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1. Purpose and Scope

The purpose of this procedure is to provide guidance and instructions to staff in correct processes in relation to odour management in line with the Environmental Permit issued by NRW.

This document is based upon the SLR Global Environmental Solutions Odour Management Plan (SLR Ref:416.04012.00006/OMP) submitted to NRW in April 2015, and has been updated in accordance with best practice.

This Odour Management Plan (OMP) is intended to be used as a reference working document for operational staff on a day-to-day basis. It outlines the main potential odour sources at the site, the mitigation measures to be used to reduce the risk of odour nuisance and the monitoring and reporting methods to be used. It will be reviewed Annually in line with the H4 Odour Guidance published by the Environment Agency.

Welsh Water Organic Energy (WWOE) understands and accepts its responsibilities in the following areas:

- WWOE will either directly or through its contractors or subcontractors, ensures that equipment on site is operated and maintained such that is effective in the control of odour at all times.
- WWOE is familiar with the characteristics of the processes and equipment on site and have identified the areas of risk of emissions from odour.
- WWOE will reduce or cease operations if necessary to avoid serious odour pollution.
- WWOE engages with neighbours to minimise their concerns or complaints.
- WWOE has a comprehensive complaints handling procedure, approved by contract partners within the local Council who represent members of the local community.

2. Record of Change

Issue Number & Date	Details of Change
Issue 1, 3 rd November 2021	Procedure updated from original SLR Global Environmental Solutions document dated April 2015.

3. Sources, Releases and Impacts

3.1 Site overview

The Anaerobic Digestion (AD) facility has the capacity to accept up to 35,000 tonnes per annum of household, commercial and industrial food waste which is processed into a homogenous substrate. The substrate is transferred to the anaerobic digestion tanks to generate biogas and a digestate. The biogas produced is used to produce renewable energy and heat through a combined heat and power (CHP) plant. The digestate is removed from site via transfer to tankers and sold as soil bio-fertiliser.

The facility comprises of the following primary elements:

- 1 No. Reception Hall for the receipt of Waste
- 1 No. Reception Tank
- 2 No. Fermenter Tanks
- 1 No. Pasteurisation System
- 1 No. Digestate Storage Tank, complete with BioGas-holder.
- 1 No. Biofilter (Odour abatement Unit)
- 1 No. Emergency Flare
- 1 No. Office & Amenity Block
- 1 No. Office & Visitors Centre
- 1 No. Site Weighbridge
- Car and Cycle Parking
- Landscaping

3.2 Description of Operations

3.2.1 Reception Building & Reception Tank

The food waste reception, storage and preparation systems are housed within the main building containing pre-treatment machinery. The building has been designed to accommodate articulated bulkers to ensure all unloading and handling operations are contained within the building.

The reception building is kept at negative pressure and air is extracted at a rate of 3 building changes per hour. All extracted air is treated within the Orgus Biofilter odour abatement plant, which consists of a quencher and enclosed biofilter.

During the working day the fast action roller shutter doors open to facilitate entry/exit of waste collection vehicles. The roller shutter doors are typically open for less than 53 seconds during each vehicle movement. During the short periods of time when the doors are open, the air extraction system continues at 3 air changes per hour to ensure negative pressure so that the air flows back into the building, thereby minimising odour release.

The prepared input material is transferred from the reception building to a sealed reception tank wherein the material is mixed to ensure a homogenous input is available for the fermenter tanks.

3.2.2 Fermenters

Following transfer of the food wastes from the reception building to the reception tank, the fermenter feedstock is pumped to Fermenter 1. The fermenters comprise heated and insulated concrete tanks, and the substrates are kept well mixed by the hydraulic mixers installed in them. Several stainless steel heating rings are positioned inside the fermenters for effective transfer of heat into the substrate material. The combination of heating and mixing ensures that the temperature throughout the fermenter is maintained at an approximately uniform temperature $\sim 40^{\circ}\text{C}$, thus ensuring the optimum conditions for mesophilic microbial activity and subsequent biogas production.

Fermenter 2 receives a small feedstock from the reception tank, and a larger feedstock from Fermenter 1 via the central pumping station. This also allows for recirculation within each fermenter.

