

PROJECT No	QC8223
PROJECT TITLE	Plymouth Energy from Waste CHP Facility
CLIENT	Kier Construction Ltd

DISCIPLINE	Civil / Structural
DOCUMENT TITLE	Additional Ground Gas Monitoring Specification
AUTHOR	Nathan Woods

DATE	21ST March 2011
CHECKED BY	Jon Goddard
AUTHORISED FOR ISSUE BY	Nathan Woods
DOCUMENT NUMBER	GG001
REVISION	C

CONTENTS

1.0	INTRODUCTION	3
2.0	SPECIFICATION REQUIREMENTS FOR ADDITIONAL GROUND GAS SAMPLING	4
3.0	REPORTING	4
	APPENDIX A	5
	APPENDIX B	6

1.0 INTRODUCTION

The following provides the requirements of the additional gas sampling to be undertaken at the proposed Energy from Waste CHP facility in Devonport Dockyard, Plymouth.

Gas sampling has been undertaken from 7 boreholes located in the vicinity of the proposed building between July and October 2010.

It is proposed to undertake further sampling over a three month period.

A borehole location plan is included in Appendix A

Results of previous sampling are included in Appendix B.

2.0 SPECIFICATION REQUIREMENTS FOR ADDITIONAL GROUND GAS SAMPLING

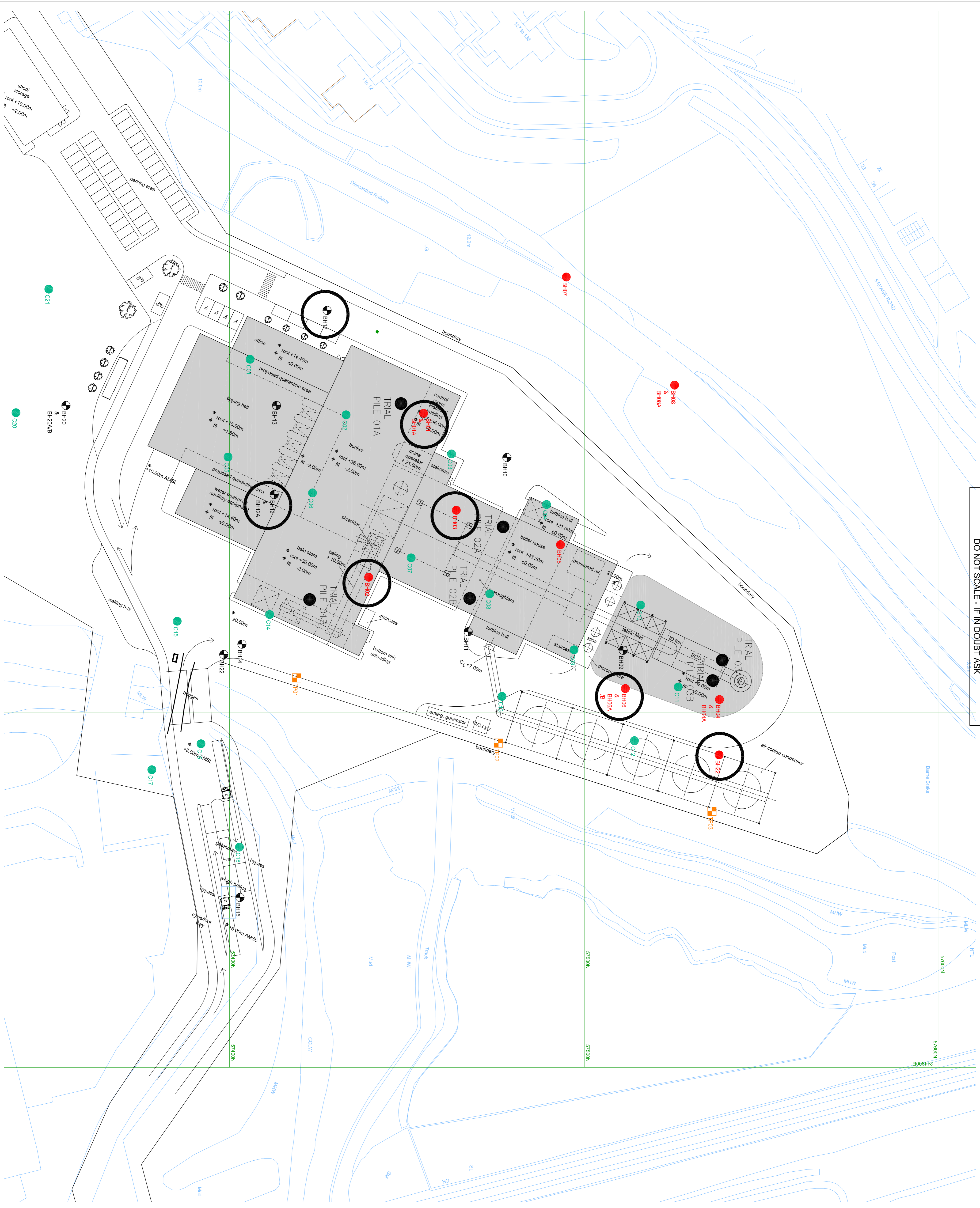
- Monitor the existing 7 borehole stations (taking bulk samples) on three additional occasions over three months. Borehole locations are shown on the location plan included in Appendix A. **Please note BH1a has a dual installation therefore two readings will be required.**
- **The first Gas sample taken from the lower installation in BH1a lower shall take the form of two no. bag samples. The remaining samples shall be taken with a Gas Monitor as carried out previously.**
- Monitor the ground gases over an 8 hour period that will coincide with high tide.
- Soil gas monitoring to be carried out using the existing monitoring stations and including at least one visit when atmospheric pressure is low (<1000Mb) and falling.
- Measurements to be taken of concentrations of methane, carbon dioxide and oxygen, together with flow rate, differential pressure and atmospheric pressure. Bulk Gas Bag samples shall be tested for the Bulk Suite for C1 to C7 analysis as defined in Geotechnics email to GHA Livigunn on 15th March 2011.
- Ground water levels are to be recorded.
- The time of taking measurements is to be recorded.
- The groundwater within the boreholes should be purged (minimum of three well volumes) 24 to 48 hours prior to gas monitoring to allow fresh groundwater to enter the borehole.
- All works are to be undertaken in accordance with CIRIA 665.

