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UKAS TESTING
4251

ANALYSIS OF THE TRACE LANDFILL GAS

AT

Biffa Eye Landfill Site
Eyebury Road
Peterborough
PE6 7YH

Commissioned by: Ben Rigg

Of

Biffa Waste Service Ltd
Rixton Old Hall
Manchester Road
Rixton
Warrington
WA3 6EW

Date of Survey:	19th April & 16th May 2017
Compiled By:	Yu Shen *Project Manager*

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Compiled By:	Yu Shen *Project Manager* MCerts Level II (TE1, 2, 3 & 4)
Signed:	
Dated:	22th May 2017

CONTENTS

1. INTRODUCTION

1.1 EnviroDat Limited was commissioned by Ben Rigg, on behalf of Biffa Waste Services Ltd, to measure the trace gas components from landfill gas located at the Eye Landfill site. Sampling was performed on the 19th April and 16th May 2017.

1.2 The sampling was conducted in response to permit requirements (Permit No. BP3537PP). Monitoring was conducted with reference to the Environment Agency document 'Guidance for Monitoring Trace Components in Landfill Gas' (LFTGN 04).

2. PLANT DESCRIPTION

2.1 Landfill gas is currently utilised by the engine and flare plant. Samples of the fuel gas were taken from a feed system for trace gas analysis after the gas booster.

3. SAMPLING PROCEDURES

3.1 Trace gas sampling was performed from the fuel gas inlet, with analysis for components identified in Table 1.1 of the EA LFTGN04 guidance note. General site information is presented in Appendix A.

3.2 Mixed bed, automated thermal desorption (ATD) tubes were used for sampling of the priority volatile organic species prior to analysis by gas chromatography with mass spectrometry (GC/MS), in accordance with EA recommendations and documented EnviroDat protocol, SPTGN04. The results are presented in Appendix B. The analytical component of the work

was conducted at Concept Life Sciences (CLS) Ltd. This element of the monitoring was repeated on 24/05/17 following quality issues with the original sampling tube on 19/04/17.

3.3 The LFTGN04 designated 'priority' carbonyl components (i.e. methanal and ethanal) were sampled onto dinitrophenylhydrazine (DNPH) impregnated, silica gel sorbent tubes prior to analysis by high performance liquid chromatography (HPLC) incorporating an ultraviolet (UV) detection system, in accordance with EA recommendations and SPTGN04. The results are presented in Appendix B. The analytical component of the work was conducted at CLS Ltd.

3.4 Arsenic was sampled onto an activated charcoal sorbent tube prior to analysis by inductively coupled plasma/optical emission spectrometry (ICP/OES), in accordance with EA recommendations and SPTGN04. The results are presented in Appendix B. The analytical component of the work was conducted at CLS Ltd.

3.5 Hydrogen sulphide was sampled into a Tedlar bag with analysis by GC/MS (by CLS Ltd) in accordance with SPTGN04. The results are presented in Appendix B.

4. RESULTS

4.1 Field measurements of the ‘bulk gases’ are given in Appendix A.

4.2 Measured concentrations of the EA ‘priority’ trace components for the landfill are given in Appendix B and shown graphically in Appendix C.

APPENDIX A

Site Information & Preliminary Gas Measurements

TABLE A: Site Information & Preliminary Gas Measurements

Sample Position Details			
Date	19/04/2017 & 16/05/2017	**Site**	Biffa Eye Landfill Site
Ambient Temperature	13°C & 24°C	**Atmospheric Pressure**	1037mbar & 1024mbar
Monitoring Organisation (s)	EnviroDat Ltd	**Analytical Laboratory**	CLS Ltd
Location of Sampling Point	Inlet Line to Utilisation Plant	**Area of Influence of collection system sampled**	All capped areas of the site
Type of Sampling Point	Nipple & Valve	**Temperature of gas**	12°C, at sample flow meter
Vacuum on Sampling	None, Positive pressure (172mbar)	**Type of waste**	Domestic, Industrial, Commercial & Hazardous
		Age of Waste	-
Status of Gas System	Fully Operational, Steady State	**Other**	-
Parameter	**Concentration**	**Units**	**Comments**
Methane*	49.0	%	-
Carbon Dioxide*	35.4	%	-
Oxygen*	0.4	%	-
Nitrogen	15.2	%	Assumed to be balance of gas
Hydrogen Sulphide	n/a	ppmv	Not required
Carbon Monoxide	n/a	ppmv	

