

**Exea Associates Limited**

Environmental Compliance and making money for our customers

# Final Report

## Marlbrook Landfill Site

Bromsgrove

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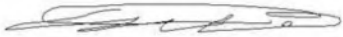
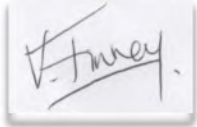
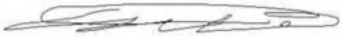
Director at:

**Exea Associates Ltd**

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Marlbrook Lane  
Bromsgrove  
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## Document Control Sheet

<b>Client</b>	<b>Worcester Regulatory Services</b>
<b>Client Reference</b>	<b>Mark Cox</b>
<b>Project</b>	<b>Marlbrook Landfill Site</b>
<b>Document Title</b>	<b>Final Report</b>
<b>Document Reference</b>	<b>EXEA/Marlbrook/2016</b>

	<b>Prepared by</b>	<b>Reviewed by</b>	<b>Issued by</b>
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<b>DATE</b> March 2016	<b>SIGNATURE</b> 	<b>SIGNATURE</b> 	<b>SIGNATURE</b> 

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## 1.0 Introduction

Exea Associates Ltd were commissioned by Worcester Regulatory Services to carry out gas monitoring at the Marlbrook landfill site on 12 occasions from January 2015 to December 2016. During the early stages of monitoring we did not expect there to be significant methane in boreholes near properties local to borehole 823, as data collected by AECOM on behalf of the site owner over an extended period of time did not identify any. Exea Associates Limited were notified in early March that methane had been measured in borehole 823. This was recorded by both Exea Associates Ltd and AECOM on a number of occasions during the assessment period resulting in a nitrogen purge and recovery test being commissioned as additional work to be carried out by Exea Associates Limited on borehole 823 in May 2015. A number of households were also visited and a laser survey was carried out using a TDL500 for Worcestershire Regulatory Services on behalf of Bromsgrove District Council.

## 1.1 Background

The Marlbrook landfill site was formed from the excavation of sands and gravels creating a void, which it is understood is approximate 2,000,000m<sup>3</sup>. This void was in-filled with various wastes. It accepted significant quantities of Industrial waste from the Longbridge car manufacturing plant, located approximately 4km away. Marlbrook landfill ceased operations in 1992, having been in constant use since the 1940s and records suggest that biodegradable content was not high. The Waste Disposal Licence was surrendered in accordance with the provisions of Control of Pollution Act 1974 as confirmed by the site engineering manager at that time, he has provided this information directly to Exea Associates Limited. The site has also been ploughed by a local business man in an attempt to claim it was arable land and then the current site owner took the site over for development as a golf course.

It is assumed, that the golf course site accepted wastes that included soils, bricks, concrete and an admix of wood and plastic and other materials as these can be observed across the site at surface level. Exea Associates Limited is not aware of the site being operated under a permit and it is not clear how the Exemptions from Waste Licensing/Permitting apply here. The current site owner has employed its own environmental consultant, "AECOM", to monitor landfill gas and water for a period described as "ten years".

In January 2015 Exea Associates Limited commenced monitoring of peripheral boreholes on behalf of Worcester Regulatory Services whereby boreholes have been monitored monthly on 12 occasions.

During this period we are informed that the boreholes in proximity to the houses situated in Ashgrove Close and Middle House Drive, along the boundary of the Marlbrook landfill site have not been affected by methane. This changed in early 2015 when methane was detected in borehole 823. On behalf of Bromsgrove District Council, Exea Associates Ltd was employed by Worcestershire

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Regulatory Services to monitor site boreholes in December 2014. Following on from the discovery of methane by AECOM in borehole 823 and their increase in monitoring frequency, Worcestershire Regulatory Services also commissioned Exea Associates Limited to carry out a laser survey for methane in properties and a Nitrogen Purge and Recovery Test in borehole 823. These works were carried out to inform the risk assessment for the site and identify if there are any immediate threats from methane to local residents and the environment.

## 2.0 Discussion

The Marlbrook landfill has been surcharged with significant quantities of soils and construction wastes. This is obvious when the site is traversed and includes bricks, concrete, re-bar, and other waste material. The consideration of wastes deposited at the site for surcharge are outside of the scope of the work carried out by Exea Associates Limited however the client is advised to consider the physical and chemical conditions of materials used for surcharge. At the very least we would advise that the stability calculations for the site and assumptions made in demonstrating the surcharge will remain intact are checked.

The monitoring carried out by Exea Associates Limited were severely impeded by the fact that boreholes were very difficult to find and when located they were not clearly marked, resulting in some boreholes not always being found and or monitored. This led to monitoring exercises taking much greater time than planned. Exea Associates resorted to placing identification markers to assist in finding the boreholes in what was poorly managed and overgrown site vegetation.

The data from borehole monitoring which can be seen in Appendix 1 has been manipulated to develop a number of time series graphs to include methane, carbon dioxide, oxygen, balance gas and atmospheric pressure. Exea Associates Ltd have also manipulated monitoring data so that a number of additional parameters can be considered, to include "Free" nitrogen, nitrogen to oxygen ratio, and methane to carbon dioxide ratio. This information can be used to understand what is happening in each borehole and the risks associated with the landfill gas at the site. We have however kept interpretation simple as general practice is not subject to this type of specialist assessment.

Boreholes are also currently monitored by AECOM on behalf of the site owner who we understand have been the consultant for the site for around 10 years. AECOM monitor both depth to water and gas in each borehole at bi-monthly intervals and in that time period Exea Associates are not aware that there has been any significant methane recorded close to the houses on the south west boundary of the site. In March 2015 AECOM recorded significant %v/v concentrations of methane in borehole 823 which is close to properties in Ashgrove close, this triggered additional site investigation work by both AECOM and Exea Associates Ltd.

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The monitoring data collected by Exea Associates Limited and the time series graphs created from the tabulated data can be seen in Appendix 1. These graphs demonstrate that in some boreholes there appears to be a direct correlation between, methane, carbon dioxide, oxygen and atmospheric pressure readings. There are numerous boreholes that appear to have a direct relationship between atmospheric pressure and gas concentrations found in the boreholes. This suggests that there is a phenomenon known as “barometric pumping” occurring. The highest risk of gas migration is when atmospheric pressure is falling, this is clear when the graphs created in Appendix 1 are viewed. The significant trend in boreholes where barometric pumping seems to be significant is the introduction and/or increase in both methane and carbon dioxide whilst oxygen and “balance” gas deplete as atmospheric pressure falls; this is all reversed as atmospheric pressure increases. This suggests that monitoring events should be planned where possible on days where atmospheric pressure is low in order to assess the site when there is the highest level of risk.

It should be noted that to enable correlation assessment the atmospheric pressure data has been adjusted to make differences more obvious and allow comparison with the other data. In essence if the lowest atmospheric pressure reading over 12 months is 951 we have adjusted this to 1 and where the next number is 962 we have adjusted to 12 and so on.

### 3.0 Conclusions

Based on 12 months monitoring Exea Associates Limited has the following comments:

- There is unreliable access to many of the boreholes as the site is overgrown with brambles and access to boreholes is not regularly maintained, this raises a safety issue for “AECOM” and Exea Associates Limited when approaching and finding hidden boreholes. This fact has been made known to all parties involved with the site.
- There is a risk that boreholes will not be monitored as a result of unreasonable risks of slips trips and falls. Exea Associates Ltd marked borehole locations to make the process of locating boreholes easier.
- A number of boreholes were without monitoring infrastructure for several occasions, this means full assessment cannot be made.
- Borehole headworks in some instances are not secure and there has been deliberate damage caused during the contract period.
- Gas data manipulation demonstrates that many boreholes are influenced by barometric pumping.
- There is Landfill gas migration at the site and this is via direct migration and via dissolved phase.
- The site conceptual model is not apparent as far as can be seen.
- The conceptual model for the site is complex with dissolved gases presenting different routes of migration that need to be better understood.
- There does not appear to be a full gas management plan for the site (action plan). The only actions observed when methane gas concentrations increase in “sensitive” boreholes is the carrying out of increased borehole monitoring. There needs to be a more detailed set of actions introduced.
- Landfill gas is entering numerous boreholes of which some are obviously significant and others are less obviously significant without a full understanding of the conceptual model.
- Landfill gas is entering borehole 823 intermittently and poses a small risk to the properties in Ashgrove Close, this assessment is based on the fact that there is only limited methane found in the garden to one property. The additional work carried out by Exea Associates Limited in May 2015 did not identify any landfill gas inside the houses around the site.
- A single garden situated adjacent to borehole 823 had low concentrations of methane (~30ppm) in close proximity to the landfill boundary. The construction design of houses is solid concrete floor and does not include suspended floors. This significantly reduces the possibility of gas entry into properties, however it should also be noted that no properties had gas nearby and the single property with gas in the garden was detected at the boundary of the landfill/garden.

- No methane was detected re-entering borehole 823 during the NPRT testing in May, Carbon Dioxide was detected at low concentrations. This may be due to the methane in migrating landfill gas being oxidized and weathered in the pathway, alternatively, it could be natural soil gas, alternatively it could be that atmospheric pressure was high and that gas and methane not being influenced by barometric pumping as described above.
- The re-entry of carbon dioxide with reduced oxygen during the NPRT test suggests that gas is from the landfill. The ongoing monitoring and the time series graphs confirm this.
- No landfill methane was observed in any of the properties that were surveyed using a laser. If this is considered along with the declining source term for gas generation from the Marlbrook landfill site, the distance of the landfill from the properties and the limited entry of methane into local boreholes. The lines of evidence here indicate that the risk of entry of landfill gas into the properties would seem to be very low.
- Borehole 823 is in a fit condition to measure landfill gases if used for gases only. The use of boreholes for gas and water monitoring is not normally considered appropriate as the response zones within the boreholes are usually different, and in this case it is unclear why water levels are monitored because the boreholes do not seem to be installed to full depth of waste or to aquifer depth. All other boreholes may be in the same condition, however it should be noted that when boreholes are no longer dipped for water and purged with air that gas readings are likely to change.
- Borehole 823 has not been a problem with gas entry for the duration of monitoring prior to March 2015. This changed in March 2015 and the surface emissions survey using the TDL500 Laser identified gas leaving desiccation cracks the other side of the fence and in the garden very close to the borehole
- It is possible that further surcharge of the site could alter the existing gas and leachate regime within the site. This will need to be fully assessed and monitored. Further surcharge of the waste may cause compression, decrease the permeability of capping that causes migration and increase leachate entry into groundwater. This leachate may contain gas and lead to enrichment of methane in the unsaturated zone.



#### 4.0 Recommendations

It is recommended that:

- All boreholes need to be clearly marked and access made easy. This recommendation falls outside of the scope of the works commissioned to Exea Associates Limited but is highly important as it will enable future monitoring works to be carried out in a safe manner.
- All boreholes in proximity to properties should be modified to have lockable head works.
- The same padlock type should be used on each headworks; each one being opened with a universal same key in order to simplify access.
- It is recommended that all boreholes situated close to residential properties are used for gas monitoring only, as dipping for depth to water allows each borehole continually to vent and to purge with air; this means collected gas is regularly replaced with atmospheric air which is not what is happening in the soil. If water level is still to be monitored we would recommend that the vast quantity of data already collected is reviewed to assess whether there are great differences in data collected with a view to reducing the frequency of depth to water assessment.
- It is also suggested that AECOM explain to Worcestershire Regulatory Services the purpose of the water monitoring data. If the exercise is necessary and valuable the site owner will need to install new boreholes for groundwater only.
- We would advise that existing boreholes that have sensitive receptors nearby should continue to be monitored for gas on a minimum of one monthly intervals.
- Where possible, the site boreholes should be visited by AECOM and Exea Associates Ltd when atmospheric conditions may increase the potential for migration. This will require a more flexible approach to monitoring.
- Borehole waters should be assessed for dissolved methane to allow assessment of the saturated zone being a migration pathway.
- A full conceptual model is developed for the site that accommodates geological/hydrogeological conditions and considers not only the impact of landfill gas on the local properties but which considers the fate and transport of dissolved methane. The depth to true groundwater should be determined.
- Worcestershire Regulatory Services should consider the installation of a couple of boreholes in close proximity to borehole 823. These boreholes should be secure and lockable and monitored on a monthly basis for methane, carbon dioxide, oxygen and balance and the data subject to interpretation.

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- The former site manager should be approached for detailed information on waste deposit areas and where gas migration is most likely.
- The site should have an improved Gas Management Plan that involves more than just increasing monitoring frequency.

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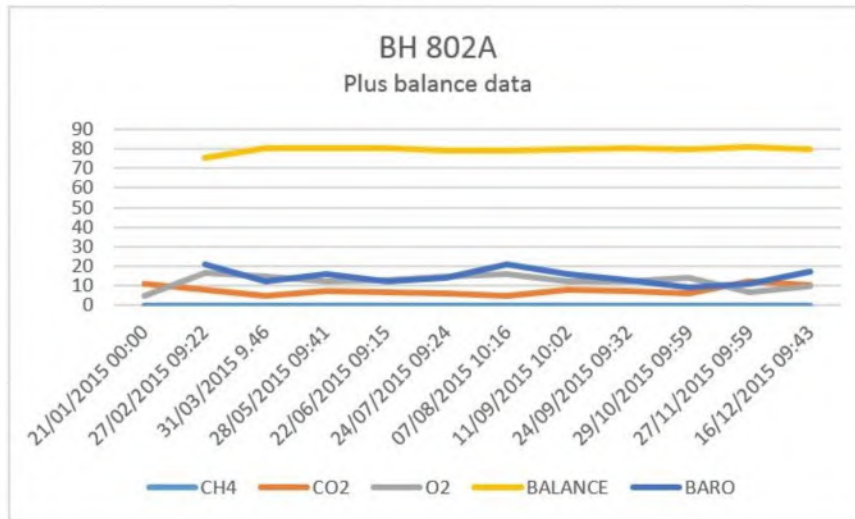
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Appendix 1- Monitoring Data and Graphs

**Borehole 802A**

***Borehole 802A with balance calculated***

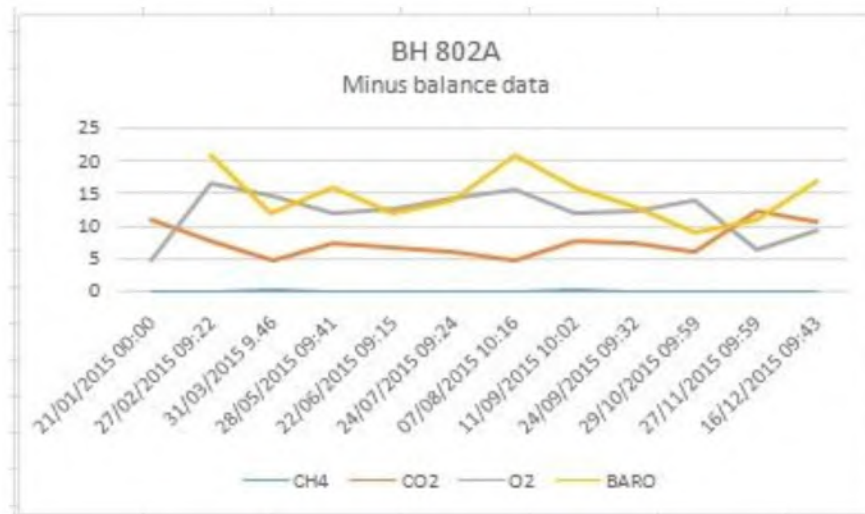
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21/01/2015 00:00	0	11.1	4.8		
27/02/2015 09:22	0	7.8	16.8	21	75.4
31/03/2015 09:46	0.1	4.8	14.9	12	80.2
28/05/2015 09:41	0	7.3	12.1	16	80.6
22/06/2015 09:15	0	6.8	12.8	12	80.4
24/07/2015 09:24	0	6.1	14.5	14	79.4
07/08/2015 10:16	0	4.9	15.8	21	79.3
11/09/2015 10:02	0.1	7.8	12.1	16	80
24/09/2015 09:32	0	7.3	12.4	13	80.3
29/10/2015 09:59	0	6.1	14	9	79.9
27/11/2015 09:59	0	12.4	6.5	11	81.1
16/12/2015 09:43	0	10.6	9.6	17	79.8



**Borehole 802A without balance data**

DATE	CH4	CO2	O2	BARO
21/01/2015 00:00	0	11.1	4.8	
27/02/2015 09:22	0	7.8	16.8	21
31/03/2015 9.46	0.1	4.8	14.9	12
28/05/2015 09:41	0	7.3	12.1	16
22/06/2015 09:15	0	6.8	12.8	12
24/07/2015 09:24	0	6.1	14.5	14
07/08/2015 10:16	0	4.9	15.8	21
11/09/2015 10:02	0.1	7.8	12.1	16
24/09/2015 09:32	0	7.3	12.4	13
29/10/2015 09:59	0	6.1	14	9

27/11/2015 09:59	0	12.4	6.5	11
16/12/2015 09:43	0	10.6	9.6	17



Borehole reference 802a		
Condition	Y/N	Comment
Borehole inaccessible or headworks missing	Y	BH visited on all occasions
Air entry into borehole	Y	
Barometric pumping	Y	
Enrichment of methane	N	

### Borehole 803

#### Borehole 803 with balance data

DATE	CH4	CO2	O2	BARO	BALANCE
21/01/2015 00:00	0	5.8	7.4		
27/02/2015 09:40	0	2	10	21	88
31/03/2015 09:55	0.3	2.3	5.2	13	92.2

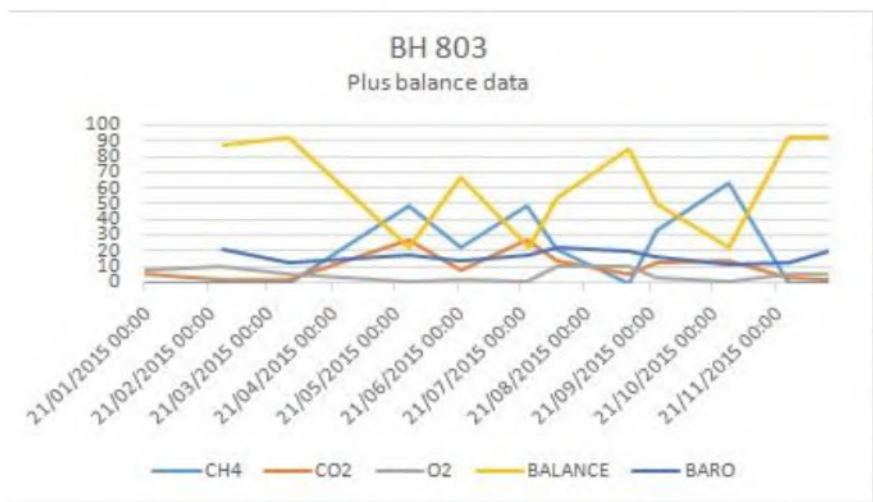
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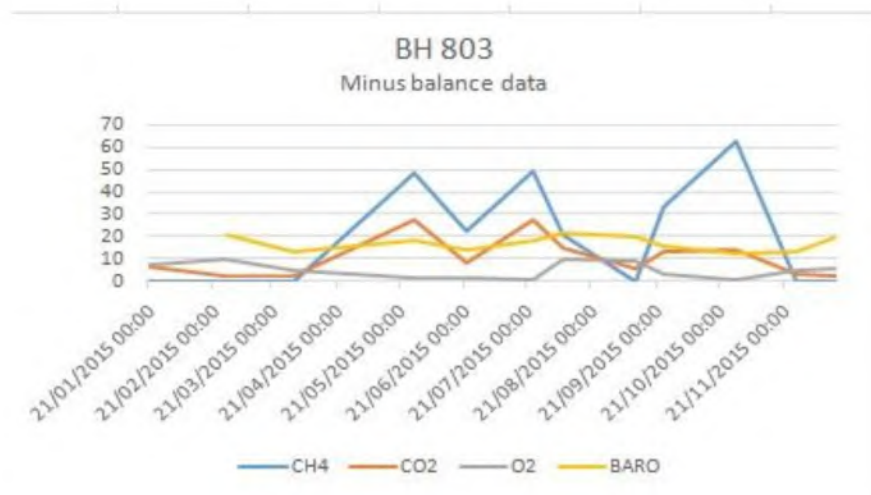
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28/05/2015 09:52	48.4	27.6	0.8	18	23.2
22/06/2015 09:28	22.9	8.3	1.6	14	67.2
24/07/2015 10:07	49.4	27.7	0.3	18	22.6
07/08/2015 10:23	21.3	14.6	10.2	22	53.9
11/09/2015 10:28	0	5.2	9.6	20	85.2
24/09/2015 09:45	33.7	13	3.2	16	50.1
29/10/2015 10:08	63.1	13.8	0.5	12	22.6
27/11/2015 10:09	0	2.8	5.2	13	92
16/12/2015 09:51	0	1.9	5.7	20	92.4