3.2.3 Gas System

The gas produced in the reception tank and primary fermenter is piped to the secondary fermenter where it mixes with the gas produced in the secondary fermenter. This gas is piped to the gas membrane collection and storage roof on the digestate storage tank.

The biogas that is captured is utilised as the fuel for dedicated CHP gas engine, and emissions from the combustion are discharged to atmosphere via a silenced exhaust. Heat is recovered from the engine water jackets and oil coolers and is used in the heating rings within the fermenters, and within the pasteurisation units.

3.2.4 Pasteurisation

Digestate material to be pasteurised is withdrawn from the end of the fermentation process and, via a macerator unit to provide $<12\text{mm}$ particle size, transferred to the batch pasteurisation units.

3.2.5 Separation

Following pasteurisation, the digestate is supplied to the filter screw press separator. This separator allows for the reduction of the solids in the digestate, reducing the volume of liquid digestate requiring storage. The solid material captured includes residual debris such as plastic, stones, wood and other inert or particulate material that is not digestible in the AD process.

3.2.6 Digestate Storage Tank

Following separation, the liquid digestate is pumped from a small holding tank in the separator area into the digestate storage tank. The digestate storage tank also supports the gas collection and storage membrane. The tank is emptied using a pump connected to the tanker filling station.

3.2.7 Odour Abatement System

The air extraction system for the main reception building ensures three (3) air changes per hour. Air from the reception building is extracted from ceiling-mounted ducted grilles and fed through a sealed extraction duct into an odour control unit (Orgus Biofilter).

The above ground odour control unit allows for easy access for site inspection and maintenance, ensuring effective operation and avoiding the need to work in confined spaces to carry out these duties.

Water recirculation is an integral part of the odour control process, as it maintains the biological activity of the media and thereby maximises the effectiveness of the treatment. The unit has its own integrated recirculation system to recycle / reuse water.

The media used in the biofilter is derived from coconut fibres (coir). Air flow and temperature is monitored by instrumentation continuously and displayed on the SCADA system within the control room. This data is sampled daily during operational hours against the parameters detailed in the OEM O&M manual.

Air discharged through the biofilter will be discharged via a single stack. The size of the biofilter has been designed to ensure it allows for the recommended residence time of the air when collected at a rate of three air changes per hour from the reception building which it services.

3.3 Odours derived from processes.

This section provides an inventory of all potential odour sources under the full range of non-emergency conditions.

With the correct controls in place, odours can be contained and reduced appropriately. The sources of potential odour generation are:

- Delivery, storage and pre-treatment of incoming waste;
- AD process and storage of digestate; and
- transfer of digestate offsite.

Typical chemical odorants associated with putrescible wastes which may form part of the residual waste are detailed in Table 3-1.

**Table 3-1
Wastes - Typical Primary Chemical Odorants**

Source	Descriptive Terms	Typical Primary Chemical Odorants
Food	Putrid, sour, fishy, rotten vegetables, rotten meat.	Putrecine, cadaverine, amines, sulphides, ammonia
Oils	Oily acrid petrol like.	Aromatics, toluene, xylene

Table Source: Applied Environmental Research Centre Ltd, *Guidance Manual for Landfill Managers on the Assessment and Control of Landfill Odours* (October 2000)

Table 3-2 below presents the factors that affect odour variation, in addition to the intentional release points. The subsequent sections describe the potential odour generation and odorants in further detail

**Table 3-2
Odour Sources**

Source	Location	Factors affecting Source	Odour Intensity Rating (at release point)	Intentional Release Point
Storage and pre-treatment of waste (Reception Building and Reception Tank)	Reception Building and Reception tank	State of decomposition on arrival at facility; Storage time before entering the AD process.	Low	Biofilter exhaust stack
Delivery of waste (Roller shutter doors open)	Reception Building	State of decomposition on arrival at facility; Storage time before entering the AD process.	Medium - High	Roller Shutter Doors (fugitive emission)
AD Process & Digestate Storage	Digestate and Fermenter tanks (sealed)	Continuous	Low	CHP exhaust stack
Digestate Collection	Tanker transfer station	Average of once per day	Medium	Tanker vent

3.4.1 Delivery, Storage and Handling of Incoming Waste

The incoming feedstock is made up of food waste which is likely to have been stored for a short period without aeration prior to being received at the facility and can therefore become anaerobic. Such conditions result in the generation of odours with ammonia being the most commonly observed odour formed. The offloading, pre-treatment and processing of the waste feedstock have a high potential for the generation of odorous emissions and is located within the reception building. The storage of pre-treated wastes awaiting entry into the AD process is within the sealed Reception Tank.