Notes: * Raw result obtained from landfill gas analyser (19/04/2017)

APPENDIX B

Trace Gas Results

TABLE B: Trace Gas Results

Trace Gases - Test 1							
	Test Duration	Flow Rate	Flowmeter	Volume	Ambient T	Barometric P	Volume
	(min)	(ml/min)	CAL Factor	(l as sampled)	(°C)	(kPa)	(l @ STP)
Arsenic	60	200	1.0262	**12.31**	13	103.7	**12.03**
Aldehydes	20	200	1.0262	**4.10**	13	103.7	**4.01**
VOC	6	50	0.994	**0.30**	24	102.4	**0.28**

Compound	Mass of TG (ng)	LoD of TG (ng)	Concentration		Units	Analysis Notes (See below)	Analysis UKAS Acredited (Y/N)
Arsenic (as As)		1000	<	**83**	µg/m3	-	Y
Acetaldehyde (Ethanal)	3600	100		**898**	µg/m3	a	Y
Formaldehyde (Methanal)	300	100		**75**	µg/m3	a	Y
1-pentene		10	<	**36**	µg/m3	-	Y
1,1-dichloroethane		10	<	**36**	µg/m3	-	Y
1,1-dichloroethylene		10	<	**36**	µg/m3	-	Y
1,2-dichloroethane	110	10		**397**	µg/m3	-	N
1,2-dichloroethylene	91	30		**329**	µg/m3	-	Y
1,3-butadiene		10	<	**36**	µg/m3	-	Y
1,4-epoxy-1,3-butadiene (Furan)		10	<	**36**	µg/m3	-	N
1-propanethiol		10	<	**36**	µg/m3	-	Y
2-butoxyethanol		10	<	**36**	µg/m3	-	N
Benzene	970	10		**3502**	µg/m3	c	Y
Butyric acid		10	<	**36**	µg/m3	-	N
Carbon disulphide	460	10		**1661**	µg/m3	-	N
Carbon tetrachloride		10	<	**36**	µg/m3	-	Y
Chloroethane		30	<	**108**	µg/m3	-	N
Dichloromethane		10	<	**36**	µg/m3	-	N
Dimethyl disulphide		10	<	**36**	µg/m3	-	N
Dimethyl sulphide	3000	10		**10830**	µg/m3	c	Y
Ethyl butyrate		25	<	**90**	µg/m3	-	N
Ethyl Mercaptan (ethanethiol)		10	<	**36**	µg/m3	-	N
Methyl Mercaptan (methanethiol)		30	<	**108**	µg/m3	-	N
N-Butyl Mercaptan		10	<	**36**	µg/m3	-	Y
Styrene		10	<	**36**	µg/m3	-	N
Toluene	1600	10		**5776**	µg/m3	c	N
Trichloroethylene		10	<	**36**	µg/m3	-	Y
Vinyl chloride monomer (chloroethene)		10	<	**36**	µg/m3	-	Y

Compound	Concentration in ppm	LOD of TG (ppm)	Concentration		Units	Analysis Notes (See below)	Analysis UKAS Acredited (Y/N)
Hydrogen sulphide*	200	10		**303571**	µg/m3	-	N

*H2S value is equivalent to 200 ppm, values in highlighted box are expressed as ppm and not ng

(a) – Results have been blank corrected
(b) – Results should be considered a minimum due to detector saturation
(c) – Results should be viewed with caution due to being outside of the instrument calibration range

Reference to UKAS (final column) relates to the accreditation status of the analysis only, sampling is covered under EnviroDat Accreditation scope.

APPENDIX C

Trace Gas Chart

TABLE C: Trace Gas Chart