



CONSULTING ENGINEERS

**CIVIL • STRUCTURAL
GEOTECHNICAL • ENVIRONMENTAL**

SB/VAL/23049/02

18th April 2024

KMM Homes Ltd
31 Sackville Street
Manchester,
M1 3LZ,

Att: Mr Mark McClarty

Dear Mr McClarty

**RE: VALIDATION REPORT FOR RESIDENTIAL DEVELOPMENT AT OLDHAM ROAD,
MIDDLETON, FOR PLOTS 1, 5, 6 and 7.**

Further to your recent instructions, we have now revisited this site to inspect and validate the topsoil and subsoil material within the front, side and rear garden areas of plots 1, 5, 6 and 7 as identified upon the appended Validation Location Plan 23049/01A.

1.0 Introduction

The site has initially been subjected to a Phase I Desk Study ref. 7355 dated November 2021 and carried out by Sub Surface North West Limited. The desk study initially identified the site to comprise fields with large ponds denoted as Morton Pits from 1848. The site remained largely unchanged until 1967 when the pits were infilled and the site was developed with domestic garages and a fuel station was also added adjacent to the site at this time and was extended into site from 1984. All on site buildings were demolished by 1991. Following this report a Phase II Ground investigation Report, report ref. 7355A and dated April 2022 was carried out by Sub Surface North West Limited. The investigation comprised of five (5 No.) trial pits, nine (9 No.) cable percussive boreholes with five (5 No.) boreholes being followed on with rotary methods. Made ground was encountered on the site and depths ranging between 0.80m and 9.00m below existing ground level. Within the areas of the historic infilled ponds, made ground was recorded to a maximum depth of 6.50m. Lead contamination, asbestos and PAH contamination was encountered across the site and as such a formal Remediation Strategy was required to address the contamination found on site.

Sub Surface North West Limited then produced a Remediation Strategy ref. 7355B dated April 2022. The report recommended that either a minimum 600mm blanket of clean topsoil or topsoil and subsoil will be placed in the rear and side gardens of the proposed residential development and 450mm capping within any proposed front garden or any other soft landscaping areas. In addition, a geotextile membrane was to be placed at the base of the cover system to inhibit the mixing of asbestos fibres.

The site has been subjected to an initial phase of validation which was carried out by Robert E Fry Consulting Engineers, report reference SB/VAL/23049/01 and dated April 2023. The rear garden areas of plots 1 to 5 and 8 to 14 were validated as part of this process. At the time the rear garden and side garden areas of plots 6 and 7 were not formed along with the side garden areas of plot 5 and front garden area of plot 1. These plots now make up the focus of the latest phase of validation work.

ROBERT E FRY & ASSOCIATES LTD.
45, Bridgeman Terrace
Wigan, WN1 1TT

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Company Registration No. 2436911



Representative samples of the capping materials installed within the garden areas have been collected to allow a programme of chemical analyses to determine the suitability of the capping materials. The remediation strategy proposed a minimum of six samples to be taken or 1 sample/100m³, whichever was greater for a brownfield source or a minimum of three samples to be taken or 1 sample/250m³, whichever was greater of greenfield material.

As part of the latest phase of validation, a total of five (5 No.) soil samples have been taken. All samples were submitted to the laboratories of Element, who are a UKAS and MCERTS accredited laboratory facility. Each sample has been subject to a wide ranging program of analyses which includes metals, inorganics, organics, PAH (USEPA 16) compounds and hydrocarbons, TPH (CWG), BTEX and MTBE. The range of determinands considered is in accordance with the specification detailed within the remediation strategy document. The full results of the laboratory chemical analyses are attached to this correspondence for reference.

Assessment of the Element laboratory test results as shown in tables 1 indicates the range of contaminants that were analysed and their respective assessment criteria. The analysis has indicated that no contaminants tested, exceeded their respected assessment criteria.

