

## Bradford, Julie

**From:** Oakes, Ian  
**Sent:** 08 December 2014 12:06  
**To:** Bradford, Julie  
**Cc:** Wright, Paul  
**Subject:** FW: Hafod Update Report and Proposals  
**Attachments:** NEW WELL PERFORMANCE TABLE-TR-NOV2014.docx; 20141119\_FINALMethaneEmissionsSurvey\_Hafod-NOV-14.docx; 20141119\_Hafod\_GasWellsTable-NOV-14.docx

EDRM / PR

**From:** Roberts, Anthony  
**Sent:** 05 December 2014 15:09  
**To:** GBall@coryenvironmental.co.uk  
**Cc:** AHoll@coryenvironmental.co.uk; Oakes, Ian; ICraven@coryenvironmental.co.uk; Ward, Tyrone  
**Subject:** Re: Hafod Update Report and Proposals

Dear Ian and Graham,

Thank you for the latest dip survey for the new wells and the update report on actions taken in response to the July audit.

Before we set a date for the re-visit (I will send possible dates to you to agree shortly) I have attached the Gazomat methane emissions report and the well survey report for information and action as discussed in the site de-brief following the previous visit.

I have also attached a table I have constructed to aid NRW in understanding the effectiveness of the new wells and the de-watering protocol for the wells.

The table shows that the performance of the wells is compromised by the levels of leachate and the available slotting. I have calculated the slotting available for extraction and compared this with the slotting that would have been available compared with the original well proposal.

There has been a small improvement in the wells with pneumatic pumps fitted but a reduction in slotting available for the well with the electric pump fitted. Is this due to the high rate of perched leachate influx? Wells with pumps in are specified on the table.

To Gain the most benefit from the installation of these wells I feel it is important that the pumps are able to de-water the wells efficiently depending on re-charge rates. Consideration therefore might be given to installation of further pumps depending on the updated dip data. I would be very grateful if you could provide the next set of dip data in the same format as previously provided.

Finally it would be useful to review the targeted depth of the original wells (also included in the attached table) to ensure that the wells which were significantly below target depth or have subsequently been blocked are adequate for the original design purpose.

Best wishes

Tony

Tony Roberts  
Cyfoeth Naturiol Cymru / Natural Resources Wales  
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**Sent:** 28 November 2014 12:45

**To:** Roberts, Anthony

**Cc:** [AHoll@coryenvironmental.co.uk](mailto:AHoll@coryenvironmental.co.uk); Oakes, Ian; [ICraven@coryenvironmental.co.uk](mailto:ICraven@coryenvironmental.co.uk); Ward, Tyrone

**Subject:** Re: Hafod Update Report and Proposals

Hi Tony

Please see attached dip data taken at Hafod this week on the new wells, though the new wells mentioned are around 3.2M available the remainder are faring slightly better - with the continued efforts at Gas well evacuation this should continue to show improvement.

**Graham Ball**

**Head of Landfill Gas and Bio Gas**

**Cory Environmental Resource Management**

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**From:** "Roberts, Anthony" <[Anthony.Roberts@cyfoethnaturiolcymru.gov.uk](mailto:Anthony.Roberts@cyfoethnaturiolcymru.gov.uk)>

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**Date:** 28/11/2014 11:51

**Subject:** Re: Hafod Update Report and Proposals

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Good Morning Ian,

Thank you for the report and updated plan. The installation of the new pin wells at this density appears to be appropriate to help to control emissions from the area in question.

I would also like to take this opportunity to thank you for the work that has been undertaken in response to our audit in July as detailed in your attached report.

Now we have the report I will finish the summary of the follow up audit with Ty including the developments that you have summarised. I am also in the process of amalgamating some of the reporting



data that you have sent through to give a better idea of what is happening in the new wells in relation to the camera survey findings etc.

In summary wells 32,35,37,40 and 41 have less than 3.2m of slotted pipe available for extraction and all of the pipes are compromised in some form. The targeted removal of leachate by the additional pumps you have installed will help to improve this situation and should improve gas extraction efficiency further. Myself and Ty will now produce a consolidated follow up audit report which we will submit to you by next Friday.

If you have any further queries please do not hesitate to contact me.

