



4251

ANALYSIS OF THE TRACE LANDFILL GAS

AT

Eye Landfill Site

Eyebury Road
Tanholt Lane
Eye
Peterborough
PE6 7TH

Commissioned by: Mr. Lijie Wang

Of

Biffa Waste Services Ltd

Rixton Old Hall
Manchester Road
Rixton
Warrington
WA3 6EW

Date of Survey:

20th June 2019

Compiled By:

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Project Manager

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Project Manager
MCerts Level II (TE1, 2, 3 & 4)

Signed: 

Dated: 21st July 2019

CONTENTS

1. INTRODUCTION
2. PLANT DESCRIPTION
3. SAMPLING PROCEDURES
4. RESULTS

APPENDICES:

APPENDIX A: Site Information & Preliminary Gas Measurements
APPENDIX B: Trace Gas Results
APPENDIX C: Trace Gas Chart

Notes to Report.

- a). EnviroDat Ltd, Report Template V10.
- b). This report should not be reproduced except in full, without written approval of Envirodat Ltd.
- c). Opinions and Interpretations herein are outside the scope of UKAS/MCerts Accreditation.

1. INTRODUCTION

- 1.1 EnviroDat Limited was commissioned by Mr. Lijie Wang, on behalf of Biffa Waste Services Ltd, to measure the trace gas components from landfill gas located at Eye Landfill Site. Sampling was performed on the 20th June 2019.
- 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 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 analytical

component of the work was conducted at Marchwood Scientific Services (MSS) Ltd, Manchester.

- 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 MSS Ltd, Manchester.
- 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 Concept Life Sciences (CLS) Ltd, Manchester.
- 3.5 Hydrogen sulphide was sampled into a Tedlar bag with analysis by GC/MS (by CLS Ltd, Manchester) 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 gas 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	20/06/2019	Site	Eye Landfill Site
Ambient Temperature	23°C	Atmospheric Pressure	1010mbar
Monitoring Organisation (s)	EnviroDat Ltd	Analytical Laboratory	MSS/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	Gate Valve	Temperature of gas	20.9°C at sample flow meter
Vacuum on Sampling	None, Positive pressure	Type of waste	Domestic, Industrial, Commercial & Hazardous
		Age of Waste	-
Status of Gas System	Fully Operational, Steady State	Other	-
Parameter	Concentration	Units	Comments
Methane*	46.5	%	-
Carbon Dioxide*	33.1	%	-
Oxygen*	1.2	%	-
Nitrogen	19.2	%	Assumed to be balance of gas
Hydrogen Sulphide	-	ppm	See Appendix B
Carbon Monoxide	-	ppm	-

Notes: *Raw result obtained from GA5000 landfill gas analyser

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	0.999	11.99	23	101	11.02
Aldehydes	20	200	0.999	4.00	23	101	3.67
VOC	5	50	1.012	0.25	23	101	0.23

Compound	Mass of TG (ng)	LoD of TG (ng)	Concentration	Units	Analysis Notes (See below)	Analysis UKAS Accredited (Y/N)
Arsenic (as As)		1000	< 91	µg/m3	-	Y
Acetaldehyde (Ethanal)	2200	100	599	µg/m3	-	Y
Formaldehyde (Methanal)	200	100	54	µg/m3	-	Y
Vinyl chloride		10	< 43	µg/m3	-	N
1,3-butadiene		10	< 43	µg/m3	-	N
Methanethiol	110	50	473	µg/m3	-	N
Chloroethane	120	10	516	µg/m3	-	N
1-pentene	500	20	2150	µg/m3	-	N
1,4-epoxy-1,3-butadiene (Furan)	600	10	2580	µg/m3	c	N
Ethanethiol		50	< 215	µg/m3	-	N
1,1-dichloroethene		5	< 21	µg/m3	-	N
Dimethyl sulphide	2500	10	10748	µg/m3	c	N
Dichloromethane	450	10	1935	µg/m3	c	N
Carbon disulphide	3400	50	14618	µg/m3	c	N
1,2-dichloroethene (trans + cis)	44	10	189	µg/m3	-	N
1,1-dichloroethane	13	5	56	µg/m3	-	N
Propanethiol		40	< 172	µg/m3	-	N
1,2-dichloroethane	89	5	383	µg/m3	-	N
Carbon tetrachloride		5	< 21	µg/m3	-	N
Benzene	800	1	3439	µg/m3	c	N
Trichloroethylene	25	5	107	µg/m3	-	N
Butanethiol		40	< 172	µg/m3	-	N
Dimethyl disulphide	100	10	430	µg/m3	-	N
Toluene	2600	5	11178	µg/m3	-	N
Butyric acid		10	< 43	µg/m3	-	N
Ethyl butyrate		10	< 43	µg/m3	-	N
2-Butoxyethanol		10	< 43	µg/m3	-	N
Styrene	540	5	2322	µg/m3	c	N

Compound	Concentration in ppm	LOD of TG (ppm)	Concentration	Units	Analysis Notes (See below)	Analysis UKAS Accredited (Y/N)
Hydrogen sulphide*	110	10	166964	µg/m3	-	N

*H2S value is equivalent to 110 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