3.0 REPORTING

- Results and findings from each visit are to be reported back to Kier and MVV as soon as practically possible (no longer than 1 week after testing). Any additional monitoring / mitigation that may be required will be advised following a review of the findings.
- The results of each visit are to be provided in tabulated format following that included in Appendix B.

APPENDIX A – BOREHOLE LOCATION PLAN

DO NOT SCALE - IF IN DOUBT ASK



NOTES

- Cable percussion borehole
- Cable percussion borehole with rotary cored drilling following on
- Mechanically excavated trial pit
- CPTru probehole
- TRIAL PILE LOCATIONS
- LOCATIONS OF ADDITIONAL GAS MONITORING.

FOR INFORMATION

Rev	Date	Description	By	Chk	App
B	07/03/11	ADD. GAS MONITORING LOCATIONS ADDED	NW	KC	NW
A	27/1/11	INFORMATION	NW	KC	NW

gha ivigunn
 Chartered Office
 The Studio
 C1 Brookfield Road
 S16 1ES
 T: 0161 4814800
 F: 0161 4814700
 E: info@ghaivigunn.com
 W: www.ghaivigunn.com

CLIENT
KIER CONSTRUCTION LTD

PROJECT
PLYMOUTH EFW

TITLE
SI LOCATION PLAN

SCALE	1:500
DRAWING SIZE	A1
CAD FILE NAME	QC8223/10
DRAWING No.	QC8223/10
REV.	B

APPENDIX B – PREVIOUS GROUND GAS READINGS



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project PROPOSED ENERGY FROM WASTE PLANT, DEVONPORT,
PLYMOUTH

Project No PE100830
Borehole BH1A (P1)
Sheet No. 1 (1 of 2)

Client MVV UMWELT GMBH

Installation Details

Installation Type	Standpipe	Diameter	50mm
Depth to Base	7.00m	Cover Type	Flush lockable protective cover
Filter Zone	1.50 - 7.00m	Ground Level	7.62 m OD
Date Installed	13 July 2010		

Date	Time	Depth to Water (m bgl)	Methane CH4 (% VOL)	Methane CH4 (% LEL)	CO2 (Steady Reading) (% VOL)	O2 (Steady Reading) (% VOL)	N2 (Steady Reading) (% VOL)	H2S (Steady Reading) (ppm)	Remarks
27-Jul-2010	11:51:00	5.76	0.0	3.8	0.0	20.4	79.5	0	LEL dropped to zero after 30 seconds
11-Aug-2010	10:45:00	5.95	0.0	6.0	0.0	20.7	79.2	0	LEL dropped to zero after 10 seconds.
24-Aug-2010	09:05:00	5.71	1.1	5.0	0.0	19.6	80.3	0	LEL & CH4 Vol dropped to zero after 30seconds.
8-Sep-2010	12:20:00	5.83	0.0	0.0	0.0	20.2	79.2	0	
21-Sep-2010	11:20:00	5.89	0.0	0.0	0.0	20.4	79.5	0	
5-Oct-2010	11:05:00	5.81	1.2	2.5	0.0	20.8	79.2	0	LEL dropped to zero after 30 seconds

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project PROPOSED ENERGY FROM WASTE PLANT, DEVONPORT,
PLYMOUTH

Project No PE100830
Borehole BH1A (P1)
Sheet No. 1 (2 of 2)

Client MVV UMWELT GMBH

Installation Details

Installation Type	standpipe	Diameter	50mm
Depth to Base	7.00m	Cover Type	Flush lockable protective cover
Filter Zone	1.50 - 7.00m	Ground Level	7.62 m OD
Date Installed	13 July 2010		

Date	Time	CO (Steady Reading) (ppm)	Barometric Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
27-Jul-2010	11:51:00	0	1024	0.0	
11-Aug-2010	10:45:00	0	1016	4.5/0.0	
24-Aug-2010	09:05:00	0	1010	0.0	
8-Sep-2010	12:20:00	0	1004	0.0	
21-Sep-2010	11:20:00	0	1018	0.1	
5-Oct-2010	11:05:00	0	997	0.0	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project PROPOSED ENERGY FROM WASTE PLANT, DEVONPORT,
PLYMOUTH