Table 1: Summary of Contamination Analysis: Metals & Inorganics					
	No. of Samples	Range of Values (mg/kg)	Assessment Criteria (mg/kg)	No. of Samples Failing	Locations
Arsenic	5	9.4 – 24.5	37 ³	0	-
Cadmium	5	< 0.1 – 1.1	11.0 ³	0	-
Chromium (total)	5	33.3 – 45.0	910 ³	0	-
Copper	5	40 - 79	2400 ³	0	-
Lead	5	79 - 142	200 ¹	0	-
Mercury	5	< 0.1 – 0.3	40 ³	0	-
Nickel	5	13.8 – 23.7	180 ³	0	-
Selenium	5	<1	250 ³	0	-
Zinc	5	88 – 578	3700 ³	0	-
Total Cyanide	5	<0.5 – 1.1	34.0 ²	0	-
Phenol	5	<0.15	200 ³	0	-
pH	5	7.13 – 7.99	-	0	-
SOM	5	1.41 – 7.12			
TOC %	5	0.82 – 4.13	-	0	-
SO ₄ (2:1)	5	0.0648 - 0.2483	0.5 ⁴	0	-
Asbestos	5	NAD	Present/Absent	0	-
¹ DEFRA : SP1010 : Category 4 Screening Levels ² Atkins Atrisk SSV residential with home grown produce (2.5% SOM) ³ LQM and CIEH S4UL's for Human Health Risk Assessment (Registration No. S4UL 3265) residential with home grown produce (2.5% SOM) ⁴ BRE Special Digest 1:2005 DS-1 (units in g/l)					

ND – None Detected

The soil samples retained from the site investigation have been subject to a programme of analyses which have assessed the concentrations of the individual constituents of the polycyclic aromatic hydrocarbon series. A summary of these results is shown in table 1. The assessment criteria utilised are based upon the presence of 2.5% soil organic matter within the samples generally. Reference to the tests results does however show more variable soil organic matter content.

Assessment of table 2 below confirms that two samples of the capping material has been shown to contain elevated concentrations of Dibenz[ah]anthracene within the side and rear garden area of plot 6.

To assess the polycyclic aromatic hydrocarbon (PAH) contamination the surrogate marker approach has been used. The ratios of the seven genotoxic PAH's (benzo(a)anthracene, Chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, indeno(123-cd)pyrene, dibenzo(ah)anthracene and benzo(ghi)perylene) to benzo(a)pyrene, have been determined and compared with the published ratio profile of a coal tar test material (Culp et al 1998). The comparison indicates that the PAH contamination matches the Culp profile within reasonable bounds, (as defined in DEFRA 2014) allowing the genotoxic PAH's to be assessed against the C4SL for benzo(a)pyrene as a surrogate marker. See appended Surrogate Marker Approach to PAH Assessment, detailing graph and results.

When comparing the contamination using Genotoxic PAH (benzo(a)pyrene) as a surrogate marker), both soil samples tested are below the threshold, 1.92mg/kg and 2.48 mg/kg, respectively when using Benzen(a)pyrene as a genotoxic marker, 5.0 mg/kg, and consequently no further consideration is required.

Table 2: Summary of Contamination Analysis: Organics: PAH USEPA 16 Suite					
	No. of Samples	Range of Values (mg/kg)	Assessment Criteria¹ (mg/kg)	No. of Samples Failing	Locations
Naphthalene	5	0.07 – 0.15	5.6	0	-
Acenaphthylene	5	<0.03 – 0.22	420	0	-
Acenaphthene	5	0.12 – 0.27	510	0	-
Fluorene	5	0.12 – 0.17	400	0	-
Phenanthrene	5	1.63 – 2.30	220	0	-
Anthracene	5	0.54 – 0.72	5400	0	-
Fluoranthene	5	2.35 – 4.73	560	0	-
Pyrene	5	2.02 – 4.10	1200	0	-
Benzo(a)anthracene	5	1.02 – 2.33	11.0	0	-
Chrysene	5	1.09 – 2.31	22.0	0	-
Benzo(a)pyrene	5	1.06 – 2.48	5.0 ²	0	-
Indeno(123-cd)pyrene	5	0.63 – 1.60	36.0	0	-
Dibenzo(ah)anthracene	5	0.23 – 0.40	0.28	0	-
Benzo(ghi)perylene	5	0.17 – 1.60	340	0	-
Benzo(b)fluoranthene	5	0.48 – 1.77	3.3	0	-
Benzo(k)fluoranthene	5	0.48 – 1.10	93	0	-
¹ LQM & CIEH S4UL's for human health risk assessment (Registration No. S4UL 3265) – Residential with home grown produce (2.5% SOM)					
² DEFRA : SP1010 : Category 4 Screening Levels					

A further five (5 No.) samples were selected for a programme of TPH (CWG) analysis. Table 3 has indicated that all results are below the assessment criteria and therefore there is no requirement for remediation in terms of hydrocarbons.

