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Qualitative Odour Assessment

Bryn Pica Waste Operations Environmental Permit Variation

Cynon Valley Waste Disposal Limited

Report No. CRM.0121.001.PE.R.004

'Experience and expertise working in union'

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Project:	Bryn Pica Waste Operations Environmental Permit Variation
For:	Cynon Valley Waste Disposal Limited
Status:	FINAL
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1.0 Introduction

1.1 Overview

1.1.1 A qualitative Odour Assessment has been carried out by Enzygo Ltd on behalf of Cynon Valley Waste Disposal Limited ("the Operator") to support the Environmental Permit Variation Application EPR/AP3199/V013 to assess the impact of odour as a result of the proposed changes to the Bryn Pica Waste Operations Facility ("the Facility).

1.1.2 The Facility is located within an area occupied by the Bryn Pica Landfill Site at the following address:

Bryn Pica Waste Operations
Llwydcoed
Aberdare
Rhondda Cynon Taff
CF44 0BX

1.1.3 The Operator currently carries out the following activities at the facility:

- Materials Recycling Facility (MRF) which sorts, screens, separates, bails and compacts household, commercial and industrial wastes;
- Waste Transfer Station (WTS) which sorts, separates, shreds or compacts household, commercial and industrial wastes;
- Inert Material Recycling Facility which sorts, separates, crushes, blends and screens inert wastes such as soil and stones and wastes arising from construction and demolition activities;
- Physical Treatment Facility which de-waters gully suckings; and
- Mattress Recycling Facility which sorts, separates and shreds mattresses for recovery.

1.1.4 The Operator proposes a series of improvements to the existing facility comprising:

- investment to upgrade, renew and update waste processing in the MRF increasing the normal operational throughput from 35,000 tonnes per annum to a maximum of 110,000 tonnes per annum;
- increase in the permitted annual waste throughput of the facility from 74,999 tonnes to 150,000 tonnes;
- extension to the Mattress Recycling Facility;
- improvements to the dewatering facility which handles gully suckings; and
- addition of new waste codes similar to those already in the Permit.

1.1.5 The proposed new waste codes presented in Table 1.1.1 below are all broadly comparable with existing codes, except for dewatered digestate which is to be stored (no treatment carried out) within the WTS building. As the new waste types are potentially odorous, an assessment is required to be carried out to assess potential impact.

Table 1.1.1: Additional Waste Types

EWC Waste Code	Description	Similar waste codes included in Permit	Description
19 06 04	digestate from anaerobic treatment of municipal waste	NA	NA
19 12 01	paper and cardboard	20 01 01	paper and cardboard
19 12 02	ferrous metal	16 01 17	ferrous metal
19 12 03	non-ferrous metal	16 01 18	non-ferrous metal
19 12 04	plastic and rubber	20 01 39	Plastics
19 12 05	glass	20 01 02	Glass
19 12 07	wood other than that mentioned in 19 12 06	20 01 38	wood other than that mentioned in 20 01 37
19 12 08	textiles	20 01 11	Textiles
19 12 09	minerals (for example sand, stones)	20 02 02	soil and stones

1.1.6 Changes to the MRF operations do not result in any significant changes to the odour profile as the only change is an increase in throughput. The residence time of the waste held on site is unlikely to increase, and the new waste types proposed are comparable with existing wastes accepted onto site, as shown in Table 1.1.1 above. However, as the new waste types are transferred to the Facility from other waste sites, it is possible that they may have been stored for prolonged periods of time prior to transfer, which may result in wastes being more odorous than those transferred directly from households and commercial premises. For this reason, an assessment has been carried out to determine potential impact on receptors.

1.1.7 Dewatered digestate is proposed to be stored (no treatment carried out) within the WTS building prior to being transferred off site. As digestate is potentially odorous, an assessment is required to be carried out to assess potential impact. A site plan is included in the Drawings section of this report showing the location of the new digestate storage area within the WTS.

1.1.8 Changes to the Physical Treatment Facility do not result in any changes to the odour profile as the improvements involve only a change of location and upgrade to the de-watering liquid collection system. The types of wastes and residence time for storage of the wastes will not change as a result of the planned improvements.

1.1.9 Changes to Mattress Recycling Facility do not result in a change to the odour profile as the wastes handled by this facility are non-odorous.