Project No PE100830
Borehole BH1A (P2)
Sheet No. 1 (1 of 2)

Client MVV UMWELT GMBH

Installation Details

Installation Type	Standpipe	Diameter	50mm
Depth to Base	18.00m	Cover Type	Flush lockable protective cover
Filter Zone	9.00 - 18.00m	Ground Level	7.62 m OD
Date Installed	13 July 2010		

Date	Time	Depth to Water (m bgl)	Methane CH4 (% VOL)	Methane CH4 (% LEL)	CO2 (Steady Reading) (% VOL)	O2 (Steady Reading) (% VOL)	N2 (Steady Reading) (% VOL)	H2S (Steady Reading) (ppm)	Remarks
27-Jul-2010	11:45:00	5.34	76.0	>>>>	0.9	3.5	25.5	0	
11-Aug-2010	10:38:00	5.28	86.0	>>>>	0.8	2.5	20.6	0	CH4 VOL dropped to 76.0 after 1.5 minutes.
24-Aug-2010	09:00:00	5.22	11.0	>>>>	0.3	16.7	71.9	0	
8-Sep-2010	12:20:00	5.07	78.0	>>>>	0.6	4.1	30.3	0	
21-Sep-2010	11:20:00	5.40	50.0	>>>>	0.5	7.4	42.0	0	
5-Oct-2010	11:00:00	4.85	44.0	>>>>	1.1	8.3	50.9	0	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project PROPOSED ENERGY FROM WASTE PLANT, DEVONPORT,
PLYMOUTH

Project No PE100830
Borehole BH1A (P2)
Sheet No. 1 (2 of 2)

Client MVV UMWELT GMBH

Installation Details

Installation Type	Standpipe	Diameter	50mm
Depth to Base	18.00m	Cover Type	Flush lockable protective cover
Filter Zone	9.00 - 18.00m	Ground Level	7.62 m OD
Date Installed	13 July 2010		

Date	Time	CO (Steady Reading) (ppm)	Barometric Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
27-Jul-2010	11:45:00	0	1024	0.0	
11-Aug-2010	10:38:00	0	1016	4.5/0.0	
24-Aug-2010	09:00:00	0	1010	0.0	
8-Sep-2010	12:20:00	0	1004	0.0	
21-Sep-2010	11:20:00	0	1018	0.0	
5-Oct-2010	11:00:00	0	997	0.0	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project PROPOSED ENERGY FROM WASTE PLANT, DEVONPORT,
PLYMOUTH

Project No PE100830

Borehole BH2

Client MVV UMWELT GMBH

Sheet No. 1 (1 of 2)

Installation Details

Installation Type	Standpipe	Diameter	50mm
Depth to Base	30.00m	Cover Type	Flush lockable protective cover
Filter Zone	3.00 - 30.00m	Ground Level	8.07 m OD
Date Installed	13 July 2010		

Date	Time	Depth to Water (m bgl)	Methane CH4 (% VOL)	Methane CH4 (% LEL)	CO2 (Steady Reading) (% VOL)	O2 (Steady Reading) (% VOL)	N2 (Steady Reading) (% VOL)	H2S (Steady Reading) (ppm)	Remarks
27-Jul-2010	11:23:00	6.98	0.0	0.0	0.6	15.2	84.1	0	
11-Aug-2010	11:50:00	6.71	0.0	0.0	1.1	12.6	86.2	0	
24-Aug-2010	08:50:00	6.91	0.0	0.0	1.6	12.6	85.7	0	
8-Sep-2010	12:30:00	6.82	0.0	0.0	0.8	6.8	92.3	0	
21-Sep-2010	11:11:00		0.0	0.0	0.3	7.0	92.6	0	
5-Oct-2010	10:55:00	6.88	0.0	0.0	0.3	1.9	97.8	0	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project PROPOSED ENERGY FROM WASTE PLANT, DEVONPORT,
PLYMOUTH

Project No PE100830

Borehole BH2

Client MVV UMWELT GMBH

Sheet No. 1 (2 of 2)

Installation Details

Installation Type	standpipe	Diameter	50mm
Depth to Base	30.00m	Cover Type	Flush lockable protective cover
Filter Zone	3.00 - 30.00m	Ground Level	8.07 m OD
Date Installed	13 July 2010		

Date	Time	CO (Steady Reading) (ppm)	Barometric Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
27-Jul-2010	11:23:00	0	1023	0.0	
11-Aug-2010	11:50:00	0	1016	0.0	
24-Aug-2010	08:50:00	0	1010	0.0	
8-Sep-2010	12:30:00	0	1004	0.0	
21-Sep-2010	11:11:00	0	1018	0.0	
5-Oct-2010	10:55:00	0	997	0.0	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project PROPOSED ENERGY FROM WASTE PLANT, DEVONPORT,
PLYMOUTH

Project No PE100830

Borehole BH3

Client MVV UMWELT GMBH

Sheet No. 1 (1 of 2)