**Borehole 803 without balance data**

DATE	CH4	CO2	O2	BARO
21/01/2015 00:00	0	5.8	7.4	
27/02/2015 09:40	0	2	10	21
31/03/2015 09:55	0.3	2.3	5.2	13
28/05/2015 09:52	48.4	27.6	0.8	18
22/06/2015 09:28	22.9	8.3	1.6	14
24/07/2015 10:07	49.4	27.7	0.3	18
07/08/2015 10:23	21.3	14.6	10.2	22
11/09/2015 10:28	0	5.2	9.6	20
24/09/2015 09:45	33.7	13	3.2	16
29/10/2015 10:08	63.1	13.8	0.5	12
27/11/2015 10:09	0	2.8	5.2	13
16/12/2015 09:51	0	1.9	5.7	20



<b>Borehole reference 803</b>		
<b>Condition</b>	<b>Y/N</b>	<b>Comment</b>
Borehole inaccessible or headworks missing	Y	BH visited on all occasions
Air entry into borehole	Y	
Barometric pumping	Y	
Enrichment of methane	N	

## **Borehole 806**

### ***Borehole 806 with balance data***

<b>DATE</b>	<b>CH4</b>	<b>CO2</b>	<b>O2</b>	<b>BARO</b>	<b>BALANCE</b>
21/01/2015 00:00	26.4	32.5	4.7		
27/02/2015 09:56	0	0.9	20.8	23	78.3
31/03/2015 10:04	0.1	1	20.3	14	78.6
28/05/2015 10:02	0	0.4	20.9	19	78.7
22/06/2015 09:59	0	0.3	20.8	14	78.9
24/07/2015 10:19	0	0.3	21.5	18	78.2
07/08/2015 10:36	0	0.2	21.3	24	78.5
11/09/2015 10:35	0	1.9	18.7	21	79.4
24/09/2015 09:54	0	0.5	20.7	17	78.8
29/10/2015 10:17	0.2	1.8	19.7	13	78.3
27/11/2015 10:18	0	0.1	21.7	14	78.2
16/12/2015 10:02	0	0.1	21.8	21	78.1

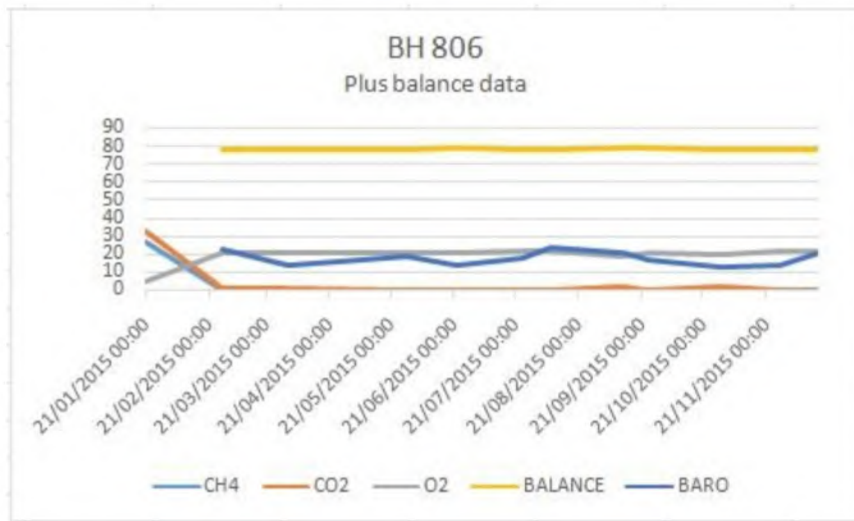
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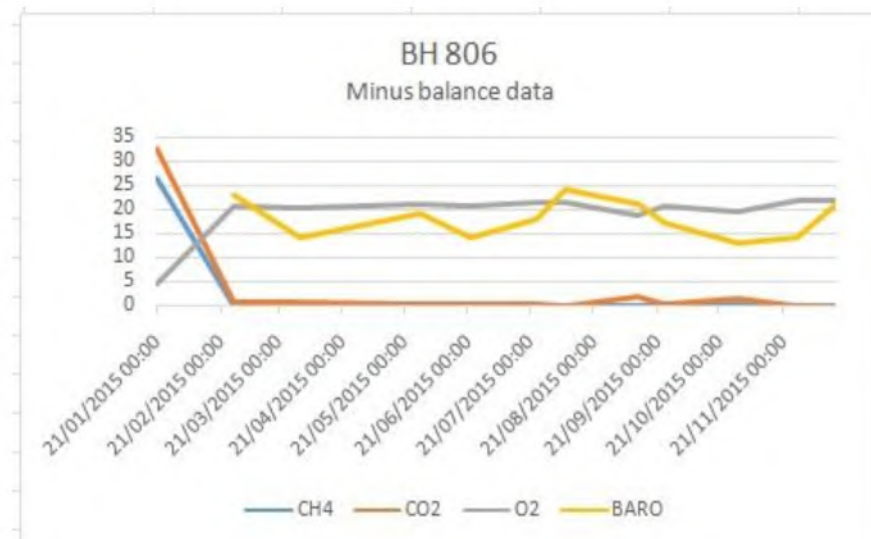


**Borehole 806 without balance data**

DATE	CH4	CO2	O2	BARO
21/01/2015 00:00	26.4	32.5	4.7	
27/02/2015 09:56	0	0.9	20.8	23
31/03/2015 10:04	0.1	1	20.3	14
28/05/2015 10:02	0	0.4	20.9	19
22/06/2015 09:59	0	0.3	20.8	14
24/07/2015 10:19	0	0.3	21.5	18
07/08/2015 10:36	0	0.2	21.3	24
11/09/2015 10:35	0	1.9	18.7	21
24/09/2015 09:54	0	0.5	20.7	17

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29/10/2015 10:17	0.2	1.8	19.7	13
27/11/2015 10:18	0	0.1	21.7	14
16/12/2015 10:02	0	0.1	21.8	21



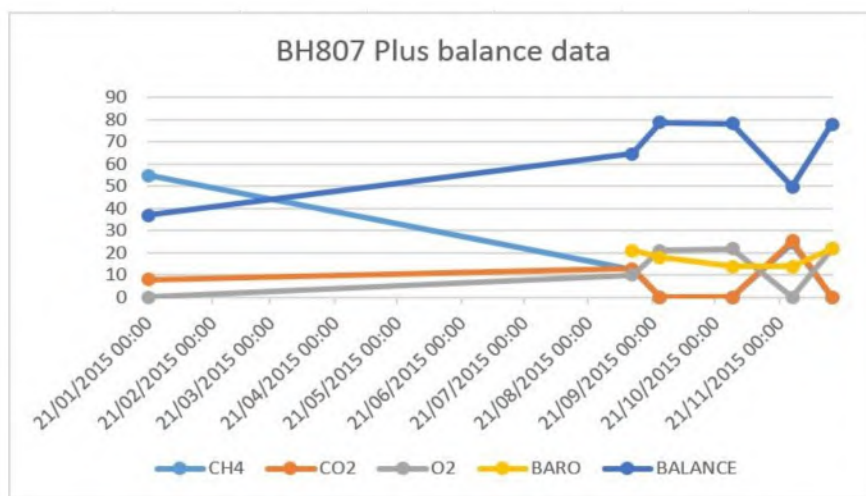
Borehole reference 806		
Condition	Y/N	Comment
Borehole inaccessible or headworks missing	Y	Borehole visited on all occasions
Air entry into borehole	Y	
Barometric pumping	N	
Enrichment of methane	N	

### Borehole 807

#### Borehole 807 with balance data

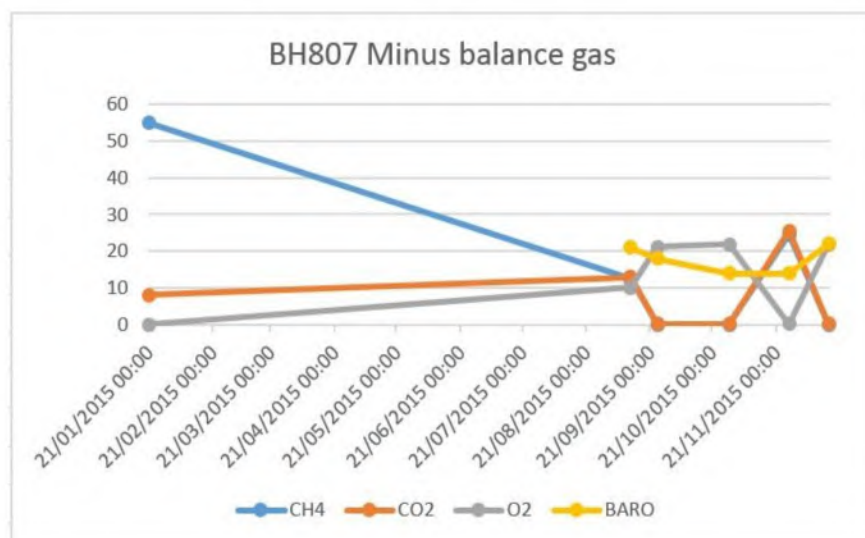
DATE	CH4	CO2	O2	BARO	BALANCE
21/01/2015 00:00	54.9	8	0.02		

27/02/2015 00:00	Not accessible				
31/03/2015 00:00	Not accessible				
28/05/2015 00:00	Not accessible				
22/06/2015 00:00	Not accessible				
24/07/2015 00:00	Not accessible				
07/08/2015 00:00	Not accessible				
11/09/2015 10:48	12.4	12.9	10.1	21	64.6
24/09/2015 10:04	0	0.1	21.2	18	78.7
29/10/2015 10:26	0	0.1	21.8	14	78.1
27/11/2015 10:29	24.5	25.5	0.2	14	49.8
16/12/2015 10:12	0	0.1	21.9	22	78



**Borehole 807 without balance data**

DATE	CH4	CO2	O2	BARO
21/01/2015 00:00	54.9	8	0.02	
27/02/2015 00:00	Not accessible			
31/03/2015 00:00	Not accessible			
28/05/2015 00:00	Not accessible			
22/06/2015 00:00	Not accessible			
24/07/2015 00:00	Not accessible			
07/08/2015 00:00	Not accessible			
11/09/2015 10:48	12.4	12.9	10.1	21
24/09/2015 10:04	0	0.1	21.2	18
29/10/2015 10:26	0	0.1	21.8	14
27/11/2015 10:29	24.5	25.5	0.2	14
16/12/2015 10:12	0	0.1	21.9	22



<b>Borehole reference 807</b>		
<b>Condition</b>	<b>Y/N</b>	<b>Comment</b>
Borehole inaccessible or headworks missing	Y	Inaccessible on 6 occasions
Air entry into borehole		Insufficient data
Barometric pumping		Insufficient data
Enrichment of methane		Insufficient data

### **Borehole 809**

#### ***Borehole 809 with balance data***

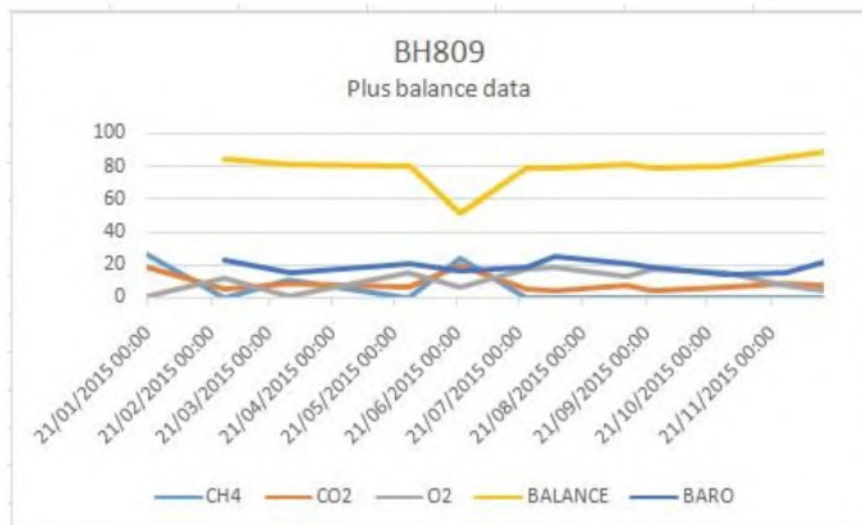
<b>DATE</b>	<b>CH4</b>	<b>CO2</b>	<b>O2</b>	<b>BARO</b>	<b>BALANCE</b>
21/01/2015 00:00	26	18.7	0.7		
27/02/2015 10:09	0	5	11.3	23	83.7
31/03/2015 10:13	10.5	8.2	0.5	15	80.8
28/05/2015 10:16	0	5.8	15	21	79.2
22/06/2015 10:20	23.5	19.4	5.8	16	51.3
24/07/2015 10:39	0	5	16.7	18	78.3
07/08/2015 10:49	0	3.9	18	25	78.1
11/09/2015 10:59	0	6.7	12.6	21	80.7
24/09/2015 10:14	0	4.3	17.1	18	78.6
29/10/2015 10:35	0	5.8	15	14	79.2
27/11/2015 10:43	0	8	7	15	85
16/12/2015 10:21	0	7.4	4.2	22	88.4

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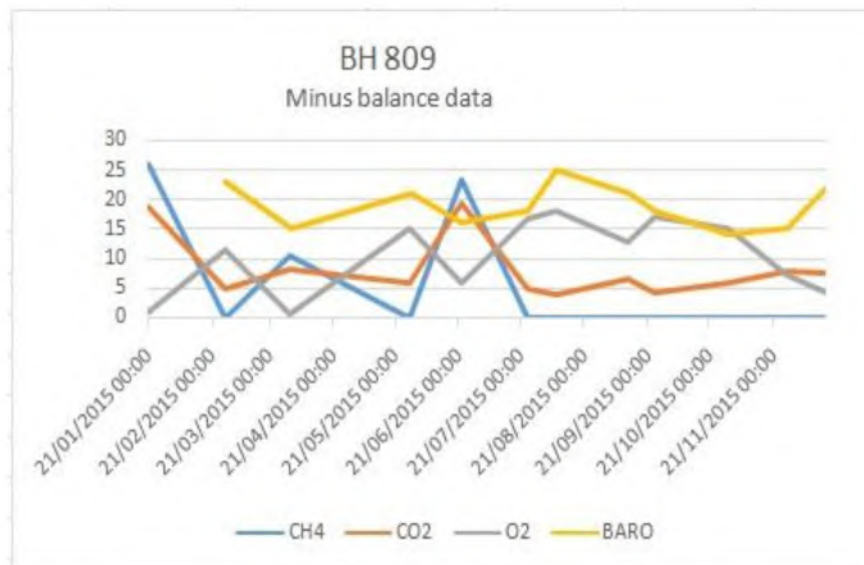
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Registered in England & Wales



**Borehole 809 without balance**

DATE	CH4	CO2	O2	BARO
21/01/2015 00:00	26	18.7	0.7	
27/02/2015 10:09	0	5	11.3	23
31/03/2015 10:13	10.5	8.2	0.5	15
28/05/2015 10:16	0	5.8	15	21
22/06/2015 10:20	23.5	19.4	5.8	16
24/07/2015 10:39	0	5	16.7	18
07/08/2015 10:49	0	3.9	18	25
11/09/2015 10:59	0	6.7	12.6	21
24/09/2015 10:14	0	4.3	17.1	18

29/10/2015 10:35	0	5.8	15	14
27/11/2015 10:43	0	8	7	15
16/12/2015 10:21	0	7.4	4.2	22



Borehole reference 809		
Condition	Y/N	Comment
Borehole inaccessible or headworks missing	Y	BH visited on all occasions
Air entry into borehole	Y	
Barometric pumping	Y	
Enrichment of methane	N	

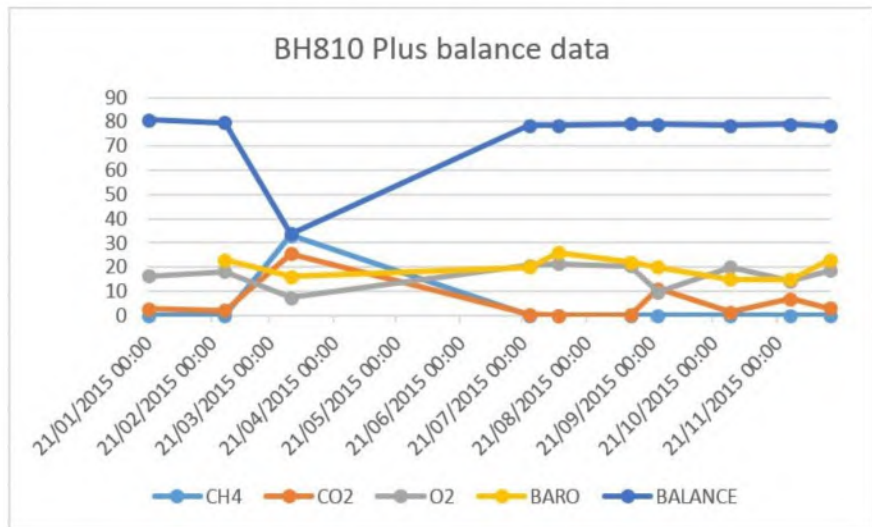
**Borehole 810**

**Borehole 810 with balance data**

DATE	CH4	CO2	O2	BARO	BALANCE
21/01/2015 00:00	0	2.8	16.4		
27/02/2015 10:21	0	2.2	18.1	23	79.7

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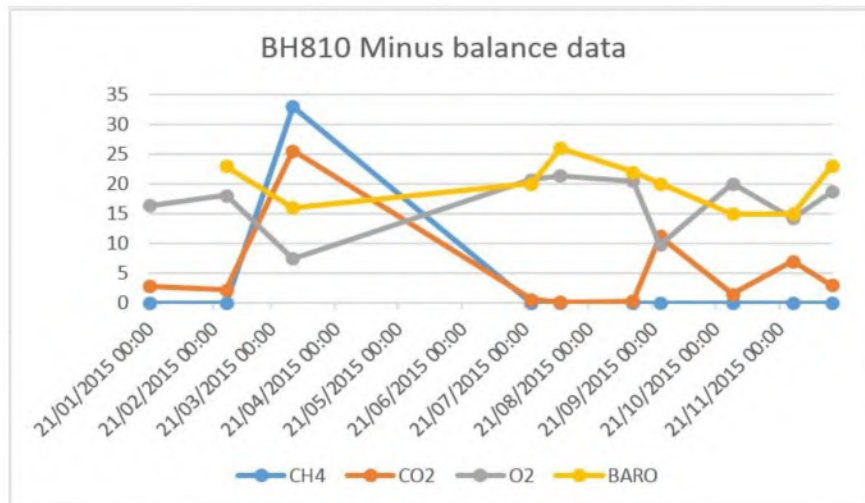
31/03/2015 10:25	33	25.6	7.5	16	33.9
28/05/2015 00:00	Not accessible				
22/06/2015 00:00	Not accessible				
24/07/2015 10:58	0	0.6	20.8	20	78.6
07/08/2015 10:55	0	0.1	21.4	26	78.5
11/09/2015 11:05	0	0.3	20.5	22	79.2
24/09/2015 10:22	0	11.2	9.8	20	79
29/10/2015 10:42	0	1.5	20	15	78.5
27/11/2015 10:49	0	7	14.2	15	78.8
16/12/2015 10:28	0	3	18.7	23	78.3





**Borehole 810 without balance data**

DATE	CH4	CO2	O2	BARO
21/01/2015 00:00	0	2.8	16.4	
27/02/2015 10:21	0	2.2	18.1	23
31/03/2015 10:25	33	25.6	7.5	16
28/05/2015 00:00	Not accessible			
22/06/2015 00:00	Not accessible			
24/07/2015 10:58	0	0.6	20.8	20
07/08/2015 10:55	0	0.1	21.4	26
11/09/2015 11:05	0	0.3	20.5	22
24/09/2015 10:22	0	11.2	9.8	20
29/10/2015 10:42	0	1.5	20	15
27/11/2015 10:49	0	7	14.2	15
16/12/2015 10:28	0	3	18.7	23

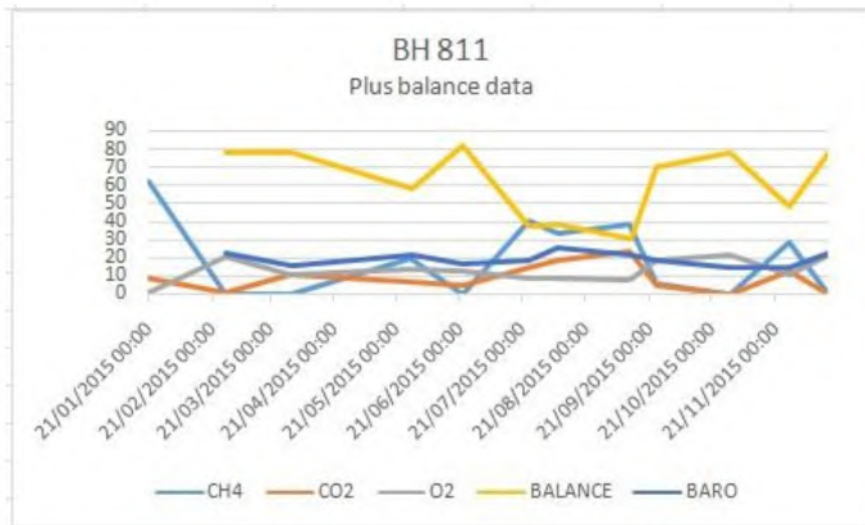


<b>Borehole reference 810</b>		
<b>Condition</b>	<b>Y/N</b>	<b>Comment</b>
Borehole inaccessible or headworks missing	Y	BH inaccessible on two occasions
Air entry into borehole	Y	
Barometric pumping	Y	
Enrichment of methane	N	