1.2 Scope of Assessment

1.2.1 The only proposed changes to operations which may impact the odour profile are:

- the handling and storage of digestate within the WTS; and
- the handling and storage of new waste types in the MRF as described in Table 1.1.1.

This assessment is only concerned with these operations which are carried out within the WTS and MRF.

1.3 Relevant Guidance

1.3.1 The approach to assessing the odour impacts on the surrounding area is to apply a qualitative risk-assessment as described in the Institute of Air Quality Management (IAQM) guidance on assessment of odours for planning, IAQM, 2014 (termed 'the IAQM Guidance' for the purpose of this report).

1.3.2 Natural Resources Wales' (NRW) 'How to comply with your environmental permit Additional guidance for: H4 Odour Management' NRW, October 2014 (termed 'H4' for the purposes of this report) has also been consulted in producing this report.

2.0 Assessment Approach

2.1.1 The odour risk assessment set out in the IAQM Guidance follows a Source-Pathway-Receptor approach. This approach describes the concept that, for an odour impact (such as annoyance or loss of amenity) to occur, there must be a source of odour, a pathway to transport the odour to an off-site location, and a receptor (e.g. people) to be affected by the odour.

2.1.2 In order to determine the risk of potential odour effects, several factors determining odour exposure were used. These factors are outlined as, and referred to as, the 'FIDOR' factors in NRW's H4 Guidance Document. The FIDOR factors are:

- **F**requency – the frequency with which odours are detected;
- **I**ntensity – the intensity of odours detected;
- **D**uration – the duration of exposure to detectable odours;
- **O**ffensiveness – the level of pleasantness or unpleasantness of odours; and
- **R**eceptor – the sensitivity of the location where odours are detected, and/or the proximity of odour releases to an odour-sensitive location.

2.1.3 The risk of odour effects at a given receptor location may be estimated using the following fundamental relationship of

Effect ≈ Dose x Response

2.1.4 In this relationship, the dose is a measure of the likely exposure to odours, or the impact. The response is determined by the sensitivity of the receiving environment and therefore the overall effect is the result of changes in odour exposure at specific receptors, considering their sensitivity to odours.

2.1.5 The key factors that will influence the effects of odours are the magnitude of the odour source(s), the effectiveness of the pathway for transporting odours, and the sensitivity of the receptor. The methodology set out in the IAQM Guidance document describes in detail a Source-Pathway-Receptor approach to odour risk assessment and includes tables and matrices to assist in determining the likely risk of odour effects. The IAQM methodology is outlined below. It includes an element of professional judgement.

2.2 Stage 1: Determination of Odour Impact

2.2.1 Table 2.2.1 below describes the risk rating criteria as a summarised from the information provided in Table 9 of the IAQM Guidance.

Table 2.2.1: Source Pathway Receptor Risk Ratings

Source Odour Potential	Pathway Effectiveness	Receptor Sensitivity
Large Source Odour Potential: Large-scale odour source and/or a source with highly unpleasant odours (hedonic tone -2 to -4); no odour control.	Highly Effective Pathway: Very short distance between source and receptor (e.g. adjacent to site); receptor downwind of source relative to prevailing wind; ground level releases (e.g. open lagoons); no obstacle between source and receptor.	High Sensitivity: Highly sensitive receptors e.g. residential properties, touristic areas and schools
Medium Source Odour Potential: Medium-scale odour source and/or a source with moderately unpleasant odours (hedonic tone 0 to -2); basic odour controls in place.	Moderately Effective Pathway: Receptor is local to the source; releases are elevated but compromised by building effects.	Medium Sensitivity: Moderately sensitive receptors e.g. users would expect to enjoy a reasonable level of amenity, commercial and retail premises, and recreation areas.
Small Source Odour Potential: Small-scale odour source and/or a source with pleasant odours (hedonic tone 0 - +4); effective, tangible odour controls.	Ineffective Pathway: Long distance between source and receptor (>500 m); receptors upwind of source relative to prevailing wind; odour release from stack/high level.	Low Sensitivity: Receptors not sensitive e.g. industrial activities or farms.

2.2.2 The risk ratings identified using the criteria in Table 2.2.1 above are then combined with the source odour potential in Figure 2.2.1 below, which has been reproduced from Table 10 in the IAQM Guidance. This matrix is then applied to estimate the overall risk of odour impact at each receptor location.