Table 3: Summary of Contamination Analysis: Organics: TPH (CWG) Suite					
	No. of Samples	Range of Values mg/kg	Assessment* Criteria mg/kg	No. of Samples Failing	Notes
Aliphatic EC> 5 - 6	5	<0.1	78.0	0	-
Aliphatic EC> 6 - 8	5	<0.1	230	0	-
Aliphatic EC> 8 - 10	5	<0.1	65.0	0	-
Aliphatic EC> 10 - 12	5	<0.2 – 5.2	330	0	-
Aliphatic EC> 12 - 16	5	<4 – 315	2400	0	-
Aliphatic EC> 16 - 21	5	<7 – 531	65000	0	-
Aliphatic EC> 21 - 35	5	<7 - 133	65000	0	-
Aromatic EC> 5 - 7	5	<0.1	140	0	-
Aromatic EC> 7 - 8	5	<0.1	290	0	-
Aromatic EC> 8 - 10	5	<0.1	83.0	0	-
Aromatic EC> 10 - 12	5	<0.2	180	0	-
Aromatic EC> 12 - 16	5	<4 – 12	330	0	-
Aromatic EC> 16 - 21	5	27 - 264	540	0	-
Aromatic EC> 21 - 35	5	213 – 348	1500	0	-
Aromatic EC> 35 - 44	5	12 - 62	1500	0	-
*Criteria values based upon LQM & CIEH S4UL's for human health risk assessment (Registration No. S4UL 3265) – Residential with home grown produce (2.5% SOM)					

The hydrocarbon analysis was extended to the BTEX range and all concentrations are below the assessment criteria levels, and therefore no remediation is required in terms of BTEX factions.

Table 4: Summary of Contamination Analysis: Organics: BTEX Suite					
	No. of Samples	Range of Values (mg/kg)	Assessment* Criteria (mg/kg)	No. of Samples Failing	Notes
Benzene	5	<0.005	0.17	0	
Toluene	5	<0.005	290	0	
EthylBenzene	5	<0.005	110	0	
M/Pylenes	5	<0.005	140	0	
O - Xylene	5	<0.005	140	0	
Methyl tert-Butyl Ether	5	<0.005	20 ¹	0	
Criteria values based upon LQM & CIEH S4UL's for human health risk assessment (Registration No. S4UL 3265) – Residential with home grown produce (2.5% SOM)					
¹ Atkins Atrisk SSV residential with home grown produce (1% SOM)					

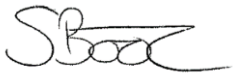
To verify the thickness of the clean cover system, trial holes have been excavated through the capping materials to a maximum depth of 0.60m below existing ground level within the front garden area of plot 1 side garden area of plot 5, side and rear garden area of plot 6 and rear garden area of plot 7. A summary of the ground conditions encountered within each garden area are provided below and photographs of the validation pits are appended to this report for reference.

- Plot 1 front garden area, plot 5 side garden area and plot 6 comprised of a topsoil material consisting of a dark grey slightly gravelly slightly sandy silty clay with occasional rootlets with a geotextile membrane located at 0.60m below ground level.
- Plot 7 comprised of a topsoil material consisting of a dark grey slightly gravelly slightly sandy silty clay with occasional rootlets to 0.50m with an orangish brown silty sand being recorded to 0.60m, with a geotextile membrane located at the base of the excavation.

In conclusion we can advise that the topsoil and subsoil material has not recorded any elevated concentrations that pose a hazard to the long term end users of the site and that the materials used are suitable for use within the garden area of plots 1, 5, 6 and 7. Trial pit excavations have also confirmed that a minimum 0.60m cover layer comprised either of topsoil or topsoil and subsoil has been applied to the soft landscaping areas with a geotextile membrane at the base of the capping. It is now considered that the development has undergone a full phase of validation of the garden areas with no elevated contaminants recorded within each phase of the validation.