### **Borehole 811**

#### ***Borehole 811 with balance data***

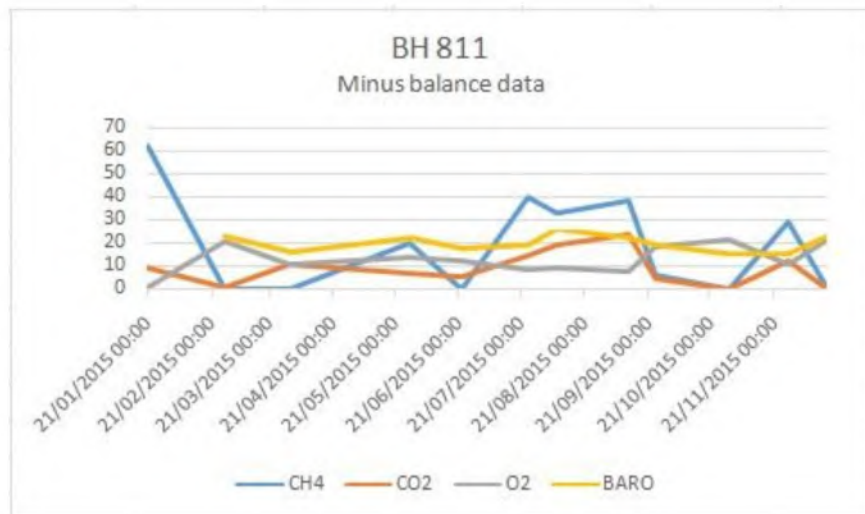
<b>DATE</b>	<b>CH4</b>	<b>CO2</b>	<b>O2</b>	<b>BARO</b>	<b>BALANCE</b>
21/01/2015 00:00	61.9	9	0.7		
27/02/2015 10:33	0.1	0.7	20.6	23	78.6
31/03/2015 10:32	0.1	10.6	10.6	16	78.7
28/05/2015 10:46	20.1	7.3	14	22	58.6
22/06/2015 10:37	0.1	5.2	12.5	17	82.2
24/07/2015 11:20	39.8	14.5	8.4	19	37.3
07/08/2015 11:05	33.1	18.9	9.1	26	38.9
11/09/2015 11:13	38.3	23.4	7.6	22	30.7
24/09/2015 10:29	5.9	4.8	18.5	19	70.8
29/10/2015 10:51	0.1	0.4	21.4	15	78.1
27/11/2015 11:00	28.8	12.4	10.6	15	48.2
16/12/2015 10:36	0	0.2	21.5	23	78.3



**Borehole 811 without balance data**

DATE	CH4	CO2	O2	BARO
21/01/2015 00:00	61.9	9	0.7	
27/02/2015 10:33	0.1	0.7	20.6	23
31/03/2015 10:32	0.1	10.6	10.6	16
28/05/2015 10:46	20.1	7.3	14	22
22/06/2015 10:37	0.1	5.2	12.5	17
24/07/2015 11:20	39.8	14.5	8.4	19
07/08/2015 11:05	33.1	18.9	9.1	26
11/09/2015 11:13	38.3	23.4	7.6	22
24/09/2015 10:29	5.9	4.8	18.5	19

29/10/2015 10:51	0.1	0.4	21.4	15
27/11/2015 11:00	28.8	12.4	10.6	15
16/12/2015 10:36	0	0.2	21.5	23



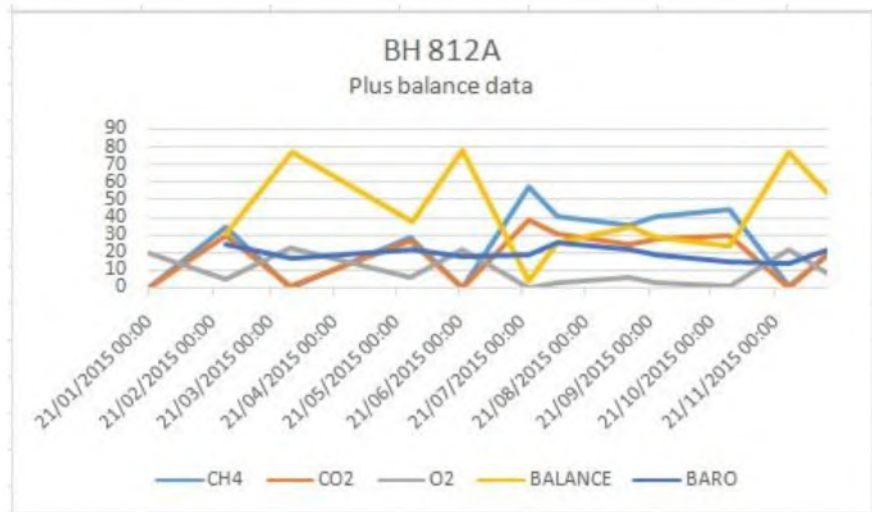
Borehole reference 811		
Condition	Y/N	Comment
Borehole inaccessible or headworks missing	Y	BH visited on all occasions
Air entry into borehole	Y	
Barometric pumping	Y	
Enrichment of methane	Y	On one occasion

**Borehole 812A**

**Borehole 812A with balance data**

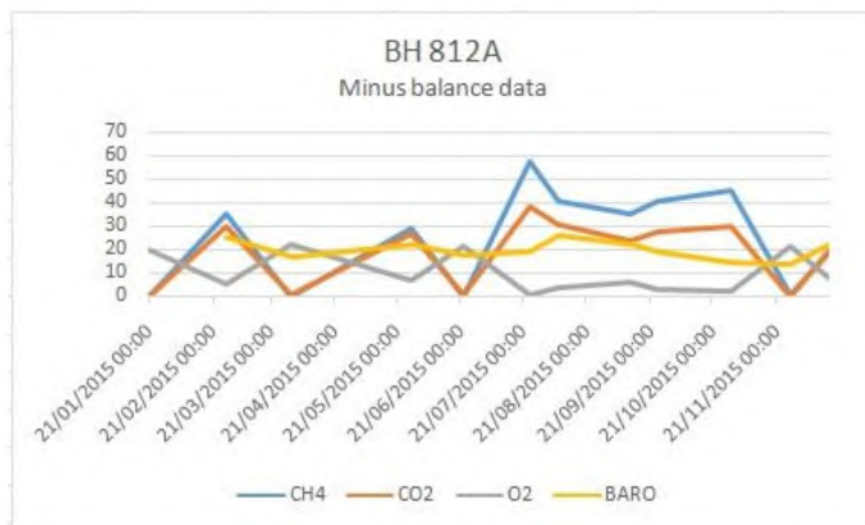
DATE	CH4	CO2	O2	BARO	BALANCE
21/01/2015 00:00	0	0.1	19.7		
27/02/2015 10:48	35.1	29.7	5.1	25	30.1

31/03/2015 10:39	0.1	0.7	22.2	17	77
28/05/2015 11:04	29.2	26.9	6.4	22	37.5
22/06/2015 10:51	0.1	0.5	21.1	18	78.3
24/07/2015 11:28	57.7	38.4	0.3	19	3.6
07/08/2015 11:12	40.4	30.8	3.1	26	25.7
11/09/2015 11:35	35.4	24.2	5.7	22	34.7
24/09/2015 10:42	40.8	27.4	2.9	19	28.9
29/10/2015 11:03	45.2	29.7	1.5	15	23.6
27/11/2015 11:16	0.6	0.2	21.7	14	77.5
16/12/2015 10:48	19.3	19.7	7.6	22	53.4



**Borehole 812A without balance data**

DATE	CH4	CO2	O2	BARO
21/01/2015 00:00	0	0.1	19.7	
27/02/2015 10:48	35.1	29.7	5.1	25
31/03/2015 10:39	0.1	0.7	22.2	17
28/05/2015 11:04	29.2	26.9	6.4	22
22/06/2015 10:51	0.1	0.5	21.1	18
24/07/2015 11:28	57.7	38.4	0.3	19
07/08/2015 11:12	40.4	30.8	3.1	26
11/09/2015 11:35	35.4	24.2	5.7	22
24/09/2015 10:42	40.8	27.4	2.9	19
29/10/2015 11:03	45.2	29.7	1.5	15
27/11/2015 11:16	0.6	0.2	21.7	14
16/12/2015 10:48	19.3	19.7	7.6	22



<b>Borehole reference 812A</b>		
<b>Condition</b>	<b>Y/N</b>	<b>Comment</b>
Borehole inaccessible or headworks missing	Y	BH visited on all occasions
Air entry into borehole	Y	
Barometric pumping	Y	CO2 only
Enrichment of methane	N	

## **Borehole 812**

### ***Borehole 812 with balance data***

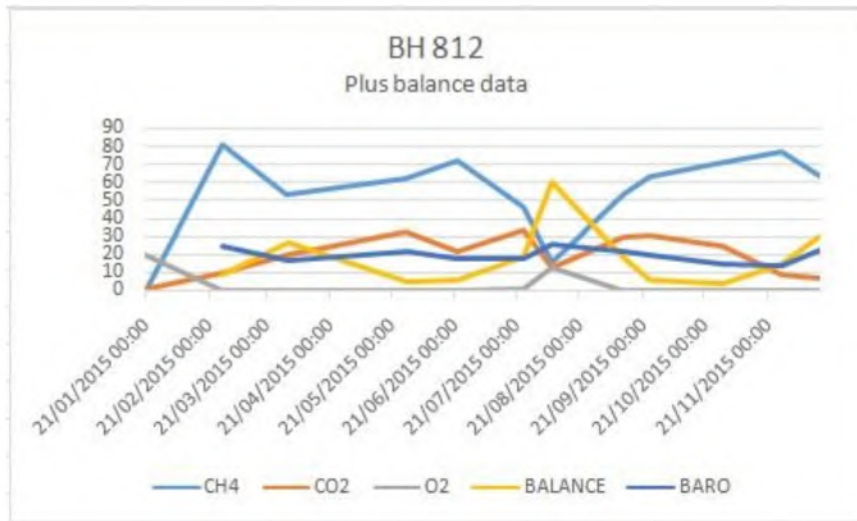
<b>DATE</b>	<b>CH4</b>	<b>CO2</b>	<b>O2</b>	<b>BARO</b>	<b>BALANCE</b>
21/01/2015 00:00	0	0.9	19.2		
27/02/2015 10:58	80.8	9.6	0.5	25	9.1
31/03/2015 10:48	53.5	19.8	0.4	17	26.3
28/05/2015 11:13	62.1	32.6	0.5	22	4.8
22/06/2015 11:04	71.6	21.8	0.5	18	6.1
24/07/2015 11:34	46	33.5	1.6	18	18.9
07/08/2015 11:18	15.6	12.3	12.4	26	59.7
11/09/2015 11:20	53	29.4	0.4	22	17.2
24/09/2015 10:36	63.2	30.8	0.3	20	5.7
29/10/2015 10:57	71.4	24.7	0.3	15	3.6
27/11/2015 11:07	76.9	8.5	0.3	14	14.3
16/12/2015 10:43	63.2	6.5	0.3	23	30

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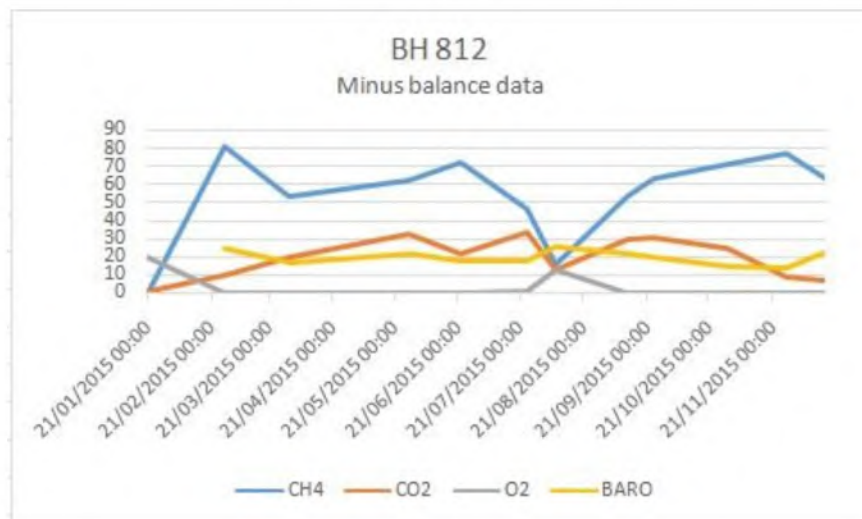


**Borehole 812 without balance data**

DATE	CH4	CO2	O2	BARO
21/01/2015 00:00	0	0.9	19.2	
27/02/2015 10:58	80.8	9.6	0.5	25
31/03/2015 10:48	53.5	19.8	0.4	17
28/05/2015 11:13	62.1	32.6	0.5	22
22/06/2015 11:04	71.6	21.8	0.5	18
24/07/2015 11:34	46	33.5	1.6	18
07/08/2015 11:18	15.6	12.3	12.4	26
11/09/2015 11:20	53	29.4	0.4	22
24/09/2015 10:36	63.2	30.8	0.3	20



29/10/2015 10:57	71.4	24.7	0.3	15
27/11/2015 11:07	76.9	8.5	0.3	14
16/12/2015 10:43	63.2	6.5	0.3	23



<b>Borehole reference 812</b>		
<b>Condition</b>	<b>Y/N</b>	<b>Comment</b>
Borehole inaccessible or headworks missing	Y	BH visited on all occasions.
Air entry into borehole	Y	
Barometric pumping	Y	
Enrichment of methane	Y	

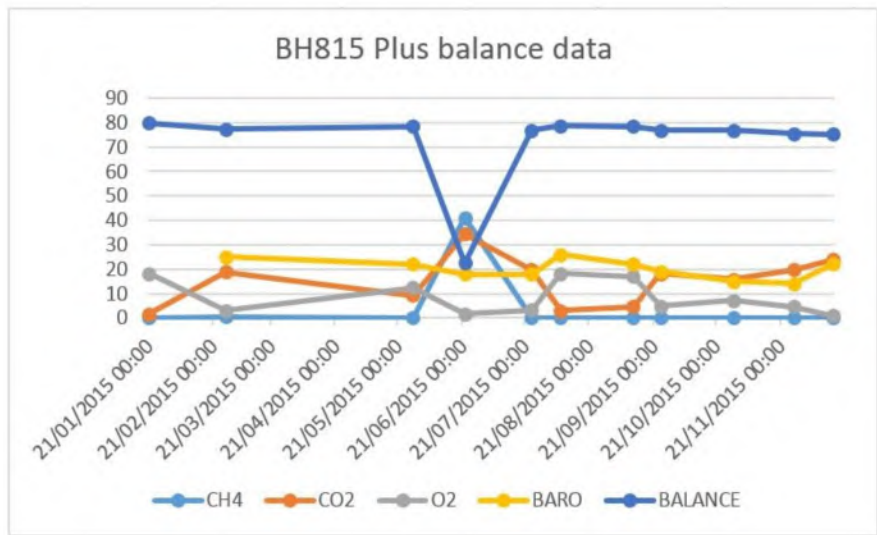
### Borehole 815

#### Borehole 815 with balance data

<b>DATE</b>	<b>CH4</b>	<b>CO2</b>	<b>O2</b>	<b>BARO</b>	<b>BALANCE</b>
21/01/2015 00:00	0	1.8	18.1		
27/02/2015 11:10	0.6	18.9	3.1	25	77.4

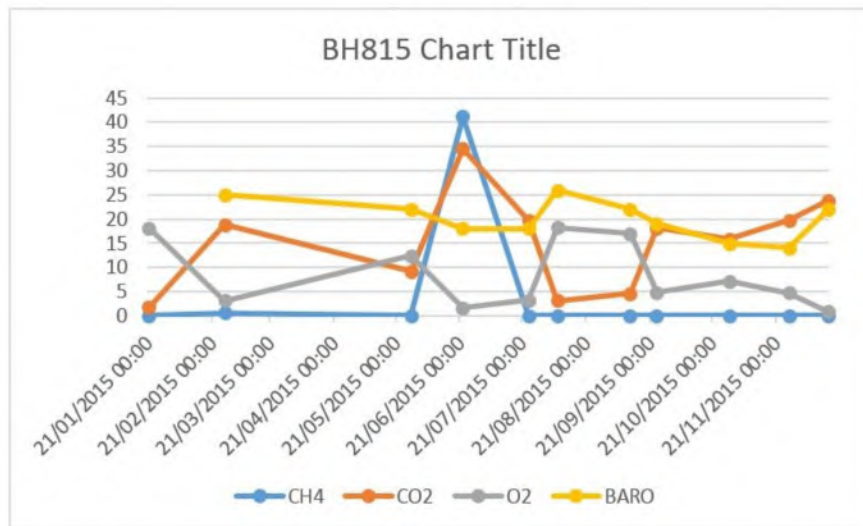
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31/03/2015 00:00	Not accessible				
28/05/2015 11:26	0	9.2	12.4	22	78.4
22/06/2015 11:10	41.2	34.5	1.7	18	22.6
24/07/2015 11:43	0	19.7	3.3	18	77
07/08/2015 11:25	0	3.1	18.3	26	78.6
11/09/2015 11:43	0	4.6	17	22	78.4
24/09/2015 10:49	0	18.2	4.9	19	76.9
29/10/2015 11:11	0	15.9	7.2	15	76.9
27/11/2015 11:24	0	19.8	4.7	14	75.5
16/12/2015 10:56	0	23.9	0.9	22	75.2



**Borehole 815 without balance data**

DATE	CH4	CO2	O2	BARO
21/01/2015 00:00	0	1.8	18.1	
27/02/2015 11:10	0.6	18.9	3.1	25
31/03/2015 00:00	Not accessible			
28/05/2015 11:26	0	9.2	12.4	22
22/06/2015 11:10	41.2	34.5	1.7	18
24/07/2015 11:43	0	19.7	3.3	18
07/08/2015 11:25	0	3.1	18.3	26
11/09/2015 11:43	0	4.6	17	22
24/09/2015 10:49	0	18.2	4.9	19
29/10/2015 11:11	0	15.9	7.2	15
27/11/2015 11:24	0	19.8	4.7	14
16/12/2015 10:56	0	23.9	0.9	22



<b>Borehole reference 815</b>		
<b>Condition</b>	<b>Y/N</b>	<b>Comment</b>
Borehole inaccessible or headworks missing	Y	Inaccessible on one occasion.
Air entry into borehole	Y	Enriched Nitrogen
Barometric pumping	Y	
Enrichment of methane	N	

## **Borehole 816**

### ***Borehole 816 with balance data***

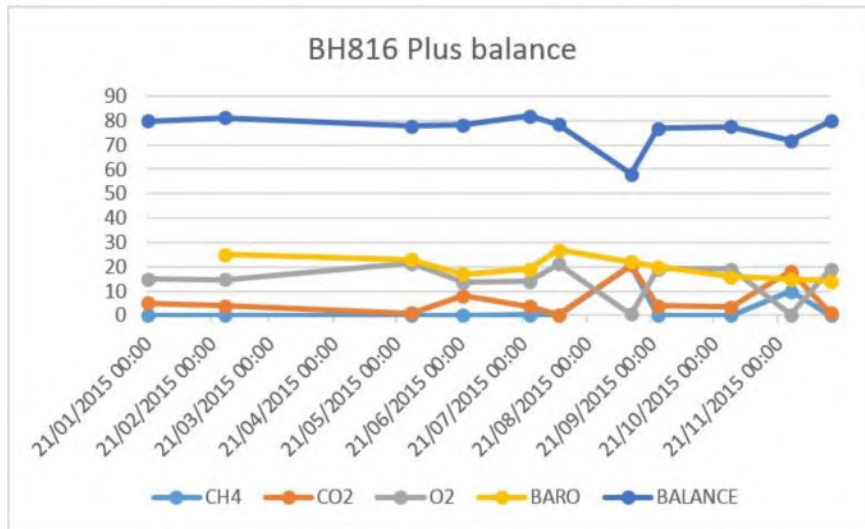
<b>DATE</b>	<b>CH4</b>	<b>CO2</b>	<b>O2</b>	<b>BARO</b>	<b>BALANCE</b>
21/01/2015 00:00	0	5.1	15		
27/02/2015 11:20	0	4	14.8	25	81.2
31/03/2015 00:00	Not accessible				
28/05/2015 11:45	0	0.9	21.3	23	77.8
22/06/2015 11:17	0	8.1	13.6	17	78.3
24/07/2015 11:56	0.3	3.8	14	19	81.9
07/08/2015 11:40	0	0.4	21.2	27	78.4
11/09/2015 11:51	20.7	20.7	0.5	22	58.1
24/09/2015 10:56	0	4.1	19	20	76.9
29/10/2015 11:19	0	3.4	19.1	16	77.5
27/11/2015 11:31	9.9	18.1	0.3	15	71.7
16/12/2015 11:02	0	1	19.1	14	79.9