Figure 2.2.1: Table 10 of IAQM Guidance - Risk of Odour Impact at Receptor Locations

Table 10: Risk of odour exposure (impact) at the specific receptor location

		Source Odour Potential		
		Small	Medium	Large
Pathway Effectiveness	Highly effective pathway	Low Risk	Medium Risk	High Risk
	Moderately effective pathway	Negligible Risk	Low Risk	Medium Risk
	Ineffective pathway	Negligible Risk	Negligible Risk	Low Risk

Source: IAQM Guidance

2.3 Stage 2: Determination of Odour Effect

The next stage of the risk assessment is to identify the potential odour effect at each receptor location. This is carried out using the matrix presented in Figure 2.3.1 below (replicated from Table 11 in the IQAM Guidance), which combines the overall odour impact for each receptor with the receptor sensitivity determined using the criteria in Table 2.2.1 above.

Figure 2.3.1: Table 11 of IQAM Guidance - Magnitude of Odour Effect at Receptor Locations

Table 11: Likely magnitude of odour effect at the specific receptor location

Risk of Odour Exposure	Receptor Sensitivity		
	Low	Medium	High
High Risk of Odour Exposure	Slight Adverse Effect	Moderate Adverse Effect	Substantial Adverse Effect
Medium Risk of Odour Exposure	Negligible Effect	Slight Adverse Effect	Moderate Adverse Effect
Low Risk of Odour Exposure	Negligible Effect	Negligible Effect	Slight Adverse Effect
Negligible Risk of Odour Exposure	Negligible Effect	Negligible Effect	Negligible Effect

Source: IAQM Guidance

2.3.1 At the final stage of assessment, an overall significance of odour effects is determined, based on professional judgment and considering the significance of effect at each specific receptor location.

3.0 Odour Risk Assessment

3.1 Overview

3.1.1 The following sections determine the site-specific information required to complete the assessment, then apply the assessment methodology described in Section 2.0 to determine the odour effect on the receptors from odours arising from the proposed changes in operations.

3.1.2 There are two main operational areas on-site: the WTS where the solid digestate is stored, and the MRF where the proposed new incoming wastes will be received. This assessment addresses impacts from these two operations taking a 'worst case' assessment approach where there are multiple waste types with differing odorous attributes.

3.2 Sensitive Receptors

3.2.1 Locations sensitive to odour emitted from the Facility are places where members of the public are regularly present. Residential properties closest to, and downwind of, the main waste operations on-site will be most sensitive. The surrounding industrial properties are likely to be of low sensitivity, with those closest to, and downwind of, the Facility's activities most likely to be affected by odours.

3.2.2 Key receptors that have the potential to be impacted by odour emissions are summarised in Table 3.2.1 below. Distances have been calculated from the MRF or the WTS. The Physical Treatment Facility is in close proximity to the WTS and therefore the distances associated with the WTS are also representative for the Physical Treatment Facility.

Table 3.2.1: Sensitive Receptors

Ref	Receptor	Type	Distance (m) from MRF	Direction	Distance (m) from WTS	Direction
1.	Biogen Anaerobic Digestion (AD) Facility	Industrial	60m	NNW	730m	N
2.	Coedcae Farm	Residential/Agricultural	1250m	S	500m	S
3.	Residential area of Abernant	Residential	1700m	S	1050m	S
4.	Tir-ergyd	Residential	850m	WSW	1050m	WNW
5.	Ysgubor-wen House	Residential	1500m	SW	1050m	SW
6.	Dylas Cottage	Residential	720m	WNW	1200m	NW
7.	Gelli-uchan Farm	Residential	1100m	W	1500m	NW
8.	Dylas Farm	Residential/Agricultural	860m	NW	1540m	NNW

Ref	Receptor	Type	Distance (m) from MRF	Direction	Distance (m) from WTS	Direction
9.	Residential area of Winchfawr	Residential	1630m	NE	2000m	NNE
10.	Cwm Glo A Glyndyrys	Ecological	1630m	E	1600m	ENE
11.	Bryncarnau Grasslands	Ecological	1260m	NNW	1900m	NNW

3.2.3 The Operator of the Bryn Pica Landfill Site is the same as the Operator of Bryn Pica Waste Operations and therefore have been excluded as a receptor as they are part of the same organisation and there are shared operations.