We trust that this information meets with your requirements at this time and would recommend that copies of this correspondence along with the relevant attachments should be provided to the various regulatory authorities for their consent and approval. Should you require any further assistance, then please do not hesitate to contact us directly.

Signed for and on behalf of
R E FRY & ASSOCIATES LIMITED



Stephen Boot B.Sc. (Hons), FGS
R E FRY & ASSOCIATES LTD

Enc: Validation Location Plan 23049/01A
Site Photographs
Element Laboratory Test Results
Surrogate Marker approach to PAH Assessment.



Key:

Site Boundary

Plots Validated in March 2023

Plots Validated in March 2024

smas

worksafe consultant

www.smasltd.com

as recognised by

SSIP

SAFETY SCHEMES IN PROCUREMENT

Drawing Stage		Drawing Status	
☐ Draft	Comments	☒ Tender	
☒ Issued	Information	☐ Construction	
☐ Preliminary	Approval	☐ As Built	

This drawing is not authorised unless signed as checked & approved

Client
KMM Homes

Job title
Oldham Road
Middleton

Drawing title
Validation Location Plan

REFA

CONSULTING ENGINEERS

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Tel: –(01942) 826020

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Chkd SB	Appvd HM	date 18.04.24	scale 1:500	drawn EB
DRAWING No		23049/01A		rev A

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Any discrepancies to this drawing discovered on site should be reported to REFA immediately. IF IN DOUBT ASK!



View of Plot 1 front garden excavated to a depth of 0.60m exposing geotextile membrane at base. Validated on 27th March 2024



View of Plot 5 side garden excavated to a depth of 0.60m. Validated on 5th March 2024.



*View of Plot 6 rear garden exposing geotextile membrane at base of excavation.
Validated on 13th March 2024.*



*View of Plot 6 side garden excavated to a depth of 0.60m, exposing geotextile
membrane at base at 0.60m. Validated on 13th March 2024*



View of Plot 7 rear garden, validated on 5th March 2024

Robert E Fry & Associates Ltd
45 Bridgeman Terrace
Wigan
United Kingdom
WN1 1TT



Attention : Stephen Boot
Date : 15th March, 2024
Your reference : 23049
Our reference : Test Report 24/4007 Batch 1
Location : Oldham Road Middleton
Date samples received : 7th March, 2024
Status : Final Report
Issue : 202403151151

Three samples were received for analysis on 7th March, 2024 of which three were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

The greenhouse gas emissions generated (in Carbon – Co₂e) to obtain the results in this report are estimated as:

Scope 1&2 emissions - 11.077 kg of CO₂

Scope 1&2&3 emissions - 26.178 kg of CO₂

Authorised By:

Bruce Leslie
Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: Robert E Fry & Associates Ltd
Reference: 23049
Location: Oldham Road Middleton
Contact: Stephen Boot
EMT Job No: 24/4007

