Our Ref. P284

6th November 2003

Robert Johnston
Flintshire County Council
Transport, Planning & the Environment
County Hall
Mold
Clwyd
CH7 6NFF

Dear Robert

Client: **Mrs May**
Property: **Beechwood, Mold Road, Altami, Mold, Clwyd, CH7 6LG**

Further to report Ref P284/F/03.

Please treat this as the Remediation statement for the purposes of section 78H (7) of the Environmental Protection Act 1990.

Remediation to the above property commenced on 14th March 2003 and was completed on the 28th August 2003. Following completion the site was then handed back to the Loss adjusters for reinstatement.

Yours sincerely,

Steve Lyduch

Enc.

163464

ALPHA ENVIRONMENTAL SYSTEMS GROUP

Alpha Environmental Systems (UK) Ltd.

Clearwater House
Mortimer Road
Hereford HR4 9SP
T: 01432 276646
F: 01432 276656
E: info@alphaesgroup.com
W: www.alphaesgroup.com

Alpha Environmental (Jersey) Limited

The Arched Barn
Le Catillon
Les Charrieres
St Martin
Jersey JE3 6BG
T/F: 01534 854754
E: info@alphaesgroup.com
W: www.alphaesgroup.com

ISO 9002 UKAS

ISO 14001 UKAS

are both accredited to:

Alpha Environmental Systems Limited

32/33 Loughanhill
Industrial Estate
Coleraine
Co Londonderry
BT52 2NR
T: 028 7035 4435
F: 028 7032 0847
E: info@alphaesgroup.com
W: www.alphaesgroup.com

Also offices in:
Oldham
KENT
Dumbarton
Belfast

International Offices:
Dublin
Nigeria
Hong Kong

Our Ref. P284

27th October 2003

Robert Johnston
Flintshire County Council
Transport, Planning & the Environment
County Hall
Mold
Clwyd
CH7 6NFF

Dear Robert

Client: **Mrs May**
Property: **Beechwood, Mold Road, Altami, Mold, Clwyd, CH7 6LG**

Please find enclosed a copy of our final report P284/F/03 for your perusal.

If you queries with any of the information contained within these reports please do not hesitate to contact the office.

Yours sincerely,

Steve Lyduch

Enc.

ACF

102520

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REPORT ON REMEDIAL WORKS UNDERTAKEN AT BEECHWOOD MOLD ROAD ALLTAMI MOLD CLWYD CH7 6LG

Client:	**Cunningham & Lindsey**
Report Number:	**P284/F03**
Report Title:	**Validation Report, Beechwood, Mold Road,Alltami, Mold Clwyd, CH7 6LG**
Report Status:	**Final Report**
Author(s):	**Steve Lyduch**
(Signature and Date)	27-10-03
QA Approved:	**Tim Patterson**
(Signature and Date)	27-10-03

This report has been prepared by Alpha Environmental Systems (UK) Ltd. with all reasonable care, skill and diligence according to the objectives as agreed with the Client. We disclaim any responsibility to the Client and others in respect of any matters outside of this scope of works. This report is confidential to the Client, and we accept no responsibility to third parties to whom this report, or any part thereof, is made known. Any such parties relies on the contents of the report at their own risk.

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1.0 INTRODUCTION & OBJECTIVES

1.1 Introduction

Alpha Environmental Systems (UK) Ltd was commissioned by Peter Fairhurst (Cunningham Lindsey) to undertake site assessment and remediation works at Beechwood, Mold Road, Alltami, Mold, Clwyd, CH7 6LG. This assessment was made following the identification of hydrocarbon odours within the rooms to the rear of the property.

1.2 Objectives

The objectives of the assessment works were:

1. To ascertain presence or absence of hydrocarbon vapours within the property, and the severity of any potential contamination.

2. To provide recommendations for any further investigative or remediation works required in order to mitigate potential environmental risks.

The objective of the remdiation works was to return the property to a condition that was fit for purpose.

This report provides a summary of all the works undertaken at the site including the initial investigation, remediation works undertaken, and validation results. Supporting information is provided within the Appendices.

2.0 SITE DETAILS

2.1 Site Location & Description

Beechwood is a 3 bedroom semi-detached property located in a predominantly rural area. Access to the property is via the A4994.There are boundary fences to the West and a shared driveway to the East. To the north of the property is a farm.

There is a patio area to the rear of the property leading to a grassed lawn. The slabs are bedded on sand on top of re-compacted hard-core. To the right hand side of the property is a concrete path leading to the front entrance.

The house was constructed approximately 53 years ago. An extension to the rear of the property has been added at a later date. Depths of the extension footings are approximately 800 mm. The foundations are constructed of concrete block with red bricks. The external face of the property is rendered. It is not known if the original building has foundations or at what depth these might extend to.

The property is one of 4 that share a septic tank. The waste pipe runs parallel and less than 1 m away from the external rear wall and is made of clay. The soils up against the extension wall consist of rubble and stones that could be part of the fill material generated during the construction phase and not part of the natural sub soil.

A detailed topographic survey was not undertaken, however, Beechwood seems to be on a relatively flat plain with no significant slopes.

2.1.1 Internal Floors

The internal ground floors are of a mixed construction with solid floors to the extension, sitting room and hall. There is a suspended wooden floor in the lounge. The drop below the suspended floor is approximately 600 mm with a solid concrete sub floor. Dwarf walls span the length of the room with timber joists at 400 mm spacing spanning the width. The dividing wall between the two properties is approximately 500 mm thick and is solid brick (no apparent cavity). There is a hole in the wall that is below the neighbours floor and the fill material can be seen. Near to the first dwarf wall is a drainage pipe that runs below the extension floor. This takes any flood water from below the lounge floor into a possible soak away (this is not known). Below the suspended floor there is a plastic pipe running close to the surface of the extension floor. This leads to an air brick outside. To the left hand side of the fireplace there is small area in the sub floor where the soil is visible. This is a sandy clay soil and water was observed seeping through the boundary wall.

