



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:

29th April 2020

Compiled By:

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Senior Project Manager

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

Signed: 

Dated: 15th May 2020

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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 29th April 2020.
- 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 MSS Ltd, Manchester.
- 3.5 Hydrogen sulphide was analysed on site by Certified Geotech 5000 owned by Envirodat. 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	29/04/2020	Site	Eye Landfill Site
Ambient Temperature	23°C	Atmospheric Pressure	1001mbar
Monitoring Organisation (s)	EnviroDat Ltd	Analytical Laboratory	MSS 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	14.7°C at sample flow meter
Vacuum on Sampling	Positive pressure (150mbar)	Type of waste	Domestic, Industrial, Commercial & Hazardous
		Age of Waste	-
Status of Gas System	Fully Operational, Steady State	Other	-
Parameter	Concentration	Units	Comments
Methane*	47.7	%	-
Carbon Dioxide*	32.8	%	-
Oxygen*	2.3	%	-
Nitrogen*	17.2	%	Assumed to be balance of gas
Hydrogen Sulphide*	156	ppm	See Appendix B
Carbon Monoxide	-	ppm	-

Notes: *Raw result obtained from certified Geotech 5000 landfill gas analyser owned by Envirodat

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	0.9471	11.37	14.5	100.1	10.66
Aldehydes	28	200	0.9471	5.30	14.5	100.1	4.98
VOC	5	50	0.966	0.24	14.5	100.1	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)		100	< 9	µg/m3	-	N	
Acetaldehyde (Ethanal)	600	100	121	µg/m3	-	Y	
Formaldehyde (Methanal)		100	< 20	µg/m3	-	Y	
Vinyl chloride	110	10	486	µg/m3	-	N	
1,3-butadiene		10	< 44	µg/m3	-	N	
Methanethiol	150	50	662	µg/m3	-	N	
Chloroethane	76	10	335	µg/m3	-	N	
1-pentene	250	20	1104	µg/m3	-	N	
1,4-epoxy-1,3-butadiene (Furan)	310	10	1368	µg/m3	-	N	
Ethanethiol	57	50	252	µg/m3	-	N	
1,1-dichloroethene		5	< 22	µg/m3	-	N	
Dimethyl sulphide	1700	10	7504	µg/m3	c	N	
Dichloromethane	50	10	221	µg/m3	-	N	
Carbon disulphide	3900	10	17215	µg/m3	c	N	
1,2-dichloroethene (trans + cis)	51	10	225	µg/m3	-	N	
1,1-dichloroethane	6	5	26	µg/m3	-	N	
Propanethiol		40	< 177	µg/m3	-	N	
1,2-dichloroethane	52	5	230	µg/m3	-	N	
Carbon tetrachloride		5	< 22	µg/m3	-	N	
Benzene	890	1	3929	µg/m3	c	N	
Trichloroethylene	35	5	154	µg/m3	-	N	
Butanethiol		40	< 177	µg/m3	-	N	
Dimethyl disulphide	47	10	207	µg/m3	-	N	
Toluene	4000	5	17656	µg/m3	b	N	
Butyric acid		10	< 44	µg/m3	-	N	
Ethyl butyrate		10	< 44	µg/m3	-	N	
2-Butoxyethanol		10	< 44	µg/m3	-	N	
Styrene	1200	5	5297	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*	156	10	236786	µg/m3	-	N	

*H2S value is equivalent to 156 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

Priority Trace Components - Eye - 2020

NON DETECTED DATA PRESENTED AS BLANKS - HYDROGEN SULPHIDE RESULTS NOT SHOWN DUE TO RELATIVELY HIGH VALUES