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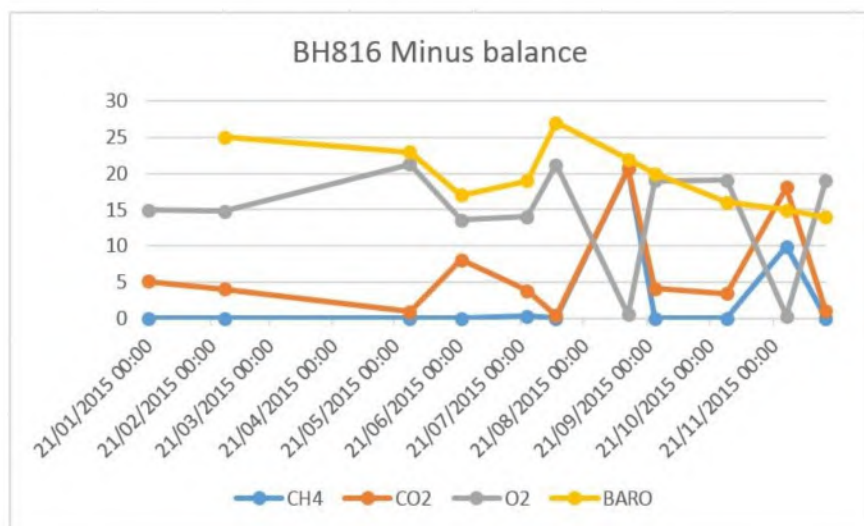
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**Borehole 816 without balance data**

DATE	CH4	CO2	O2	BARO
21/01/2015 00:00	0	5.1	15	
27/02/2015 11:20	0	4	14.8	25
31/03/2015 00:00	Not accessible			
28/05/2015 11:45	0	0.9	21.3	23
22/06/2015 11:17	0	8.1	13.6	17
24/07/2015 11:56	0.3	3.8	14	19
07/08/2015 11:40	0	0.4	21.2	27
11/09/2015 11:51	20.7	20.7	0.5	22
24/09/2015 10:56	0	4.1	19	20
29/10/2015 11:19	0	3.4	19.1	16

27/11/2015 11:31	9.9	18.1	0.3	15
16/12/2015 11:02	0	1	19.1	14



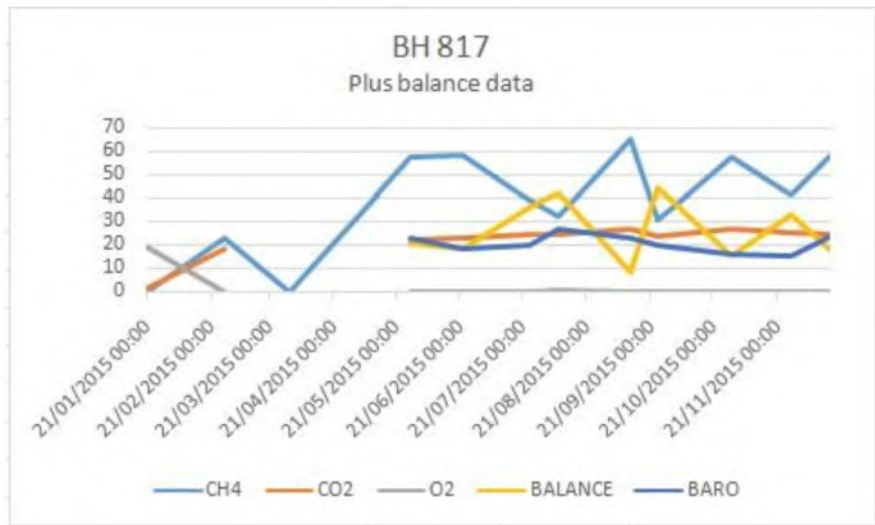
Borehole reference 816		
Condition	Y/N	Comment
Borehole inaccessible or headworks missing	Y	Inaccessible on one occasion.
Air entry into borehole	Y	
Barometric pumping	Y	For CO2 only
Enrichment of methane	Y	

### Borehole 817

#### Borehole 817 with balance data

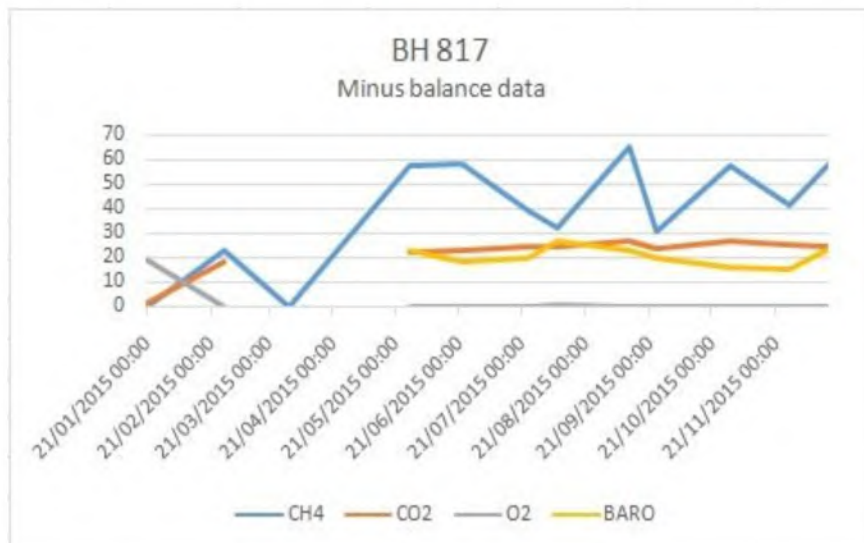
DATE	CH4	CO2	O2	BARO	BALANCE
21/01/2015 00:00	0	1.4	19.2		
27/02/2015 11:31	23.1	18.1	0.5	23	58.3

31/03/2015 00:00	Not accessible				
28/05/2015 12:02	56.9	22.1	0.5	23	20.5
22/06/2015 11:28	58.1	23.4	0.3	18	18.2
24/07/2015 12:08	39.1	24.5	0.3	20	36.1
07/08/2015 11:48	32.3	24.3	0.6	27	42.8
11/09/2015 11:59	64.9	26.8	0.3	23	8
24/09/2015 11:03	30.7	24.2	0.3	20	44.8
29/10/2015 11:27	57.5	27	0.3	16	15.2
27/11/2015 11:38	41.5	25.2	0.2	15	33.1
16/12/2015 11:09	58.3	24.3	0.3	24	17.1



**Borehole 817 without balance data**

DATE	CH4	CO2	O2	BARO
21/01/2015 00:00	0	1.4	19.2	
27/02/2015 11:31	23.1	18.1	0.5	23
31/03/2015 00:00	Not accessible			
28/05/2015 12:02	56.9	22.1	0.5	23
22/06/2015 11:28	58.1	23.4	0.3	18
24/07/2015 12:08	39.1	24.5	0.3	20
07/08/2015 11:48	32.3	24.3	0.6	27
11/09/2015 11:59	64.9	26.8	0.3	23
24/09/2015 11:03	30.7	24.2	0.3	20
29/10/2015 11:27	57.5	27	0.3	16
27/11/2015 11:38	41.5	25.2	0.2	15
16/12/2015 11:09	58.3	24.3	0.3	24



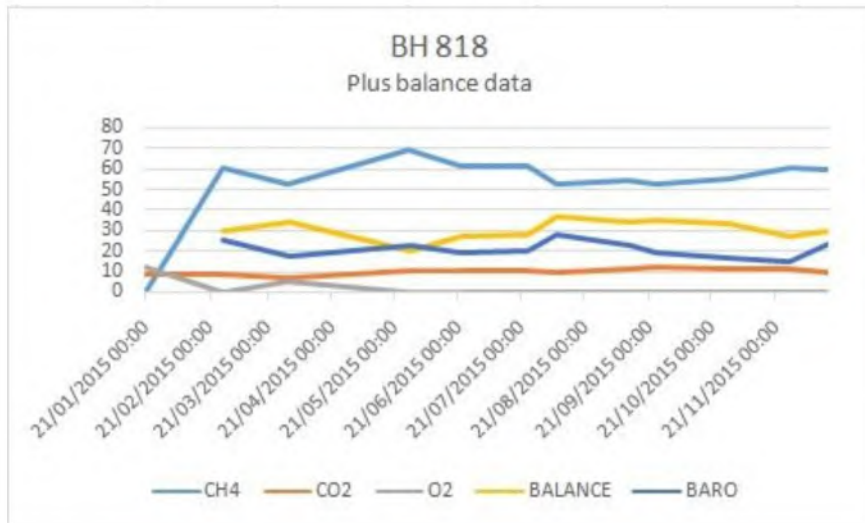


<b>Borehole reference 817</b>		
<b>Condition</b>	<b>Y/N</b>	<b>Comment</b>
Borehole inaccessible or headworks missing	Y	Inaccessible on one occasion.
Air entry into borehole	N	Severely weathered with enriched balance
Barometric pumping	Y	
Enrichment of methane	N	

**Borehole 818**

***Borehole 818 with balance data***

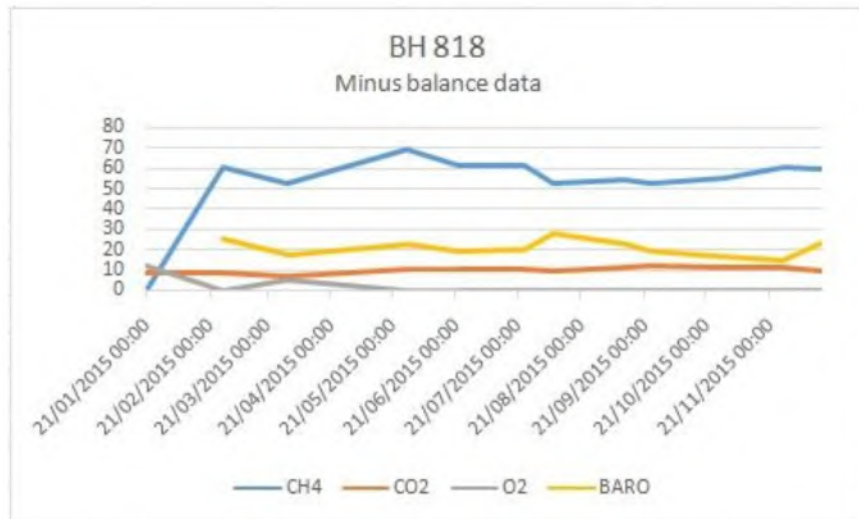
<b>DATE</b>	<b>CH4</b>	<b>CO2</b>	<b>O2</b>	<b>BARO</b>	<b>BALANCE</b>
21/01/2015 00:00	0	8.7	12.6		
27/02/2015 11:43	60.7	9	0.4	25	29.9
31/03/2015 11:06	52.8	7.3	5.6	18	34.3
28/05/2015 12:22	69.6	10.2	0.3	23	19.9
22/06/2015 11:37	61.9	10.1	0.5	19	27.5
24/07/2015 12:23	61.7	10.1	0.3	20	27.9
07/08/2015 11:58	52.8	9.8	0.4	28	37
11/09/2015 12:41	54.2	11.2	0.4	23	34.2
24/09/2015 11:29	52.8	12	0.3	19	34.9
29/10/2015 11:41	55.1	11.1	0.2	17	33.6
27/11/2015 11:57	60.9	11.5	0.3	15	27.3
16/12/2015 11:29	60.2	9.9	0.3	24	29.6



**Borehole 818 without balance data**

DATE	CH4	CO2	O2	BARO
21/01/2015 00:00	0	8.7	12.6	
27/02/2015 11:43	60.7	9	0.4	25
31/03/2015 11:06	52.8	7.3	5.6	18
28/05/2015 12:22	69.6	10.2	0.3	23
22/06/2015 11:37	61.9	10.1	0.5	19
24/07/2015 12:23	61.7	10.1	0.3	20
07/08/2015 11:58	52.8	9.8	0.4	28
11/09/2015 12:41	54.2	11.2	0.4	23
24/09/2015 11:29	52.8	12	0.3	19

29/10/2015 11:41	55.1	11.1	0.2	17
27/11/2015 11:57	60.9	11.5	0.3	15
16/12/2015 11:29	60.2	9.9	0.3	24



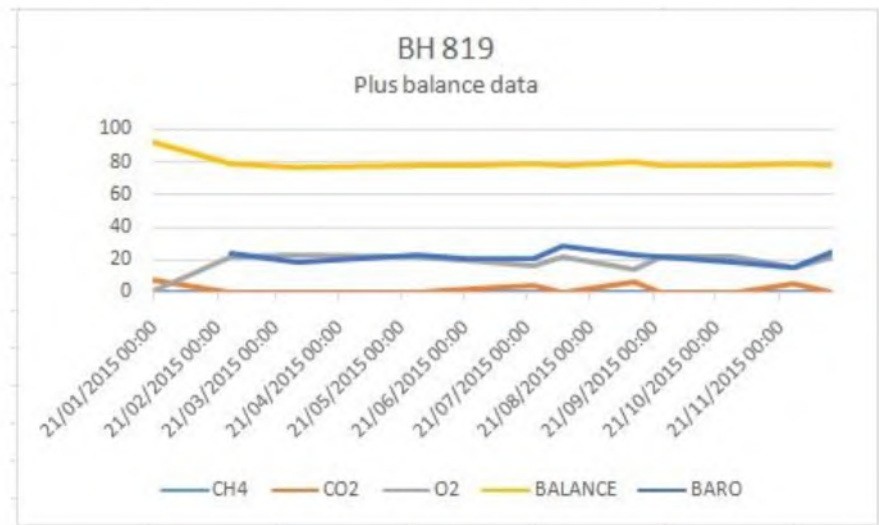
<b>Borehole reference 818</b>		
<b>Condition</b>	<b>Y/N</b>	<b>Comment</b>
Borehole inaccessible or headworks missing	N	Accessible on all occasions
Air entry into borehole	N	There appears to be weathering O2 depletion.
Barometric pumping	N	Not obvious
Enrichment of methane	Y	

**Borehole 819**

**Borehole 819 with balance data**

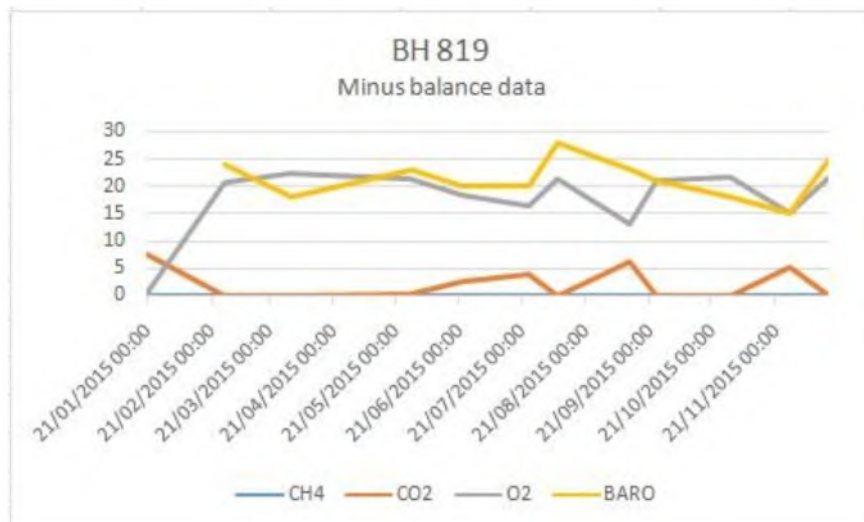
<b>DATE</b>	<b>CH4</b>	<b>CO2</b>	<b>O2</b>	<b>BARO</b>	<b>BALANCE</b>
21/01/2015 00:00	0	7.6	0.7		92.1
27/02/2015 11:51	0	0.1	20.9	24	79

31/03/2015 11:13	0.1	0.1	22.5	18	77.3
28/05/2015 12:30	0	0.3	21.5	23	78.2
22/06/2015 11:43	0	2.6	18.7	20	78.7
24/07/2015 12:28	0	4.1	16.5	20	79.4
07/08/2015 12:03	0	0.1	21.4	28	78.5
11/09/2015 12:46	0	6.4	13.4	23	80.2
24/09/2015 11:35	0	0.1	21.2	21	78.7
29/10/2015 11:45	0	0.2	21.7	18	78.1
27/11/2015 12:02	0	5.2	15.2	15	79.6
16/12/2015 11:34	0	0.1	21.8	25	78.1



**Borehole 819 without balance data**

DATE	CH4	CO2	O2	BARO
21/01/2015 00:00	0	7.6	0.7	
27/02/2015 11:51	0	0.1	20.9	24
31/03/2015 11:13	0.1	0.1	22.5	18
28/05/2015 12:30	0	0.3	21.5	23
22/06/2015 11:43	0	2.6	18.7	20
24/07/2015 12:28	0	4.1	16.5	20
07/08/2015 12:03	0	0.1	21.4	28
11/09/2015 12:46	0	6.4	13.4	23
24/09/2015 11:35	0	0.1	21.2	21
29/10/2015 11:45	0	0.2	21.7	18
27/11/2015 12:02	0	5.2	15.2	15
16/12/2015 11:34	0	0.1	21.8	25



<b>Borehole reference 819</b>		
<b>Condition</b>	<b>Y/N</b>	<b>Comment</b>
Borehole inaccessible or headworks missing	N	Accessible on all occasions
Air entry into borehole	Y	
Barometric pumping	N	Not obvious
Enrichment of methane	N	

### **Borehole 820**

#### ***Borehole 820 with balance data***

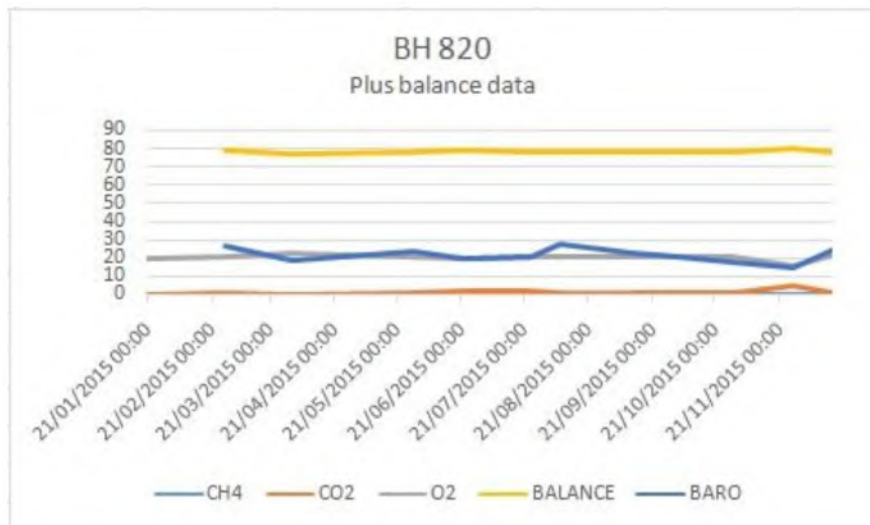
<b>DATE</b>	<b>CH4</b>	<b>CO2</b>	<b>O2</b>	<b>BARO</b>	<b>BALANCE</b>
21/01/2015 00:00	0	0	19.8		
27/02/2015 12:01	0.1	0.5	20.6	27	78.8
31/03/2015 11:18	0.1	0.1	22.5	19	77.3
28/05/2015 12:38	0	1.1	20.9	24	78
22/06/2015 11:52	0	1.5	19.6	20	78.9
24/07/2015 12:33	0	1.8	19.9	21	78.3
07/08/2015 12:09	0	0.8	20.8	28	78.4
11/09/2015 12:51	0	0.8	20.6	23	78.6
24/09/2015 11:40	0	1.4	20.1	22	78.5
29/10/2015 11:51	0	1.1	20.8	18	78.1
27/11/2015 12:08	0	4.9	15.2	15	79.9
16/12/2015 11:40	0	0.9	21.1	25	78