The covering of the floors in the lounge & dinning room is of carpet with parquet block floors to the sitting room & hall.

2.2 Site Geology, Hydrogeology and Hydrology

A detailed assessment of the site Geology, hydrogeology or hydrology was not made at the initial stage.

2.3 Site History

2.3.1 Historical Development of the Site

A detailed assessment of the historical development of the site and its surrounding areas was not made as part of the investigation. There is a possibility that this land could historically have been agricultural with unknown drainage systems running throughout.

2.3.2 Historic Contaminative Land Uses

The site and its immediately surrounding environs are believed to have comprised residential properties for a considerable time. There are apparently no other known potential sources of hydrocarbon contamination in the area.

2.3.3 Recent Contaminative Land Uses

As described the site is a residential property constructed in the 1950s.There is no oil fired heating on the property belonging to Mr & Mrs May. There is no clear reason other than the leak from the next door neighbours tank that would have resulted in the presence of hydrocarbon contamination at the site.

Fumes were first noticed within the property at the end of November 2002. This was initially put down to white spirit as the next door neighbours were re-decorating. Mrs May's mother visited the property on 14th December 2002 and the smells were still strong. It was then discovered to be heating oil. On discussions with her next door neighbours it was found that the oil tank had previously been relocated. The tank was examined by the neighbour and was empty. Apparently the tank had recently been refilled with 250 gallons (1140 litres).

It was noticed by Mrs May that the fumes worsened after heavy rains.

On the 24th December both Mr & Mrs May were feeling generally unwell and the Environmental Health were contacted and visited site on the 31st December and advised Mrs May to vacate the property. Her insurance company were contacted on 3rd January 2003 and appointed loss adjusters Cunningham Lindsey.

Mr & Mrs May have not got any form of oil fired heating and there is no tank sited on there property.

2.4 Investigative works Undertaken

In order to determine the presence and severity of potential contamination at the site, Alpha was instructed to undertake Initial Site Investigation works.

The works comprised of the following:

A site walk over was undertaken on 10th January2003 for a visual inspection of the site. People attending site included:

Mrs May – House owner.
Mr Robert Johnson – Flintshire City Council Council, Senior Environmental Health Officer.

Prior to Alpha's visit Robert Johnson (EH) located the septic tank and discovered that oil was present. Since the discovery the tank has been emptied.

On the 16th January 2003 intrusive investigative works to the property were undertaken these works comprised of:

- The measurement of ambient hydrocarbon vapours in the form of Volitile Organic Compounds (VOCs) within the property. This was undertaken using a hand held photo ionisation detector (PID).
- 2 No.Trial pits excavated by hand to foundation depth.
- Floorboards were lifted to allow samples to be recovered from the sub soils.
- 5 No. soil samples were recovered and forwarded to an independent laboratory for TPH (Total petroleum hydrocarbon) analysis.
- The ambient air was sampled using an ATD Tube and was submitted to an independent laboratory for chemical analysis.

2.5 Investigative Results

Results of the ambient air monitoring undertaken within Beechwood were as follows.

2.5.1 General Air PID Readings (16th January 2003)

Diesel Fumes (Volatile Organic Compounds)	
Location	Result (ppm)
Lounge	21
Dinning area	19
Sitting room	4.2
Hall	4
Kitchen	3.5
Bedroom 1	2.0
Bedroom 2	2.6
Bedroom 3 (chimney breast)	8.6
Bathroom	1.7
Below floor	55
Air brick 1	19.7
Air brick 2	0.4
Air brick 3	0.0

2.5.2 ATD Tube (16th January 2003)

One ATD tube supplied by Scientifics was used to sample the ambient air. The air tube was running for 30 min and calibrated at a flow rate of 200 ml/m drawing 6 litres of air.

A summary of results listed below. Full analysis results can be found in Appendix 3: Analysis results.

Tube No Mi030017
O/R ANA/11101.004

Analyte	Concentration (µg/tube)	Concentration (mg/kg)
N-hexane	<0.01	<0.0016
Benzene	0.01	0.0016
Toluene	<0.01	<0.0016
Sulphur dioxide		
1-Hexadecene	0.05	0.0083

The ATD tube did not register any concentrations of hydrocarbons. However, at the time of sampling olfactory evidence indicated high concentrations. It is to be assumed that the tube was not set correctly.

2.5.3 VOC Readings - Wall (16th January 2003)

Diesel Fumes (Volatile Organic Compounds)		
Location	Depth (mm)	Result (ppm)
W1	Surface	495
W2	Surface	500
W3	Surface	515
W4	surface	490

Probe holes were not drilled into the party wall below the floor due to interference from high ambient concentrations below the floor.

2.6 TPH Analysis

Results of samples forwarded to an independent laboratory for chemical analysis are presented below.

Analysis certificates are presented in Appendix 3: Analysis results.

2.6.1 TPH Analysis - Soils

Location	Depth mm	Results (mg/kg)
TP1	0.4m into party wall	3000
TP1	0.6 into party wall	190
TP2	Drainage pipe suspended floor	8150
TP3	Fire place suspended floor	83900
TP4	Surface suspended floor	4150
TP4	200	1150
TP5	Above 1st course of bricks	125
TP6	0.6 sewer pipe	35
TP6	.0.65	15
TP7	foundation	20

2.7 Discussion

Results of the initial investigation indicated that hydrocarbon contamination was present in the rubble below the suspended floor in the lounge and in fill material between the party wall. Oil and water was observed seeping from the cavity wall. Contamination was discovered in the party wall with vapour phase concentrations of 500 ppm and TPH concentrations of up to 3000 mg/kg (TP1). The most significant levels of contamination was discovered below the suspended floor as TPH analysis recorded concentrations of up to 83900 mg/kg.