Installation Details

Installation Type	Standpipe	Diameter	50mm
Depth to Base	29.80m	Cover Type	Flush lockable protective cover
Filter Zone	1.50 - 29.80m	Ground Level	8.08 m OD
Date Installed	19 July 2010		

Date	Time	Depth to Water (m bgl)	Methane CH4 (% VOL)	Methane CH4 (% LEL)	CO2 (Steady Reading) (% VOL)	O2 (Steady Reading) (% VOL)	N2 (Steady Reading) (% VOL)	H2S (Steady Reading) (ppm)	Remarks
27-Jul-2010	11:34:00	7.02	0.0	0.0	0.6	16.9	82.4	0	
11-Aug-2010	11:55:00	6.75	0.0	0.0	0.3	18.9	80.7	0	
24-Aug-2010	08:54:00	7.02	0.1	0.4	3.1	9.8	87.0	0	CH4 Vol dropped to zero after 30 seconds.
8-Sep-2010	12:25:00	6.50	21	>>>>	1.3	14.1	83.9	0	CH4 Vol & LEL dropped to zero after 30 seconds
21-Sep-2010	11:15:00	7.09	0.0	0.0	1.6	13.0	85.3	0	
5-Oct-2010	10:45:00	6.81	0.0	0.0	2.4	10.8	86.7	0	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project PROPOSED ENERGY FROM WASTE PLANT, DEVONPORT,
PLYMOUTH

Project No PE100830

Borehole BH3

Client MVV UMWELT GMBH

Sheet No. 1 (2 of 2)

Installation Details

Installation Type	standpipe	Diameter	50mm
Depth to Base	29.80m	Cover Type	Flush lockable protective cover
Filter Zone	1.50 - 29.80m	Ground Level	8.08 m OD
Date Installed	19 July 2010		

Date	Time	CO (Steady Reading) (ppm)	Barometric Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
27-Jul-2010	11:34:00	0	1023	0.0	
11-Aug-2010	11:55:00	0	1016	0.0	
24-Aug-2010	08:54:00	0	1010	0.0	
8-Sep-2010	12:25:00	0	1004	-0.1	
21-Sep-2010	11:15:00	0	1018	0.0	
5-Oct-2010	10:45:00	0	997	0.0	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project PROPOSED ENERGY FROM WASTE PLANT, DEVONPORT,
PLYMOUTH

Project No PE100830

Borehole BH6B

Client MVV UMWELT GMBH

Sheet No. 1 (1 of 2)

Installation Details									
Installation Type		Standpipe			Diameter		50mm		
Depth to Base		30.00m			Cover Type		Flush lockable protective cover		
Filter Zone		1.50 - 30.00m			Ground Level		7.80 m OD		
Date Installed		16 July 2010							
Date	Time	Depth to Water (m bgl)	Methane CH4 (% VOL)	Methane CH4 (% LEL)	CO2 (Steady Reading) (% VOL)	O2 (Steady Reading) (% VOL)	N2 (Steady Reading) (% VOL)	H2S (Steady Reading) (ppm)	Remarks
27-Jul-2010	11:10:00	6.31	0.0	0.0	0.0	20.6	79.3	0	Had to remove bung to allow water to drain off
11-Aug-2010	11:30:00	6.04	0.0	0.0	1.1	11.1	87.7	0	
24-Aug-2010	08:40:00	6.32	0.0	0.0	1.2	10.9	87.8	0	
8-Sep-2010	12:35:00	5.80	0.0	0.0	0.0	9.5	90.6	0	Had to remove bung to allow water to drain.
21-Sep-2010	11:05:00	6.55	0.0	0.0	1.4	13.5	85.0	0	
5-Oct-2010	10:40:00	6.13	0.0	0.0	0.0	12.7	87.3	0	Had to remove bung to allow water to drain off

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project PROPOSED ENERGY FROM WASTE PLANT, DEVONPORT,
PLYMOUTH

Project No PE100830

Borehole BH6B

Client MVV UMWELT GMBH

Sheet No. 1 (2 of 2)

Installation Details

Installation Type	Standpipe	Diameter	50mm
Depth to Base	30.00m	Cover Type	Flush lockable protective cover
Filter Zone	1.50 - 30.00m	Ground Level	7.80 m OD
Date Installed	16 July 2010		

Date	Time	CO (Steady Reading) (ppm)	Barometric Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
27-Jul-2010	11:10:00	0	1023	0.0	
11-Aug-2010	11:30:00	0	1016	0.0	
24-Aug-2010	08:40:00	0	1010	0.0	
8-Sep-2010	12:35:00	0	1004	0.0	
21-Sep-2010	11:05:00	0	1018	0.0	
5-Oct-2010	10:40:00	0	997	0.0	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project PROPOSED ENERGY FROM WASTE PLANT, DEVONPORT,
PLYMOUTH

Project No PE100830

Borehole BH7

Client MVV UMWELT GMBH

Sheet No. 1 (1 of 2)

Installation Details

Installation Type	Standpipe	Diameter	50mm
Depth to Base	18.00m	Cover Type	Flush lockable protective cover
Filter Zone	1.50 - 18.00m	Ground Level	12.80 m OD
Date Installed	20 July 2010		