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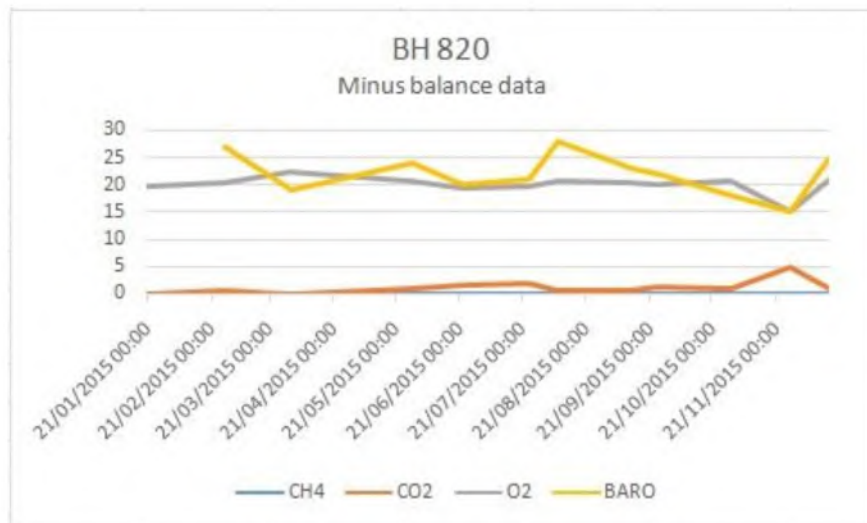
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**Borehole 820 without balance data**

DATE	CH4	CO2	O2	BARO
21/01/2015 00:00	0	0	19.8	
27/02/2015 12:01	0.1	0.5	20.6	27
31/03/2015 11:18	0.1	0.1	22.5	19
28/05/2015 12:38	0	1.1	20.9	24
22/06/2015 11:52	0	1.5	19.6	20
24/07/2015 12:33	0	1.8	19.9	21
07/08/2015 12:09	0	0.8	20.8	28
11/09/2015 12:51	0	0.8	20.6	23
24/09/2015 11:40	0	1.4	20.1	22

29/10/2015 11:51	0	1.1	20.8	18
27/11/2015 12:08	0	4.9	15.2	15
16/12/2015 11:40	0	0.9	21.1	25



<b>Borehole reference 820</b>		
<b>Condition</b>	<b>Y/N</b>	<b>Comment</b>
Borehole inaccessible or headworks missing	N	Monitored on all occasions
Air entry into borehole	Y	
Barometric pumping	N	
Enrichment of methane	N	

### Borehole 821

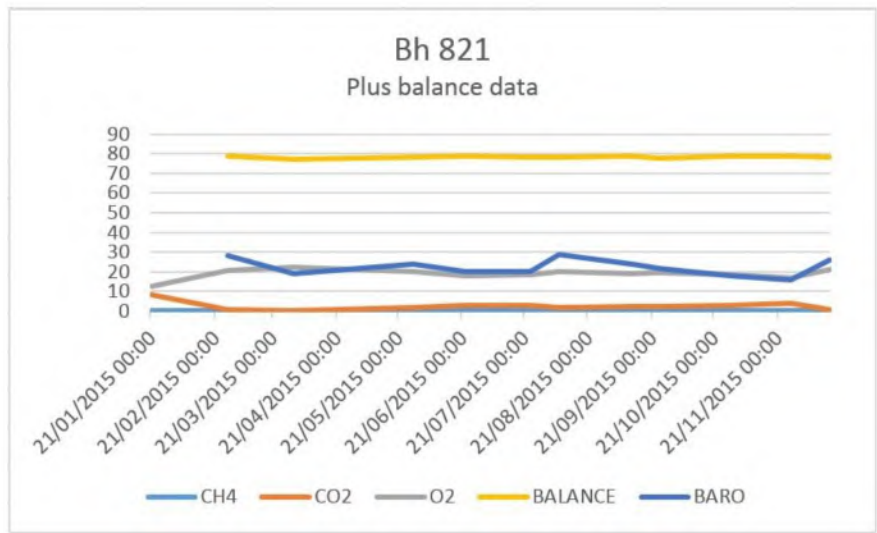
#### Borehole 821 with balance data

<b>DATE</b>	<b>CH4</b>	<b>CO2</b>	<b>O2</b>	<b>BARO</b>	<b>BALANCE</b>
21/01/2015 00:00	0	8.3	12.6		
27/02/2015 12:08	0	0.6	20.8	28	78.6

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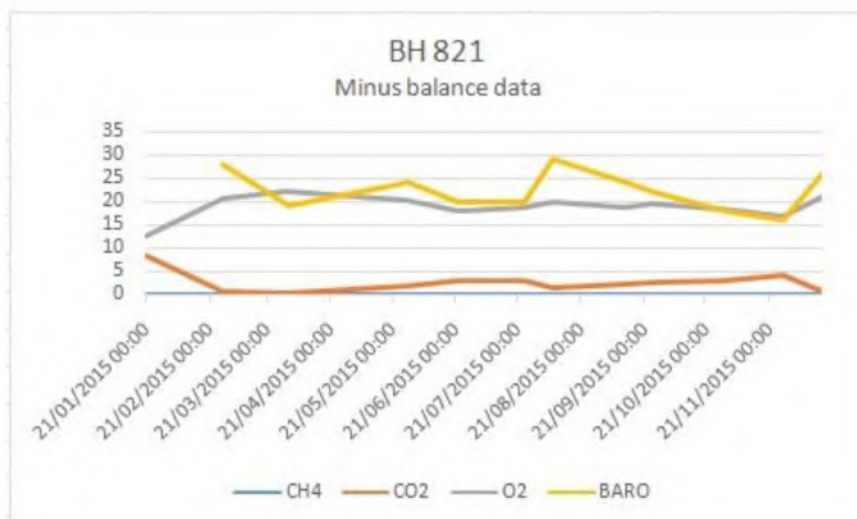


31/03/2015 11:24	0.1	0.4	22.3	19	77.2
28/05/2015 12:44	0	1.8	20.2	24	78
22/06/2015 11:58	0	3	18.1	20	78.9
24/07/2015 12:39	0	2.9	18.7	20	78.4
07/08/2015 12:14	0	1.7	20	29	78.3
11/09/2015 12:56	0	2.2	18.9	24	78.9
24/09/2015 11:45	0	2.5	19.6	22	77.9
29/10/2015 11:56	0	3	18.5	18	78.5
27/11/2015 12:13	0	4.2	16.9	16	78.9
16/12/2015 11:45	0	0.9	21.1	26	78



**Borehole 821 without balance data**

DATE	CH4	CO2	O2	BARO
21/01/2015 00:00	0	8.3	12.6	
27/02/2015 12:08	0	0.6	20.8	28
31/03/2015 11:24	0.1	0.4	22.3	19
28/05/2015 12:44	0	1.8	20.2	24
22/06/2015 11:58	0	3	18.1	20
24/07/2015 12:39	0	2.9	18.7	20
07/08/2015 12:14	0	1.7	20	29
11/09/2015 12:56	0	2.2	18.9	24
24/09/2015 11:45	0	2.5	19.6	22
29/10/2015 11:56	0	3	18.5	18
27/11/2015 12:13	0	4.2	16.9	16
16/12/2015 11:45	0	0.9	21.1	26



<b>Borehole reference 821</b>		
<b>Condition</b>	<b>Y/N</b>	<b>Comment</b>
Borehole inaccessible or headworks missing	N	Monitored on all occasions
Air entry into borehole	Y	
Barometric pumping	N	
Enrichment of methane	N	

### **Borehole 822A**

#### ***Borehole 822A with balance data***

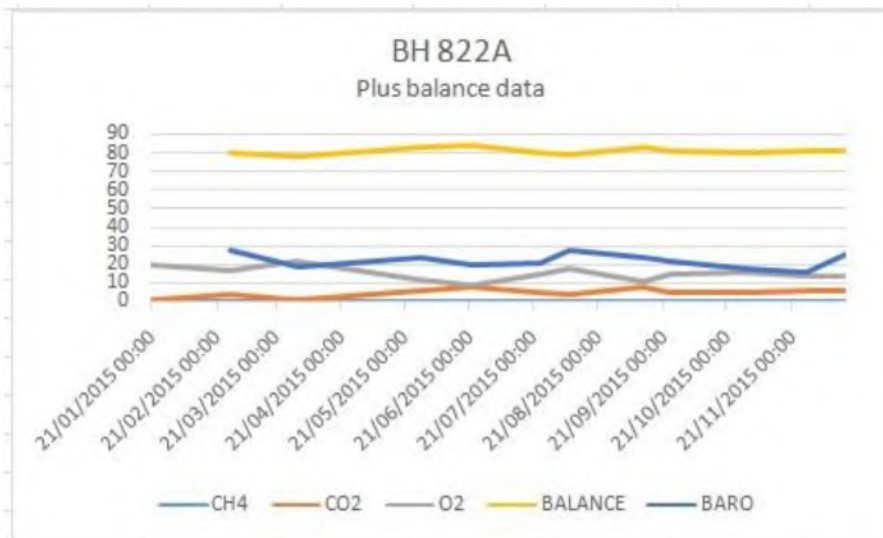
<b>DATE</b>	<b>CH4</b>	<b>CO2</b>	<b>O2</b>	<b>BARO</b>	<b>BALANCE</b>
21/01/2015 00:00	0	0.5	19.3		
27/02/2015 12:20	0	3.9	16.8	28	79.3
31/03/2015 11:29	0.1	0.6	21.8	19	77.5
28/05/2015 12:50	0	5.9	11.5	24	82.6
22/06/2015 12:03	0	7.7	8.3	20	84
24/07/2015 12:46	0	5	14.8	21	80.2
07/08/2015 12:22	0	3.1	18	28	78.9
11/09/2015 13:02	0	7.2	10.2	24	82.6
24/09/2015 11:50	0	4.7	14.9	22	80.4
29/10/2015 12:01	0	4.8	15.9	18	79.3
27/11/2015 12:18	0	5.3	13.8	16	80.9
16/12/2015 11:50	0	5.6	13.7	26	80.7

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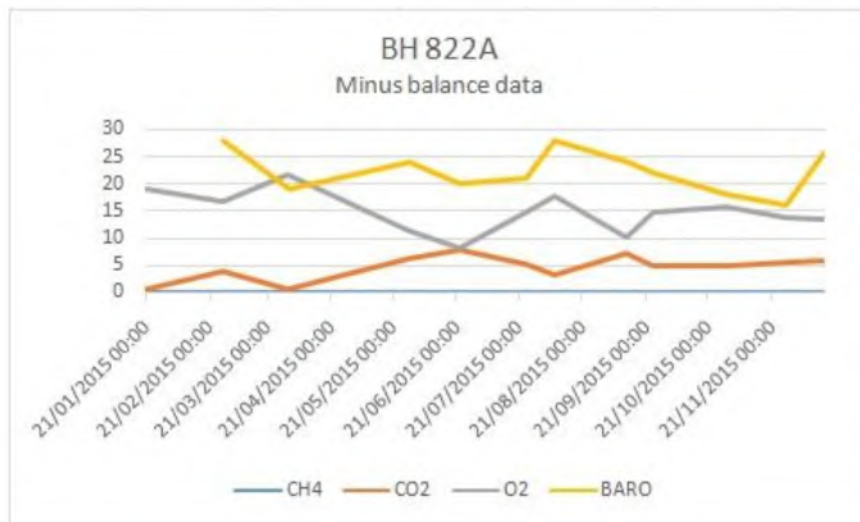


**Borehole 822A without balance data**

DATE	CH4	CO2	O2	BARO
21/01/2015 00:00	0	0.5	19.3	
27/02/2015 12:20	0	3.9	16.8	28
31/03/2015 11:29	0.1	0.6	21.8	19
28/05/2015 12:50	0	5.9	11.5	24
22/06/2015 12:03	0	7.7	8.3	20
24/07/2015 12:46	0	5	14.8	21
07/08/2015 12:22	0	3.1	18	28
11/09/2015 13:02	0	7.2	10.2	24
24/09/2015 11:50	0	4.7	14.9	22
29/10/2015 12:01	0	4.8	15.9	18

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27/11/2015 12:18	0	5.3	13.8	16
16/12/2015 11:50	0	5.6	13.7	26



Borehole reference 822A		
Condition	Y/N	Comment
Borehole inaccessible or headworks missing	N	Monitored on all occasions
Air entry into borehole	Y	
Barometric pumping	N	
Enrichment of methane	N	

### Borehole 822

#### Borehole 822 with balance data

DATE	CH4	CO2	O2	BALANCE	BARO
27/02/2015 12:30	0	0.7	20.9	78.4	28
31/03/2015 11:34	0.1	0.1	22.4	77.4	19
28/05/2015 12:56	0	1.4	21.2	77.4	24

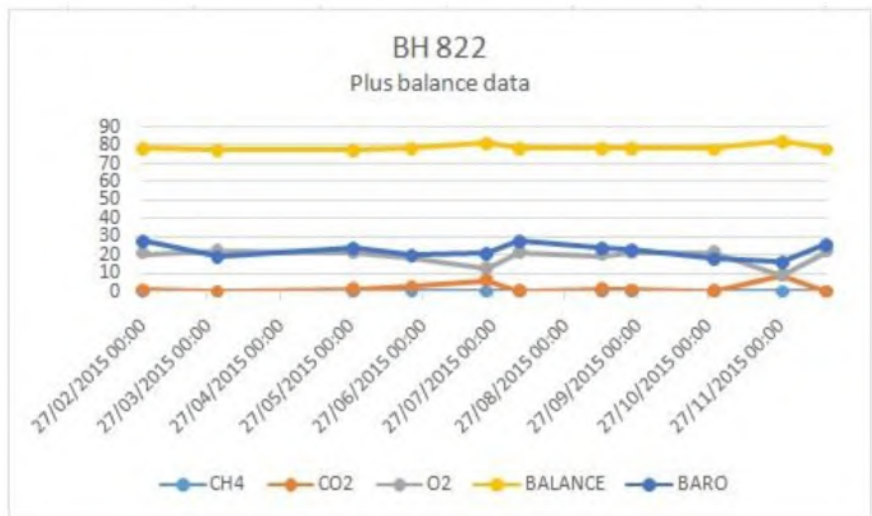
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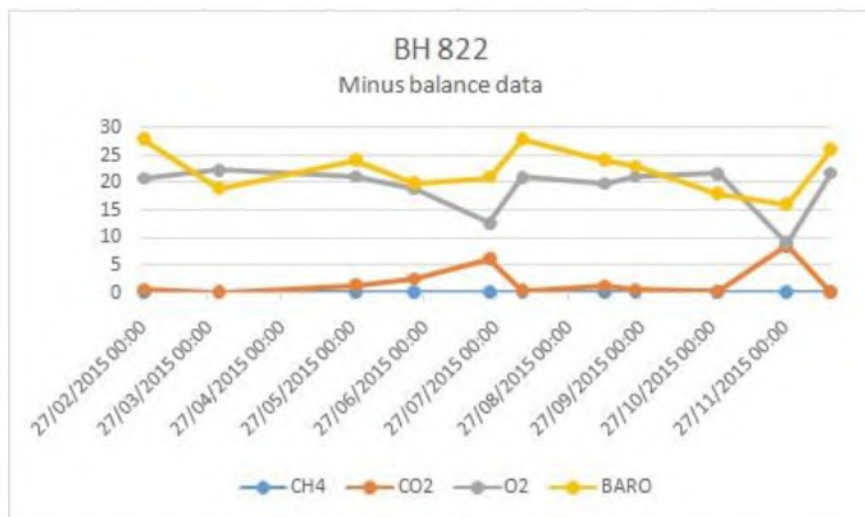
22/06/2015 12:09	0	2.6	18.9	78.5	20
24/07/2015 12:51	0	6.3	12.7	81	21
07/08/2015 12:27	0	0.5	21	78.5	28
11/09/2015 13:07	0	1.3	19.9	78.8	24
24/09/2015 11:56	0	0.7	21.2	78.1	23
29/10/2015 12:07	0	0.3	21.7	78	18
27/11/2015 12:24	0	8.7	9	82.3	16
16/12/2015 11:55	0	0.2	21.8	78	26



**Borehole 822 without balance data**

DATE	CH4	CO2	O2	BARO
------	-----	-----	----	------

27/02/2015 12:30	0	0.7	20.9	28
31/03/2015 11:34	0.1	0.1	22.4	19
28/05/2015 12:56	0	1.4	21.2	24
22/06/2015 12:09	0	2.6	18.9	20
24/07/2015 12:51	0	6.3	12.7	21
07/08/2015 12:27	0	0.5	21	28
11/09/2015 13:07	0	1.3	19.9	24
24/09/2015 11:56	0	0.7	21.2	23
29/10/2015 12:07	0	0.3	21.7	18
27/11/2015 12:24	0	8.7	9	16
16/12/2015 11:55	0	0.2	21.8	26



Borehole reference 822		
Condition	Y/N	Comment
Borehole inaccessible or headworks missing	Y	Inaccessible on a single occasion

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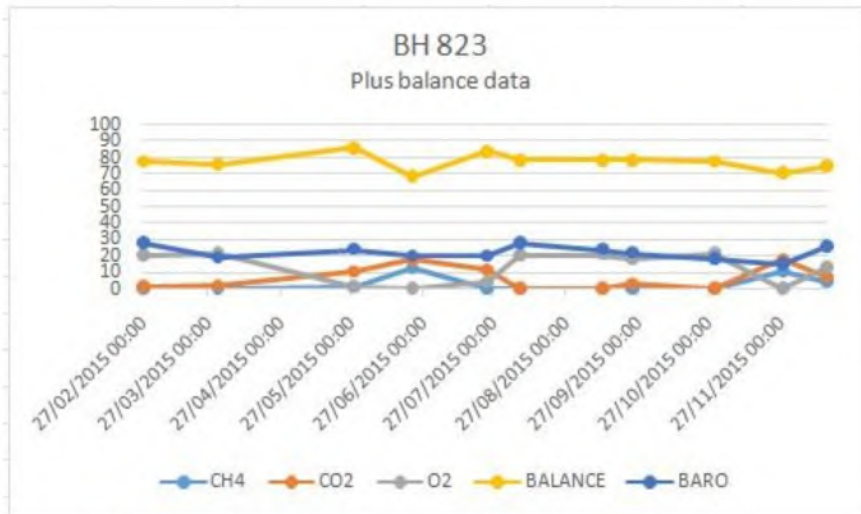
Air entry into borehole	Y	
Barometric pumping	Y	Atmospheric balance
Enrichment of methane	N	

### Borehole 823

#### *Borehole 823 with balance data*

DATE	CH4	CO2	O2	BARO	BALANCE
27/02/2015 12:43	0	1.8	20.3	28	77.9
31/03/2015 11:40	0.5	2.2	21.1	19	76.2
28/05/2015 13:02	0.9	11.1	1.5	24	86.5
22/06/2015 12:15	13	17.9	0.5	20	68.6
24/07/2015 12:56	0	12	4	20	84
07/08/2015 12:31	0	0.9	20.3	28	78.8
11/09/2015 13:15	0	0.5	20.8	24	78.7
24/09/2015 12:02	0	3.3	17.9	22	78.8
29/10/2015 12:11	0	0.5	21.6	18	77.9
27/11/2015 12:29	10.8	18.1	0.2	15	70.9
16/12/2015 12:01	4.3	7.6	12.8	26	75.3

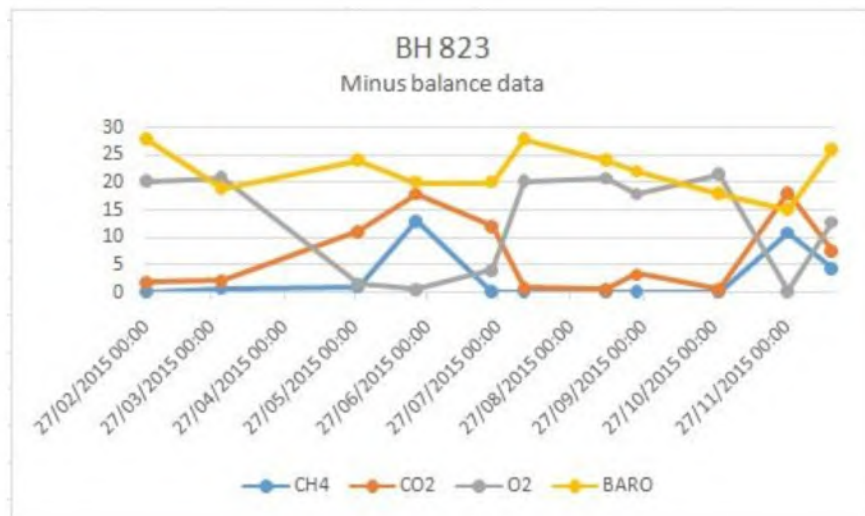




**Borehole 823 without balance data**

DATE	CH4	CO2	O2	BARO
27/02/2015 12:43	0	1.8	20.3	28
31/03/2015 11:40	0.5	2.2	21.1	19
28/05/2015 13:02	0.9	11.1	1.5	24
22/06/2015 12:15	13	17.9	0.5	20
24/07/2015 12:56	0	12	4	20
07/08/2015 12:31	0	0.9	20.3	28
11/09/2015 13:15	0	0.5	20.8	24
24/09/2015 12:02	0	3.3	17.9	22
29/10/2015 12:11	0	0.5	21.6	18