Best wishes

Tony

Tony Roberts

**Cyfoeth Naturiol Cymru / Natural Resources Wales**

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**From:** [ICraven@coryenvironmental.co.uk](mailto:ICraven@coryenvironmental.co.uk) <[ICraven@coryenvironmental.co.uk](mailto:ICraven@coryenvironmental.co.uk)>

**Sent:** 28 November 2014 08:28

**To:** Roberts, Anthony; Oakes, Ian

**Cc:** [GBall@coryenvironmental.co.uk](mailto:GBall@coryenvironmental.co.uk); [AHoll@coryenvironmental.co.uk](mailto:AHoll@coryenvironmental.co.uk)

**Subject:** Hafod Update Report and Proposals

Tony/Ian

Further to last weeks site visit please find attached an update report and further explanation of the proposals we discussed with you on the day. Over the next two weeks we intend to get manifold 7 moved and the extension to the 180mm main completed. If possible we will also start drilling the pin wells, but will inform you of this prior to starting. If you have any queries please do not hesitate to contact me.

Kind regards

**Ian Craven**

**NW Area Manager**

**Cory Environmental Resource Management**

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# NEW WELL STATUS AND LEACHATE SUMMARY OCTOBER-NOVEMBER 2014

Percentage of waste depth drilled	Camera Survey Comments Summary	Depth To Base	Depth to liquid	Perforations from	Final Length of Slotted Pipe Available for Extraction At Time Of Camera Survey 16th-17th October 2014	Slotted pipe available- Data taken from Site Reported Dips 24/11/2014	Pump Installed	Initial Proposed total slotting for gas extraction	Percentage of Original well design available for extraction- Camera Survey Dip	Total Slotted Pipe Available For extraction Camera Survey Dip % 16th-17th October 2014	Percentage of Original well design available for extraction - Site Dip	Total Slotted Pipe Available For extraction site Survey Dip % 24/11/2014
84.659	Total solid blockage at 4m pushed down to 6m then came up to 5m depth to slots 3.5m. Available slotting for extraction 1.5m	5	0	3.5	1.5	0.00		14.5	10.344828		0	
55.545	Debris and slime from 9m and build up on liquid surface as in GW 32. Depth to liquid 11.6m	19	11.6	4.5	7.1			22.5	31.555556		0	
67.044	Depth to liquid 9.38m leachate head of 12.62	21.8	9.38	7	2.38	2.89	Pneumatic	23	10.347826		12.56522	
88.786	Perforations from 6.8 depth to leachate 10m Depth to base 16.26	16.3	10	6.8	3.2	3.5		18.2	17.582418		19.23077	
89.664	Depth to liquid 7.22, depth to base 15.46	15.5	7.22	4.2	3.02	4.1	Pneumatic	10.8	27.962963		37.96296	
93.158	Depth to liquid 11.37, depth to base 28.12	28.1	11.37	3.5	7.87	4.43		26.5	29.698113		16.71698	
71.619	Foam from top of well. Depth to liquid 14, depth to base 26.8	26.8	14	6.52	7.48	0		29.48	25.373134			
66.673	Foam from 7m, depth to liquid 8.83, depth to base 16.9	16.9	8.83	6	2.83	2.75		18	15.722222		15.27778	
76.164	Foam, depth to liquid 6.9, depth to base 12.7	12.7	6.9	3.17	3.73	4.58	Pneumatic	8.83	42.242356		51.86863	
71.226	Top section at an incline of 22.5 deg. Slime on well walls, debris on surface of liquid. Depth to liquid 18.35, depth to base 28.55	28.6	18.35	7.8	10.55	14.75		28.2	37.411348		52.30496	
75.115	Foam on surface, depth to liquid, 17.33, depth to base, 19	19	17.33	3.9	13.43	10.5	Electric	32.1	41.838006		32.71028	
73.222	Slime on well walls, foam from 10, depth to liquid 12.6, depth to base 18.12	18.1	12.6	3.5	9.1			14.5	62.758621		0	
										29.4031158		23.8637583







## Methane Emissions Survey Sheet – Hafod Landfill

<b>Site</b>	Hafod Landfill: <b>Permit No BS8621IW</b>	<b>Date</b>	19 <sup>th</sup> Nov 2014	<b>Time</b>	in: 10:25 out: 15:45
<b>Instrument</b>	Gazomat Inspectra TDL (Serial No.: 1470311)	<b>Test gas reading</b>	N/A	<b>Time</b>	N/A
<b>Next Calibration due</b>	2015	<b>Background reading</b>	1.8	<b>Time</b>	11:30
<b>Weather conditions:</b>	Dry, cold, cloud, light breeze, easterly			<b>Atm. Press.</b>	1006mb
<b>Survey Undertaken by:</b>	T Roberts, T Ward				

### General comments / observations

This Technical Review follow up is being carried out as a key part of Natural Resources Wales' strategy to reduce methane emissions from landfill sites in Wales. The objectives of the site review include ensuring that the site is being operated and maintained so as to maximise gas collection efficiency and minimise fugitive landfill gas emissions. Treating the gas in a manner that minimises point source emissions.