The initial source of contamination the (next door neighbours tank) is understood to have been repaired.

It is understood that remedial works have been carried out to the next door neighbours property. However, the scope of these works is unknown.

The principal ongoing sources of contamination identified at the property were therefore contaminated concrete sub floors and contaminated fill material.

Potential receptors included the occupants of Beechwood, and building materials.

2.8 Recommendations

The initial investigative works had not detailed the extent of contamination below the soild floors in the sitting room & dinning room. It was recommended that further investigative works be undertaken to demonstrate whether hydrocarbon contamination was below these floors.

2.9 Further Investigative works

These works comprised of:

- Excavation of a trench to sitting room against party wall.
- Excavation of a trench to dinning room against party wall.
- Probe Hole survey to subfloors.

2.9.1 VOC Probe Holes 3 April 2003

Diesel Fumes (Volatile Organic Compounds)		
Location	Depth (mm)	Result (ppm)
X10	300	85
X11	300	134
X12	300	700
X13	300	295
X14	300	91
X15	300	500
X16	300	200
X17	300	63
X18	300	800
X19	300	850
X20	300	480
X21	300	300
X22	300	440
X23	300	25
X24	300	398
X25	300	50
X26	300	150
X27	300	50
X28	300	45
X29	300	30
X30	300	25
X31	300	200
X32	300	108

2.9.2 VOC Probe Holes Wall

Diesel Fumes (Volatile Organic Compounds)		
Location	Depth (mm)	Result (ppm)
W10	floor level	125
W11	floor level	130
W12	floor level	52
W13	floor level	270
W14	floor level	120
W15	floor level	290
W16	floor level	485
W17	floor level	250
W18	floor level	590
W19	floor level	130
W20	floor level	14
W21	floor level	6
W22	floor level	23

Results indicate that the concrete sub floors below the property had been adversely impacted as a consequence of the oil spill. Hydrocarbon contamination was also identified below these solid floors within the subsoil/fill material. This contaminated material represented an ongoing source of contamination that, principally through the migration of vapours, could have had an impact upon the occupants of the property.

As a result of the assessment works undertaken, it was recommended that remedial action was undertaken. The objectives of proposed works was to principally return the property to a condition that was fit for use as a residential dwelling.

Targets for remediation works were proposed as:

General air 1.0 mg/m^3 or less
Probe holes 5 ppm or less
Soils 350 mg/kg or less.

Details of the remediation works undertaken are described in Section 3.0 of this document.

3.0 REMEDIATION WORKS

Work commenced to remediate the property on the 14 March 2003. Initial works comprised of:

- Excavation of the sitting room floor to the same level as the lounge floor.
- Removal of floorboards and joists to the lounge.
- Removal of rubble from below the suspended floor.
- Drilling of injection points into party wall.
- Excavate a trench to external front room wall.
- Disposal of contaminated material off site to a licensed landfill site organised by Llimpia waste.

These works removed the bulk of the most significantly contaminated materials from the property.

Following the above works a course of microbiological treatments was undertaken in order to reduce residual concentrations to as low as practicable. These works comprised of:

- 10 microbiological injections to party wall.
- 10 microbiological foundational scrubs.
- 10 microbiological scrubs to concrete subfloor.
- 10 microbiological injections to soils in the lounge.
- 10 microbiological injections to soils in the sitting room.
- 10 microbiological injections to soils in the dinning room.

Following treatment No 10 a site investigation was undertaken to assess the progress of remedial works.

Following the remedial process meetings took place with the Envionmental Health to discuss indoor vapour level targets.

Re-instatement works was undertaken by a local building contractor nominated by Cunningham & Lindsey.

4.0 VALIDATION

In order to validate the progress and effectiveness of the remediation works to the property additional sampling and vapour monitoring was undertaken.

The reduction in hydrocarbon concentrations was demonstrated by the recovery of air samples and chemical analysis. Results are presented in the tables below.

Validation sampling locations are provided in Figure 4 Appendix 1.

A summary of results listed below. Full analysis results can be found in Appendix 3: Analysis Results.

4.1 ATD Tube Monitoring 13th June 2003

Sampling was for 30 min at a flow rate of 200ml/m sampling 6 litres of air.

Tube No Mi033120
O/R ANA/12077.001 Lounge

Analyte	Concentration (µg/tube)	Concentration (mg/m^3)
N-hexane	<0.01	<0.0016
Benzene	<0.01	<0.0016
Toluene	0.02	0.0033
Naphthalene	<0.01	<0.0016
Sulphur Dioxide		
Acetonitrile	0.09	0.0149
Acetic acid	0.02	0.0033
C7-C14 hydrocarbons	3.0	0.49

Tube No Mi033124.004
O/R ANA/12077.004 Sitting room

Analyte	Concentration (µg/tube)	Concentration (mg/m^3)
N-hexane	0.01	0.016
Benzene	<0.01	<0.0016
Toluene	0.04	0.0066
Naphthalene	<0.01	<0.0016
Sulphur Dioxide		
Carbon disulphide		
Acetonitrile	0.18	0.0299
Dichloromethane	0.01	0.0016
C7-C14 hydrocarbons	8.7	1.45

4.1.1 ATD Tube monitoring 7 July 2003

Sampling was for 60 min at a flow rate of 200ml/m sampling 12 litres of air.

Tube No Mi033119
O/R ANA/12395.001

Analyte	Concentration (µg/tube)	Concentration (mg/m^3)
N-hexane	<0.01	<0.00083
Benzene	<0.01	<0.00083
Toluene	0.10	0.0083
Naphthalene	<0.01	<0.00083
Sulphur Dioxide		
Acetonitrile	0.04	0.0033
Acetic acid	0.04	0.0033
Xylene	0.04	0.0033
C7-C14 hydrocarbons	4.0	0.33

4.1.2 DRO Analysis

Full analysis results can be found in Appendix 3: Analytical results.

