



4251

ANALYSIS OF THE TRACE LANDFILL GAS

AT

Standard Landfill Site
Spencers Industrial Estate
Buckley
Flintshire
CH7 3LY

Commissioned by: Mr Phil Mulhall

Of

Flintshire County Council
Alltami Depot
Mold Road - Alltami
Flintshire
CH7 6LG

Date of Survey:

17th March 2015

Compiled By:

Yu Shen
Project Manager

ANALYSIS OF THE TRACE LANDFILL GAS

AT

Standard Landfill Site

Spencers Industrial Estate
Buckley
Flintshire
CH7 3LY

Commissioned by: Mr Phil Mulhall

Of

Flintshire County Council

Alltami Depot
Mold Road - Alltami
Flintshire
CH7 6LG

Date of Survey: 17th March 2015

Compiled By: Yu Shen
Project Manager
Mcerts Level II (TE1, 2, 3 & 4)

Signed:



Dated: 2nd April 2015

CONTENTS

- 1.** INTRODUCTION
- 2.** PLANT DESCRIPTION
- 3.** SAMPLING PROCEDURES
- 4.** RESULTS
- 5.** DISCUSSION & CONCLUSION

APPENDICES:

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

1. INTRODUCTION

- 1.1 EnviroDat Limited was commissioned by Mr Phil Mulhall, on behalf of Flintshire County Council, to measure the trace gas components from landfill gas located at Standard Landfill Site. Sampling was performed on the 17th March 2015.
- 1.2 The sampling was conducted in response to PPC Permit requirements (Permit No. 37073). 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 CHP 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 SAL 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 SAL 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 SAL Ltd, Manchester.
- 3.5 Hydrogen sulphide was sampled into a Tedlar bag with analysis by GC/MS (by SAL 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 also given in Appendix B.

5. DISCUSSION AND CONCLUSION

- 5.1 The aim of the survey was to measure trace components from the landfill gas at Standard Landfill Site.
- 5.2 The levels of trace components within the landfill gas are of a range and magnitude not dissimilar to what would be expected and can be regarded as comparable with biogenic gas of this nature from other sources. Appendix C shows the variation of trace gas parameters over time.

APPENDIX A

Site Information & Preliminary Gas Measurements

TABLE A: Site Information & Preliminary Gas Measurements

Sample Position Details			
Date	17/03/2015	Site	Standard Landfill Site
Ambient Temperature	8.5°C	Atmospheric Pressure	1001mbar
Monitoring Organisation (s)	EnviroDat Ltd	Analytical Laboratory	SAL 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	Valve	Temperature of gas	10°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*	35	%	-
Carbon Dioxide*	22	%	-
Oxygen*	0.3	%	-
Nitrogen*	42.7	%	Assumed to be balance of gas
Hydrogen Sulphide*	-	ppmv	Not required
Carbon Monoxide*	-	ppmv	

Notes: * Raw result obtained from client.

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)
VOC	5	50	0.9764	0.2441	10	100.1	0.23
Aldehydes	15	200	0.9727	3	10	100.1	2.86
Arsenic	64	200	1.0148	12.8	10	100.1	12.20

Compound	Mass of TG (ng)	LoD of TG (ng)	Concentration	Units	Analysis Notes (See below)	Analysis UKAS Accredited (Y/N)
1, 1 - dichloroethane		10	< 43	µg/m3	-	Y
1, 2 - dichloroethane		10	< 43	µg/m3	-	N
1, 1 - dichloroethene		10	< 43	µg/m3	-	Y
1, 2 - dichloroethene	170	30	731	µg/m3	-	Y
1, 3 - butadiene		10	< 43	µg/m3	-	Y
1 - butanethiol		10	< 43	µg/m3	-	Y
1 - pentene	100	10	430	µg/m3	-	Y
1 - propanethiol		10	< 43	µg/m3	-	Y
2 - butoxyl ethanol		10	< 43	µg/m3	-	N
Arsenic (as As)		1000	< 82	µg/m3	-	Y
Benzene	490	10	2106	µg/m3	-	Y
Butyric acid		10	< 43	µg/m3	-	N
Carbon disulphide ^(a)	590	10	2536	µg/m3	-	N
Chloroethane		30	< 129	µg/m3	-	N
Chloroethene (vinyl chloride)	160	10	688	µg/m3	-	Y
Dimethyl disulphide	22	10	95	µg/m3	-	N
Dimethyl sulphide	51	10	219	µg/m3	-	Y
Ethanal (acetaldehyde)	200	100	70	µg/m3	-	N
Ethanethiol	270	10	1161	µg/m3	-	N
Ethyl butyrate		25	< 107	µg/m3	-	N
Furan (1,4-epoxy-1,3 butadiene)		10	< 43	µg/m3	-	N
Hydrogen sulphide (ppm)*	13	10	19732	µg/m3	-	N
Methanal (formaldehyde) ^(a)	200	100	70	µg/m3	-	N
Methanethiol		30	< 129	µg/m3	-	N
Styrene	44	10	189	µg/m3	-	N
Tetrachloromethane		10	< 43	µg/m3	-	Y
Toluene ^(b)	2100	10	9027	µg/m3	-	N
Trichloroethene	20	10	86	µg/m3	-	Y

*H2S value is equivalent to 13 ppm

(a) – Results have been blank corrected

(b) – 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 UKAS Accreditation scope.

APPENDIX C

Historical Trace Gas Chart

TABLE C: Historical Trace Gas Chart

