitchin April 2013
10019011_VA103 3 SOIL % SDG: 7219159

Analyte	Chem Class	Method	Result	Pass/Fail
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	115	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	110	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	115	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	108	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	114	OK
GRO SURROGATE	TPH	VOLATILES	136	HIGH

Surrogate Recovery Data

Hitchin April 2013
10019011_VA104 6.5 SOIL % SDG: 7219160

Analyte	Chem Class	Method	Result	Pass/Fail
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	92.4	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	85.9	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	93	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	81.5	OK
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	92.7	OK
GRO SURROGATE	TPH	VOLATILES	144	HIGH

Surrogate Recovery Data

Hitchin April 2013
10019011_VA105 6.5 SOIL % SDG: 7219162

Analyte	Chem Class	Method	Result	Pass/Fail
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	95.9	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	104	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	97	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	95.2	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	97.5	OK
GRO SURROGATE	TPH	VOLATILES	138	HIGH

Surrogate Recovery Data

Hitchin April 2013
10019011_VA106 6.3 SOIL % SDG: 7219163

Analyte	Chem Class	Method	Result	Pass/Fail
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	91.7	OK
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	89.6	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	99.6	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	94.9	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	82.4	OK
GRO SURROGATE	TPH	VOLATILES	146	HIGH

Surrogate Recovery Data

Hitchin April 2013
10019011_VA107 6.8 SOIL % SDG: 7219165

Analyte	Chem Class	Method	Result	Pass/Fail
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	107	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	104	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	106	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	103	OK
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	108	OK
GRO SURROGATE	TPH	VOLATILES	141	HIGH

Surrogate Recovery Data

Hitchin April 2013

SDG: 7219167

10019011_VA108 6.7

SOIL

%

Analyte	Chem Class	Method	Result	Pass/Fail
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	80.5	OK
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	89.7	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	90.1	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	84.9	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	90.6	OK
GRO SURROGATE	TPH	VOLATILES	125	HIGH

Surrogate Recovery Data

Hitchin April 2013
10019011_VA109 6.8 SOIL % SDG: 7219168

Analyte	Chem Class	Method	Result	Pass/Fail
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	99.4	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	90.3	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	102	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	92.3	OK
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	94.2	OK
GRO SURROGATE	TPH	VOLATILES	117	OK

Surrogate Recovery Data

Hitchin April 2013

SDG:

7219170

10019011_VA110

3

SOIL

%

Analyte	Chem Class	Method	Result	Pass/Fail
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	101	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	92.1	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	95.3	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	102	OK
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	101	OK
GRO SURROGATE	TPH	VOLATILES	109	OK

Surrogate Recovery Data

Hitchin April 2013

SDG:

7219171

10019011_VA111 7

SOIL

%

Analyte	Chem Class	Method	Result	Pass/Fail
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	112	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	108	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	110	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	106	OK
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	111	OK
GRO SURROGATE	TPH	VOLATILES	114	OK

Surrogate Recovery Data

Hitchin April 2013
10019011_VA112 7 SOIL % SDG: 7219172

Analyte	Chem Class	Method	Result	Pass/Fail
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	99.4	OK
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	94.9	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	95.6	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	94.2	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	99	OK
GRO SURROGATE	TPH	VOLATILES	128	HIGH

Surrogate Recovery Data

Hitchin April 2013
10019011_VA113 6.7 SOIL % SDG: 7219173

Analyte	Chem Class	Method	Result	Pass/Fail
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	90.5	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	84.7	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	90.2	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	81.8	OK
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	89.8	OK
GRO SURROGATE	TPH	VOLATILES	118	OK

Surrogate Recovery Data

Hitchin April 2013

SDG:

7219177

10019011_VA114 3

SOIL

%

Analyte	Chem Class	Method	Result	Pass/Fail
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	99	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	87.6	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	92.7	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	100	OK
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	99.2	OK
GRO SURROGATE	TPH	VOLATILES	119	OK

Surrogate Recovery Data

Hitchin April 2013
10019011_VA115 6.5 SOIL % SDG: 7226591

Analyte	Chem Class	Method	Result	Pass/Fail
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	104	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	103	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	102	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	107	OK
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	104	OK
GRO SURROGATE	TPH	VOLATILES	139	HIGH

Surrogate Recovery Data

Hitchin April 2013
10019011_VA116 6.5 SOIL % SDG: 7226594

Analyte	Chem Class	Method	Result	Pass/Fail
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	85.2	OK
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	92.7	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	94	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	95.1	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	90.9	OK
GRO SURROGATE	TPH	VOLATILES	120	OK

Surrogate Recovery Data

Hitchin April 2013
10019011_VA117 6.5 SOIL % SDG: 7226600

Analyte	Chem Class	Method	Result	Pass/Fail
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	98.4	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	102	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	89.8	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	102	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	86.4	OK
GRO SURROGATE	TPH	VOLATILES	124	HIGH

Surrogate Recovery Data

Hitchin April 2013

SDG:

