

Natural Resources Wales
Waste and Industry Regulation Team
Maes Y Fynnon
Bangor
LL57 2DW

Wednesday, 31 January 2024

Ask for: Emma Small
Ref: ECL.9611.R02.004

Dear Mr Roberts,

Penhesgyn Gors Landfill Site – Q4 2023 Monitoring Report

This letter report accompanies the factual monitoring data that was collated during October to December of 2023. The scope of this quarterly monitoring report is as per Table S4.1 in Schedule 4 – Reporting and the relevant provisions, of the site permit. Table 1 below summarises the monitoring and reporting completed by Egniol over the year, with the Q4 monitoring shown in green.

Table 1: Summary of Egniol Monitoring and Q4 Reporting

Description	Monitoring Point References	Reporting period
Leachates Levels and Quality (Area 3) as required by condition 3.5.1 (Table S3.1 and Table S3.8)	Cell 1 – (BHL14, BHL15) Cell 2 – (BHL13, L nr 38, L nr 122) Cell 3 – (BHL10, BHMH3A, BHMH3B) Valley Cell (L16, L17, BH60) As identified on Figure 2 Monitoring locations, of the Hydrogeological Risk Assessment Review (Report fc37224, June 2020)	Quarterly
	Depth to base of monitoring well Cell 1 (BHL13) Cell 2 (BHL14) Cell 3 (BHMH3A) Valley Cell (BH60)	
	Leachate Quality (sampling and testing) Cell 1 (BHL13) Cell 2 (BHL14) Cell 3 (BHMH3A) Valley Cell (BH60)	Every 6 months
	Leachate Quality (sampling and testing) Area 2 L1, L4, L5, L6 and L7 Area 3 Cell 1 BHL13, Cell 2 BHL14, Cell 3 BHMH3A and Valley Cell BH60	Annually
Surface Water Quality as required by condition 3.5.1 (Tables S3.3 and S3.9)	Surface Water Quality sampling and testing SW9 and SW10	Every 6 months
	Surface Water Quality sampling and testing SW1 to SW10	Annually
Landfill gas lateral migration Parameters as required by condition 3.5.1 (Table S3.6)	Landfill gas monitoring boreholes as identified on Drawing 5739.SURV.D03.	Quarterly

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Description	Monitoring Point References	Reporting period
Groundwater Monitoring and Quality as required by condition 3.5.1 (Tables S3.5 and S3.10)	Groundwater quality and monitoring (Dip levels and sampling) BH2/88, BH8/88, BH22 and BH96B	Every 6 months
	Groundwater quality and monitoring (Dip levels and sampling) BH2/88, BH96/B, BH1/88, BH19 and BH96B	Annually
	Depth to groundwater and base of monitoring wells (Dip levels) BH01 to BH31, BH50 to BH54, BH1/88, BH2/88 and BH96B	Annually

During the Q4 monitoring visit a number of positions were inaccessible due to flooding, Table 2 below summarises the locations that were not monitored during this period. Going forward into 2024 Egniol will schedule monitoring in the water logged areas for the summer period in July during Quarter 3 to ensure safe access to the monitoring and sampling locations is available.

Table 2: Summary of Positions not Accessible during the Q4 Monitoring Visits

Description	Monitoring point reference	Comments
Leachates Levels and Quality (Area 3) as required by condition 3.5.1 (Table S3.1 and Table S3.8)	L7	Leachate well dry, no sample taken
	BHL17	Missing dip data
	L1	Sampled and tested but no dip data
	L5 and L6	Recorded as dry but sampled
Surface Water Quality as required by condition 3.5.1 (Tables S3.5 and S3.10)	SW03 and SW04	Inaccessible due to flooding, annual sampling not completed.
Groundwater Monitoring and Quality as required by condition 3.5.1 (Tables S3.5 and S3.10)	BH52, BH2/88 and BH96/B	Inaccessible due to flooding, unable to dip and sample.
	BH22 and BH8/88	Boreholes lost, locations unknown.
	BH13	Gas cap stuck, unable to dip.
	BH25	Unable to locate borehole.

Table 3 below summarises the monitoring completed by YLEM and Element and included within this Q4 report.