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	4-6	7-9									Please see attached notes for all abbreviations and acronyms		
Sample ID	VAL Plot 5	VAL Plot 7											
Depth	0.20	0.20											
COC No / misc													
Containers	V J T	V J T											
Sample Date	05/03/2024	05/03/2024											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	07/03/2024	07/03/2024									LOD/LOR	Units	Method No.
Arsenic #	11.1	24.5									<0.5	mg/kg	TM30/PM15
Cadmium #	0.1	<0.1									<0.1	mg/kg	TM30/PM15
Chromium #	36.7	45.0									<0.5	mg/kg	TM30/PM15
Copper #	35	79									<1	mg/kg	TM30/PM15
Lead #	90	112									<5	mg/kg	TM30/PM15
Mercury #	0.3	0.3									<0.1	mg/kg	TM30/PM15
Nickel #	16.7	21.5									<0.7	mg/kg	TM30/PM15
Selenium #	<1	1									<1	mg/kg	TM30/PM15
Zinc #	101	109									<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	0.07	0.08									<0.04	mg/kg	TM4/PM8
Acenaphthylene	0.14	<0.03									<0.03	mg/kg	TM4/PM8
Acenaphthene #	0.12	0.27									<0.05	mg/kg	TM4/PM8
Fluorene #	0.12	0.20									<0.04	mg/kg	TM4/PM8
Phenanthrene #	1.51	1.82									<0.03	mg/kg	TM4/PM8
Anthracene #	0.69	0.45									<0.04	mg/kg	TM4/PM8
Fluoranthene #	3.62	2.35									<0.03	mg/kg	TM4/PM8
Pyrene #	3.25	2.02									<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	1.72	1.02									<0.06	mg/kg	TM4/PM8
Chrysene #	1.82	1.09									<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	3.24	1.72									<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	2.02	1.06									<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	1.33	0.63									<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	0.23	0.17									<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	1.33	0.62									<0.04	mg/kg	TM4/PM8
PAH 16 Total	21.2	13.5									<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	2.33	1.24									<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.91	0.48									<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	92	90									<0	%	TM4/PM8
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL) #	<0.1	<0.1 ^{SV}									<0.1	mg/kg	TM36/PM12
>C6-C8 (HS_1D_AL) #	<0.1	<0.1 ^{SV}									<0.1	mg/kg	TM36/PM12
>C8-C10 (HS_1D_AL)	<0.1	<0.1 ^{SV}									<0.1	mg/kg	TM36/PM12
>C10-C12 (EH_CU_1D_AL) #	<0.2	<0.2									<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 (EH_CU_1D_AL) #	<4	<4									<4	mg/kg	TM5/PM8/PM16
>C16-C21 (EH_CU_1D_AL) #	10	<7									<7	mg/kg	TM5/PM8/PM16
>C21-C35 (EH_CU_1D_AL) #	65	52									<7	mg/kg	TM5/PM8/PM16
>C35-C44 (EH_CU_1D_AL)	<7	<7									<7	mg/kg	TM5/PM8/PM16

Please include all sections of this report if it is reproduced

Total aliphatics C5-44 (EH_CU+HS_1D_AL)	75	52										<26	mg/kg	TAG/TM36/PM36/PM12/PM10

Client Name: Robert E Fry & Associates Ltd
Reference: 23049
Location: Oldham Road Middleton
Contact: Stephen Boot
EMT Job No: 24/4007

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

4 of 13

Note:

The LOQ of the Asbestos Quantification is 0.001% dry fibre of dry mass of sample.

Where trace asbestos is reported the amount of asbestos will be $<0.1\%$.

QF-PM 3.1.15 v10 Please include all sections of this report if it is reproduced 6 of 12

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Client Name:	Robert E Fry & Associates Ltd
Reference:	23049
Location:	Oldham Road Middleton
Contact:	Stephen Boot

[illegible]

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.

It is a requirement under ISO 17025 that we inform clients if samples are deviating i.e. outside what is expected. A deviating sample indicates that the sample 'may' be compromised but not necessarily will be compromised. The result is still accredited and our analytical reports will still show accreditation on the relevant analytes.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 24/4007

SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

Please include all sections of this report if it is reproduced

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a requirement of our Accreditation Body for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

Age of Diesel

The age of release estimation is based on the nC17/pristane ratio only as prescribed by Christensen and Larsen (1993) and Kaplan, Galperin, Alimi et al., (1996).

Age estimation should be treated with caution as it can be influenced by site specific factors of which the laboratory are not aware.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above quantitative calibration range. The result should be considered the minimum value and is indicative only. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

Robert E Fry & Associates Ltd
45 Bridgeman Terrace
Wigan
United Kingdom
WN1 1TT



4225



Attention : Stephen Boot
Date : 22nd March, 2024
Your reference : 23049-Oldham Road, Middleton
Our reference : Test Report 24/4652 Batch 1
Location : 23049-Oldham Road, Middleton
Date samples received : 16th March, 2024
Status : Final Report
Issue : 202403221629

Two samples were received for analysis on 16th March, 2024 of which two were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

The greenhouse gas emissions generated (in Carbon – Co2e) to obtain the results in this report are estimated as:

Scope 1&2 emissions - 6.95 kg of CO₂

Scope 1&2&3 emissions - 16.426 kg of CO₂

Authorised By:



Bruce Leslie
Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: Robert E Fry & Associates Ltd
Reference: 23049-Oldham Road, Middleton
Location: 23049-Oldham Road, Middleton
Contact: Stephen Boot
EMT Job No: 24/4652