7226601

10019011_VA118 3

SOIL

%

Analyte	Chem Class	Method	Result	Pass/Fail
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	91.6	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	86.8	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	94.9	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	93.4	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	83	OK
GRO SURROGATE	TPH	VOLATILES	131	HIGH

Surrogate Recovery Data

Hitchin April 2013
10019011_VA119 6.5 SOIL % SDG: 7226602

Analyte	Chem Class	Method	Result	Pass/Fail
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	97.3	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	97.9	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	102	OK
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	102	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	104	OK
GRO SURROGATE	TPH	VOLATILES	135	HIGH

Surrogate Recovery Data					
Hitchin April 2013			SDG:	7226604	
10019011_VA120	6.5	SOIL	%		
Analyte	Chem Class		Method		Pass/Fail
GRO SURROGATE	TPH		VOLATILES		128

7226604

%

Analyte	Chem Class	Method	Result	Pass/Fail
GRO SURROGATE	TPH	VOLATILES	128	HIGH

Surrogate Recovery Data

Hitchin April 2013

SDG:

7226605

10019011_VA121

3.5

SOIL

%

Analyte	Chem Class	Method	Result	Pass/Fail
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	96.4	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	98.6	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	89.6	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	100	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	91	OK
GRO SURROGATE	TPH	VOLATILES	144	HIGH

Surrogate Recovery Data

Hitchin April 2013

SDG:

7226606

10019011_VA122 3

SOIL

%

Analyte	Chem Class	Method	Result	Pass/Fail
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	93.2	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	86.1	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	94.1	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	93.6	OK
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	92.1	OK
GRO SURROGATE	TPH	VOLATILES	141	HIGH

Surrogate Recovery Data

Hitchin April 2013
10019011_VA123 2.5 SOIL % SDG: 7226607

Analyte	Chem Class	Method	Result	Pass/Fail
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	108	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	96.5	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	96.3	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	106	OK
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	104	OK
GRO SURROGATE	TPH	VOLATILES	134	HIGH

Surrogate Recovery Data

Hitchin April 2013

SDG:

7233085

10019011_VA124

6.7

SOIL

%

Analyte	Chem Class	Method	Result	Pass/Fail
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	87.5	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	88.5	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	82.8	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	88.5	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	81.9	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	110.51571	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	111.20026	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	111.88481	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	112.56935	OK
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	113.2539	OK
GRO SURROGATE	TPH	VOLATILES	113.93844	OK
GRO SURROGATE	TPH	VOLATILES	176	HIGH

Surrogate Recovery Data

Hitchin April 2013

SDG:

7233107

10019011_VA125

-1.529422799

SOIL

%

Analyte	Chem Class	Method	Result	Pass/Fail
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	116.67662	OK
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	118.04571	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	115.99208	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	115.30753	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	117.36117	OK
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	99.9	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	103	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	105	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	96	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	101	OK
GRO SURROGATE	TPH	VOLATILES	102	OK
GRO SURROGATE	TPH	VOLATILES	118.73026	OK

Surrogate Recovery Data

Hitchin April 2013

SDG:

7233109

10019011_VA126

-2.128297258

SOIL

%

Analyte	Chem Class	Method	Result	Pass/Fail
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	120.7839	HIGH
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	120.09935	HIGH
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	121.46844	HIGH
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	122.15299	HIGH
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	122.83753	HIGH
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	96.5	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	105	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	101	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	97.8	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	95.3	OK
GRO SURROGATE	TPH	VOLATILES	123.52208	HIGH
GRO SURROGATE	TPH	VOLATILES	130	HIGH

Surrogate Recovery Data

Hitchin April 2013

SDG:

7233114

10019011_VA127

-3.725295815

SOIL

%

Analyte	Chem Class	Method	Result	Pass/Fail
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	102.01209	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	102.70703	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	104.09692	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	103.40198	OK
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	90.7	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	97.7	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	90.6	OK
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	104.79187	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	91.9	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	91.7	OK
GRO SURROGATE	TPH	VOLATILES	105.48681	OK
GRO SURROGATE	TPH	VOLATILES	121	HIGH

Surrogate Recovery Data

Hitchin April 2013

SDG:

7233101

10019011_VA128

1.5

SOIL

%

Analyte	Chem Class	Method	Result	Pass/Fail
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	86.2	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	84.9	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	84.8	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	83.8	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	85.9	OK
GRO SURROGATE	TPH	VOLATILES	127	HIGH

Surrogate Recovery Data					
Hitchin April 2013			SDG:	7246218	
10019011_VA130	1.2	SOIL	%		
Analyte	Chem Class		Method		Pass/Fail
GRO SURROGATE	TPH		VOLATILES		133
					HIGH

7246218

%

Analyte	Chem Class	Method	Result	Pass/Fail
GRO SURROGATE	TPH	VOLATILES	133	HIGH

Surrogate Recovery Data

Hitchin April 2013

SDG:

7246219

10019011_VA131

1.2

SOIL

%

Analyte	Chem Class	Method	Result	Pass/Fail
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	83	OK
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	88.9	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	90	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	82.6	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	90.9	OK
GRO SURROGATE	TPH	VOLATILES	84	OK