Date	Time	Depth to Water (m bgl)	Methane CH4 (% VOL)	Methane CH4 (% LEL)	CO2 (Steady Reading) (% VOL)	O2 (Steady Reading) (% VOL)	N2 (Steady Reading) (% VOL)	H2S (Steady Reading) (ppm)	Remarks
27-Jul-2010	13:22:00	8.70	0.0	0.0	0.3	20.2	79.4	0	
11-Aug-2010	13:33:00	8.66	0.0	0.0	1.9	18.6	79.4	0	
24-Aug-2010	13:30:00	8.53	0.0	0.0	1.9	17.0	81.0	0	
8-Sep-2010	13:00:00	8.30	0.0	0.0	0.3	19.5	79.8	0	
21-Sep-2010	12:15:00	8.60	0.0	0.0	1.2	19.2	79.5	0	
5-Oct-2010	12:55:		0.0	0.0	1.9	17.7	80.3	0	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project PROPOSED ENERGY FROM WASTE PLANT, DEVONPORT,
PLYMOUTH

Project No PE100830

Borehole BH7

Client MVV UMWELT GMBH

Sheet No. 1 (2 of 2)

Installation Details

Installation Type	standpipe	Diameter	50mm
Depth to Base	18.00m	Cover Type	Flush lockable protective cover
Filter Zone	1.50 - 18.00m	Ground Level	12.80 m OD
Date Installed	20 July 2010		

Date	Time	CO (Steady Reading) (ppm)	Barometric Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
27-Jul-2010	13:22:00	0	1022	0.0	
11-Aug-2010	13:33:00	0	1016	0.0	
24-Aug-2010	13:30:00	0	1010	0.0	
8-Sep-2010	13:00:00	0	1004	0.0	
21-Sep-2010	12:15:00	0	1018	0.0	
5-Oct-2010	12:55:	0	997	0.0	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project PROPOSED ENERGY FROM WASTE PLANT, DEVONPORT,
PLYMOUTH

Project No PE100830

Borehole BH8A

Client MVV UMWELT GMBH

Sheet No. 1 (1 of 2)

Installation Details

Installation Type	standpipe	Diameter	50mm
Depth to Base	9.20m	Cover Type	Flush lockable protective cover
Filter Zone	1.50 - 9.20m	Ground Level	13.68 m OD
Date Installed	21 July 2010		

Date	Time	Depth to Water (m bgl)	Methane CH4 (% VOL)	Methane CH4 (% LEL)	CO2 (Steady Reading) (% VOL)	O2 (Steady Reading) (% VOL)	N2 (Steady Reading) (% VOL)	H2S (Steady Reading) (ppm)	Remarks
27-Jul-2010	13:10:00	5.02	0.0	0.0	0.3	19.9	79.7	0	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project PROPOSED ENERGY FROM WASTE PLANT, DEVONPORT,
PLYMOUTH

Project No PE100830

Borehole BH8A

Client MVV UMWELT GMBH

Sheet No. 1 (2 of 2)

Installation Details

Installation Type	standpipe	Diameter	50mm
Depth to Base	9.20m	Cover Type	Flush lockable protective cover
Filter Zone	1.50 - 9.20m	Ground Level	13.68 m OD
Date Installed	21 July 2010		

Date	Time	CO (Steady Reading) (ppm)	Barometric Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
27-Jul-2010	13:10:00	0	1021	0.0	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project PROPOSED ENERGY FROM WASTE PLANT, DEVONPORT,
PLYMOUTH

Project No PE100830
Borehole BH12A
Sheet No. 1 (1 of 2)

Client MVV UMWELT GMBH

Installation Details									
Installation Type		Standpipe			Diameter		50mm		
Depth to Base		22.50m			Cover Type		Flush lockable protective cover		
Filter Zone		1.50 - 22.50m			Ground Level		7.73 m OD		
Date Installed		17 July 2010							
Date	Time	Depth to Water (m bgl)	Methane CH4 (% VOL)	Methane CH4 (% LEL)	CO2 (Steady Reading) (% VOL)	O2 (Steady Reading) (% VOL)	N2 (Steady Reading) (% VOL)	H2S (Steady Reading) (ppm)	Remarks
27-Jul-2010	12:10:00	4.83	0.0	0.0	0.0	20.1	79.8	0	Had to remove bung to allow water to drain off
11-Aug-2010	12:05:00	5.52	0.0	0.0	2.9	2.6	94.4	0	
24-Aug-2010	09:10:00	5.41	0.0	0.0	0.6	17.2	82.1	0	Had to remove bung to allow water to drain off.
8-Sep-2010	12:10:00	4.57	0.0	0.0	0.0	20.4	79.5	0	Had to remove bung to allow water to drain.
21-Sep-2010	11:30:00	4.85	0.0	0.0	1.8	14.7	83.5	0	
5-Oct-2010	11:20:00	4.35	0.0	0.0	3.0	5.5	91.4	0	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project PROPOSED ENERGY FROM WASTE PLANT, DEVONPORT,
PLYMOUTH