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-3	4-6									Please see attached notes for all abbreviations and acronyms		
Sample ID	VAL PLOT 6 REAR	VAL PLOT 6 SIDE											
Depth	0.40	0.60											
COC No / misc													
Containers	V J T	V J T											
Sample Date	13/03/2024	13/03/2024											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	16/03/2024	16/03/2024									LOD/LOR	Units	Method No.
Arsenic #	14.2	21.7									<0.5	mg/kg	TM30/PM15
Cadmium #	0.8	1.1									<0.1	mg/kg	TM30/PM15
Chromium #	39.5	40.8									<0.5	mg/kg	TM30/PM15
Copper #	59	72									<1	mg/kg	TM30/PM15
Lead #	102	142									<5	mg/kg	TM30/PM15
Mercury #	0.4	<0.1									<0.1	mg/kg	TM30/PM15
Nickel #	19.0	23.7									<0.7	mg/kg	TM30/PM15
Selenium #	<1	<1									<1	mg/kg	TM30/PM15
Zinc #	310	578									<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	0.07	0.15									<0.04	mg/kg	TM4/PM8
Acenaphthylene	0.17	0.22									<0.03	mg/kg	TM4/PM8
Acenaphthene #	0.12	0.22									<0.05	mg/kg	TM4/PM8
Fluorene #	0.12	0.17									<0.04	mg/kg	TM4/PM8
Phenanthrene #	1.78	2.30									<0.03	mg/kg	TM4/PM8
Anthracene #	0.54	0.72									<0.04	mg/kg	TM4/PM8
Fluoranthene #	3.70	4.73									<0.03	mg/kg	TM4/PM8
Pyrene #	3.27	4.10									<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	1.79	2.33									<0.06	mg/kg	TM4/PM8
Chrysene #	1.84	2.31									<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	3.06	3.93									<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	1.92	2.48									<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	1.23	1.60									<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	0.29	0.40									<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	1.24	1.60									<0.04	mg/kg	TM4/PM8
PAH 16 Total	21.1	27.3									<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	2.20	2.83									<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.86	1.10									<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	96	98									<0	%	TM4/PM8
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL) #	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>C6-C8 (HS_1D_AL) #	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>C8-C10 (HS_1D_AL)	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>C10-C12 (EH_CU_1D_AL) #	<0.2	<0.2									<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 (EH_CU_1D_AL) #	<4	<4									<4	mg/kg	TM5/PM8/PM16
>C16-C21 (EH_CU_1D_AL) #	<7	<7									<7	mg/kg	TM5/PM8/PM16
>C21-C35 (EH_CU_1D_AL) #	133	49									<7	mg/kg	TM5/PM8/PM16
>C35-C44 (EH_CU_1D_AL)	20	12									<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-44 (EH_CU+HS_1D_AL)	153	61									<26	mg/kg	TM5/PM8/PM16/PM12/PM15

Element Materials Technology

Client Name: Robert E Fry & Associates Ltd
Reference: 23049-Oldham Road, Middleton
Location: 23049-Oldham Road, Middleton
Contact: Stephen Boot
EMT Job No: 24/4652

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-3	4-6									Please see attached notes for all abbreviations and acronyms		
Sample ID	VAL PLOT 6 REAR	VAL PLOT 6 SIDE											
Depth	0.40	0.60											
COC No / misc													
Containers	V J T	V J T											
Sample Date	13/03/2024	13/03/2024											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	16/03/2024	16/03/2024									LOD/LOR	Units	Method No.
TPH CWG													
Aromatics													
>C5-EC7 (HS_1D_AR) #	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>EC7-EC8 (HS_1D_AR) #	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>EC8-EC10 (HS_1D_AR) #	<0.1	<0.1									<0.1	mg/kg	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR) #	<0.2	<0.2									<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 (EH_CU_1D_AR) #	<4	6									<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 (EH_CU_1D_AR) #	60	68									<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 (EH_CU_1D_AR) #	348	268									<7	mg/kg	TM5/PM8/PM16
>EC35-EC44 (EH_CU_1D_AR)	62	57									<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-44 (EH_CU+HS_1D_AR)	470	399									<26	mg/kg	TM5/PM8/PM16/PM12/PM10
Total aliphatics and aromatics(C5-44) (EH_CU+HS_1D_Total)	623	460									<52	mg/kg	TM5/PM8/PM16/PM12/PM10
MTBE #	<5	<5									<5	ug/kg	TM36/PM12
Benzene #	<5	<5									<5	ug/kg	TM36/PM12
Toluene #	<5	<5									<5	ug/kg	TM36/PM12
Ethylbenzene #	<5	<5									<5	ug/kg	TM36/PM12
m/p-Xylene #	<5	<5									<5	ug/kg	TM36/PM12
o-Xylene #	<5	<5									<5	ug/kg	TM36/PM12
Total Phenols HPLC	<0.15	<0.15									<0.15	mg/kg	TM26/PM21B
Natural Moisture Content	19.5	16.5									<0.1	%	PM4/PM0
Moisture Content (% Wet Weight)	16.3	14.2									<0.1	%	PM4/PM0
Sulphate as SO4 (2:1 Ext) #	0.2999	0.3811									<0.0015	g/l	TM38/PM20
Total Cyanide #	<0.5	<0.5									<0.5	mg/kg	TM89/PM45
Total Organic Carbon #	4.08	4.13									<0.02	%	TM21/PM24
Sulphide	<10	<10									<10	mg/kg	TM107/PM45
pH #	7.95	8.13									<0.01	pH units	TM73/PM11
Asbestos Type*	NAD	NAD										None	Subcontracted