Surrogate Recovery Data					
Hitchin April 2013		SDG: 7246220			
10019011_VA132	1.2	SOIL	%		
Analyte	Chem Class		Method	Result	Pass/Fail
GRO SURROGATE	TPH		VOLATILES	124	HIGH

7246220

%

Analyte	Chem Class	Method	Result	Pass/Fail
GRO SURROGATE	TPH	VOLATILES	124	HIGH

Surrogate Recovery Data

Hitchin April 2013

SDG:

7246222

10019011_VA133

1.2

SOIL

%

Analyte	Chem Class	Method	Result	Pass/Fail
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	89.4	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	85.1	OK
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	87.9	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	82.7	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	88.8	OK
GRO SURROGATE	TPH	VOLATILES	100	OK

Surrogate Recovery Data

Hitchin April 2013
10019011_VA134 6 SOIL % SDG: 7251514

Analyte	Chem Class	Method	Result	Pass/Fail
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	89	OK
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	99.8	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	103	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	90.1	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	103	OK
GRO SURROGATE	TPH	VOLATILES	137	HIGH

Surrogate Recovery Data

Hitchin April 2013

SDG:

7251516

10019011_VA135

6

SOIL

%

Analyte	Chem Class	Method	Result	Pass/Fail
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	102	OK
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	99.7	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	92.4	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	92.8	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	101	OK
GRO SURROGATE	TPH	VOLATILES	144	HIGH

Surrogate Recovery Data

Hitchin April 2013
10019011_VA136 6 SOIL % SDG: 7251518

Analyte	Chem Class	Method	Result	Pass/Fail
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	102	OK
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	100	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	93.3	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	93.4	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	103	OK
GRO SURROGATE	TPH	VOLATILES	145	HIGH

Surrogate Recovery Data

Hitchin April 2013
10019011_VA137 6 SOIL % SDG: 7251520

Analyte	Chem Class	Method	Result	Pass/Fail
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	96.8	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	93.3	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	98.1	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	91.4	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	97.7	OK
GRO SURROGATE	TPH	VOLATILES	117	OK

Surrogate Recovery Data

Hitchin April 2013

SDG:

7259928

10019011_VA138

3

SOIL

%

Analyte	Chem Class	Method	Result	Pass/Fail
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	95.1	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	82.7	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	82.6	OK
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	92.7	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	98.3	OK
GRO SURROGATE	TPH	VOLATILES	115	OK

Surrogate Recovery Data

Hitchin April 2013
10019011_VA139 5.5 SOIL % SDG: 7259929

Analyte	Chem Class	Method	Result	Pass/Fail
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	92.4	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	93.7	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	85.3	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	96.1	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	86	OK
GRO SURROGATE	TPH	VOLATILES	152	HIGH

Surrogate Recovery Data

Hitchin April 2013

SDG:

7259930

10019011_VA140

3

SOIL

%

Analyte	Chem Class	Method	Result	Pass/Fail
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	95	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	86.1	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	100	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	85.2	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	97.1	OK
GRO SURROGATE	TPH	VOLATILES	118	OK

Surrogate Recovery Data

Hitchin April 2013
10019011_VA141 6.5 SOIL % SDG: 7259931

Analyte	Chem Class	Method	Result	Pass/Fail
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	98.9	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	93	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	103	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	92.6	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	101	OK
GRO SURROGATE	TPH	VOLATILES	96	OK

Surrogate Recovery Data

Hitchin April 2013

SDG:

7259932

10019011_VA142 3

SOIL

%

Analyte	Chem Class	Method	Result	Pass/Fail
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	94.1	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	91.8	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	101	OK
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	99.5	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	99.1	OK
GRO SURROGATE	TPH	VOLATILES	119	OK

Surrogate Recovery Data

Hitchin April 2013
10019011_VA143 6.5 SOIL % SDG: 7259933

Analyte	Chem Class	Method	Result	Pass/Fail
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	92.5	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	96.8	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	98.9	OK
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	97.2	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	90.6	OK
GRO SURROGATE	TPH	VOLATILES	122	HIGH

Surrogate Recovery Data

Hitchin April 2013
10019011_VA144 3 SOIL % SDG: 7259934

Analyte	Chem Class	Method	Result	Pass/Fail
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	94.8	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	95.1	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	89.5	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	97.9	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	91.3	OK
GRO SURROGATE	TPH	VOLATILES	90	OK

Surrogate Recovery Data

Hitchin April 2013
10019011_VA145 6.5 SOIL % SDG: 7259935

Analyte	Chem Class	Method	Result	Pass/Fail
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	85.4	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	93.8	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	96.9	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	84.6	OK
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	93.1	OK
GRO SURROGATE	TPH	VOLATILES	128	HIGH

Surrogate Recovery Data

Hitchin April 2013

SDG:

7259937

10019011_VA146

3

SOIL

%

Analyte	Chem Class	Method	Result	Pass/Fail
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	96.4	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	99.2	OK
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	91.8	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	89.7	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	96.8	OK
GRO SURROGATE	TPH	VOLATILES	101	OK