Project No PE100830

Borehole BH12A

Client MVV UMWELT GMBH

Sheet No. 1 (2 of 2)

Installation Details

Installation Type	standpipe	Diameter	50mm
Depth to Base	22.50m	Cover Type	Flush lockable protective cover
Filter Zone	1.50 - 22.50m	Ground Level	7.73 m OD
Date Installed	17 July 2010		

Date	Time	CO (Steady Reading) (ppm)	Barometric Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
27-Jul-2010	12:10:00	0	1024	0.0	
11-Aug-2010	12:05:00	0	1016	0.0	
24-Aug-2010	09:10:00	0	1010	0.0	
8-Sep-2010	12:10:00	0	1004	0.0	
21-Sep-2010	11:30:00	0	1018	0.0	
5-Oct-2010	11:20:00	0	997	0.0	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project PROPOSED ENERGY FROM WASTE PLANT, DEVONPORT,
PLYMOUTH

Project No PE100830

Borehole BH15

Client MVV UMWELT GMBH

Sheet No. 1 (1 of 2)

Installation Details

Installation Type	Standpipe	Diameter	50mm
Depth to Base	8.30m	Cover Type	Flush lockable protective cover
Filter Zone	1.50 - 8.30m	Ground Level	5.51 m OD
Date Installed	14 July 2010		

Date	Time	Depth to Water (m bgl)	Methane CH4 (% VOL)	Methane CH4 (% LEL)	CO2 (Steady Reading) (% VOL)	O2 (Steady Reading) (% VOL)	N2 (Steady Reading) (% VOL)	H2S (Steady Reading) (ppm)	Remarks
27-Jul-2010	12:23:00	4.48	0.0	0.0	0.0	20.3	79.6	0	Had to remove bung to clear blockage
11-Aug-2010	12:50:00	4.21	0.0	0.0	1.9	18.6	79.4	0	
24-Aug-2010	09:37:00	4.37	0.0	0.0	0.4	17.3	82.2	0	
8-Sep-2010	11:00:00	4.15	0.0	0.0	0.4	16.4	83.1	0	
21-Sep-2010	11:45:00	4.58	0.0	0.0	0.4	17.8	81.7	0	
5-Oct-2010	12:20:00	4.57	0.0	0.0	0.5	17.4	82.0	0	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project PROPOSED ENERGY FROM WASTE PLANT, DEVONPORT,
PLYMOUTH

Project No PE100830

Borehole BH15

Client MVV UMWELT GMBH

Sheet No. 1 (2 of 2)

Installation Details

Installation Type	standpipe	Diameter	50mm
Depth to Base	8.30m	Cover Type	Flush lockable protective cover
Filter Zone	1.50 - 8.30m	Ground Level	5.51 m OD
Date Installed	14 July 2010		

Date	Time	CO (Steady Reading) (ppm)	Barometric Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
27-Jul-2010	12:23:00	0	1025	0.0	
11-Aug-2010	12:50:00	0	1016	0.0	
24-Aug-2010	09:37:00	0	1010	0.0	
8-Sep-2010	11:00:00	0	1004	-0.1	
21-Sep-2010	11:45:00	0	1018	0.0	
5-Oct-2010	12:20:00	0	997	0.0	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project PROPOSED ENERGY FROM WASTE PLANT, DEVONPORT,
PLYMOUTH

Project No PE100830

Borehole BH17

Client MVV UMWELT GMBH

Sheet No. 1 (1 of 2)

Installation Details

Installation Type	Standpipe	Diameter	50mm
Depth to Base	15.30m	Cover Type	Flush lockable protective cover
Filter Zone	1.50 - 15.30m	Ground Level	7.50 m OD
Date Installed	6 July 2010		

Date	Time	Depth to Water (m bgl)	Methane CH4 (% VOL)	Methane CH4 (% LEL)	CO2 (Steady Reading) (% VOL)	O2 (Steady Reading) (% VOL)	N2 (Steady Reading) (% VOL)	H2S (Steady Reading) (ppm)	Remarks
27-Jul-2010	12:00:00	5.47	0.0	0.0	0.0	20.2	79.7	0	
11-Aug-2010	12:09:00	5.46	0.0	0.0	2.7	11.7	85.5	0	
24-Aug-2010	09:15:00	5.53	0.0	0.0	4.9	7.8	87.2	0	
8-Sep-2010	12:15:00		0.0	0.0	2.7	9.2	88.0	0	
21-Sep-2010	11:25:00	5.45	0.0	0.0	0.0	20.7	79.2	0	
5-Oct-2010	11:15:00	5.39	0.0	0.0	0.0	20.7	79.2	0	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project PROPOSED ENERGY FROM WASTE PLANT, DEVONPORT,
PLYMOUTH

Project No PE100830

Borehole BH17

Client MVV UMWELT GMBH

Sheet No. 1 (2 of 2)

Installation Details

Installation Type	Standpipe	Diameter	50mm
Depth to Base	15.30m	Cover Type	Flush lockable protective cover
Filter Zone	1.50 - 15.30m	Ground Level	7.50 m OD
Date Installed	6 July 2010		