27/11/2015 12:29	10.8	18.1	0.2	15
16/12/2015 12:01	4.3	7.6	12.8	26



Borehole reference 823		
Condition	Y/N	Comment
Borehole inaccessible or headworks missing	Y	Inaccessible on a single occasion
Air entry into borehole	Y	Atmospheric balance.
Barometric pumping	Y	
Enrichment of methane	N	

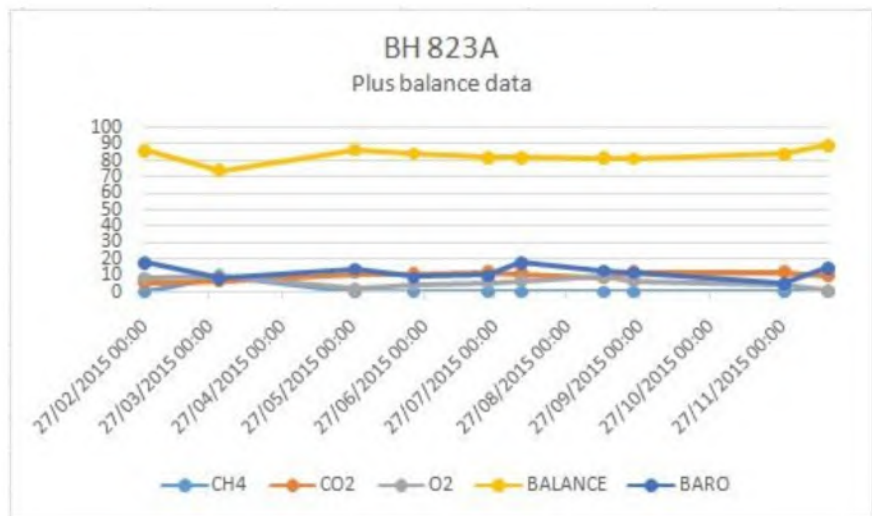
### Borehole 823A

#### Borehole 823A with balance data

DATE	CH4	CO2	O2	BARO	BALANCE
27/02/2015 12:51	0	5.2	8.5	18	86.3
31/03/2015 11:45	9.7	6.2	10	8	74.1

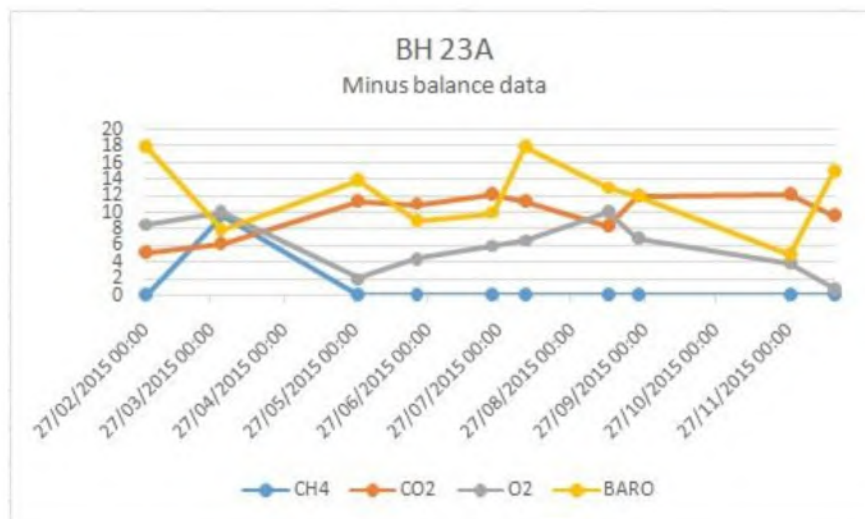
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28/05/2015 13:08	0	11.3	2	14	86.7
22/06/2015 12:21	0	11	4.4	9	84.6
24/07/2015 13:02	0	12.1	6	10	81.9
07/08/2015 12:36	0	11.3	6.6	18	82.1
11/09/2015 13:20	0	8.4	10.1	13	81.5
24/09/2015 12:07	0	12	6.9	12	81.1
27/11/2015 12:34	0	12.2	3.9	5	83.9
16/12/2015 12:06	0	9.7	0.8	15	89.5



**Borehole 823A without balance data**

DATE	CH4	CO2	O2	BARO
27/02/2015 12:51	0	5.2	8.5	18
31/03/2015 11:45	9.7	6.2	10	8
28/05/2015 13:08	0	11.3	2	14
22/06/2015 12:21	0	11	4.4	9
24/07/2015 13:02	0	12.1	6	10
07/08/2015 12:36	0	11.3	6.6	18
11/09/2015 13:20	0	8.4	10.1	13
24/09/2015 12:07	0	12	6.9	12
27/11/2015 12:34	0	12.2	3.9	5
16/12/2015 12:06	0	9.7	0.8	15

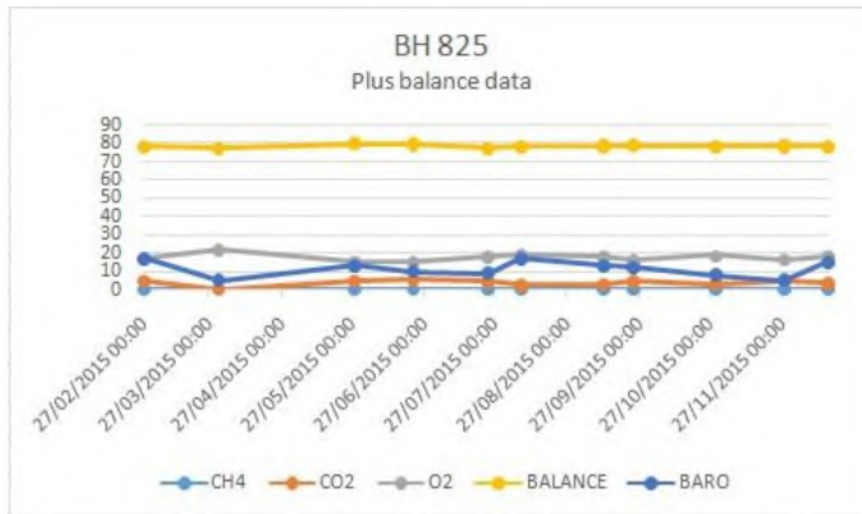


Borehole reference 823A		
Condition	Y/N	Comment

Borehole inaccessible or headworks missing	Y	Inaccessible on a couple of occasions
Air entry into borehole	Y	Air present – balance at atmospheric
Barometric pumping	Y	Not as obvious
Enrichment of methane	N	Methane only present on a single occasion

***Borehole 825 Borehole 825 with balance data***

DATE	CH4	CO2	O2	BARO	BALANCE
27/02/2015 13:04	0	4.7	16.9	17	78.4
31/03/2015 11:52	0.1	0.1	22.2	5	77.6
28/05/2015 13:31	0	4.8	15.3	13	79.9
22/06/2015 12:41	0	5.4	15	10	79.6
24/07/2015 13:23	0	4.4	17.9	9	77.7
07/08/2015 12:45	0	2.5	19.1	17	78.4
11/09/2015 13:27	0	2.9	18.3	13	78.8
24/09/2015 12:16	0	4.4	16.3	12	79.3
29/10/2015 12:28	0	3.1	18.6	8	78.3
27/11/2015 12:46	0	4.8	16.5	5	78.7
16/12/2015 12:13	0	3.3	18.5	15	78.2



**Borehole 825 without balance data**

DATE	CH4	CO2	O2	BARO
27/02/2015 13:04	0	4.7	16.9	17
31/03/2015 11:52	0.1	0.1	22.2	5
28/05/2015 13:31	0	4.8	15.3	13
22/06/2015 12:41	0	5.4	15	10
24/07/2015 13:23	0	4.4	17.9	9
07/08/2015 12:45	0	2.5	19.1	17
11/09/2015 13:27	0	2.9	18.3	13
24/09/2015 12:16	0	4.4	16.3	12
29/10/2015 12:28	0	3.1	18.6	8

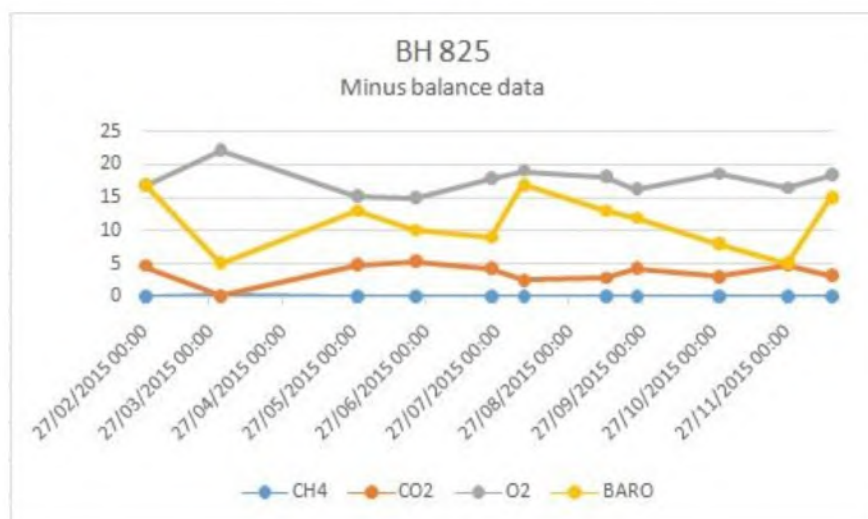
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27/11/2015 12:46	0	4.8	16.5	5
16/12/2015 12:13	0	3.3	18.5	15

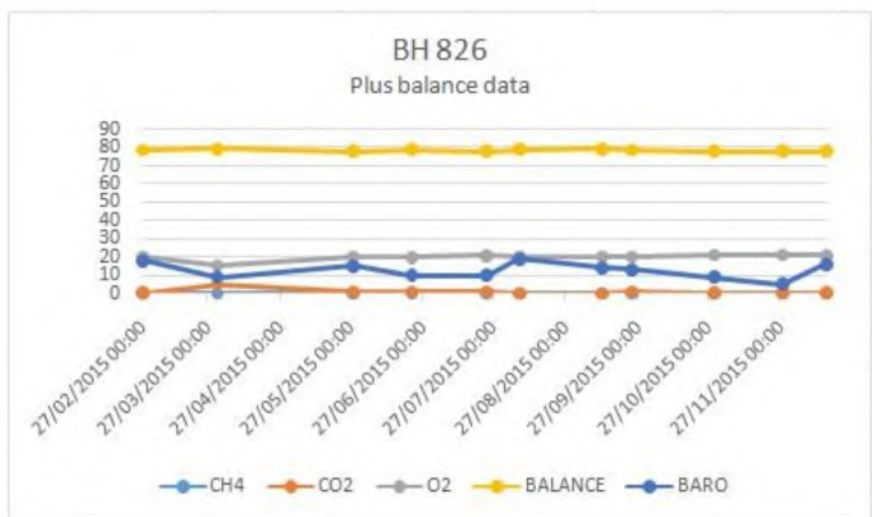


Borehole reference 825		
Condition	Y/N	Comment
Borehole inaccessible or headworks missing	Y	Inaccessible on a single occasion
Air entry into borehole	Y	
Barometric pumping	N	
Enrichment of methane	N	

**Borehole 826 Borehole 826 with balance data**

DATE	CH4	CO2	O2	BARO	BALANCE
27/02/2015 13:13	0	0.8	20.7	18	78.5
31/03/2015 11:57	0.1	4.9	15.7	9	79.3
28/05/2015 13:42	0	1.1	20.7	15	78.2
22/06/2015 12:50	0	1.2	19.9	10	78.9

24/07/2015 13:31	0	1	20.9	10	78.1
07/08/2015 12:53	0	0.4	20.7	19	78.9
11/09/2015 13:34	0	0.4	20.5	14	79.1
24/09/2015 12:22	0	0.9	20.6	13	78.5
29/10/2015 12:33	0	0.6	21.3	9	78.1
27/11/2015 12:51	0	0.8	21.2	5	78
16/12/2015 12:19	0	0.7	21.1	16	78.2

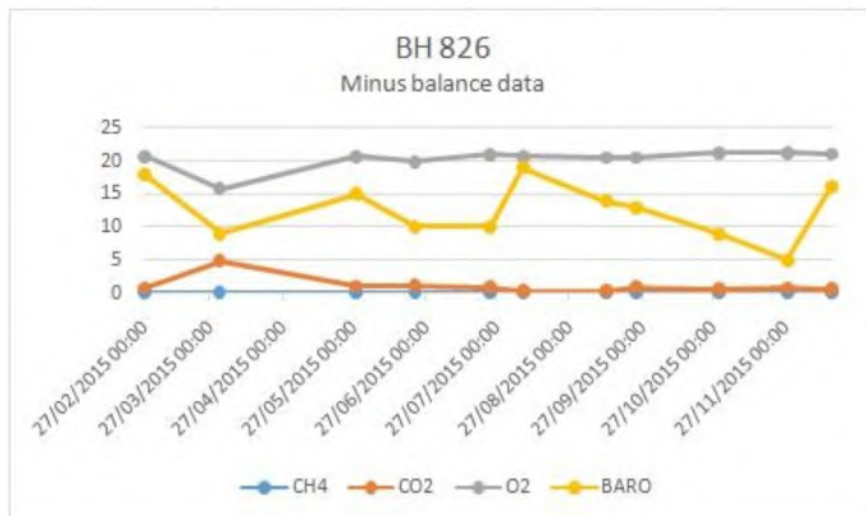


**Borehole 826 without balance data**

DATE	CH4	CO2	O2	BARO
27/02/2015 13:13	0	0.8	20.7	18



31/03/2015 11:57	0.1	4.9	15.7	9
28/05/2015 13:42	0	1.1	20.7	15
22/06/2015 12:50	0	1.2	19.9	10
24/07/2015 13:31	0	1	20.9	10
07/08/2015 12:53	0	0.4	20.7	19
11/09/2015 13:34	0	0.4	20.5	14
24/09/2015 12:22	0	0.9	20.6	13
29/10/2015 12:33	0	0.6	21.3	9
27/11/2015 12:51	0	0.8	21.2	5
16/12/2015 12:19	0	0.7	21.1	16

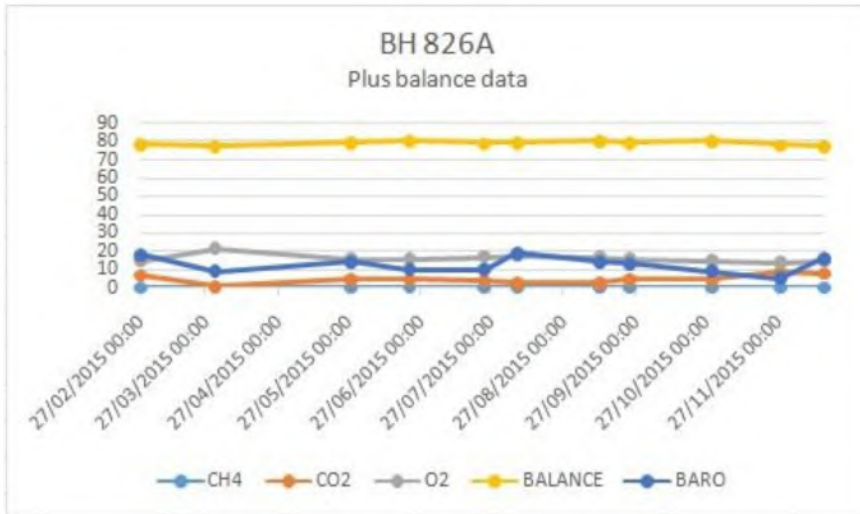


Borehole reference 826		
Condition	Y/N	Comment
Borehole inaccessible or headworks missing	Y	Inaccessible on a single occasion

Air entry into borehole	Y	
Barometric pumping	N	
Enrichment of methane	N	

**Borehole 826A Borehole 826A with balance data**

DATE	CH4	CO2	O2	BARO	BALANCE
27/02/2015 13:20	0	6.8	15	18	78.2
31/03/2015 12:03	0.1	0.7	21.4	9	77.8
28/05/2015 13:48	0	4.3	16.1	14	79.6
22/06/2015 12:55	0	4.2	15.8	10	80
24/07/2015 13:39	0	4	17.1	10	78.9
07/08/2015 12:58	0	3	17.4	19	79.6
11/09/2015 13:38	0	3	16.8	14	80.2
24/09/2015 12:27	0	4.6	15.9	13	79.5
29/10/2015 12:37	0	4.6	15.1	9	80.3
27/11/2015 12:56	0	8.3	13.8	5	77.9
16/12/2015 12:24	0	7.7	14.9	16	77.4

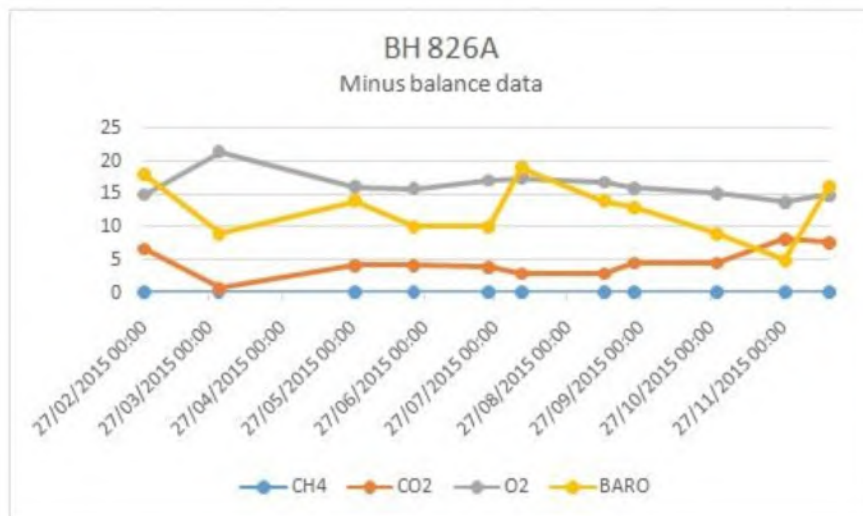


**Borehole 826A without balance data**

DATE	CH4	CO2	O2	BARO
27/02/2015 13:20	0	6.8	15	18
31/03/2015 12:03	0.1	0.7	21.4	9
28/05/2015 13:48	0	4.3	16.1	14
22/06/2015 12:55	0	4.2	15.8	10
24/07/2015 13:39	0	4	17.1	10
07/08/2015 12:58	0	3	17.4	19
11/09/2015 13:38	0	3	16.8	14
24/09/2015 12:27	0	4.6	15.9	13
29/10/2015 12:37	0	4.6	15.1	9

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27/11/2015 12:56	0	8.3	13.8	5
16/12/2015 12:24	0	7.7	14.9	16

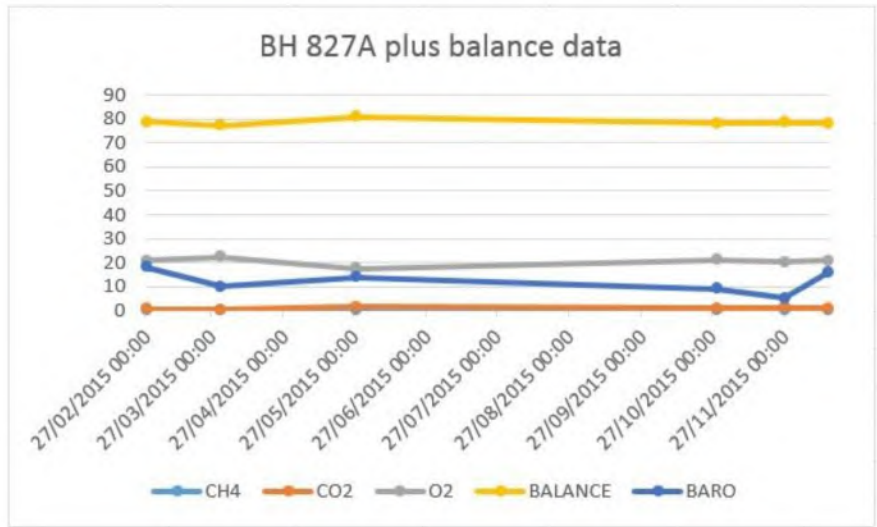


Borehole reference 826A		
Condition	Y/N	Comment
Borehole inaccessible or headworks missing	Y	Inaccessible on a single occasion
Air entry into borehole	Y	Very obvious
Barometric pumping	N	
Enrichment of methane	N	No methane, ~5% CO2

**Borehole 827A Borehole 827A with balance data**

DATE	CH4	CO2	O2	BALANCE	BARO
27/02/2015 13:31	0	0.4	20.7	78.9	18
31/03/2015 12:10	0.1	0.1	22.4	77.4	10
28/05/2015 13:57	0	1.6	17.5	80.9	14
29/10/2015 12:43	0	0.7	21	78.3	9