Client Name:	Robert E Fry & Associates Ltd
Reference:	23049-Oldham Road, Middleton
Location:	23049-Oldham Road, Middleton
Contact:	Stephen Boot

[illegible]

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.

It is a requirement under ISO 17025 that we inform clients if samples are deviating i.e. outside what is expected. A deviating sample indicates that the sample 'may' be compromised but not necessarily will be compromised. The result is still accredited and our analytical reports will still show accreditation on the relevant analytes.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 24/4652

SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a requirement of our Accreditation Body for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

Age of Diesel

The age of release estimation is based on the nC17/pristane ratio only as prescribed by Christensen and Larsen (1993) and Kaplan, Galperin, Alimi et al., (1996).

Age estimation should be treated with caution as it can be influenced by site specific factors of which the laboratory are not aware.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above quantitative calibration range. The result should be considered the minimum value and is indicative only. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 24/4652

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO ₂ generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Preparation of Soil and Marine Sediment Samples for Total Organic Carbon.	Yes		AD	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM21B	As Received samples are extracted in Methanol: Water (60:40) by reciprocal shaker.			AR	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes

EMT Job No: 24/4652

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM89	Modified USEPA method OIA-1667 (1999). Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide, Sulphide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Sulphide/Thiocyanate by Skalar Continuous Flow Analyser	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide, Sulphide and Thiocyanate analysis.			AR	Yes
Subcontracted	See attached subcontractor report for accreditation status and provider.					AR	

Robert E Fry & Associates Ltd
45 Bridgeman Terrace
Wigan
United Kingdom
WN1 1TT



4225



Attention : Stephen Boot
Date : 10th April, 2024
Your reference : 23049
Our reference : Test Report 24/5699 Batch 1
Location : Oldham Road
Date samples received : 4th April, 2024
Status : Final Report
Issue : 202404101448

One sample was received for analysis on 4th April, 2024 and was scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

The greenhouse gas emissions generated (in Carbon – Co2e) to obtain the results in this report are estimated as:

Scope 1&2 emissions - 3.475 kg of CO2

Scope 1&2&3 emissions - 8.213 kg of CO2

Authorised By:



Phil Sommerton BSc

Senior Project Manager

Please include all sections of this report if it is reproduced

Client Name: Robert E Fry & Associates Ltd
Reference: 23049
Location: Oldham Road
Contact: Stephen Boot
EMT Job No: 24/5699

Solids: V=60g VOC jar. J=250g glass jar. T=plastic tub

Please see attached notes for all abbreviations and acronyms

Element Materials Technology

Client Name: Robert E Fry & Associates Ltd
Reference: 23049
Location: Oldham Road
Contact: Stephen Boot
EMT Job No: 24/5699