Date	Time	CO (Steady Reading) (ppm)	Barometric Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
27-Jul-2010	12:00:00	0	1024	0.0	
11-Aug-2010	12:09:00	0	1016	0.0	
24-Aug-2010	09:15:00	0	1010	0.0	
8-Sep-2010	12:15:00	0	1004	0.0	
21-Sep-2010	11:25:00	0	1018	0.0	
5-Oct-2010	11:15:00	0	997	0.0	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project PROPOSED ENERGY FROM WASTE PLANT, DEVONPORT,
PLYMOUTH

Project No PE100830

Borehole BH18

Client MVV UMWELT GMBH

Sheet No. 1 (1 of 2)

Installation Details

Installation Type	Standpipe	Diameter	50mm
Depth to Base	16.00m	Cover Type	Flush lockable protective cover
Filter Zone	1.50 - 16.00m	Ground Level	10.97 m OD
Date Installed	8 July 2010		

Date	Time	Depth to Water (m bgl)	Methane CH4 (% VOL)	Methane CH4 (% LEL)	CO2 (Steady Reading) (% VOL)	O2 (Steady Reading) (% VOL)	N2 (Steady Reading) (% VOL)	H2S (Steady Reading) (ppm)	Remarks
27-Jul-2010	12:55:00	9.71	0.0	0.0	0.0	5.8	94.1	0	
11-Aug-2010	12:35:00	9.55	0.0	0.0	0.2	8.1	91.6	0	
24-Aug-2010	09:30:00	9.70	0.0	0.0	0.6	7.7	91.6	0	
8-Sep-2010	11:35:00	9.37	0.0	0.0	0.6	8.0	90.7	0	Had to remove bung to allow water to drain.
21-Sep-2010	11:40:00	9.74	0.0	0.0	0.4	10.2	89.3	0	
5-Oct-2010	11:55:00	9.69	0.0	0.0	1.0	10.2	88.7	0	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project PROPOSED ENERGY FROM WASTE PLANT, DEVONPORT,
PLYMOUTH

Project No PE100830

Borehole BH18

Client MVV UMWELT GMBH

Sheet No. 1 (2 of 2)

Installation Details

Installation Type	Standpipe	Diameter	50mm
Depth to Base	16.00m	Cover Type	Flush lockable protective cover
Filter Zone	1.50 - 16.00m	Ground Level	10.97 m OD
Date Installed	8 July 2010		

Date	Time	CO (Steady Reading) (ppm)	Barometric Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
27-Jul-2010	12:55:00	0	1025	0.0	
11-Aug-2010	12:35:00	0	1016	0.0	
24-Aug-2010	09:30:00	0	1010	0.0	
8-Sep-2010	11:35:00	0	1004	0.0	
21-Sep-2010	11:40:00	0	1018	0.0	
5-Oct-2010	11:55:00	0	997	0.0	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project PROPOSED ENERGY FROM WASTE PLANT, DEVONPORT,
PLYMOUTH

Project No PE100830

Borehole BH19

Client MVV UMWELT GMBH

Sheet No. 1 (1 of 2)

Installation Details

Installation Type	Standpipe	Diameter	50mm
Depth to Base	17.00m	Cover Type	Flush lockable protective cover
Filter Zone	1.50 - 17.00m	Ground Level	11.38 m OD
Date Installed	12 July 2010		

Date	Time	Depth to Water (m bgl)	Methane CH4 (% VOL)	Methane CH4 (% LEL)	CO2 (Steady Reading) (% VOL)	O2 (Steady Reading) (% VOL)	N2 (Steady Reading) (% VOL)	H2S (Steady Reading) (ppm)	Remarks
27-Jul-2010	12:47:00	10.36	0.0	0.0	0.0	17.9	82.0	0	Bung left open
11-Aug-2010	12:28:00	10.08	0.0	0.0	0.0	20.3	79.6	0	Had to remove bung to allow water to drain.
24-Aug-2010	12:05:00	10.38	0.0	0.0	0.4	15.2	84.3	0	Had to remove bung to allow water to drain
8-Sep-2010	11:25:00	10.37	0.0	0.0	0.0	20.6	79.3	0	Had to remove bung to allow water to drain.
21-Sep-2010	11:40:00	10.50	0.0	0.0	0.6	12.4	86.9	0	
5-Oct-2010	12:00:00	10.38	0.0	0.0	0.0	20.7	79.2	0	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project PROPOSED ENERGY FROM WASTE PLANT, DEVONPORT,
PLYMOUTH

Project No PE100830

Borehole BH19

Client MVV UMWELT GMBH

Sheet No. 1 (2 of 2)

Installation Details

Installation Type	Standpipe	Diameter	50mm
Depth to Base	17.00m	Cover Type	Flush lockable protective cover
Filter Zone	1.50 - 17.00m	Ground Level	11.38 m OD
Date Installed	12 July 2010		

Date	Time	CO (Steady Reading) (ppm)	Barometric Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
27-Jul-2010	12:47:00	0	1025	-0.2	
11-Aug-2010	12:28:00	0	1016	0.0	
24-Aug-2010	12:05:00	0	1010	0.0	
8-Sep-2010	11:25:00	0	1004	-0.1	
21-Sep-2010	11:40:00	0	1018	0.0	
5-Oct-2010	12:00:00	0	997	0.0	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project PROPOSED ENERGY FROM WASTE PLANT, DEVONPORT,
PLYMOUTH