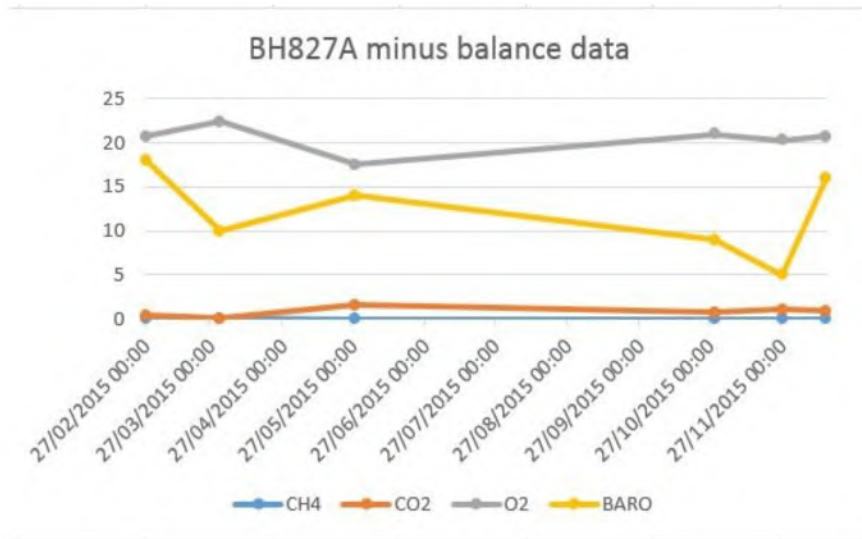
27/11/2015 13:03	0	1.1	20.3	78.6	5
16/12/2015 12:30	0	0.9	20.7	78.4	16



**Borehole 827A without balance data**

DATE	CH4	CO2	O2	BARO
27/02/2015 13:31	0	0.4	20.7	18
31/03/2015 12:10	0.1	0.1	22.4	10
28/05/2015 13:57	0	1.6	17.5	14
29/10/2015 12:43	0	0.7	21	9

27/11/2015 13:03	0	1.1	20.3	5
16/12/2015 12:30	0	0.9	20.7	16



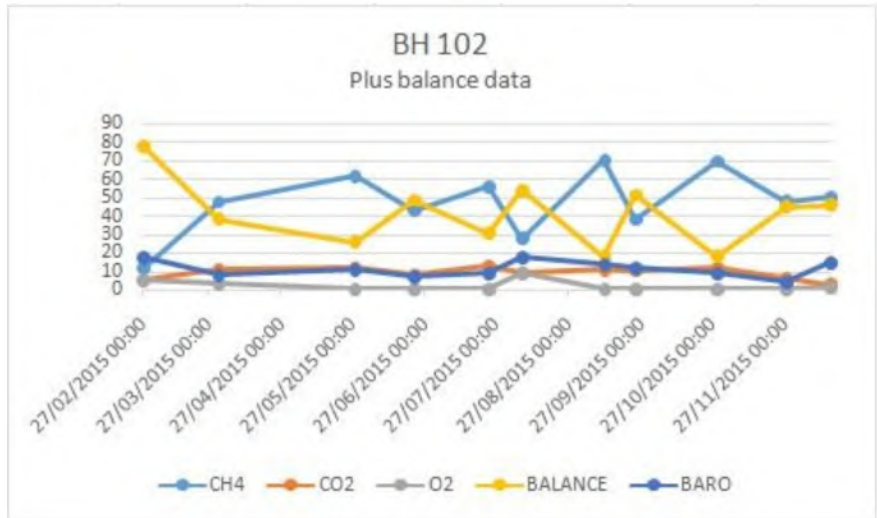
Borehole reference 827A		
Condition	Y/N	Comment
Borehole inaccessible or headworks missing	Y	Headworks missing during six monitoring events
Air entry into borehole	Y	
Barometric pumping	N	

### Borehole BH 102

#### Borehole BH 102 with balance data

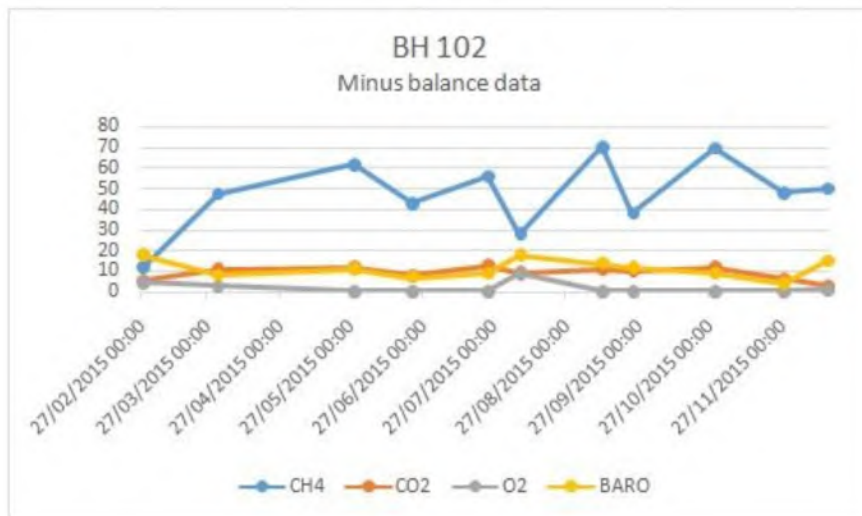
DATE	CH4	CO2	O2	BARO	BALANCE
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27/02/2015 13:46	11.5	5.5	4.7	18	78.3
31/03/2015 12:25	47.4	11.1	3	8	38.5
28/05/2015 14:22	61.7	12.1	0.3	11	25.9
22/06/2015 13:18	42.8	7.9	0.6	7	48.7
24/07/2015 14:01	55.9	12.7	0.5	9	30.9
07/08/2015 13:16	27.8	9.1	8.8	18	54.3
11/09/2015 13:52	70.2	10.8	0.4	14	18.6
24/09/2015 12:42	37.9	10.2	0.4	12	51.5
29/10/2015 12:55	69.5	11.7	0.5	9	18.3
27/11/2015 13:13	47.9	6.4	0.4	4	45.3
16/12/2015 12:40	49.9	2.9	1.1	15	46.1



**Borehole BH 102 without balance data**

DATE	CH4	CO2	O2	BARO
27/02/2015 13:46	11.5	5.5	4.7	18
31/03/2015 12:25	47.4	11.1	3	8
28/05/2015 14:22	61.7	12.1	0.3	11
22/06/2015 13:18	42.8	7.9	0.6	7
24/07/2015 14:01	55.9	12.7	0.5	9
07/08/2015 13:16	27.8	9.1	8.8	18
11/09/2015 13:52	70.2	10.8	0.4	14
24/09/2015 12:42	37.9	10.2	0.4	12
29/10/2015 12:55	69.5	11.7	0.5	9
27/11/2015 13:13	47.9	6.4	0.4	4
16/12/2015 12:40	49.9	2.9	1.1	15

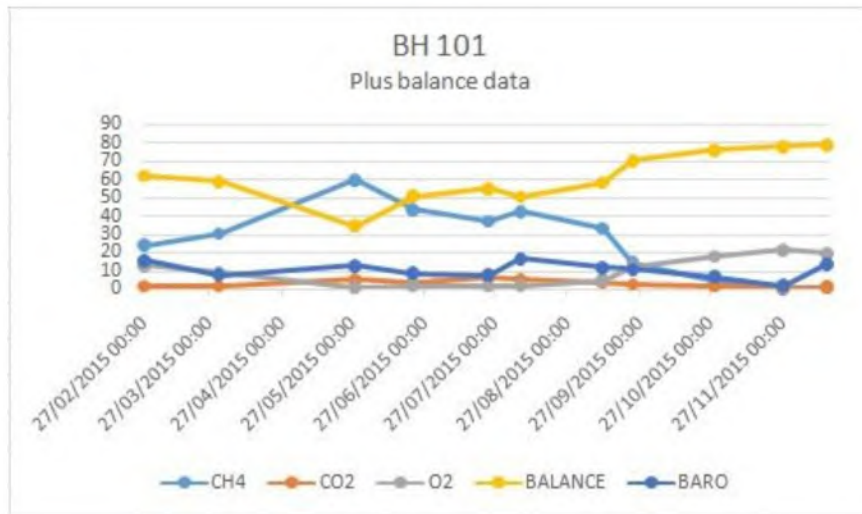




<b>Borehole reference 102</b>		
<b>Condition</b>	<b>Y/N</b>	<b>Comment</b>
Borehole inaccessible or headworks missing	Y	Borehole inaccessible on a single occasion
Air entry into borehole	Y	Less obvious
Barometric pumping	Y	
Enrichment of methane	Y	Low CO2

**Borehole BH 101 Borehole BH 101 with balance data**

<b>DATE</b>	<b>CH4</b>	<b>CO2</b>	<b>O2</b>	<b>BARO</b>	<b>BALANCE</b>
27/02/2015 13:59	23.9	1.1	12.9	16	62.1
31/03/2015 12:36	30.5	1.5	9	8	59
28/05/2015 14:33	59.8	4.7	0.9	13	34.6
22/06/2015 13:27	43.6	3.4	1.9	9	51.1
24/07/2015 14:13	37.2	6.1	1.5	8	55.2
07/08/2015 13:25	42.3	5.3	1.9	17	50.5
11/09/2015 14:01	33.2	3.6	5	12	58.2
24/09/2015 12:50	14.7	2.4	12.5	11	70.4
29/10/2015 13:01	5	1.5	17.8	7	75.7
27/11/2015 13:21	0	0.5	21.4	2	78.1
16/12/2015 12:48	1.1	0.8	19.1	14	79

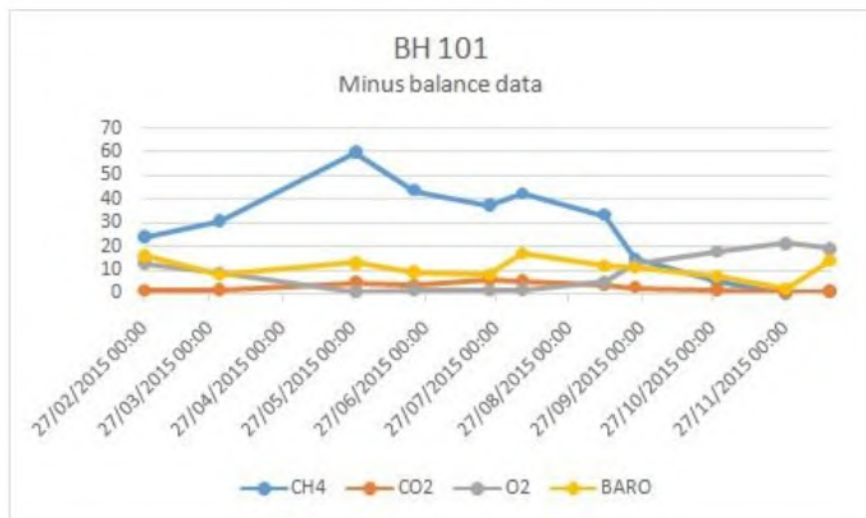


**Borehole BH 101 without balance data**

DATE	CH4	CO2	O2	BARO
27/02/2015 13:59	23.9	1.1	12.9	16
31/03/2015 12:36	30.5	1.5	9	8
28/05/2015 14:33	59.8	4.7	0.9	13
22/06/2015 13:27	43.6	3.4	1.9	9
24/07/2015 14:13	37.2	6.1	1.5	8
07/08/2015 13:25	42.3	5.3	1.9	17
11/09/2015 14:01	33.2	3.6	5	12
24/09/2015 12:50	14.7	2.4	12.5	11
29/10/2015 13:01	5	1.5	17.8	7

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27/11/2015 13:21	0	0.5	21.4	2
16/12/2015 12:48	1.1	0.8	19.1	14



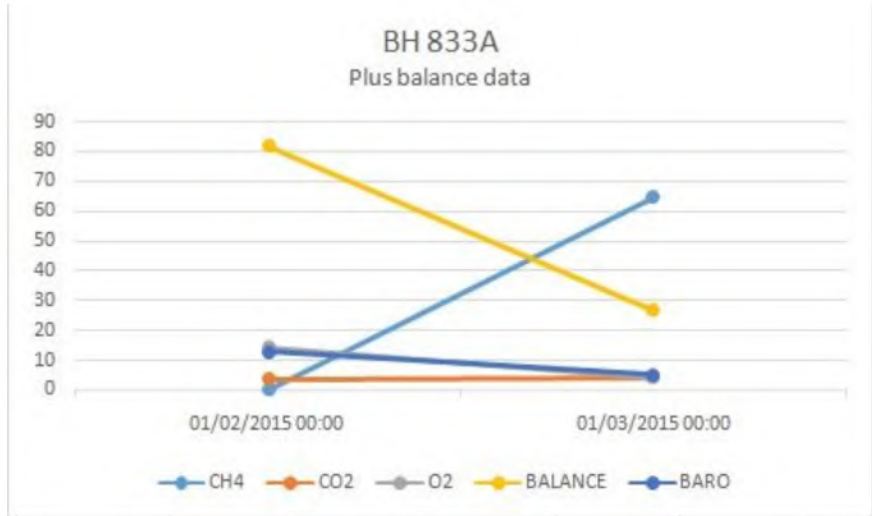
<b>Borehole reference 101</b>		
<b>Condition</b>	<b>Y/N</b>	<b>Comment</b>
Borehole inaccessible or headworks missing	Y	Inaccessible on one occasion
Air entry into borehole	Y	Consider the balance and O2 trend
Barometric pumping	Y	Yes
Enrichment of methane	Y	CO2 disproportionately low

### Borehole 833A

#### *Borehole 833A with balance data*

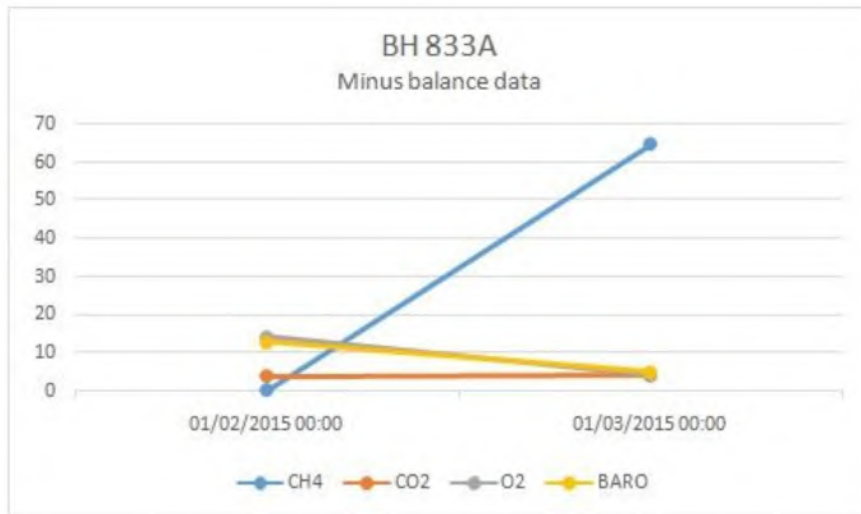
<b>DATE</b>	<b>CH4</b>	<b>CO2</b>	<b>O2</b>	<b>BARO</b>	<b>BALANCE</b>
27/02/2015 14:10	0	3.7	14.3	13	82
31/03/2015 12:56	64.8	4.3	4.1	5	26.8

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***Borehole 833A without balance data***

DATE	CH4	CO2	O2	BARO
27/02/2015 14:10	0	3.7	14.3	13
31/03/2015 12:56	64.8	4.3	4.1	5



<b>Borehole reference 833A</b>		
<b>Condition</b>	<b>Y/N</b>	<b>Comment</b>
Borehole inaccessible or headworks missing	Y	BH on 10 occasions
Air entry into borehole		Insufficient data
Barometric pumping		Insufficient data
Enrichment of methane		Insufficient data

**Borehole 836a – all data**

<b>836a</b>					
<b>DATE&amp;TIME</b>	<b>CH4%v/v</b>	<b>CO2%v/v</b>	<b>O2%v/v</b>	<b>BALANCE</b>	<b>BARO</b>
21/01/2015 00:00	Not accessible				
27/02/2015 14:28	72.6	5.7	1.7	20	994

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31/03/2015 00:00	Not accessible				
28/05/2015 14:44	3.5	1.9	19.4	75.2	990
22/06/2015 13:39	43	8.5	7.4	41.1	986
24/07/2015 14:28	19.2	12.7	0.6	67.5	986
07/08/2015 13:46	13.9	10.9	1.6	73.6	992
11/09/2015 00:00	No headworks – Unable to take reading				
24/09/2015 00:00	No headworks – Unable to take reading				
29/10/2015 00:00	No headworks – Unable to take reading				
27/11/2015 00:00	No headworks – Unable to take reading				
16/12/2015 12:48	No headworks – Unable to take reading				

***Borehole 836a with balance calculated***

<b>DATE&amp;TIME</b>	<b>CH4%v/v</b>	<b>CO2%v/v</b>	<b>O2%v/v</b>	<b>BALANCE %v/v</b>	<b>BARO mb</b>
27/02/2015 14:28	72.6	5.7	1.7	20	14
28/05/2015 14:44	3.5	1.9	19.4	75.2	10

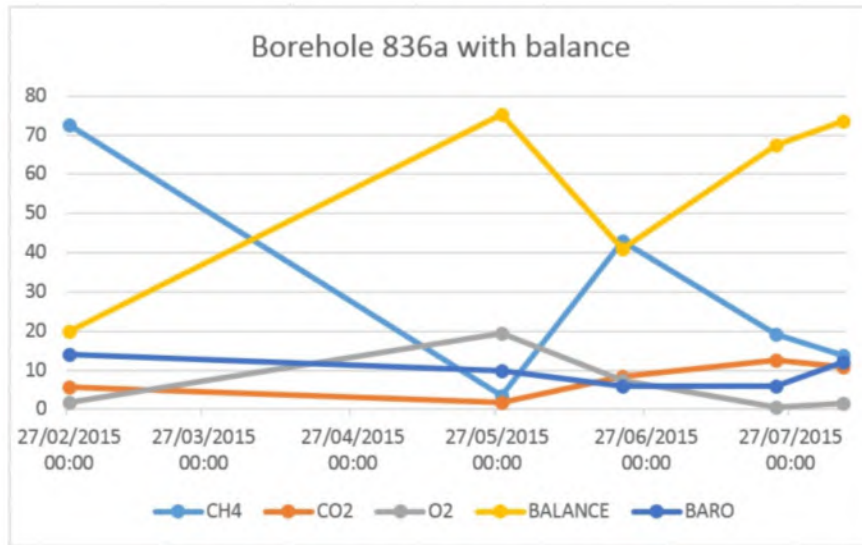
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22/06/2015 13:39	43	8.5	7.4	41.1	6
24/07/2015 14:28	19.2	12.7	0.6	67.5	6
07/08/2015 13:46	13.9	10.9	1.6	73.6	12



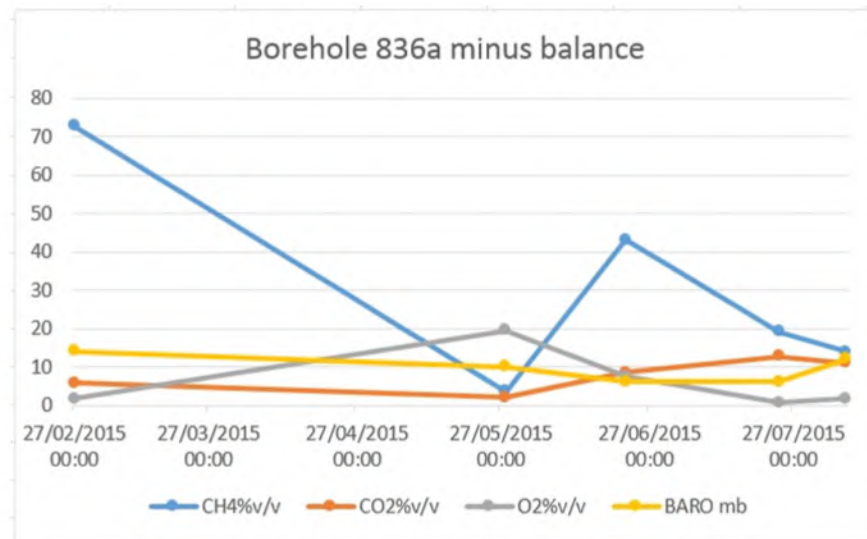
**Borehole 836a without balance**

DATE & TIME	CH4%v/v	CO2%v/v	O2%v/v	BARO mb
27/02/2015 14:28	72.6	5.7	1.7	14
28/05/2015 14:44	3.5	1.9	19.4	10
22/06/2015 13:39	43	8.5	7.4	6
24/07/2015 14:28	19.2	12.7	0.6	6

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07/08/2015 13:46	13.9	10.9	1.6	12
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Comments