An ATEX certified, Gazomat Inspectra Laser Methane Analyser was used to perform emissions testing at the site. Surface capping, seams and structures on the site were randomly tested in order to establish potential sources of methane egress.

Officers were accompanied by Graham Ball and (in part) Ian Craven, both of Cory Environmental.

*Note on scope of this work: The surface emission checks undertaken by NRW during this visit should only be considered a snapshot of the site. This exercise should not be considered a comprehensive survey of the entire site.*

### Survey Results (only readings >10 ppm recorded)

Point ref.	Time	Methane Reading	Feature and / or Grid Reference	Description / Comment
1	12:15	35ppm		Phase 3 West side, second bench up from toe. 60m from haul road – <b>Average ambient reading</b>
2	12:15	54ppm		Phase 3 West side, second bench up from toe. 60m from haul road – <b>Peak ambient reading</b>
3	12:30	1,100ppm		Reading taken along capping edge where plastic meets soil/clay cover.
4	12:40	4,700ppm		Reading taken along capping edge where plastic meets soil/clay cover.
5	12:55	893ppm		Reading taken along capping edge where plastic meets soil/clay cover.  Improved extraction in this area is required. <b>Note we subsequently found GW32 is off due to the sacrificial capping works.</b>
6	13:10	660ppm		Reading taken from area around pin well – capping to be patch welded.



7	13:15	19%vol	Reading taken from KO Pot 5 open pipe to drainage layer. <b>This is acting as a point source of emissions and requires sealing asap. Associated strong odour in this locality.</b>
8	13:30	20ppm	Phase 3 West side, third bench up from toe. Average reading across bench.
9	13:35	200ppm	Tear in geomembrane cap approx. 4m from LMP3 <b>please repair asap</b>
10	13:40	238ppm	Phase 3 East side at toe of flank. Reading from the open shredded tyre drainage ditch <b>(the Geomembrane cover is being extended)</b>  We also discussed regular inspection and maintenance of Duty diesel pump to ensure leachate in the collection sumps cannot overflow outside of the contained area. <b>In the event of a pump or level sensor failure, can the electric pump be deployed or are there other standby arrangements?</b>
11	13:55	25ppm	Phase 3 third bench up from toe, area around GW32
12	14:00	80ppm	Ambient reading in hollow area, approx. 50m downwind from current west tipping area
13	14:05	120ppm	Ambient reading downwind from current west tipping area
14	14:15	1600ppm	Ambient reading at toe of current west tipping area (50m from GW32)
15	14:20	400ppm	Reading around west area of new waste, along a 40m transect. <b>Extraction infrastructure is needed in this area. Please submit proposals for pin or horizontal wells as we discussed asap.</b>
16	14:30	1095ppm	Reading from large soil cracks around concrete ring of LMP1. (Informed that the well is blocked for as a leachate extraction/dip point and has subsequently been replaced by LMP1A.) <b>Please re-seal the well and consider top hat type fitting which may allow improved gas extraction under slight suction.</b>
17	14:40	340ppm	GW36 reading from around bentonite seal. New well in vital location but NAF. Informed well subsequently blocked 10m short of target depth. <b>To pump down perched leachate and investigate further, including possibility of bentonite inside casing?</b>
18	14:45	12-28ppm	Ambient readings between GW36 and GW37
19	15:00	138ppm	Reading from leachate weep on bench up from new GW37. <b>Consider improved soil coverage in area.</b>





### Findings/Recommendations

The table above demonstrates that there are emissions from some parts of the site:-

In Phase 3, a sweep along the flank benches recorded a value up to 4,700ppm from the surface, at the edge of the sacrificial capping. On the flanks water trapped behind the plastic, which means potential for perching in wells and infrastructure and a reduced gas extraction efficiency.

Near GW29 gas was heard to be bubbling and trapped under the capping (approx. 3m from the manifold) This well was off and is in an important location.

The uncapped flanks near the tipping area recorded up to 1,600ppm. This is accompanied by an extensive area with no active extraction.








The site management is aware of these issues and has instigated improvements works which at the time of the survey were ongoing. These include the drilling of new wells in vital locations and a targeted rotational pumping programme along with further sacrificial capping. As a result, several wells were off during the visit which are due to be re-connected.. **These improvements are expected to reduce emissions once completed.**

**Further actions were discussed with the Site Manager on the day of the survey to remedy the issues, and a follow up visit post works is planned in approximately 3 -4 weeks' time.**

## Hafod Landfill Site

### Surface Emissions Survey 19/11/2014

#### Key

-  0 - 50ppm
-  50 - 100ppm
-  101 - 500ppm
-  501 - 1000ppm
-  1001 - 5000ppm
-  5001 - 10000ppm
-  >1% v/v