Project No PE100830

Borehole BH21

Client MVV UMWELT GMBH

Sheet No. 1 (1 of 2)

Installation Details

Installation Type	Standpipe	Diameter	50mm
Depth to Base	29.80m	Cover Type	Flush lockable protective cover
Filter Zone	1.50 - 29.80m	Ground Level	7.77 m OD
Date Installed	21 July 2010		

Date	Time	Depth to Water (m bgl)	Methane CH4 (% VOL)	Methane CH4 (% LEL)	CO2 (Steady Reading) (% VOL)	O2 (Steady Reading) (% VOL)	N2 (Steady Reading) (% VOL)	H2S (Steady Reading) (ppm)	Remarks
27-Jul-2010	11:00:00	6.34	0.0	0.0	0.0	21.1	78.8	0	
11-Aug-2010	11:20:00	6.29	0.2	0.3	0.0	20.6	79.3	0	CH4 VOL and LEL dropped to zero in 10 seconds.
24-Aug-2010	08:30:00	6.32	0.0	0.0	0.2	19.6	80.1	0	
8-Sep-2010	12:40:00	6.34	0.0	0.0	0.0	19.9	80.0	0	
21-Sep-2010	11:00:00	6.36	0.0	0.0	0.0	20.7	79.2	0	
5-Oct-2010	10:30:00	6.27	0.0	0.0	0.0	21.0	79.0	0	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project PROPOSED ENERGY FROM WASTE PLANT, DEVONPORT,
PLYMOUTH

Project No PE100830

Borehole BH21

Client MVV UMWELT GMBH

Sheet No. 1 (2 of 2)

Installation Details

Installation Type	standpipe	Diameter	50mm
Depth to Base	29.80m	Cover Type	Flush lockable protective cover
Filter Zone	1.50 - 29.80m	Ground Level	7.77 m OD
Date Installed	21 July 2010		

Date	Time	CO (Steady Reading) (ppm)	Barometric Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
27-Jul-2010	11:00:00	0	1023	0.0	
11-Aug-2010	11:20:00	0	1016	0.0	
24-Aug-2010	08:30:00	0	1010	0.0	
8-Sep-2010	12:40:00	0	1004	0.0	
21-Sep-2010	11:00:00	0	1018	0.0	
5-Oct-2010	10:30:00	0	997	0.0	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project PROPOSED ENERGY FROM WASTE PLANT, DEVONPORT,
PLYMOUTH

Project No PE100830

Borehole BH22

Client MVV UMWELT GMBH

Sheet No. 1 (1 of 2)

Installation Details

Installation Type	Standpipe	Diameter	50mm
Depth to Base	10.00m	Cover Type	Flush lockable protective cover
Filter Zone	1.50 - 10.00m	Ground Level	5.23 m OD
Date Installed	19 July 2010		

Date	Time	Depth to Water (m bgl)	Methane CH4 (% VOL)	Methane CH4 (% LEL)	CO2 (Steady Reading) (% VOL)	O2 (Steady Reading) (% VOL)	N2 (Steady Reading) (% VOL)	H2S (Steady Reading) (ppm)	Remarks
27-Jul-2010	12:35:00	4.58	1.1	21.4	0.2	16.4	82.2	0	
11-Aug-2010	12:21:00	4.52	0.0	0.0	0.3	17.8	81.8	0	
24-Aug-2010	09:22:00	4.17	0.0	0.0	0.4	17.6	81.9	0	
8-Sep-2010	12:00:00	4.50	0.0	0.0	0.4	20.1	79.8	0	CO2 dropped to zero after 30 seconds.
21-Sep-2010	11:35:00	4.55	0.0	0.0	0.4	17.9	81.7	0	
5-Oct-2010	12:30:00	4.50	0.0	0.0	0.4	17.5	82.0	0	

Remarks



FIELDWORK - Insitu Gas Monitoring - Instrument Record

Project PROPOSED ENERGY FROM WASTE PLANT, DEVONPORT,
PLYMOUTH

Project No PE100830

Borehole BH22

Client MVV UMWELT GMBH

Sheet No. 1 (2 of 2)

Installation Details

Installation Type	standpipe	Diameter	50mm
Depth to Base	10.00m	Cover Type	Flush lockable protective cover
Filter Zone	1.50 - 10.00m	Ground Level	5.23 m OD
Date Installed	19 July 2010		

Date	Time	CO (Steady Reading) (ppm)	Barometric Pressure (mBars)	Flow Rate (Peak/Stable) (l/hr)	Remarks
27-Jul-2010	12:35:00	0	1025	0.0	
11-Aug-2010	12:21:00	0	1016	0.0	
24-Aug-2010	09:22:00	0	1010	0.0	
8-Sep-2010	12:00:00	0	1004	0.0	
21-Sep-2010	11:35:00	0	1018	0.0	
5-Oct-2010	12:30:00	0	997	0.0	

Remarks