Borehole reference 836a		
Condition	Y/N	Comment
Borehole inaccessible or headworks missing	Y	HW missing on several occasions
Air entry into borehole	Y	
Barometric pumping	Y	
Enrichment of methane	Y	

Appendix 2 – Borehole data

BH Reference	Date and time	CH4	CO2	O2	Balance	N2:O2
802a	27/02/2015 13:31	0	0.4	20.7	78.9	4
802a	31/03/2015 12:10	0.1	0.1	22.4	77.4	3



802a	28/05/2015 13:57	0	1.6	17.5	80.9	5
802a	29/10/2015 12:43	0	0.7	21	78.3	4
802a	27/11/2015 13:03	0	1.1	20.3	78.6	4
802a	16/12/2015 12:30	0	0.9	20.7	78.4	4
803	21/01/2015 00:00	0	5.8	7.4	86.8	12
803	27/02/2015 09:40	0	2	10	88	9
803	31/03/2015 09:55	0.3	2.3	5.2	92.2	18
803	28/05/2015 09:52	48.4	27.6	0.8	23.2	29
803	22/06/2015 09:28	22.9	8.3	1.6	67.2	42
803	24/07/2015 10:07	49.4	27.7	0.3	22.6	75
803	07/08/2015 10:23	21.3	14.6	10.2	53.9	5
803	11/09/2015 10:28	0	5.2	9.6	85.2	9
803	24/09/2015 09:45	33.7	13	3.2	50.1	16
803	29/10/2015 10:08	63.1	13.8	0.5	22.6	45
803	27/11/2015 10:09	0	2.8	5.2	92	18
803	16/12/2015 09:51	0	1.9	5.7	92.4	16
806	21/01/2015 00:00	26.4	32.5	4.7	36.4	8
806	27/02/2015 09:56	0	0.9	20.8	78.3	4
806	31/03/2015 10:04	0.1	1	20.3	78.6	4
806	28/05/2015 10:02	0	0.4	20.9	78.7	4
806	22/06/2015 09:59	0	0.3	20.8	78.9	4
806	24/07/2015 10:19	0	0.3	21.5	78.2	4
806	07/08/2015 10:36	0	0.2	21.3	78.5	4
806	11/09/2015 10:35	0	1.9	18.7	79.4	4
806	24/09/2015 09:54	0	0.5	20.7	78.8	4
806	29/10/2015 10:17	0.2	1.8	19.7	78.3	4
806	27/11/2015 10:18	0	0.1	21.7	78.2	4
806	16/12/2015 10:02	0	0.1	21.8	78.1	4
807	21/01/2015 00:00	54.9	8	0.02	37.1	1,853
807	11/09/2015 10:48	12.4	12.9	10.1	64.6	6
807	24/09/2015 10:04	0	0.1	21.2	78.7	4
807	29/10/2015 10:26	0	0.1	21.8	78.1	4
807	27/11/2015 10:29	24.5	25.5	0.2	49.8	249
807	16/12/2015 10:12	0	0.1	21.9	78	4

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809	21/01/2015 00.00	26	18.7	0.7	54.6	78
809	27/02/2015 10.09	0	5	11.3	83.7	7
809	31/03/2015 10.13	10.5	8.2	0.5	80.8	162

809	28/05/2015 10.16	0	5.8	15	79.2	5
809	22/06/2015 10.20	23.5	19.4	5.8	51.3	9
809	24/07/2015 10.39	0	5	16.7	78.3	5
809	07/08/2015 10.49	0	3.9	18	78.1	4
809	11/09/2015 10.59	0	6.7	12.6	80.7	6
809	24/09/2015 10.14	0	4.3	17.1	78.6	5
809	29/10/2015 10.35	0	5.8	15	79.2	5
809	27/11/2015 10.43	0	8	7	85	12
809	16/12/2015 10.21	0	7.4	4.2	88.4	21
810	21/01/2015 00:00	0	2.8	16.4	80.8	5
810	27/02/2015 10:21	0	2.2	18.1	79.7	4
810	31/03/2015 10:25	33	25.6	7.5	33.9	5
810	24/07/2015 10:58	0	0.6	20.8	78.6	4
810	07/08/2015 10:55	0	0.1	21.4	78.5	4
810	11/09/2015 11:05	0	0.3	20.5	79.2	4
810	24/09/2015 10:22	0	11.2	9.8	79	8
810	29/10/2015 10:42	0	1.5	20	78.5	4
810	27/11/2015 10:49	0	7	14.2	78.8	6
810	16/12/2015 10:28	0	3	18.7	78.3	4
811	21/01/2015 00:00	61.9	9	0.7	28.4	41
811	27/02/2015 10:33	0.1	0.7	20.6	78.6	4
811	31/03/2015 10:32	0.1	10.6	10.6	78.7	7
811	28/05/2015 10:46	20.1	7.3	14	58.6	4
811	22/06/2015 10:37	0.1	5.2	12.5	82.2	7
811	24/07/2015 11:20	39.8	14.5	8.4	37.3	4
811	07/08/2015 11:05	33.1	18.9	9.1	38.9	4
811	11/09/2015 11:13	38.3	23.4	7.6	30.7	4
811	24/09/2015 10:29	5.9	4.8	18.5	70.8	4
811	29/10/2015 10:51	0.1	0.4	21.4	78.1	4
811	27/11/2015 11:00	28.8	12.4	10.6	48.2	5

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811	16/12/2015 10:36	0	0.2	21.5	78.3	4
812a	21/01/2015 00:00	0	0.1	19.7	80.2	4
812a	27/02/2015 10:48	35.1	29.7	5.1	30.1	6
812a	31/03/2015 10:39	0.1	0.7	22.2	77	3
812a	28/05/2015 11:04	29.2	26.9	6.4	37.5	6
812a	22/06/2015 10:51	0.1	0.5	21.1	78.3	4
812a	24/07/2015 11:28	57.7	38.4	0.3	3.6	12
812a	07/08/2015 11:12	40.4	30.8	3.1	25.7	8
812a	11/09/2015 11:35	35.4	24.2	5.7	34.7	6
812a	24/09/2015 10:42	40.8	27.4	2.9	28.9	10
812a	29/10/2015 11:03	45.2	29.7	1.5	23.6	16
812a	27/11/2015 11:16	0.6	0.2	21.7	77.5	4
812a	16/12/2015 10:48	19.3	19.7	7.6	53.4	7

812	21/01/2015 00:00	0	0.9	19.2	79.9	4
812	27/02/2015 10:58	80.8	9.6	0.5	9.1	18
812	31/03/2015 10:48	53.5	19.8	0.4	26.3	66
812	28/05/2015 11:13	62.1	32.6	0.5	4.8	10
812	22/06/2015 11:04	71.6	21.8	0.5	6.1	12
812	24/07/2015 11:34	46	33.5	1.6	18.9	12
812	07/08/2015 11:18	15.6	12.3	12.4	59.7	5
812	11/09/2015 11:20	53	29.4	0.4	17.2	43
812	24/09/2015 10:36	63.2	30.8	0.3	5.7	19
812	29/10/2015 10:57	71.4	24.7	0.3	3.6	12
812	27/11/2015 11:07	76.9	8.5	0.3	14.3	48
812	16/12/2015 10:43	63.2	6.5	0.3	30	100
815	21/01/2015 00:00	0	1.8	18.1	80.1	4
815	27/02/2015 11:10	0.6	18.9	3.1	77.4	25
815	28/05/2015 11:26	0	9.2	12.4	78.4	6
815	22/06/2015 11:10	41.2	34.5	1.7	22.6	13
815	24/07/2015 11:43	0	19.7	3.3	77	23
815	07/08/2015 11:25	0	3.1	18.3	78.6	4
815	11/09/2015 11:43	0	4.6	17	78.4	5
815	24/09/2015 10:49	0	18.2	4.9	76.9	16
815	29/10/2015 11:11	0	15.9	7.2	76.9	11

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815	27/11/2015 11:24	0	19.8	4.7	75.5	16
815	16/12/2015 10:56	0	23.9	0.9	75.2	84
816	21/01/2015 00:00	0	5.1	15	79.9	5
816	27/02/2015 11:20	0	4	14.8	81.2	5
816	28/05/2015 11:45	0	0.9	21.3	77.8	4
816	22/06/2015 11:17	0	8.1	13.6	78.3	6
816	24/07/2015 11:56	0.3	3.8	14	81.9	6
816	07/08/2015 11:40	0	0.4	21.2	78.4	4
816	11/09/2015 11:51	20.7	20.7	0.5	58.1	116
816	24/09/2015 10:56	0	4.1	19	76.9	4
816	29/10/2015 11:19	0	3.4	19.1	77.5	4
816	27/11/2015 11:31	9.9	18.1	0.3	71.7	239
816	16/12/2015 11:02	0	1	19.1	79.9	4
817	21/01/2015 00:00	0	1.4	19.2	79.4	4
817	27/02/2015 11:31	23.1	18.1	0.5	58.3	117
817	28/05/2015 12:02	56.9	22.1	0.5	20.5	41
817	22/06/2015 11:28	58.1	23.4	0.3	18.2	61
817	24/07/2015 12:08	39.1	24.5	0.3	36.1	120
817	07/08/2015 11:48	32.3	24.3	0.6	42.8	71
817	11/09/2015 11:59	64.9	26.8	0.3	8	27
817	24/09/2015 11:03	30.7	24.2	0.3	44.8	149
817	29/10/2015 11:27	57.5	27	0.3	15.2	51

817	27/11/2015 11:38	41.5	25.2	0.2	33.1	165
817	16/12/2015 11:09	58.3	24.3	0.3	17.1	57
818	21/01/2015 00:00	0	8.7	12.6	78.7	6
818	27/02/2015 11:43	60.7	9	0.4	29.9	75
818	31/03/2015 11:06	52.8	7.3	5.6	34.3	6
818	28/05/2015 12:22	69.6	10.2	0.3	19.9	66
818	22/06/2015 11:37	61.9	10.1	0.5	27.5	55
818	24/07/2015 12:23	61.7	10.1	0.3	27.9	93
818	07/08/2015 11:58	52.8	9.8	0.4	37	92
818	11/09/2015 12:41	54.2	11.2	0.4	34.2	85
818	24/09/2015 11:29	52.8	12	0.3	34.9	116
818	29/10/2015 11:41	55.1	11.1	0.2	33.6	168

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818	27/11/2015 11:57	60.9	11.5	0.3	27.3	91
818	16/12/2015 11:29	60.2	9.9	0.3	29.6	99
819	21/01/2015 00:00	0	7.6	0.7	91.7	131
819	27/02/2015 11:51	0	0.1	20.9	79	4
819	31/03/2015 11:13	0.1	0.1	22.5	77.3	3
819	28/05/2015 12:30	0	0.3	21.5	78.2	4
819	22/06/2015 11:43	0	2.6	18.7	78.7	4
819	24/07/2015 12:28	0	4.1	16.5	79.4	5
819	07/08/2015 12:03	0	0.1	21.4	78.5	4
819	11/09/2015 12:46	0	6.4	13.4	80.2	6
819	24/09/2015 11:35	0	0.1	21.2	78.7	4
819	29/10/2015 11:45	0	0.2	21.7	78.1	4
819	27/11/2015 12:02	0	5.2	15.2	79.6	5
819	16/12/2015 11:34	0	0.1	21.8	78.1	4
820	21/01/2015 00:00	0	0	19.8	80.2	4
820	27/02/2015 12:01	0.1	0.5	20.6	78.8	4
820	31/03/2015 11:18	0.1	0.1	22.5	77.3	3
820	28/05/2015 12:38	0	1.1	20.9	78	4
820	22/06/2015 11:52	0	1.5	19.6	78.9	4
820	24/07/2015 12:33	0	1.8	19.9	78.3	4
820	07/08/2015 12:09	0	0.8	20.8	78.4	4
820	11/09/2015 12:51	0	0.8	20.6	78.6	4
820	24/09/2015 11:40	0	1.4	20.1	78.5	4
820	29/10/2015 11:51	0	1.1	20.8	78.1	4
820	27/11/2015 12:08	0	4.9	15.2	79.9	5
820	16/12/2015 11:40	0	0.9	21.1	78	4
821	21/01/2015 00:00	0	8.3	12.6	79.1	6
821	27/02/2015 12:08	0	0.6	20.8	78.6	4
821	31/03/2015 11:24	0.1	0.4	22.3	77.2	3
821	28/05/2015 12:44	0	1.8	20.2	78	4
821	22/06/2015 11:58	0	3	18.1	78.9	4

821	24/07/2015 12:39	0	2.9	18.7	78.4	4
821	07/08/2015 12:14	0	1.7	20	78.3	4
821	11/09/2015 12:56	0	2.2	18.9	78.9	4

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821	24/09/2015 11:45	0	2.5	19.6	77.9	4
821	29/10/2015 11:56	0	3	18.5	78.5	4
821	27/11/2015 12:13	0	4.2	16.9	78.9	5
821	16/12/2015 11:45	0	0.9	21.1	78	4
822a	21/01/2015 00:00	0	0.5	19.3	80.2	4
822a	27/02/2015 12:20	0	3.9	16.8	79.3	5
822a	31/03/2015 11:29	0.1	0.6	21.8	77.5	4
822a	28/05/2015 12:50	0	5.9	11.5	82.6	7
822a	22/06/2015 12:03	0	7.7	8.3	84	10
822a	24/07/2015 12:46	0	5	14.8	80.2	5
822a	07/08/2015 12:22	0	3.1	18	78.9	4
822a	11/09/2015 13:02	0	7.2	10.2	82.6	8
822a	24/09/2015 11:50	0	4.7	14.9	80.4	5
822a	29/10/2015 12:01	0	4.8	15.9	79.3	5
822a	27/11/2015 12:18	0	5.3	13.8	80.9	6
822a	16/12/2015 11:50	0	5.6	13.7	80.7	6
822	27/02/2015 12:30	0	0.7	20.9	78.4	4
822	31/03/2015 11:34	0.1	0.1	22.4	77.4	3
822	28/05/2015 12:56	0	1.4	21.2	77.4	4
822	22/06/2015 12:09	0	2.6	18.9	78.5	4
822	24/07/2015 12:51	0	6.3	12.7	81	6
822	07/08/2015 12:27	0	0.5	21	78.5	4
822	11/09/2015 13:07	0	1.3	19.9	78.8	4
822	24/09/2015 11:56	0	0.7	21.2	78.1	4
822	29/10/2015 12:07	0	0.3	21.7	78	4
822	27/11/2015 12:24	0	8.7	9	82.3	9
822	16/12/2015 11:55	0	0.2	21.8	78	4
823	27/02/2015 12:43	0	1.8	20.3	77.9	4
823	31/03/2015 11:40	0.5	2.2	21.1	76.2	4
823	28/05/2015 13:02	0.9	11.1	1.5	86.5	58
823	22/06/2015 12:15	13	17.9	0.5	68.6	137
823	24/07/2015 12:56	0	12	4	84	21
823	07/08/2015 12:31	0	0.9	20.3	78.8	4
823	11/09/2015 13:15	0	0.5	20.8	78.7	4

823	24/09/2015 12:02	0	3.3	17.9	78.8	4
823	29/10/2015 12:11	0	0.5	21.6	77.9	4
823	27/11/2015 12:29	10.8	18.1	0.2	70.9	354
823	16/12/2015 12:01	4.3	7.6	12.8	75.3	6
823a	27/02/2015 12:51	0	5.2	8.5	86.3	10
823a	31/03/2015 11:45	9.7	6.2	10	74.1	7

823a	28/05/2015 13:08	0	11.3	2	86.7	43
823a	22/06/2015 12:21	0	11	4.4	84.6	19
823a	24/07/2015 13:02	0	12.1	6	81.9	14
823a	07/08/2015 12:36	0	11.3	6.6	82.1	12
823a	11/09/2015 13:20	0	8.4	10.1	81.5	8
823a	24/09/2015 12:07	0	12	6.9	81.1	12
823a	27/11/2015 12:34	0	12.2	3.9	83.9	22
823a	16/12/2015 12:06	0	9.7	0.8	89.5	112
825	27/02/2015 13:04	0	4.7	16.9	78.4	5
825	31/03/2015 11:52	0.1	0.1	22.2	77.6	3
825	28/05/2015 13:31	0	4.8	15.3	79.9	5
825	22/06/2015 12:41	0	5.4	15	79.6	5
825	24/07/2015 13:23	0	4.4	17.9	77.7	4
825	07/08/2015 12:45	0	2.5	19.1	78.4	4
825	11/09/2015 13:27	0	2.9	18.3	78.8	4
825	24/09/2015 12:16	0	4.4	16.3	79.3	5
825	29/10/2015 12:28	0	3.1	18.6	78.3	4
825	27/11/2015 12:46	0	4.8	16.5	78.7	5
825	16/12/2015 12:13	0	3.3	18.5	78.2	4
826	27/02/2015 13:13	0	0.8	20.7	78.5	4
826	31/03/2015 11:57	0.1	4.9	15.7	79.3	5
826	28/05/2015 13:42	0	1.1	20.7	78.2	4
826	22/06/2015 12:50	0	1.2	19.9	78.9	4
826	24/07/2015 13:31	0	1	20.9	78.1	4
826	07/08/2015 12:53	0	0.4	20.7	78.9	4
826	11/09/2015 13:34	0	0.4	20.5	79.1	4
826	24/09/2015 12:22	0	0.9	20.6	78.5	4
826	29/10/2015 12:33	0	0.6	21.3	78.1	4

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826	27/11/2015 12:51	0	0.8	21.2	78	4
826	16/12/2015 12:19	0	0.7	21.1	78.2	4
826a	27/02/2015 13:20	0	6.8	15	78.2	5
826a	31/03/2015 12:03	0.1	0.7	21.4	77.8	4
826a	28/05/2015 13:48	0	4.3	16.1	79.6	5
826a	22/06/2015 12:55	0	4.2	15.8	80	5
826a	24/07/2015 13:39	0	4	17.1	78.9	5
826a	07/08/2015 12:58	0	3	17.4	79.6	5
826a	11/09/2015 13:38	0	3	16.8	80.2	5
826a	24/09/2015 12:27	0	4.6	15.9	79.5	5
826a	29/10/2015 12:37	0	4.6	15.1	80.3	5
826a	27/11/2015 12:56	0	8.3	13.8	77.9	6
826a	16/12/2015 12:24	0	7.7	14.9	77.4	5
827a	27/02/2015 13:31	0	0.4	20.7	78.9	4
827a	31/03/2015 12:10	0.1	0.1	22.4	77.4	3
827a	28/05/2015 13:57	0	1.6	17.5	80.9	5
827a	29/10/2015 12:43	0	0.7	21	78.3	4
827a	27/11/2015 13:03	0	1.1	20.3	78.6	4
827a	16/12/2015 12:30	0	0.9	20.7	78.4	4
102	27/02/2015 13:46	11.5	5.5	4.7	78.3	17
102	31/03/2015 12:25	47.4	11.1	3	38.5	13
102	28/05/2015 14:22	61.7	12.1	0.3	25.9	86
102	22/06/2015 13:18	42.8	7.9	0.6	48.7	81
102	24/07/2015 14:01	55.9	12.7	0.5	30.9	62
102	07/08/2015 13:16	27.8	9.1	8.8	54.3	6
102	11/09/2015 13:52	70.2	10.8	0.4	18.6	46
102	24/09/2015 12:42	37.9	10.2	0.4	51.5	129
102	29/10/2015 12:55	69.5	11.7	0.5	18.3	37
102	27/11/2015 13:13	47.9	6.4	0.4	45.3	113
102	16/12/2015 12:40	49.9	2.9	1.1	46.1	42
101	27/02/2015 13:59	23.9	1.1	12.9	62.1	5
101	31/03/2015 12:36	30.5	1.5	9	59	7
101	28/05/2015 14:33	59.8	4.7	0.9	34.6	38
101	22/06/2015 13:27	43.6	3.4	1.9	51.1	27

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101	24/07/2015 14:13	37.2	6.1	1.5	55.2	37
101	07/08/2015 13:25	42.3	5.3	1.9	50.5	27
101	11/09/2015 14:01	33.2	3.6	5	58.2	12
101	24/09/2015 12:50	14.7	2.4	12.5	70.4	6
101	29/10/2015 13:01	5	1.5	17.8	75.7	4
101	27/11/2015 13:21	0	0.5	21.4	78.1	4
101	16/12/2015 12:48	1.1	0.8	19.1	79	4
836a	27/02/2015 14:10	0	3.7	14.3	82	6
836a	31/03/2015 12:56	64.8	4.3	4.1	26.8	7
836a	27/02/2015 14:28	72.6	5.7	1.7	20	12
836a	28/05/2015 14:44	3.5	1.9	19.4	75.2	4
836a	22/06/2015 13:39	43	8.5	7.4	41.1	6
836a	24/07/2015 14:28	19.2	12.7	0.6	67.5	112
836a	07/08/2015 13:46	13.9	10.9	1.6	73.6	46

### Appendix 3 – photographs of site conditions