Diesel range Organics				
		Result (mg/kg)		
Location	Depth(m)	7.04.03	23.04.03	18.6.03
TP1	0.1	30		
TP2	1.0	20		
TP6	Surface	10		
TP7	1.0	120		
TP10	0.5		50	5
TP11	0.3		10	5
TP12	0.3			5
TP13	0.8			10
TP14	0.8			15

Locations of trial pits and excavations can be found in Fig 4 Appendix 1.

4.1.3 VOC Probe Holes

Diesel Fumes (Volatile Organic Compounds)					
Location	Depth (mm)	Result (ppm)			
		16.5.03	29.5.03	16.6.03	206.03
X10	300	50	12	4	3
X11	300	80	20	3.1	1.8
X12	300	350	83	23	5.0
X13	300	110	30	8	2.1
X14	300	32	5.1	5.1	4.8
X15	300	200	70	15	6
X16	300	110	21	7	1.3
X17	300	25	N/D	0.3	0.3
X18	300	320	60	10	5.2
X19	300	160	75	40	7
X20	300	210	10	3.1	N/D
X21	300	130	19	5.1	N/D
X22	300	184	20	9	3.1
X23	300	N/D	N/D	0.6	0.3
X24	300	75	5.6	5.0	4.1
X25	300	N/D	N/*D	0.2	0.5
X26	300	10	2.3	0.9	0.5
X27	300	1.3	N/D	N/D	0.2
X28	300	N/D	N/D	N/D	N/D
X29	300	4.3	0.2	0.6	N/D
X30	300	1.6	N/D	0.7	0.3
X31	300	31	0.9	0.9	N/D
X32	300	15	1.6	1.8	2.1

5.0 INTERPRETATION OF RESULTS

3 ATD tubes were used to monitor the ambient air. Analysis results show hydrocarbon levels of 4.0 µg on the tube (0.33mg/m^3).

A total of 11 soil samples were recovered from site. Analysis results indicate significant reductions from 83900 mg/kg to120 mg/kg with the majority being <50 mg/kg.

A significant reduction in detectable VOC's was also achieved with final concentrations being <5 ppm.

Data gathered from Beechwood during works indicates that the principal source-pathway-receptor linkage to the occupants has been addressed. All targets have been achieved and the objectives of the remediation works have been completed. However, Alpha cannot comment on the remedial works undertaken to the neighbouring property and cannot be held responsible for any recontamination that may occur from that property.

6.0 INITIAL CONCLUSIONS

- The site is an existing residential property constructed approximately 53 years ago.
- Hydrocarbon odours were initially detected by the property owners.
- Initial investigative works by the next door neighbours indicated a leak in the oil supply pipe.
- Measurement of the ambient air using a hand held PID indicated significant levels of VOCs in the lounge, permeating from below the suspended floors.
- Contamination was discovered in the shared septic tank by the Environmental Health Officer.
- Chemical analysis confirmed significant hydrocarbon contamination.
- Contamination was discovered below the solid floor to the sitting room.
- Contaminated materials were excavated and disposed of.
- A course of microbiological treatments was used to remediate the residual contamination at the property.
- The site was remediated after 10 treatments.
- 3 ATD Tubes were used to monitor the general air. Chemical analysis confirmed reductions of VOC concentrations.
- DRO analysis from soil samples recovered show significant reduction of concentrations within the soils.
- Reinstatement was undertaken by a local contractor nominated by Cunningham & Lindsey