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-3										Please see attached notes for all abbreviations and acronyms				
Sample ID	VAL PLOT 1-FRONT														
Depth	0.40														
COC No / misc															
Containers	V J T														
Sample Date	27/03/2024														
Sample Type	Soil														
Batch Number	1														
Date of Receipt	04/04/2024											LOD/LOR	Units	Method No.	
TPH CWG															
Aromatics															
>C5-EC7 (HS_1D_AR) #		<0.1										<0.1	mg/kg	TM36/PM12	
>EC7-EC8 (HS_1D_AR) #		<0.1										<0.1	mg/kg	TM36/PM12	
>EC8-EC10 (HS_1D_AR) #		<0.1										<0.1	mg/kg	TM36/PM12	
>EC10-EC12 (EH_CU_1D_AR) #		9.5										<0.2	mg/kg	TM5/PM8/PM16	
>EC12-EC16 (EH_CU_1D_AR) #		103										<4	mg/kg	TM5/PM8/PM16	
>EC16-EC21 (EH_CU_1D_AR) #		264										<7	mg/kg	TM5/PM8/PM16	
>EC21-EC35 (EH_CU_1D_AR) #		272										<7	mg/kg	TM5/PM8/PM16	
>EC35-EC44 (EH_CU_1D_AR)		12										<7	mg/kg	TM5/PM8/PM16	
Total aromatics C5-44 (EH_CU+HS_1D_AR)		661										<26	mg/kg	TM5/PM8/PM16/PM10/PM12/PM14/PM15	
Total aliphatics and aromatics(C5-44) (EH_CU+HS_1D_Total)		1629										<52	mg/kg	TM5/PM8/PM16/PM10/PM12/PM14/PM15	
MTBE #		<5										<5	ug/kg	TM36/PM12	
Benzene #		<5										<5	ug/kg	TM36/PM12	
Toluene #		<5										<5	ug/kg	TM36/PM12	
Ethylbenzene #		<5										<5	ug/kg	TM36/PM12	
m/p-Xylene #		<5										<5	ug/kg	TM36/PM12	
o-Xylene #		<5										<5	ug/kg	TM36/PM12	
Total Phenols HPLC		<0.15										<0.15	mg/kg	TM26/PM21B	
Natural Moisture Content		19.3										<0.1	%	PM4/PM0	
Moisture Content (% Wet Weight)		16.2										<0.1	%	PM4/PM0	
Sulphate as SO4 (2:1 Ext) #		0.2483										<0.0015	g/l	TM38/PM20	
Total Cyanide #		<0.5										<0.5	mg/kg	TM89/PM45	
Total Organic Carbon #		1.92										<0.02	%	TM21/PM24	
Sulphide		<10										<10	mg/kg	TM107/PM45	
pH #		7.86										<0.01	pH units	TM73/PM11	
Asbestos Type*		NAD											None	Subcontracted	

Contact: Stephen Boot

It is a requirement under ISO 17025 that we inform clients if samples are deviating i.e. outside what is expected. A deviating sample indicates that the sample 'may' be compromised but not necessarily will be compromised. The result is still accredited and our analytical reports will still show accreditation on the relevant analytes.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 24/5699

SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 35°C ±5°C.

Where Mineral Oil is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a requirement of our Accreditation Body for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

Age of Diesel

The age of release estimation is based on the nC17/pristane ratio only as prescribed by Christensen and Larsen (1993) and Kaplan, Galperin, Alimi et al., (1996).

Age estimation should be treated with caution as it can be influenced by site specific factors of which the laboratory are not aware.

Tentatively Identified Compounds (TICs)

Where Tentatively Identified Compounds (TICs) are reported, up to 10 Tentatively Identified Compounds will be listed where there is found to be a greater than 80% match with the NIST library. The reported concentration is determined semi-quantitatively, with a matrix specific limit of detection.

Note, other compounds may be present but are not reported.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above quantitative calibration range. The result should be considered the minimum value and is indicative only. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 24/5699

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil.	PM24	Preparation of Soil and Marine Sediment Samples for Total Organic Carbon.	Yes		AD	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM21B	As Received samples are extracted in Methanol: Water (60:40) by reciprocal shaker.			AR	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes

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Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM89	Modified USEPA method OIA-1667 (1999). Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide, Sulphide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Sulphide/Thiocyanate by Skalar Continuous Flow Analyser	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide, Sulphide and Thiocyanate analysis.			AR	Yes
Subcontracted	See attached subcontractor report for accreditation status and provider.					AR	

SURROGATE MARKER APPROACH TO PAH ASSESSMENT