Stage 1: Determination of Odour Impact

3.3 Storage and Handling of Wastes

3.3.1 Descriptions of potential sources of odour identified at the Facility are summarised in Table 3.3.1 below.

Table 3.3.1 Inventory of Odour Sources at the Facility

Ref	Aspect	Potential Odour Source	Scenario
MRF			
1.	Vehicle off-loading	Bulk wastes being tipped	Tipping of waste releases trapped odours and exposes new odour surfaces. Wastes may contain residual contamination which may be odorous.
2.	Waste stored in MRF building	Fugitive emission from MRF building when doors are open	Wastes may contain residual contamination which may be odorous.
3.	Treatment and separation of waste in MRF	Treatment by sorting, screening, separation, bailing and compaction.	Movement and treatment of waste releases trapped odours and exposes new odour surfaces. Wastes may contain residual contamination which may be odorous.
4.	Transfer from MRF to waste storage areas	From wastes within vehicle	Release of odour whilst waste is moved exposes new odour surfaces. Wastes may contain residual contamination which may be odorous.
5.	Storage of separated waste recyclable materials	Storage of waste in individual storage areas	If stored for extended periods, some wastes may generate odour. Wastes may contain residual contamination which may be odorous.

Ref	Aspect	Potential Odour Source	Scenario
6.	Storage of residual wastes	Storage of waste in residual waste storage areas	If stored for extended periods, some wastes may generate odour. Wastes may contain residual contamination which may be odorous.
WTS			
7.	Vehicle off-loading	Bulk wastes being tipped	Tipping of waste releases trapped odours and exposes new odour surfaces.
8.	Transfer from WTS off-site.	Wastes being loaded and stored within vehicle	Release of odour whilst waste is moved exposes new odour surfaces
9.	Storage of solid fraction digestate	Digestate stored on concrete hardstanding within WTS	If stored for extended periods, wastes may generate odour

3.4 Source Odour Impact

3.4.1 As discussed in Section 1.0 of this report, the only changes to operations as a result of this Permit Variation Application is the introduction of storage of digestate in the WTS and the acceptance of new waste types in the MRF. The potential for odour to be generated is assessed using the assessment methodology in Section 2.0 of this report.

3.4.2 As the proposed new wastes accepted by the MRF are stored and handled together with the waste types already included in the Environmental Permit, it is not possible to separate odour impacts from the new waste types. The odour generated by the new waste types is potentially higher than those which are already permitted therefore the assessment has been carried out based on the properties of these new waste types.

3.4.3 It is considered that the solid fraction of digestate, as opposed to whole digestate, is of medium odour potential. This is because the more odorous compounds within the digestate are retained within the liquid fraction which has largely been removed prior to acceptance onto the Facility.

3.4.4 Table 3.4.1 below describes the key potential odorous processes at the MRF and WTS and identifies the potential for odour releases from each source. For each source, the odour potential in terms of the FIDO part of FIDOR is discussed (i.e. the frequency, intensity, duration and offensiveness).

Table 3.4.1 Source Odour Potential at the Facility

Ref	Potential Odour Source	Frequency and Duration	Intensity and Offensiveness	Management and Mitigation[1]	Overall Source Odour Potential
MRF					
1.	Vehicle off-loading	Frequent deliveries. Very short-term activity – transient odours only	Offensiveness is anticipated to be moderate. Whilst the tipping of waste releases trapped odours, and exposes new odour surfaces, odorous substances only occur as contamination of the wastes and are not present in large quantities.	Transfers to the MRF are made in covered vehicles. Wastes are tipped within the MRF building.	Medium
2.	Storage of waste in MRF building	Frequent deliveries. Short term – wastes are typically stored for less than 24 hours.	Offensiveness is anticipated to be moderate. Odorous substances only occur as contamination of the wastes and are not present in large quantities.	Wastes are tipped within the MRF building and are processed rapidly.	Medium
3.	Treatment and separation of waste in MRF	Treatment processes are carried out continually during operational hours. Processes are carried out at high speed with no prolonged storage of wastes. Transient odours only.	Offensiveness is anticipated to be moderate. Odorous substances only occur as contamination of the wastes and are not present in large quantities.	Wastes are treated within the MRF building and are processed rapidly.	Medium

[1] In all instances, operations on-site will adhere to the controls stipulated in the Facility's Odour Management Plan (OMP). The OMP will be adhered to by all site staff at all times.