Appendix 1

Plan of Site

All plans are diagrammatic and are not to scale

Fig 1

BEECHWOOD

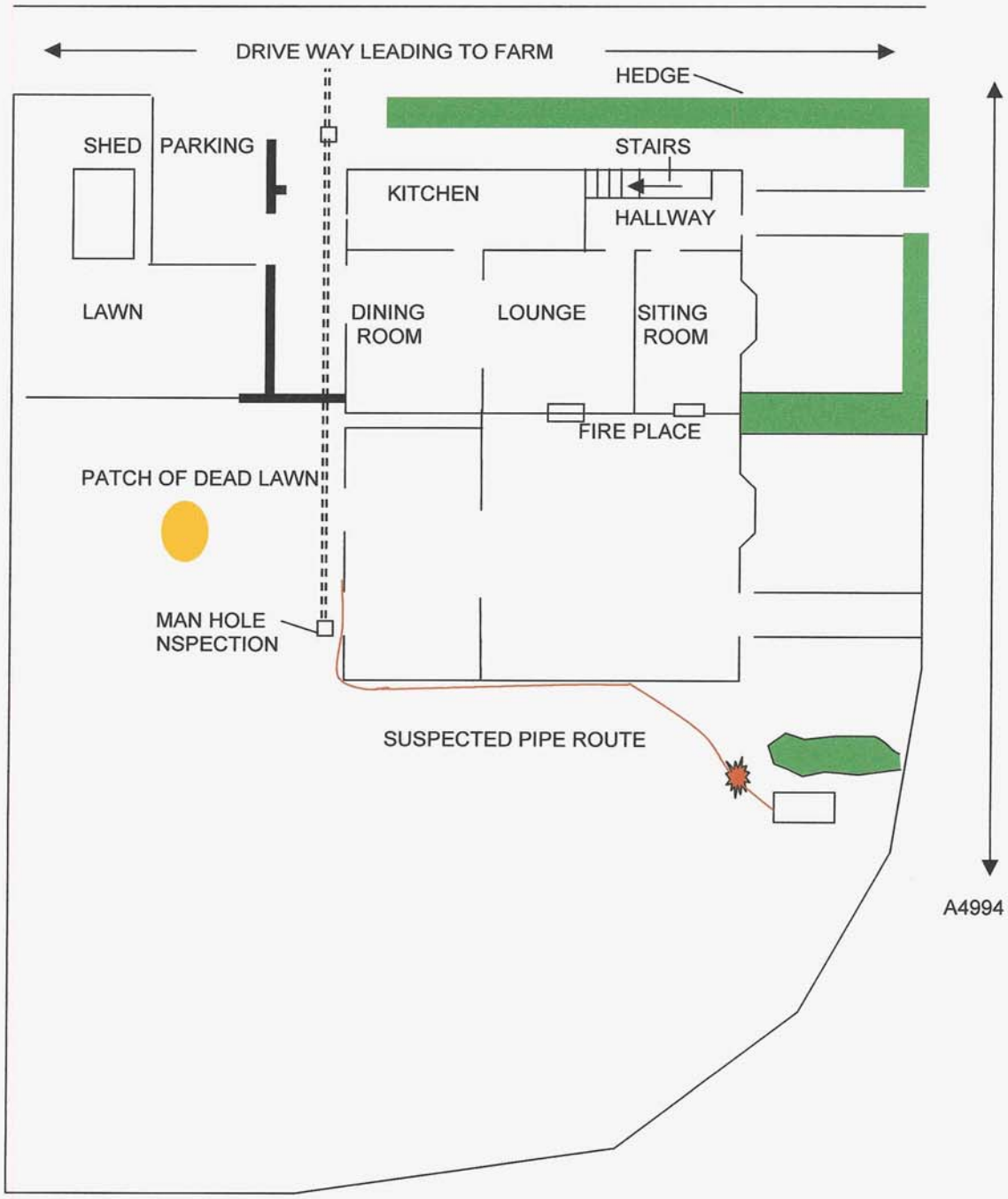


Fig 2

TRIAL PIT LOCATIONS

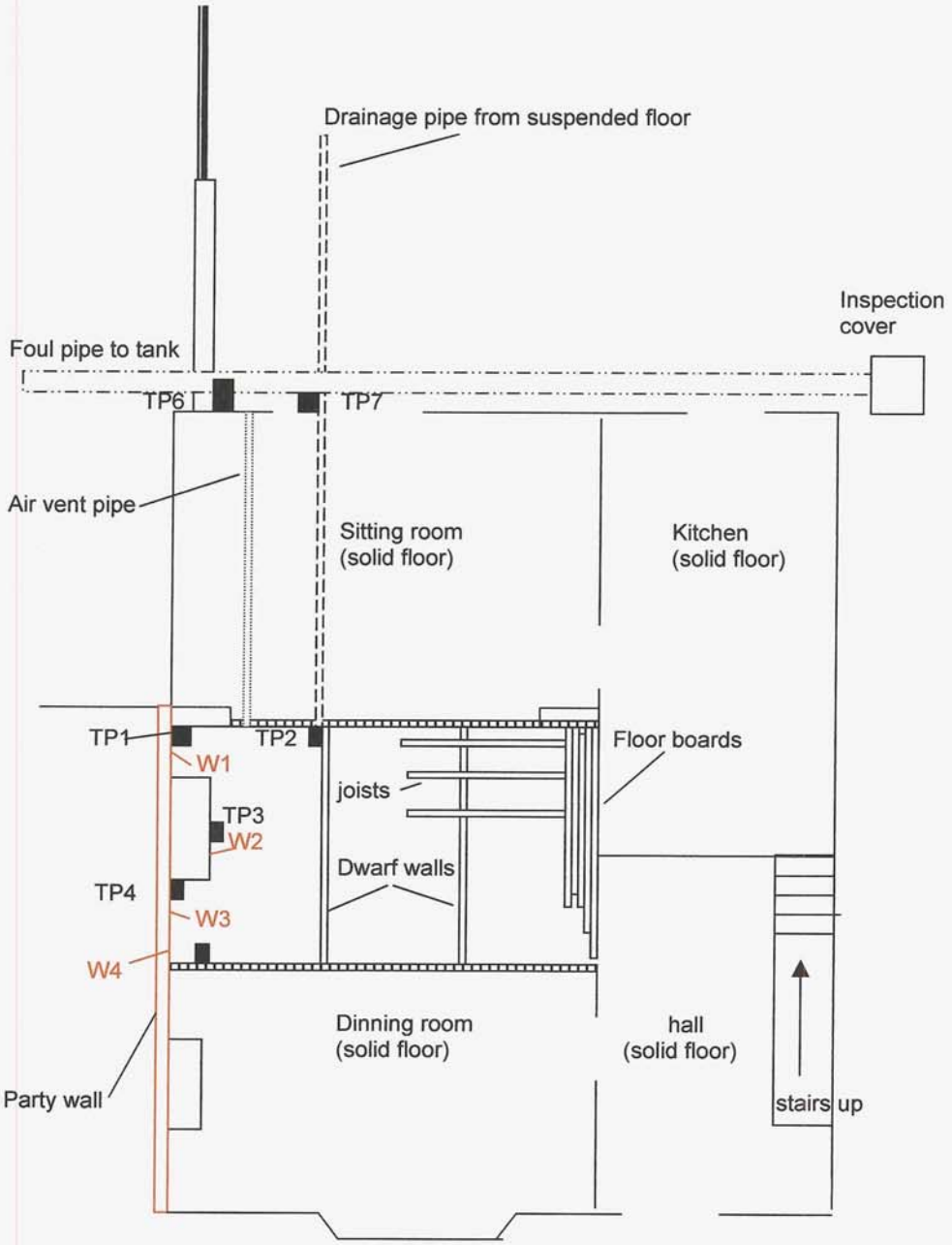


Fig 3

PROBE HOLE RESULTS AFTER
FLOOR EXCAVATION.