Surrogate Recovery Data

Hitchin April 2013
10019011_VA147 6.5 SOIL % SDG: 7259938

Analyte	Chem Class	Method	Result	Pass/Fail
PERYLENE-D12 SURROGATE RECOVERY	PAH	GCMS	85.6	OK
PHENANTHRENE-D10 SURROGATE RECOVERY	PAH	GCMS	89.9	OK
CHRYSENE-D12 SURROGATE RECOVERY	PAH	GCMS	84.5	OK
NAPHTHALENE-D8 SURROGATE RECOVERY	PAH	GCMS	93.8	OK
ACENAPHTHENE-D10 SURROGATE RECOVERY	PAH	GCMS	91.2	OK
GRO SURROGATE	TPH	VOLATILES	127	HIGH

Surrogate Recovery Data

Hitchin May 2013

SDG:

7447489

10019011_VA148

6

SOIL

%

Analyte	Chem Class	Method	Result	Pass/Fail
PHENANTHRENE	PAH	ORG_S	102	OK
NAPHTHALENE	PAH	ORG_S	103	OK
BENZO_G_H_I_PERYLENE	PAH	ORG_S	118	OK
ACENAPHTHENE	PAH	ORG_S	103	OK
CHRYSENE	PAH	ORG_S	112	OK
CHRYSENE	PAH	ORG_S	112	OK
NAPHTHALENE	PAH	ORG_S	103	OK
BENZO_G_H_I_PERYLENE	PAH	ORG_S	118	OK
PHENANTHRENE	PAH	ORG_S	102	OK
ACENAPHTHENE	PAH	ORG_S	103	OK
TPH_GRO	TPH	VOLATILES	132	HIGH
TPH_GRO	TPH	VOLATILES	132	HIGH
TOLUENE_D8	VOCSURR	VOLATILES	95.6	OK
TOLUENE_D8	VOCSURR	VOLATILES	95.6	OK

Surrogate Recovery Data

Hitchin May 2013

SDG:

7447490

10019011_VA149

6

SOIL

%

Analyte	Chem Class	Method	Result	Pass/Fail
CHRYSENE	PAH	ORG_S	108	OK
PHENANTHRENE	PAH	ORG_S	114	OK
BENZO_G_H_I_PERYLENE	PAH	ORG_S	118	OK
NAPHTHALENE	PAH	ORG_S	112	OK
PHENANTHRENE	PAH	ORG_S	114	OK
ACENAPHTHENE	PAH	ORG_S	115	OK
NAPHTHALENE	PAH	ORG_S	112	OK
ACENAPHTHENE	PAH	ORG_S	115	OK
CHRYSENE	PAH	ORG_S	108	OK
BENZO_G_H_I_PERYLENE	PAH	ORG_S	118	OK
TPH_GRO	TPH	VOLATILES	129	HIGH
TPH_GRO	TPH	VOLATILES	129	HIGH
TOLUENE_D8	VOCSURR	VOLATILES	98.6	OK
TOLUENE_D8	VOCSURR	VOLATILES	98.6	OK

Surrogate Recovery Data

Hitchin May 2013

SDG:

7447493

10019011_VA150

7

SOIL

%

Analyte	Chem Class	Method	Result	Pass/Fail
ACENAPHTHENE	PAH	ORG_S	102	OK
CHRYSENE	PAH	ORG_S	99.6	OK
NAPHTHALENE	PAH	ORG_S	102	OK
PHENANTHRENE	PAH	ORG_S	99.1	OK
ACENAPHTHENE	PAH	ORG_S	102	OK
CHRYSENE	PAH	ORG_S	99.6	OK
BENZO_G_H_I_PERYLENE	PAH	ORG_S	99.1	OK
BENZO_G_H_I_PERYLENE	PAH	ORG_S	99.1	OK
PHENANTHRENE	PAH	ORG_S	99.1	OK
NAPHTHALENE	PAH	ORG_S	102	OK
TPH_GRO	TPH	VOLATILES	144	HIGH
TPH_GRO	TPH	VOLATILES	144	HIGH
TOLUENE_D8	VOCSURR	VOLATILES	104	OK
TOLUENE_D8	VOCSURR	VOLATILES	104	OK

Surrogate Recovery Data

Hitchin May 2013

SDG:

7472291

10019011_VAI51

1.2

SOIL

%

Analyte	Chem Class	Method	Result	Pass/Fail
NAPHTHALENE	PAH	GCMS	95.4	OK
PHENANTHRENE	PAH	GCMS	92.5	OK
CHRYSENE	PAH	GCMS	84.1	OK
ACENAPHTHENE	PAH	GCMS	95	OK
BENZO_G_H_I_PERYLENE	PAH	GCMS	90.9	OK
TPH_GRO	TPH	VOLATILES	125	HIGH
TOLUENE_D8	VOCSURR	VOLATILES	99.4	OK