Table 3: Monitoring Completed by Others during the Q4 Period

Parameter	Monitoring point reference	Reporting Frequency	Company
Point Source Emission to Air as required by condition 3.5.1 Table S3.2	Scania SGI12 and SGI13 combustion Engines, as identified on drawing 6170.GA.D0 4 as 'Gas Landfill Compound' Hourly Mean	Annually	Element
Landfill Gas – other Monitoring Requirements as required by condition 3.5.1 Table S3.7	Gas collection system at well control valve and manifolds on gas system as shown on Drawing 6170.GA.D04 Input to LFG Utilisation Compound 4 weekly	Quarterly	YLEM

Landfill gas in external monitoring boreholes, Schedule 3 Table S3.6

Relevant gas data was collected in all regulated landfill gas monitoring points. Concentrations of methane were low and below the compliance limit of 1%v/v in all boreholes apart from the following;

- PENBH14 recorded a peak and steady methane concentration of 23.4%v/v which exceeds the compliance limit of 1%v/v.
- PENBH013 recorded a peak methane concentration of 1.2%v/v. The steady methane level recorded was 0.1%v/v which is below the compliance limit of 1%v/v.
- PENBH18 recorded a peak methane concentration of 3.4%v/v. The steady methane level recorded was 1.2%v/v which also exceeds the compliance limit of 1%v/v.

Concentrations of carbon dioxide were generally below the relevant action limits in all monitoring points with the exception of the following exceedances.

- PENBH006 recorded a peak and steady carbon dioxide concentration of 6%v/v, exceeding the compliance limit of 2.8%v/v
- PENBH012 recorded a peak and steady carbon dioxide concentration of 4.4%v/v exceeding the compliance limit of 4.2%v/v
- PENBH014 recorded a peak and steady carbon dioxide concentration of 9.4%v/v exceeding the compliance limit of 8.3%v/v
- PENBH017 recorded a peak carbon dioxide concentration of 8.7%v/v exceeding the compliance limit of 4.8%v/v. The steady carbon dioxide concentration recorded was 6.8%v/v which is also above the compliance limit.
- PENBH018 recorded a peak carbon dioxide concentration of 7.7%v/v exceeding the compliance limit of 7.0%v/v. The steady carbon dioxide concentration recorded was 2.6%v/v which is below the compliance limit.

Groundwater Dip Levels Table S3.10

The groundwater dip level data obtained during the Q4 2023 period is enclosed with this letter.

Groundwater Laboratory Results Table S3.5

The groundwater laboratory test data completed during the Q4 period is enclosed with this letter. The data will be reviewed as part of the annual report.

Surface Water Laboratory Results Table S3.9

The surface laboratory test data completed during the Q4 period is enclosed with this letter. The data will be reviewed as part of the annual report.

Point Source to Emissions Table S3.2

The data for the point source to emissions is enclosed, as provided to Egniol by YLEM.

Other landfill gas monitoring, Schedule 3 Table S3.7

The required data set includes four 4-weekly gas field monitoring records. These records contain the gas quality data from operational gas wells as well as the gas quality at the input to the gas utilisation compound. Quality of raw landfill gas during the Q4 review period was stable with the concentrations of methane ranging from 17.6%v/v to 87.7%v/v, carbon dioxide 3.3% to 37.4%v/v, oxygen 0%v/v to 20.5%v/v and balance gas 8.1%v/v 37.6%v/v.

Leachate Levels Table S3.1

Leachate dip levels are collected quarterly for Cell 1, Cell 2, Cell 3 and the Valley Cell. The results are included within this letter. There is a compliance limit of 2m above the cell base. The following exceedances as detailed within Table 4 overleaf, were recorded during the Q4 reporting period;

Table 4: Summary of Leachate Exceedances

Monitoring point reference	Amount of Leachate (m)
BHL13	2.95
BHMH 3A	2.74
BHL nr 122	4.19
BH nr 38	2.25

Leachate Laboratory results Table S3.8

The leachate laboratory test results are enclosed with this letter.

The relevant drawings and factual monitoring data is enclosed with this letter report.

If you wish to discuss the submitted monitoring results, please do not hesitate to contact us.

Yours faithfully,



Emma Small

Associate Director – Geotechnical & Geoenvironmental
for Egniol Consulting Ltd

Enclosed;

Drawings

Egniol 5379.SURV.D03.B Monitoring Locations
Firth Consultants Figure 2 Monitoring Locations

Data

Table S3.1 9611 Penhesgyn Q4 Egniol Leachate Dip Level Data
Table S3.2 9611 Penhesgyn Q4 Element Point Source Emissions
Table S3.6 9611 Penhesgyn Q4 Egniol Raw Perimeter Gas Data
Table S3.7 9611 Penhesgyn Q3 2023-10-24 Gas Data YLEM
Table S3.7 9611 Penhesgyn Q3 2023-11-15 Gas Data YLEM
Table S3.7 9611 Penhesgyn Q3 2023-11-29 Gas Data YLEM
Table S3.7 9611 Penhesgyn Q3 2023-12-14 Gas Data YLEM
Table S3.10 9611 Penhesgyn Q4 Egniol Groundwater Dip Level Data

Tables S3.5, S3.8 and S3.9 9611 Penhesgyn Q4 i2 Analytical Laboratory Test Data