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## **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:

14<sup>th</sup> April 2021

Compiled By:

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Date of Survey: 24<sup>th</sup> April 2021

Compiled By: Yu Shen  
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MCerts Level II (TE1, 2, 3 & 4)

Signed: 

Dated: 29<sup>th</sup> April 2021

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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.

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## 1. INTRODUCTION

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- 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 14<sup>th</sup> April 2021.
- 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).

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## 2. PLANT DESCRIPTION

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- 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.

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## 3. SAMPLING PROCEDURES

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- 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.

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## 4. RESULTS

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- 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	14/04/2021	Site	Eye Landfill Site
Ambient Temperature	13°C	Atmospheric Pressure	1033mbar
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 (152mbar)	Type of waste	Domestic, Industrial, Commercial & Hazardous
		Age of Waste	-
Status of Gas System	Fully Operational, Steady State	Other	-
Parameter	Concentration	Units	Comments
Methane*	47.5	%	-
Carbon Dioxide*	30.7	%	-
Oxygen*	2.7	%	-
Nitrogen*	19.1	%	Assumed to be balance of gas
Hydrogen Sulphide*	168	ppm	See Appendix B

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	0.9977	11.97	13	103.3	11.65
Aldehydes	20	200	0.9977	3.99	13	103.3	3.88
VOC	5	50	0.9964	0.25	13	103.3	0.24
Compound	Mass of TG (ng)	LoD of TG (ng)	Concentration		Units	Analysis Notes (See below)	Analysis UKAS Accredited (Y/N)
Arsenic (as As)		500	< 43		µg/m3	-	Y
Acetaldehyde (Ethanal)	500	100	129		µg/m3	-	Y
Formaldehyde (Methanal)	200	100	51		µg/m3	-	Y
Vinyl chloride	55	10	227		µg/m3	-	N
1,3-butadiene		10	< 41		µg/m3	-	N
Methanethiol		50	< 206		µg/m3	-	N
Chloroethane	52	10	215		µg/m3	-	N
1-pentene	170	20	701		µg/m3	-	N
1,4-epoxy-1,3-butadiene (Furan)	140	10	578		µg/m3	-	N
Ethanethiol		50	< 206		µg/m3	-	N
1,1-dichloroethene		5	< 21		µg/m3	-	N
Dimethyl sulphide	960	10	3960		µg/m3	c	N
Dichloromethane	12	10	50		µg/m3	-	N
Carbon disulphide	1400	10	5775		µg/m3	c	N
1,2-dichloroethene (trans + cis)	31	10	128		µg/m3	-	N
1,1-dichloroethane		5	< 21		µg/m3	-	N
Propanethiol	52	40	215		µg/m3	-	N
1,2-dichloroethane	19	5	78		µg/m3	-	N
Carbon tetrachloride		5	< 21		µg/m3	-	N
Benzene	620	1	2558		µg/m3	c	N
Trichloroethylene	18	5	74		µg/m3	-	N
Butanethiol		40	< 165		µg/m3	-	N
Dimethyl disulphide	18	10	74		µg/m3	-	N
Toluene	3700	5	15263		µg/m3	c	N
Butyric acid		10	< 41		µg/m3	-	N
Ethyl butyrate		10	< 41		µg/m3	-	N
2-Butoxyethanol		10	< 41		µg/m3	-	N
Styrene	300	5		1238	µg/m3	-	N
Compound	Concentration in ppm	LOD of TG (ppm)	Concentration		Units	Analysis Notes (See below)	Analysis UKAS Accredited (Y/N)
Hydrogen sulphide*	168	10		255000	µg/m3	-	N

\*H2S value is equivalent to 168 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**