Ref	Potential Odour Source	Frequency and Duration	Intensity and Offensiveness	Management and Mitigation[1]	Overall Source Odour Potential
4.	Transfer from MRF to waste storage areas	Frequent transfers. Very short-term activity – transient odours only	Offensiveness is anticipated to be moderate. Whilst the movement of waste releases trapped odours, and exposes new odour surfaces, odorous substances only occur as contamination of the wastes and are not present in large quantities.	Very short-term activity – transient odours only	Medium
5.	Storage of separated waste recyclable materials	Short term storage – wastes are removed from site quickly and within between 2 weeks (plastics and paper) and one month (other wastes).	Offensiveness is anticipated to be moderate. Odorous substances only occur as contamination of the wastes and are not present in large quantities.	Wastes are removed from site within a short timeframe. Once stored, they are not disturbed, double handled or subject to further treatment.	Medium
6.	Storage of residual wastes	Temporary storage – wastes are removed from site as soon as possible, typically within 24 hours in any instance.	Offensiveness is anticipated to be moderate. Odorous substances only occur as contamination of the wastes and are not present in large quantities.	Wastes are removed from site within a short timeframe. Once stored, they are not disturbed, double handled or subject to further treatment.	Medium
WTS					
7.	Vehicle off-loading (digestate)	Moderately frequent deliveries of solid fraction digestate to the facility (approximately weekly)	Offensiveness is anticipated to be moderate. Whilst whole digestate may be odorous, only the solid fraction is stored, which has been treated and many of the odorous compounds are removed during treatment of the raw waste by AD and dewatering.	Transfers to the WTS will be made by covered vehicles. Digestate is not disturbed or double handled within the WTS or subject to treatment. It is only stored on-site, then removed within covered vehicles, limiting disturbance which in turn limits odour release potential.	Medium

Ref	Potential Odour Source	Frequency and Duration	Intensity and Offensiveness	Management and Mitigation[1]	Overall Source Odour Potential
8.	Transfer from WTS off-site (digestate)	Moderately frequent deliveries of solid fraction digestate from the facility (approximately weekly)	Offensiveness is anticipated to be moderate. Whilst whole digestate may be odorous, only the solid fraction is stored, which has been treated and many of the odorous compounds are removed during treatment of the raw waste by AD and dewatering.	Transfers from the WTS will be made by covered vehicles. Digestate is not disturbed or double handled within the WTS or subject to treatment. It is only stored on-site, then removed within covered vehicles, limiting disturbance which in turn limits odour release potential.	Medium
9.	Storage of solid fraction digestate	Short term storage of solid fraction digestate (less than two weeks maximum)	Offensiveness is anticipated to be moderate. Whilst whole digestate may be odorous, only the solid fraction is stored, which has been treated and many of the odorous compounds are removed during treatment of the raw waste by AD and dewatering. Quantities stored are relatively low volume (approximately 30m^3 maximum, but typically much lower) and low throughput (approximately an average of 3.8 tonnes per day maximum).	Solid fraction digestate only will be received in WTS building, which is covered, within a storage clamp providing mitigation for the transfer of odour from the digestate. Digestate is not disturbed or double handled within the WTS or subject to treatment. It is only stored on-site, then removed within covered vehicles, limiting disturbance which in turn limits odour release potential.	Medium