Surrogate Recovery Data					
Hitchin May 2013			SDG:	7472293	
10019011_VAI52	1.2	SOIL	%		
Analyte			Chem Class	Method	Result
TPH_GRO			TPH	VOLATILES	102
TOLUENE_D8			VOCSURR	VOLATILES	106

7472293

%

Analyte	Chem Class	Method	Result	Pass/Fail
TPH_GRO	TPH	VOLATILES	102	OK
TOLUENE_D8	VOCSURR	VOLATILES	106	OK

Surrogate Recovery Data

Hitchin May 2013

SDG:

7472295

10019011_VAI53

1.2

SOIL

%

Analyte	Chem Class	Method	Result	Pass/Fail
PHENANTHRENE	PAH	GCMS	92.1	OK
BENZO_G_H_I_PERYLENE	PAH	GCMS	89.9	OK
NAPHTHALENE	PAH	GCMS	95.3	OK
ACENAPHTHENE	PAH	GCMS	95.3	OK
CHRYSENE	PAH	GCMS	86.7	OK
TPH_GRO	TPH	VOLATILES	121	HIGH
TOLUENE_D8	VOCSURR	VOLATILES	103	OK

Surrogate Recovery Data

Hitchin May 2013

SDG: 7472298

10019011_VAI54

1.2

SOIL

%

Analyte	Chem Class	Method	Result	Pass/Fail
TPH_GRO	TPH	VOLATILES	129	HIGH
TOLUENE_D8	VOCSURR	VOLATILES	101	OK

7472298

%

Analyte	Chem Class	Method	Result	Pass/Fail
TPH_GRO	TPH	VOLATILES	129	HIGH
TOLUENE_D8	VOCSURR	VOLATILES	101	OK

Surrogate Recovery Data

Hitchin May 2013

SDG:

7472300

10019011_VAI55

3

SOIL

%

Analyte	Chem Class	Method	Result	Pass/Fail
ACENAPHTHENE	PAH	GCMS	102	OK
CHRYSENE	PAH	GCMS	90.4	OK
NAPHTHALENE	PAH	GCMS	102	OK
BENZO_G_H_I_PERYLENE	PAH	GCMS	97.4	OK
PHENANTHRENE	PAH	GCMS	98.8	OK
TPH_GRO	TPH	VOLATILES	104	OK
TOLUENE_D8	VOCSURR	VOLATILES	99.5	OK

Surrogate Recovery Data

Hitchin October 2011
10019011_VP102 0.4 SOIL % SDG: 4385423

Analyte		Chem Class	Method	Result	Pass/Fail
TPH_GRO		TPH	VOLATILES	103	OK

Surrogate Recovery Data

Hitchin October 2011
10019011_VP103 0.7 SOIL % SDG: 4385419

Analyte		Chem Class	Method	Result	Pass/Fail
TPH_GRO		TPH	VOLATILES	73	LOW

Surrogate Recovery Data					
Hitchin May 2013			SDG:	7447495	
10019011_WAC	0	SOIL	%		
Analyte			Chem Class	Method	Result
TPH_GRO			TPH	VOLATILES	123
TPH_GRO			TPH	VOLATILES	123

7447495

%

Analyte	Chem Class	Method	Result	Pass/Fail
TPH_GRO	TPH	VOLATILES	123	HIGH
TPH_GRO	TPH	VOLATILES	123	HIGH

Surrogate Recovery Data

Hitchin May 2013

SDG:

7447497

10019011_WAC 2 0

SOIL

%

Analyte	Chem Class	Method	Result	Pass/Fail
TPH_GRO	TPH	VOLATILES	119	OK
TPH_GRO	TPH	VOLATILES	119	OK

Surrogate Recovery Data

Hitchin October 2011
10019011_WAC01 W SOIL % SDG: 4401785

Analyte	Chem Class	Method	Result	Pass/Fail
TPH_GRO	TPH	VOLATILES	140	HIGH

Surrogate Recovery Data

Hitchin October 2011

SDG:

4401786

10019011_WAC02 W

SOIL

%

Analyte	Chem Class	Method	Result	Pass/Fail
TPH_GRO	TPH	VOLATILES	138	HIGH

Surrogates are organic compounds chemically similar to the target compounds that are spiked in each sample at a known concentration prior to sample preparation. The percentage recovery of the surrogate can then be evaluated. The criteria for evaluation are typically developed by the laboratory and/or based upon published values provided for related methods by the US EPA. As detailed in the US EPA CLP Functional guidelines, *the evaluation of the results of these surrogate spikes is not necessarily straightforward. The sample itself may produce effects due to such factors as interferences and high concentrations of analytes. Since the effects of the sample matrix are frequently outside the control of the laboratory and may present relatively unique problems, the evaluation and review of data based on specific sample results is frequently subjective and demands analytical experience and professional judgment.*

Nonetheless, the data reviewer should;

- Check that surrogate data are presented for all GC/MS analyses.
- If the laboratory provides criteria then check that surrogate recoveries are within these stipulated criteria. If any recoveries fall outside the criteria, use professional judgement to evaluate whether there is a potential matrix effect, in discussion with the laboratory and if so, whether this needs to be identified in the interpretation of the data.
- If the laboratory provides no criteria and the surrogate recovery falls below 10% then contact the laboratory for an explanation. This may also potentially be the result of a matrix effect and the data may not be usable.