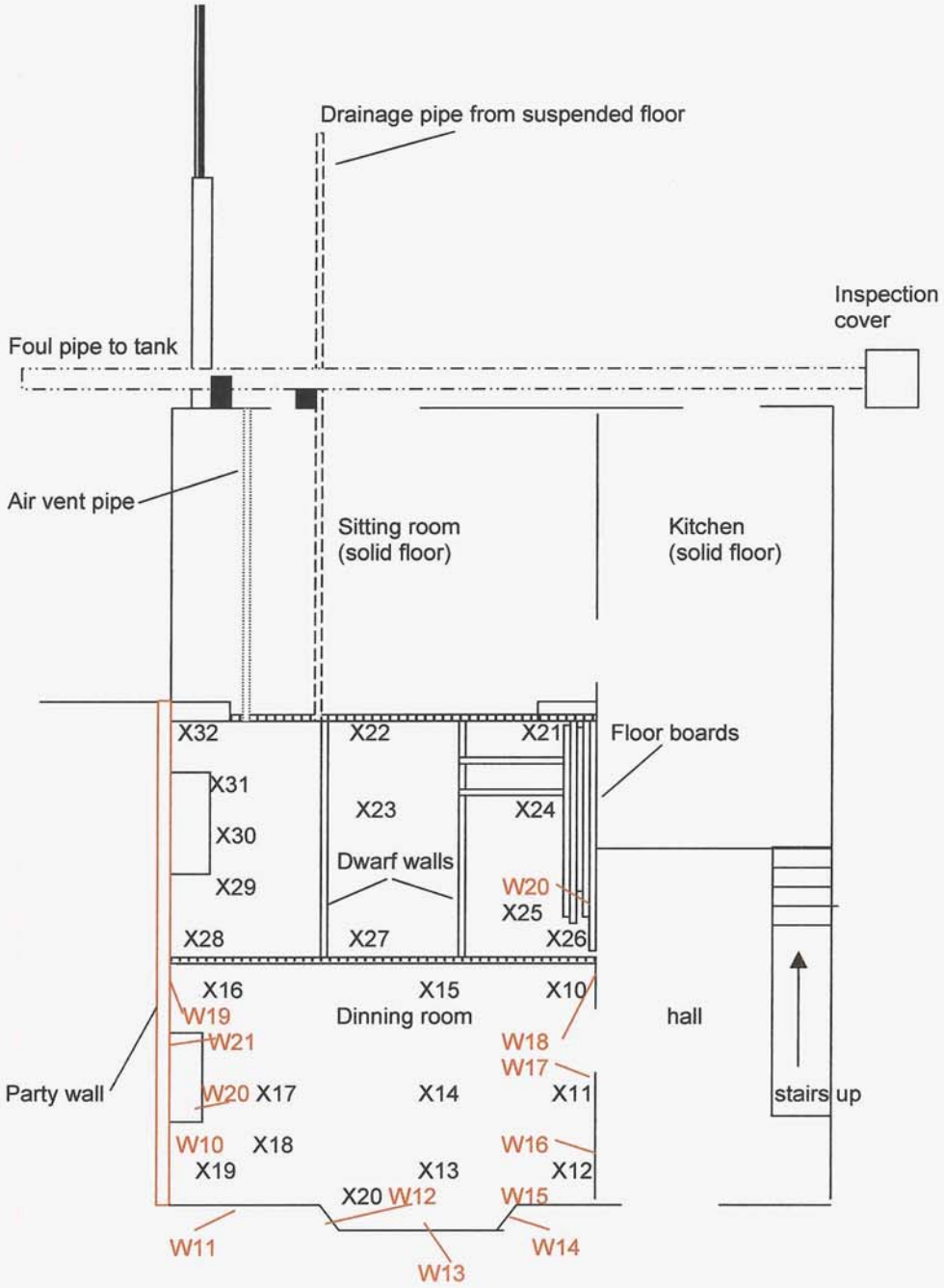
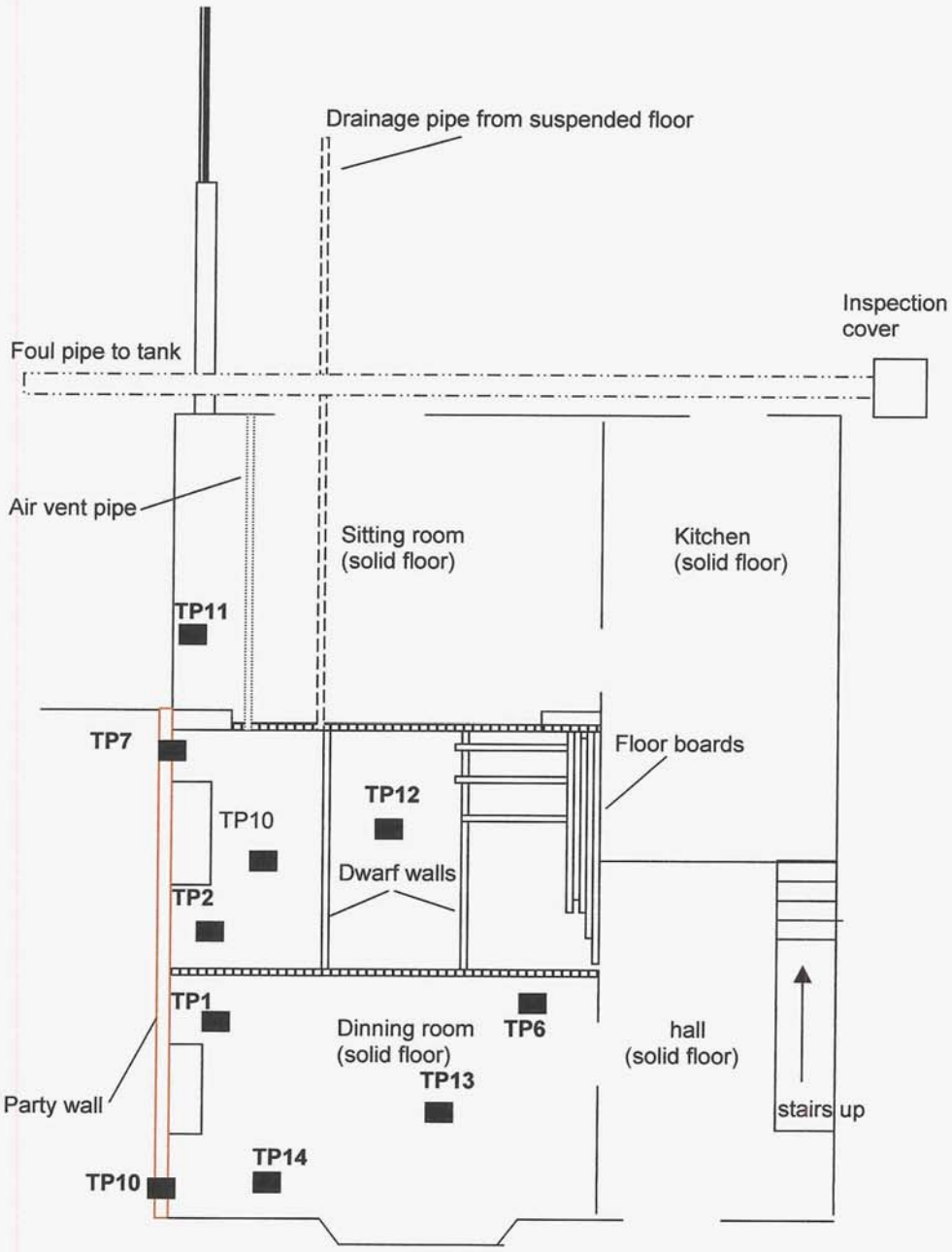


