



**Cyfoeth
Naturiol
Cymru
Natural
Resources
Wales**

Mr. Adam Mears
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Ein cyf / Our ref: EAWML 37027
Eich cyf / Your ref: ALM/LLAN/EAL55

Dyddiad/Date: 4th April 2014

Sent via email to:
adam.mears@fccenvironment.co.uk

Dear Adam,

RE: Permit BU0800IZ, Llanddulas Landfill

Thank you for providing Cyfoeth Naturiol Cymru / Natural Resources Wales with a summary of the information relating to the gas well dewatering at Llanddulas Landfill in 2013, which was received on 10th March 2014.

Having reviewed the information provided we do not agree with all of the conclusions that your summary provides. Our comments are as follows:

1. Your own data demonstrates that gas well dewatering can provide benefit on stabilising gas yields from individual wells. As a result our future position on this matter will be that any wells that are totally blinded / inhibited by liquid and correspond to areas of high fugitive emissions (point source or diffuse) will be treated as a lack of appropriate measures for the control of landfill gas on site.
2. You state that most wells receive 95% of the benefits of dewatering from reducing liquid levels to just below plain casing sections. Were any of the gas wells included in the trial where the liquid level was reduced significantly then de-silted in line with the best practice outlined in Section 8.4.4.3 of the ICOP for landfill gas management? This could have had a notable effect on the amount of slotting available and subsequent extraction efficacy of those wells.
3. In relation to the inferences drawn from the data provided on gas well D245. You state that there was not a sustainable improvement in gas quality or suction on this well following dewatering. This is to be expected; as an increased area of slotting becomes available the differential pressure should decrease with a concurrent rise in gas flow (if the slots are not blinded by silt / bio fouling). However, as there is no data presented on actual gas flows at this well it is difficult to draw cast iron conclusions from this data.

(cont.)

www.cyfoethnaturiolcymru.gov.uk

www.naturalresourceswales.gov.uk

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Croesewir gohebiaeth yn y Gymraeg a'r Saesneg
Correspondence welcomed in Welsh and English

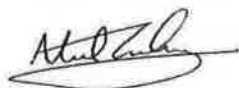
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Gas quality should be expected to drop to represent that of a more atypical landfill concentration, rather than artificially methane enriched gas quality observed in the headspace of a well that is blinded by liquid. This trend is displayed by many of the wells included in the trial, with gas quality initially dropping as liquid levels drop and slotted pipe becomes available. It is also concerning to note between September and December the differential pressure applied to D245 varies by over 50mb and at times approaches -70mb. We do not typically expect to see such wild variations in applied pressure and this makes the gas quality data less meaningful in the context of the trial.

4. We would expect the installation of permanent capping together with the retro drilling of new gas wells to yield the greatest benefit to extraction efficacy at the site. However, this does not devalue or negate the need for gas well dewatering, which in light of the average rainfall for North Wales should be considered an important part of gas control on the operational / uncapped areas of the site. Again, gas well dewatering is widely accepted as best practice in the Landfill industry and is documented in the ICOP for the management of landfill gas. We note that other less sensitively located landfills operated by 3C Waste / FCC benefit from a greater percentage of dedicated gas well pumps than currently present at Llanddulas.
5. We support the strategic dewatering of gas wells as part of a "whole site approach" to landfill gas management. However, we do not accept that wells totally blinded by liquid provide any meaningful gas control, this often lead to an increase in landfill gas emissions in areas adjacent to those wells. This is corroborated by actual emissions data gathered during previous inspections at Llanddulas and other sites in the landfill sector. If the gas field is constructed with a degree of "redundancy" built in then the remaining infrastructure should maintain a high degree of extraction, especially given proximity of sensitive receptors.
6. 3C Waste's own environmental monitoring demonstrates that there are areas of fugitive emissions still being recorded on Phase 2. To further this point the gas quality recorded from leachate extraction points (which indicates gas at depth) by NRW shows good quality landfill gas is still being generated on this phase. Information regarding gas well de-watering and de-silting carried out by Infinis has previously been requested but the information has never been provided. If the objectives of the gas management system are being met in this part of the site, we would not expect to see fugitive emissions (especially in lieu of this phase benefitting from areas of permanent capping). NRW will continue to review the gas extraction efficacy in this area of the site in line with the permit and Landfill Directive requirements.

I trust this clarifies our position with regard to landfill gas well dewatering at Llanddulas but should you wish to discuss this in more detail please contact me directly.

Yn gywir / Yours faithfully,



Aled Zachary
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