PM Comments

Project Manager:

Date:

Appendix C - Risk Assessment Tables

TABLE 2
GROUNDWATER ANALYTICAL DATA WITH HDR GAC

Stage2 Human Health	Human Health High Density Residential
Stage2 Controlled Waters	URS Stage 3 SSAC
Sample Round	Hitchin Apr-June 2014
Site	Hitchin

							BH102		BH102A		BH103		BH105A		BH106A	
							31/03/2014	23/06/2014	31/03/2014	23/06/2014	31/03/2014	23/06/2014	31/03/2014	23/06/2014	31/03/2014	23/06/2014
Chem Class	Analyte	HH	CW (Drift)	CW (Chalk)	MDL	Units	0	W	0	W	0	W	0	W	0	W
BTX	BENZENE	1100	63.7	747	1	µg/l	92.8	348	ND	ND	ND	ND	ND	ND	ND	ND
	TOLUENE	>Sat	>Sol	>Sol	1	µg/l	5.54	17.7	ND	ND	ND	ND	ND	ND	ND	ND
	ETHYLBENZENE	173000	>Sol	>Sol	1	µg/l	437	801	ND	ND	ND	ND	ND	ND	ND	ND
	M P XYLENE	51600	>Sol	>Sol	1	µg/l	303	547	ND	ND	ND	ND	ND	ND	ND	ND
	O XYLENE	62100	>Sol	>Sol	1	µg/l	41.1	148	ND	ND	ND	ND	ND	ND	ND	ND
PAH	ACENAPHTHENE	>Sat	>Sol	>Sol	0.015	µg/l	0.0931	0.105	ND	ND	ND	ND	ND	ND	ND	ND
	ACENAPHTHYLENE	>Sat	>Sol	16000	0.011	µg/l	0.023	0.0222	ND	ND	ND	ND	ND	ND	ND	ND
	ANTHRACENE	>Sat	>Sol	>Sol	0.015	µg/l	ND	0.0252	ND	ND	ND	ND	ND	ND	ND	ND
	BENZO A ANTHRACENE	>Sat	>Sol	>Sol	0.017	µg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	BENZO A PYRENE	>Sat	>Sol	>Sol	0.009	µg/l	ND	ND	0.0379	ND	ND	ND	ND	ND	ND	ND
	BENZO B FLUORANTHENE	>Sat	>Sol	>Sol	0.023	µg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	BENZO G H I PERYLENE	>Sat	>Sol	>Sol	0.016	µg/l	ND	ND	0.0686	ND	ND	ND	ND	ND	ND	ND
	BENZO K FLUORANTHENE	>Sat	>Sol	>Sol	0.027	µg/l	ND	ND	0.0335	ND	ND	ND	ND	ND	ND	ND
	CHRYSENE	>Sat	>Sol	>Sol	0.013	µg/l	ND	ND	0.0346	ND	ND	ND	ND	ND	ND	ND
	DIBENZ A H ANTHRACENE	>Sat	>Sol	>Sol	0.016	µg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	FLUORANTHENE	>Sat	>Sol	>Sol	0.017	µg/l	ND	ND	0.0262	ND	ND	ND	ND	ND	0.0174	0.0172
	FLUORENE	>Sat	>Sol	>Sol	0.014	µg/l	0.192	0.191	ND	ND	ND	ND	ND	ND	ND	ND
	INDENO 1 2 3 CD PYRENE	>Sat	>Sol	>Sol	0.014	µg/l	ND	ND	0.0397	ND	ND	ND	ND	ND	ND	ND
	NAPHTHALENE	640	1120	874	0.1	µg/l	98.3	116	ND	0.154	ND	ND	ND	ND	ND	ND
	PHENANTHRENE	>Sat	>Sol	>Sol	0.022	µg/l	0.19	0.165	ND	ND	ND	ND	ND	ND	ND	ND
PYRENE	>Sat	>Sol	>Sol	0.015	µg/l	ND	ND	0.0302	ND	ND	ND	ND	ND	0.0153	ND	
VOC	DIPE	25300	120	120	1	µg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	ETBE	34600	40	40	1	µg/l	12.9	35.1	ND	ND	1.27	ND	ND	ND	ND	ND
	ETHANOL	(blank)	1100000	1100000	50	µg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	MTBE	331000	30	30	1	µg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	TAME	11700	140	140	1	µg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	TBA	628000	40	40	10	µg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
RISKTPH	RISK TPH C5 C7 AROM	(blank)	669	7430	10	µg/l	93	318	ND	ND	ND	ND	ND	ND	ND	ND
	RISK TPH C7 C8 AROM	>Sat	>Sol	>Sol	10	µg/l	ND	13	ND	ND	ND	ND	ND	ND	ND	ND
	RISK TPH C8 C10 AROM	9830	>Sol	>Sol	10	µg/l	1470	2620	ND	ND	ND	ND	ND	ND	ND	ND
	RISK TPH C10 C12 AROM	>Sat	>Sol	>Sol	10	µg/l	400	347	ND	ND	ND	ND	ND	ND	ND	ND
	RISK TPH C12 C16 AROM	>Sat	>Sol	>Sol	10	µg/l	33	49	ND	ND	ND	ND	ND	ND	ND	ND
	RISK TPH C16 C21 AROM	>Sat	>Sol	>Sol	10	µg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	RISK TPH C21 C35 AROM	>Sat	>Sol	>Sol	10	µg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	RISK TPH C5 C6 ALI	10300	>Sol	>Sol	10	µg/l	137	145	ND	ND	ND	ND	ND	ND	ND	ND
	RISK TPH C6 C8 ALI	>Sat	>Sol	>Sol	10	µg/l	347	527	ND	ND	ND	ND	ND	ND	ND	ND
	RISK TPH C8 C10 ALI	302	>Sol	>Sol	10	µg/l	1040	1640	ND	ND	ND	ND	ND	ND	ND	ND
	RISK TPH C10 C12 ALI	>Sat	>Sol	>Sol	10	µg/l	600	521	ND	ND	ND	ND	ND	ND	ND	ND
	RISK TPH C12 C16 ALI	>Sat	>Sol	>Sol	10	µg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	RISK TPH C16 C21 ALI	>Sat	>Sol	>Sol	10	µg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	RISK TPH C21 C35 ALI	>Sat	>Sol	>Sol	10	µg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	TPH STAGE2 HI	1	(blank)	10	10	ratio	1.8140591	1.9529823	0.0984192	0.0984192	0.0984192	0.0984192	0.0984192	0.0984192	0.0984192	0.0984192
MISC	NITRATE AS N	(blank)	(blank)	(blank)	300	µg/l	3570	3040	38000	39300	14100	22500	38400	38700	6210	6460