3.4.5 In summary, the overall source odour potential is 'medium'.

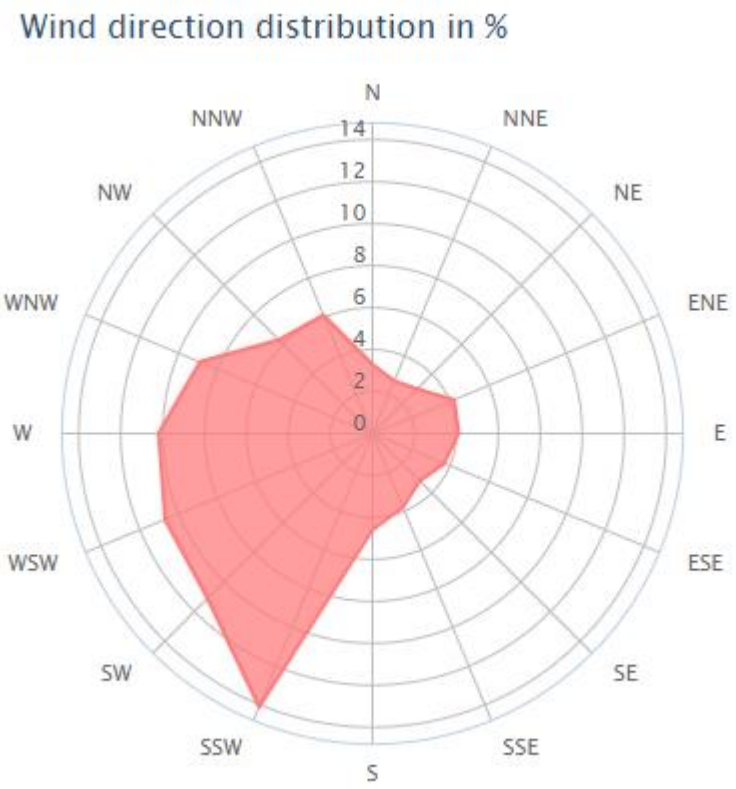
3.4.6 Dewatered fibrous digestate has a lower odour potential than whole digestate,which would have a higher hedonic tone and source odour potential. Odour from the new wastes only arises from contamination of the recyclable materials limiting odour potential.

3.5 Pathway Effectiveness

3.5.1 Proximity and location of the receptors are identified in Table 3.2.1. The receptors selected are within the closest proximity to the WTS and the MRF.

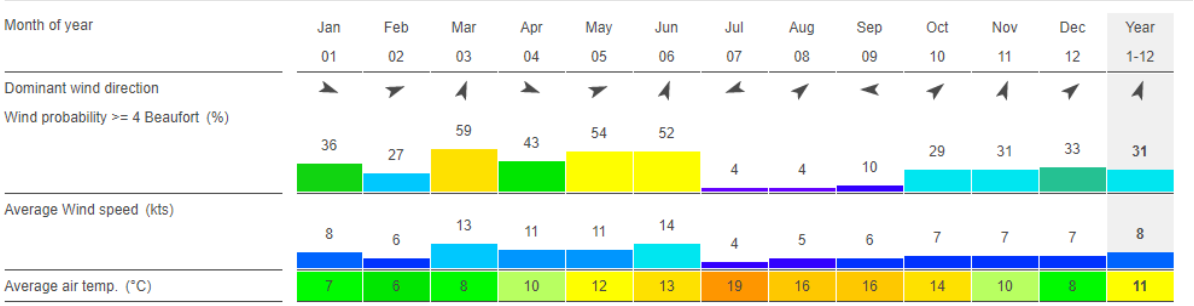
3.5.2 The prevailing winds at this site are from the south south west, west south west and west (based on regular observations recorded at the 'Penybont' monitoring station between April 2013 and February 2017 (www.windfinder.com)). Output for this station is provided below in Figures 3.5.1A and 3.5.1B.

Figure 3.5.1A: Penybont Wind Rose



Source: www.windfinder.com

Figure 3.5.1B: Penybont Wind Statistics



Source: www.windfinder.com

3.5.3 In general, odours will be transported by the wind and will not detectable at locations upwind of a source. The exception to this is during very light wind conditions when odours may disperse against the wind direction, although typically only for relatively short distances.

3.5.4 The overall pathway effectiveness is based on professional judgement, taking account of distance between source and receptor, and frequency of winds.

3.5.5 The effectiveness of the odour pathways between the MRF and WTS and the nearby, worst-case sensitive receptors are summarised in Tables 3.5.1A & B below, which draws upon the guidance set out in Table 9 in the IQAM guidance (summarised in Table 2.2.1 of this Report).