Fig 4

VALIDATION LOCATIONS



Appendix 2

De-contamination certificate

CERTIFICATE OF DECONTAMINATION

Site Address: **Beechwood, Mold Road**
Alltimi, Mold
Clwyd CH& 6LG

Alpha Environmental Systems confirm that remediation of the soil & general air at the above site has been carried out in accordance with target levels set prior to commencement of project. Samples have been extracted from the above site on completion of remediation project, and the results of analysis are as follows:

Beechwood, Mold Road, Altimi Mold, Clwyd CH7 6LG	
Sample	**Result**
General Air	Less than 0.5 mg/m^3
Probe holes	Less than 5 ppm
DRO analysis	Less than 50 mg/kg

Any queries regarding this certificate should be directed in the first instance to Steve Lyduch, Technical Services.

For and on behalf of Alpha Environmental Systems Ltd, 27 October 2002.

STEVE LYDUCH
Technical Services

Appendix 3

Analysis Results

scientifics

1. Introduction

Four mixed bed ATD tubes were submitted for analysis to ascertain the nature of the volatile organic compounds (VOC's) present. Analysis was carried out by Automatic Thermal Desorption - Gas Chromatography/Mass Spectrometry (ATD - GC/MS).

2. Samples Submitted for analysis

The following samples were received.

O/R	Project Name	Tube ID	Date Sampled	Sampled by
ANA/11101.001	P285	Mi029898	-	-
ANA/11101.002	P285	Mi030081	-	-
ANA/11101.003	P285	Mi029897	-	-
ANA/11101.004	P284	Mi030017	-	-

3. Analytical Protocol

The ATD sample tubes were desorbed at 320°C for 15 minutes onto a cold trap at -30°C before final desorption onto the GC/MS system. Separation of the compounds was by means of a specific volatile capillary analytical column.

Quantification of the requested analytes (Hexane, Benzene, Toluene and Napthalene) was achieved from the response given from a calibration of those analytes on a mixed bed ATD tube analysed under identical conditions. Analytes calibrated over a range of 0.2-2µg on the tube.

Detection limit for these analytes was set at 0.01µg on the tube.

The top five analytes present not included in the submitted list were identified and semi-quantified against the response of toluene.

Detection limit for these unknown analytes was set at 0.01 µg on the tube.

Note that although sulphur dioxide was present on the tubes, we are unable to quantify.

Results corrected for laboratory blank only.

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ANA/11101.003

Analyte	Concentration (µg/tube)
N-hexane	< 0.01
Benzene	< 0.01
Toluene	< 0.01
Naphthalene	< 0.01
Sulphur dioxide	
Ethanol	0.01
1-Hexadecene	0.03

ANA/11101.004

Analyte	Concentration (µg/tube)
N-hexane	< 0.01
Benzene	0.01
Toluene	< 0.01
Naphthalene	< 0.01
Sulphur dioxide	
1-Hexadecene	0.05

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1. Introduction

One mixed bed ATD tubes was submitted for analysis to ascertain the nature of the volatile organic compounds (VOC's) present. Analysis was carried out by Automatic Thermal Desorption - Gas Chromatography/Mass Spectrometry (ATD - GC/MS).

2. Sample Submitted for analysis

The following sample was received.

O/R	Project Name	Tube ID	Date Sampled	Sampled by
ANA/12395.001	P284	Mi033119	-	-

3. Analytical Protocol

The ATD sample tube was desorbed at 320°C for 15 minutes onto a cold trap at –30°C before final desorption onto the GC/MS system. Separation of the compounds was by means of a specific volatile capillary analytical column.

Quantification of the requested analytes (Hexane, Benzene, Toluene and Napthalene) was achieved from the response given from a calibration of those analytes on a mixed bed ATD tube analysed under identical conditions. Analytes calibrated over a range of 0.2-2μg on the tube.

Detection limit for these analytes was set at 0.01μg on the tube.

The top five analytes present not included in the submitted list were identified and semi-quantified against the response of toluene.

Detection limit for these unknown analytes was set at 0.01 μg on the tube.

Note that although sulphur dioxide was present on the tubes, we are unable to quantify.

Results corrected for laboratory blank only.