XX	Exceeds Controlled Waters Chalk Model SSAC
XX	Exceeds Human Health HDR GAC
XX	Exceeds Controlled Waters Drift Model SSAC

CSM / Assumptions:
Soil 1% SOM (0.58% TOC)
Soil properties for "sand"
Commercial site area 0.5ha
Soil gas ingress rates calculated by model
Infinite groundwater source at 1m.bgl for groundwater GAC
High density residential assume vapour exposure pathways only
CPU scenario modified from modelled commercial scenario by:
Building dimensions (l x w x h): 14m x 6.5m x 2.4m
Differential pressure: 2.6 pascals
Only vapour exposure pathways considered viable
Derived November 2010 using Human7.1 Issue9. MTF.

ND: Not detected above MDL
HH: Human Health
GAC: Generic Assessment Criteria
(blank): No criteria
NP: No pathway
>Sat: Unacceptetable risk not achieved due to calculated saturation of vapour pathway
NT: Not tested

TABLE 3
GROUNDWATER ANALYTICAL DATA WITH CPU GAC

Stage2 Human Health	Human Helath CPU
Stage2 Controlled Waters	URS Stage 3 SSAC
Sample Round	Hitchin Apr-June 2014
Site	Hitchin

							BH102		BH102A		BH103		BH105A		BH106A	
							31/03/2014	23/06/2014	31/03/2014	23/06/2014	31/03/2014	23/06/2014	31/03/2014	23/06/2014	31/03/2014	23/06/2014
Chem Class	Analyte	HH	CW (Drift)	CW (Chalk)	MDL	Units	0	W	0	W	0	W	0	W	0	W
BTEX	BENZENE	23500	63.7	747	1	µg/l	92.8	348	ND	ND	ND	ND	ND	ND	ND	ND
	TOLUENE	>Sat	>Sol	>Sol	1	µg/l	5.54	17.7	ND	ND	ND	ND	ND	ND	ND	ND
	ETHYLBENZENE	>Sat	>Sol	>Sol	1	µg/l	437	801	ND	ND	ND	ND	ND	ND	ND	ND
	M P XYLENE	>Sat	>Sol	>Sol	1	µg/l	303	547	ND	ND	ND	ND	ND	ND	ND	ND
	O XYLENE	>Sat	>Sol	>Sol	1	µg/l	41.1	148	ND	ND	ND	ND	ND	ND	ND	ND
PAH	ACENAPHTHENE	>Sat	>Sol	>Sol	0.015	µg/l	0.0931	0.105	ND	ND	ND	ND	ND	ND	ND	ND
	ACENAPHTHYLENE	>Sat	>Sol	16000	0.011	µg/l	0.023	0.0222	ND	ND	ND	ND	ND	ND	ND	ND
	ANTHRACENE	>Sat	>Sol	>Sol	0.015	µg/l	ND	0.0252	ND	ND	ND	ND	ND	ND	ND	ND
	BENZO A ANTHRACENE	>Sat	>Sol	>Sol	0.017	µg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	BENZO A PYRENE	>Sat	>Sol	>Sol	0.009	µg/l	ND	ND	0.0379	ND	ND	ND	ND	ND	ND	ND
	BENZO B FLUORANTHENE	>Sat	>Sol	>Sol	0.023	µg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	BENZO G H I PERYLENE	>Sat	>Sol	>Sol	0.016	µg/l	ND	ND	0.0686	ND	ND	ND	ND	ND	ND	ND
	BENZO K FLUORANTHENE	>Sat	>Sol	>Sol	0.027	µg/l	ND	ND	0.0335	ND	ND	ND	ND	ND	ND	ND
	CHRYSENE	>Sat	>Sol	>Sol	0.013	µg/l	ND	ND	0.0346	ND	ND	ND	ND	ND	ND	ND
	DIBENZ A H ANTHRACENE	>Sat	>Sol	>Sol	0.016	µg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	FLUORANTHENE	>Sat	>Sol	>Sol	0.017	µg/l	ND	ND	0.0262	ND	ND	ND	ND	ND	0.0174	0.0172
	FLUORENE	>Sat	>Sol	>Sol	0.014	µg/l	0.192	0.191	ND	ND	ND	ND	ND	ND	ND	ND
	INDENO 1 2 3 CD PYRENE	>Sat	>Sol	>Sol	0.014	µg/l	ND	ND	0.0397	ND	ND	ND	ND	ND	ND	ND