MRF

Table 3.5.1A: Effectiveness of Odour Pathway - MRF

Reference	Receptor	Type	Distance (m) from MRF	Direction	% Winds from Source	Pathway Effectiveness
1	Biogen AD Facility	Industrial	60m	NNW	3.8%	Highly effective
2	Coedcae Farm	Residential /Agricultural	1250m	S	3.3%	Ineffective
3	Residential area of Abernant	Residential	1700m	S	3.3%	Ineffective
4	Tir-ergyd	Residential	850m	WSW	4.2%	Ineffective
5	Ysgubor-wen House	Residential	1500m	SW	3%	Ineffective
6	Dylas Cottage	Residential	720m	WNW	3.7%	Ineffective
7	Gelli-uchan Farm	Residential	1100m	W	4.1%	Ineffective
8	Dylas Farm	Residential / Agricultural	860m	NW	3.2%	Ineffective
9	Residential area of Winchfawr	Residential	1630m	NE	11.1%	Ineffective

Reference	Receptor	Type	Distance (m) from MRF	Direction	% Winds from Source	Pathway Effectiveness
10	Cwm Glo A Glyndyrys	Ecological	1630m	E	10.1%	Ineffective
11	Bryncarnau Grasslands	Ecological	1260m	NNW	3.9%	Ineffective

3.5.6 Aside from the Biogen AD Facility from where the solid digestate arises, all receptors are located more than 500m from the MRF, and the effectiveness of the pathway between the Facility and both receptors is inhibited by dense woodland. The only receptor within the prevailing wind direction is the residential area of Winchfawr which is some 1.63km from the MRF.

3.5.7 Thus, the pathway effectiveness for these highly sensitive receptors is judged to be ineffective whereas the pathway effectiveness for the Biogen AD Facility is 'highly effective' due to its proximity to the MRF.

WTS

Table 3.5.1B: Effectiveness of Odour Pathway - WTS

Reference	Receptor	Type	Distance (m) from WTS	Direction	% Winds from Source	Pathway Effectiveness
1	Biogen AD Facility	Industrial	730m	N	4.6%	Ineffective
2	Coedcae Farm	Residential	500m	S	3.3%	Ineffective
3	Residential area of Abernant	Residential	1000m	S	3.3%	Ineffective
4	Tir-ergyd	Residential	1000m	WNW	3.7%	Ineffective
5	Ysgubor-wen House	Residential	1000m	SW	3%	Ineffective
6	Dylas Cottage	Residential	1200m	NW	3.2%	Ineffective
7	Gelli-uchan Farm	Residential	1500m	NW	3.2%	Ineffective
8	Dylas Farm	Residential / agricultural	1540m	WNW	3.7%	Ineffective
9	Residential area of Winchfawr	Residential	2000m	NNE	14.1%	Ineffective
10	Cwm Glo A Glyndyrys	Ecological	1600m	ENE	10.3	Ineffective

Reference	Receptor	Type	Distance (m) from WTS	Direction	% Winds from Source	Pathway Effectiveness
11	Bryncarnau Grasslands	Ecological	1900m	NNW	3.9	Ineffective

3.5.8 All receptors are located more than 500m from the WTS, and the effectiveness of the pathway between the Facility and both receptors is inhibited by dense woodland. The only receptor within the prevailing wind direction is the residential area of Winchfawr which is some 2000m from the WTS. Thus, the pathway effectiveness for these highly sensitive receptors is judged to be ineffective.

Stage 2: Determination of Odour Effect

3.6 Receptor Sensitivity

3.6.1 Receptors two to nine represent residential properties and are of high sensitivity receptors with respect to odour impacts. Receptor 1 is an industrial facility (Biogen AD Facility) and is of low sensitivity. This facility also generates the sold digestate fraction which is brought onto site to the WTS.

3.6.2 Receptors 10 and 11 are ecological receptors and are of moderate sensitivity as users would expect to enjoy a reasonable level of amenity.

3.7 Potential Odour Effects

3.7.1 The source odour potential, effectiveness of pathway and receptor sensitivity are summarised in Tables 3.7.1A & B below for the MRF and WTS plant areas. These aspects have been identified using the criteria described in the respective Sections of this report, which are referenced in the Tables. The two Tables consolidate the output of the assessments carried out to identify the overall odour impact using the methodology described in Section 2.0 of this report.

3.7.2 Taking a 'worst-case' assessment approach, the most offensive waste activities identified in Table 3.4.1 have been used for the purposes of this assessment. The worst-case activities had a 'medium' odour potential in all instances.