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4. Results

ANA/12395.001

Analyte	Concentration (µg/tube)
N-hexane	< 0.01
Benzene	< 0.01
Toluene	0.10
Naphthalene	< 0.01
Sulphur dioxide	
Acetonitrile	0.04
Acetic acid	0.04
Xylene	0.04
C9-C15 hydrocarbons	4.0

23 JAN 2003

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Your ref: 7058-P284
Our ref: ANA/11108

Results

O/R	DETAILS	TOTAL PETROLEUM HYDROCARBONS (TPH) CONTENT (Mg/Kg)
11108.001	P284 TP6 650mm 0.9ppm	15
11108.002	P284 TP4 200mm 393ppm	1150
11108.003	P284 TP4 surface of concrete floor 243ppm	4150
11108.004	P284 TP1 0.6m into dividing wall	190
11108.005	P284 TP6 0.6m sewer	35
11108.006	P284 TP7 to foundations	20
11108.007	P284 TP3 centre of fire place base	83900
11108.008	P284 TP2 400mm 79ppm by clay pipe	8150
11108.009	P284 400mm into dividing wall	3000
11108.010	P284 13.8ppm on top of 1st course of bricks	125

Claire Payne.

Analysed by
Claire Payne
Senior Technologist

Authorised
Paul Walker
Organic Team Leader

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Job file

07 APR 2003

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Results

Y/r: PO:7164
O/r: ANA/11590

Table 1 TPH content of soils

O/R	DETAILS	TOTAL PETROLEUM HYDROCARBON (TPH) CONTENT (Mg/Kg)
11590.002	P284 TP2 1000mm	20
11590.003	P284 TP7 1000mm	120
11590.004	P284 TP6 Surface	10
11590.005	P284 TP1 0.1m	30

Table 2 DRO content of soils

O/R	DETAILS	DIESEL RANGE ORGANICS (DRO) CONTENT (Mg/Kg)
11590.006	P278 TP7 0.5m	10
11590.007	P278 TP6 0.8m	130
11590.008	P278 TP5 0.8m	20
11590.009	P278 TP8	40
11590.012	P278 TP5 0.8m	100

Table 3 DRO content of waters

O/R	DETAILS	DIESEL RANGE ORGANICS (DRO) CONTENT (Mg/L)
11590.010	P278 Sump	0.1
11590.011	P278 TP10	0.1

Table 4 GCMS analysis of soil

O/R	DETAILS	GCMS Analysis
11590.012	P278 TP5 0.8m	Analysis of a solvent extract of the soil sample showed it to contain essentially a mix of polynuclear aromatic hydrocarbons and a smaller amount of a light mineral oil.

Claire Payne

Analysed by:
Claire Payne
Organic Technologist

Approved by:
Paul Walker
Organic Team Leader

2 3 APR 2003

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Results

Y/r: 7190
O/r: ANA/11755

Table 1 DRO content of soils

O/R	DETAILS	DIESEL RANGE ORGANICS (DRO) CONTENT (Mg/Kg)
11755.001	P284 TP10 Infill Material	50
11755.002	P284 TP11 Infill Material	10

CPayne

Analysed by:
Claire Payne
Organic Technologist

Approved by:
Paul Walker
Organic Team Leader

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13 JUN 2003

P284

5

1. Introduction

Four mixed bed ATD tubes were submitted for analysis to ascertain the nature of the volatile organic compounds (VOC's) present. Analysis was carried out by Automatic Thermal Desorption - Gas Chromatography/Mass Spectrometry (ATD - GC/MS).

2. Samples Submitted for analysis

The following samples were received.

O/R	Project Name	Tube ID	Date Sampled	Sampled by
ANA/12077.001	~~P284~~/P306	Mi029898	-	-
ANA/12077.002	~~P284~~/P306	Mi033123	-	-
ANA/12077.003	P284/~~P306~~	Mi033120	-	-
ANA/12077.004	P284/~~P306~~	Mi033124	-	-

3. Analytical Protocol

The ATD sample tubes were desorbed at 320°C for 15 minutes onto a cold trap at –30°C before final desorption onto the GC/MS system. Separation of the compounds was by means of a specific volatile capillary analytical column.

Quantification of the requested analytes (Hexane, Benzene, Toluene and Napthalene) was achieved from the response given from a calibration of those analytes on a mixed bed ATD tube analysed under identical conditions. Analytes calibrated over a range of 0.2-2μg on the tube.

Detection limit for these analytes was set at 0.01μg on the tube.

The top five analytes present not included in the submitted list were identified and semi-quantified against the response of toluene.

Detection limit for these unknown analytes was set at 0.01 μg on the tube.

Note that although sulphur dioxide was present on the tubes, we are unable to quantify.

Results corrected for laboratory blank only.

13 JUN 2003

ANA/12077.003

Lounge

Analyte	Concentration (µg/tube)
N-hexane	< 0.01
Benzene	< 0.01
Toluene	0.02
Naphthalene	< 0.01
Sulphur dioxide	
Acetonitrile	0.09
Acetic acid	0.02
C7-C14 hydrocarbons	3.0

P284

ANA/12077.004

Sitting Room

Analyte	Concentration (µg/tube)
N-hexane	0.01
Benzene	< 0.01
Toluene	0.04
Naphthalene	< 0.01
Sulphur dioxide	
Carbon disulphide	
Acetonitrile	0.18
Dichloromethane	0.01
C7-C14 hydrocarbons	8.7

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Job file.
18 JUN 2003

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Results

Y/r: 7252
O/r: ANA/12101

Table 1 DRO content of waters

O/R	DETAILS	DIESEL RANGE ORGANICS (DRO) CONTENT (Mg/Kg)
12101.001	P284 TP10 500mm	5
12101.002	P284 TP11 300mm	5
12101.003	P284 TP12 300mm	5
12101.004	P279 TP13 800mm	10
12101.005	P279 TP14 800mm	15

Claire Payne

Analysed by:
Claire Payne
Organic Technologist

Approved by:
Paul Walker
Organic Team Leader

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