	NAPHTHALENE	16700	1120	874	0.1	µg/l	98.3	116	0.154	ND	ND	ND	ND	ND	ND	ND
	PHENANTHRENE	>Sat	>Sol	>Sol	0.022	µg/l	0.19	0.165	ND	ND	ND	ND	ND	ND	ND	ND
PYRENE	>Sat	>Sol	>Sol	0.015	µg/l	ND	ND	0.0302	ND	ND	ND	ND	ND	0.0153	ND	
VOC	DIPE	535000	120	120	1	µg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	ETBE	733000	40	40	1	µg/l	12.9	35.1	ND	ND	1.27	ND	ND	ND	ND	ND
	ETHANOL	(blank)	1100000	1100000	50	µg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	MTBE	7240000	30	30	1	µg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	TAME	248000	140	140	1	µg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	TBA	17400000	40	40	10	µg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
RISKTPH	RISK TPH C5 C7 AROM	(blank)	669	7430	10	µg/l	93	318	ND	ND	ND	ND	ND	ND	ND	ND
	RISK TPH C7 C8 AROM	>Sat	>Sol	>Sol	10	µg/l	ND	13	ND	ND	ND	ND	ND	ND	ND	ND
	RISK TPH C8 C10 AROM	>Sat	>Sol	>Sol	10	µg/l	1470	2620	ND	ND	ND	ND	ND	ND	ND	ND
	RISK TPH C10 C12 AROM	>Sat	>Sol	>Sol	10	µg/l	400	347	ND	ND	ND	ND	ND	ND	ND	ND
	RISK TPH C12 C16 AROM	>Sat	>Sol	>Sol	10	µg/l	33	49	ND	ND	ND	ND	ND	ND	ND	ND
	RISK TPH C16 C21 AROM	>Sat	>Sol	>Sol	10	µg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	RISK TPH C21 C35 AROM	>Sat	>Sol	>Sol	10	µg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	RISK TPH C5 C6 ALI	>Sat	>Sol	>Sol	10	µg/l	137	145	ND	ND	ND	ND	ND	ND	ND	ND
	RISK TPH C6 C8 ALI	>Sat	>Sol	>Sol	10	µg/l	347	527	ND	ND	ND	ND	ND	ND	ND	ND
	RISK TPH C8 C10 ALI	>Sat	>Sol	>Sol	10	µg/l	1040	1640	ND	ND	ND	ND	ND	ND	ND	ND
	RISK TPH C10 C12 ALI	>Sat	>Sol	>Sol	10	µg/l	600	521	ND	ND	ND	ND	ND	ND	ND	ND
	RISK TPH C12 C16 ALI	>Sat	>Sol	>Sol	10	µg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	RISK TPH C16 C21 ALI	>Sat	>Sol	>Sol	10	µg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	RISK TPH C21 C35 ALI	>Sat	>Sol	>Sol	10	µg/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TPH_STAGE2_HI	1	(blank)	10	10	ratio	0.0849885	0.091481	0.0046091	0.0046091	0.0046091	0.0046091	0.0046091	0.0046091	0.0046091	0.0046091	
MISC	NITRATE_AS_N	(blank)	(blank)	(blank)	300	µg/l	3570	3040	38000	39300	14100	22500	38400	38700	6210	6460

XX	Exceeds Controlled Waters Chalk Model SSAC
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XX	Exceeds Controlled Waters Drift Model SSAC

CSM / Assumptions:

Soil 1% SOM (0.58% TOC)

Soil properties for "sand"

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Soil gas ingress rates calculated by model

Infinite groundwater source at 1m.bql for groundwater GAC

High density residential assume vapour exposure pathways only

CPU scenario modified from modelled commercial scenario by:

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