MRF

Table 3.7.1A: Assessment of Potential Odour Effects from the Facility - MRF

Receptor Reference	Source Odour Potential	Effectiveness of Pathway	Risk of Odour Impact	Receptor Sensitivity	Likely Odour Effect
	Dose: Risk of Odour Impact				
	See Section 3.4 for Criteria	See Section 3.4.5 for Criteria	Assessment Output	See Section 3.6 for criteria	Overall Assessment Output
1	Medium	Highly effective	Medium risk	Low	Negligible effect
2	Medium	Ineffective	Negligible risk	High	Negligible effect
3	Medium	Ineffective	Negligible risk	High	Negligible effect

Receptor Reference	Source Odour Potential	Effectiveness of Pathway	Risk of Odour Impact	Receptor Sensitivity	Likely Odour Effect
	Dose: Risk of Odour Impact				
	See Section 3.4 for Criteria	See Section 3.4.5 for Criteria	Assessment Output	See Section 3.6 for criteria	Overall Assessment Output
4	Medium	Ineffective	Negligible risk	High	Negligible effect
5	Medium	Ineffective	Negligible risk	High	Negligible effect
6	Medium	Ineffective	Negligible risk	High	Negligible effect
7	Medium	Ineffective	Negligible risk	High	Negligible effect
8	Medium	Ineffective	Negligible risk	High	Negligible effect
9	Medium	Ineffective	Negligible risk	High	Negligible effect
10	Medium	Ineffective	Negligible risk	Moderate	Negligible effect
11	Medium	Ineffective	Negligible risk	Moderate	Negligible effect

WTS

Table 3.7.1B: Assessment of Potential Odour Effects from the Facility - WTS

Receptor Reference	Source Odour Potential	Effectiveness of Pathway	Risk of Odour Impact	Receptor Sensitivity	Likely Odour Effect
	Dose: Risk of Odour Impact				
	See Section 3.4 for Criteria	See Section 3.4.5 for Criteria	Assessment Output	See Section 3.6 for criteria	Overall Assessment Output
1	Medium	Ineffective	Negligible risk	Low	Negligible effect
2	Medium	Ineffective	Negligible risk	High	Negligible effect
3	Medium	Ineffective	Negligible risk	High	Negligible effect
4	Medium	Ineffective	Negligible risk	High	Negligible effect
5	Medium	Ineffective	Negligible risk	High	Negligible effect
6	Medium	Ineffective	Negligible risk	High	Negligible effect
7	Medium	Ineffective	Negligible risk	High	Negligible effect
8	Medium	Ineffective	Negligible risk	High	Negligible effect
9	Medium	Ineffective	Negligible risk	High	Negligible effect
10	Medium	Ineffective	Negligible risk	Moderate	Negligible effect
11	Medium	Ineffective	Negligible risk	Moderate	Negligible effect

3.8 Conclusions

3.8.1 The potential odour effects have been identified using the effect ≈ dose x response relationship described in Section 2.0 of this report.

3.8.2 With respect to the storage and handling of solid digestate, based on a medium source odour potential, where the pathway is deemed to be ineffective, the likely odour effect is judged to be negligible.

3.8.3 With respect to the new waste types handled and stored in the MRF, based on a medium source odour potential, where the pathway is deemed to be highly effective, the likely odour effect is judged to be negligible due to the low sensitivity of the receptor in this instance.

3.8.4 With respect to the new waste types handled and stored in the MRF, based on a medium source odour potential, where the pathway is deemed to be ineffective, the likely odour effect is also judged to be negligible.

3.8.5 The overall outcome of the assessment, taking a worst-case assessment approach, is that the impact from the odour may result in a 'negligible effect'.

3.8.6 These conclusions are based on the findings of the risk assessment by applying the methodology described in Section 2.0 of this report.

3.8.7 The IAQM Guidance states that *'where the overall effect is greater than "slight adverse", the effect is likely to be considered significant. Note that this is a binary judgement: either it is "significant" or it is "not significant"'*. It is therefore concluded that the impact of odour on the receptors from any of the activities carried out on-site is 'not significant' despite assuming the worst-case scenario odour potential.

3.8.8 Odour emissions will be minimised by means of a stringent Odour Management Plan (OMP) which will be updated to include storage of the new waste types. The OMP will be adhered to by all site staff at all times.

4.0 References

1. Institute of Air Quality Management (IAQM) guidance on assessment of odours for planning, IAQM, 2014 (termed 'the IAQM Guidance' for the purpose of this report).

2. Natural Resources Wales' (NRW) 'How to comply with your environmental permit Additional guidance for: H4 Odour Management' NRW, October 2014 (termed 'H4' for the purposes of this report).

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