Element Materials Technology
Environmental UK Limited
Cutbush Commercial
Cutbush Lane East
Reading
RG2 9AF

P: +44 (0)118 466 4000

info.reading@element.com
element.com

REPORT FOR THE QUARTERLY EMISSIONS TO AIR FROM ENGINE EXHAUST STACKS USING A PORTABLE FLUE GAS ANALYSER

Permit Number:	RP 3733 PC
Installation:	Trecatti Landfill Site
Monitoring Dates:	28th February 2023
Client:	Biffa Waste Services Ltd
Address:	Rixton Old Hall Manchester Road Rixton Warrington WA3 6EW
Monitoring Organisation:	Element Materials Technology Environmental UK Limited
Address:	Cutbush Commercial Cutbush Lane East Reading RG2 9AF
Compiled By:	David Littlewood Operational Manager
Signed:	
Dated:	1st February 2023

CONTENTS

1. INTRODUCTION

1.1 Element Materials Technology Environmental UK Limited was commissioned by Mr L Wang, on behalf Biffa Waste Services Ltd, to measure the emissions to atmosphere from the installed landfill gas engines at Trecatti Landfill Site using an MCert Certified portable gas analyser (Testo 350XL and/or Horiba PG250).

1.2 Sampling was performed on the 28th February 2023.

1.3 The emission survey was conducted to provide information on engine performance and to provide regular improvement of emissions. Testing was specific to carbon monoxide and oxides of nitrogen, referenced to 5% oxygen normalised to standard temperature and pressure (STP).

2. SAMPLING PROCEDURES

2.1 The sampling and testing protocol adopted for this project was developed from Appendix C of the Environment Agencies Landfill Gas Technical Guidance Note 08, v2, 2010 'Guidance for Monitoring Landfill Gas Engine Emissions'.

2.2 The analysers used were within service and calibration specification. All sampling was performed from the 'turbo' port of the units, located within the engine container.

2.3 Calibration was performed with 258.8ppm nitric oxide and 1218ppm carbon monoxide (certified at ±2%) and clean air. Extraction was effected by a transfer line, through a stainless steel filtered probe. Gas was drawn through the analyser using the internal pump of the unit. The gas was conditioned to remove moisture prior to analysis.

3. RESULTS

3.1 The average measured concentrations of carbon monoxide, oxides of nitrogen (expressed as NO_2), and other parameters for the individual engines are given in the following table. The data is corrected to 273K, 101.3kPa, 5% O_2 and dry gas.

Engine ID	Sampling Time	Oxides of Nitrogen as NO_2 ($mg(N)m^{-3}$)	Carbon Monoxide ($mg(N)m^{-3}$)	Oxygen (%)
Engine 1	10:26 – 10:33	645	1288	7.03
Engine 3	Decommissioned			
Emission Limit	-	650	1500	-

Note: Concentrations at 273K, 101.3 kPa, 5% O_2 and dry gas

Engine ID	Sampling Time	Oxides of Nitrogen as NO_2 ($mg(N)m^{-3}$)	Carbon Monoxide ($mg(N)m^{-3}$)	Oxygen (%)
Engine 4	10:14 – 10:21	498	1163	7.18
Engine 5	09:57 – 10:04	435	1046	7.18
Engine 6	10:47 – 10:54	316	1147	7.7
Emission Limit	-	500	1400	-

Note: Concentrations at 273K, 101.3 kPa, 5%O_2 and dry gas

APPENDIX I

SITE DATA

Unit	Time	NOx (mg/m3 @5%)	CO (mg/m3 @5%)	O2 (%)
Engine 1 (Old Limits)	10:26:00	595	1211	7
	10:26:30	622	1238	7.03
	10:27:00	645	1286	7.07
	10:27:30	642	1286	7.05
	10:28:00	642	1290	7.08
	10:28:30	646	1294	7.07
	10:29:00	645	1300	7.06
	10:29:30	648	1299	7.02
	10:30:00	652	1300	7
	10:30:30	650	1299	7
	10:31:00	650	1299	7
	10:31:30	656	1302	7.01
	10:32:00	662	1309	7.04
	10:32:30	657	1304	7
	10:33:00	664	1309	7
	Average	**645**	**1288**	**7.03**

Unit	Time	NOx (mg/m3 @5%)	CO (mg/m3 @5%)	O2 (%)
Engine 4 (New Limits)	10:14:00	500	1170	7.1
	10:14:30	492	1155	7.1
	10:15:00	494	1159	7.2
	10:15:30	494	1158	7.16
	10:16:00	500	1162	7.2
	10:16:30	495	1162	7.18
	10:17:00	498	1165	7.2
	10:17:30	496	1164	7.2
	10:18:00	500	1164	7.2
	10:18:30	496	1160	7.16
	10:19:00	499	1162	7.18
	10:19:30	498	1164	7.17
	10:20:00	501	1170	7.2
	10:20:30	501	1163	7.19
	10:21:00	503	1161	7.22
	Average	**498**	**1163**	**7.18**

kW Engine Producing	MCR %
850	80

Unit	Time	NOx (mg/m3 @5%)	CO (mg/m3 @5%)	O2 (%)
	09:57:00	490	1088	7.09
	09:57:30	464	1073	7.17
	09:58:00	445	1048	7.2
	09:58:30	433	1044	7.21
	09:59:00	425	1044	7.22
	09:59:30	418	1039	7.2
	10:00:00	422	1042	7.22
	10:00:30	421	1035	7.22
	10:01:00	418	1038	7.2
	10:01:30	424	1039	7.18
	10:02:00	431	1041	7.17
	10:02:30	432	1041	7.17
	10:03:00	433	1040	7.17
	10:03:30	434	1041	7.17
	10:04:00	436	1041	7.17
	Average	**435**	**1046**	**7.18**

kW Engine Producing	MCR %
850	80

Unit	Time	NOx (mg/m3 @5%)	CO (mg/m3 @5%)	O2 (%)
Engine 6 (New Limits)	10:47:00	469	1226	7.4
	10:47:30	433	1214	7.56
	10:48:00	402	1192	7.64
	10:48:30	381	1172	7.66
	10:49:00	366	1161	7.68
	10:49:30	354	1154	7.69
	10:50:00	342	1142	7.72
	10:50:30	294	1130	7.71
	10:51:00	262	1126	7.73
	10:51:30	257	1127	7.74
	10:52:00	257	1129	7.75
	10:52:30	250	1125	7.75
	10:53:00	247	1116	7.77
	10:53:30	223	1096	7.81
	10:54:00	209	1090	7.86
	Average	**316**	**1147**	**7.7**