A full list of waste streams to be accepted can be found within WWOE(3) 07 Waste Acceptance Criteria.

For the majority of the time the reception building would be enclosed with all waste transfer, handling and storage operations being enclosed. During this time the air is extracted from the building at a rate of 3 building changes per hour and sent to the odour abatement plant, the biofilter. The release point during these periods is the point source of the biofilter stack.

Throughout the working day the roller shutter doors open to facilitate the entrance / exit of the waste collection vehicles from the building. During these periods, the building is a fugitive source of the odour, however as the hall operates under a negative pressure the majority of the odour is contained within the building.

3.4.2 AD Process and Digestate Storage

The material within the fermenters is considered to be high in the offensiveness scale. The anaerobic digestion process is maintained within enclosed vessels so there is little opportunity under normal conditions for odour to escape from the storage and process tanks.

All generated gas extracted from the fermenters and the digestate storage tank are sealed with all generated gas being sent to the gas collection system. The bio-gas generated and collected is sent to the CHP unit with exhaust emissions released via a 16.5m stack. Under emergency conditions whereby the CHP unit is not operational, the bio-gas would be directed to the high temperature flare with a 10m stack.

Odour is only ever released from the fermenter tanks or digestate storage tank if an emergency relief vent is activated as part of the wider emergency control system for the plant. For further information on this refer to WWOE(3) 2 Emergency Response Procedure.

3.4.3 Digestate Transfer Operations

The transfer of digestate from the digestate storage tank for transfer offsite is undertaken at the tanker filling point, using a tanker. Although the transfer of the digestate is undertaken via sealed pipework, the venting of the displaced air within the tankers is vented to atmosphere and therefore a source of odour.

The digestate is considered to be low in the offensiveness scale with operations being infrequent and of short duration.

3.4.4 Pathway

The pathway by which odours may impact upon receptor locations is a result of atmospheric dispersion. In general, high wind speeds lead to emitted odour being rapidly dispersed and diluted due to turbulence, and conversely low wind speeds inhibit the dilution of odours.

Prevailing wind directions are considered in assessing the likelihood and management of emission risks. Wind speed and direction data have been obtained for five years from Cardiff. A wind rose of speed and direction is presented in Figure 3-1. It shows the prevailing wind to be from the west. As a result, the potential impact of emissions is likely to be greater to the east of the site.

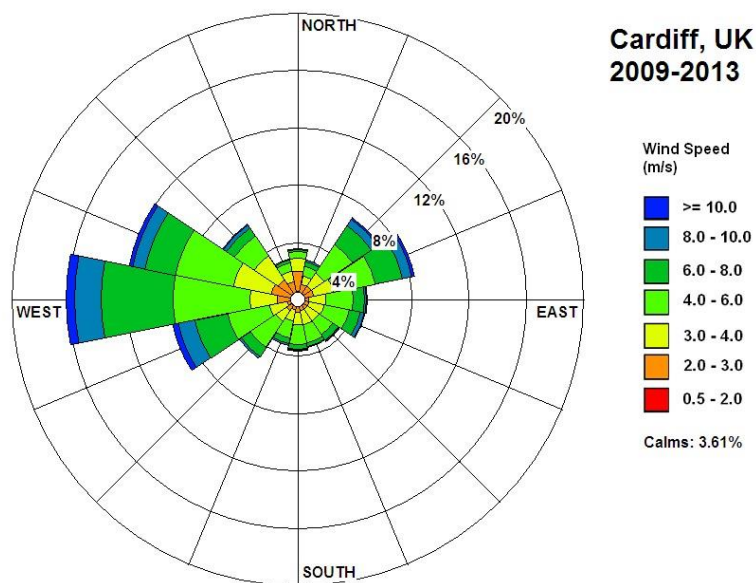


Figure 1-1 - Wind Rose for Cardiff Meteorological Station (2009 – 2013)

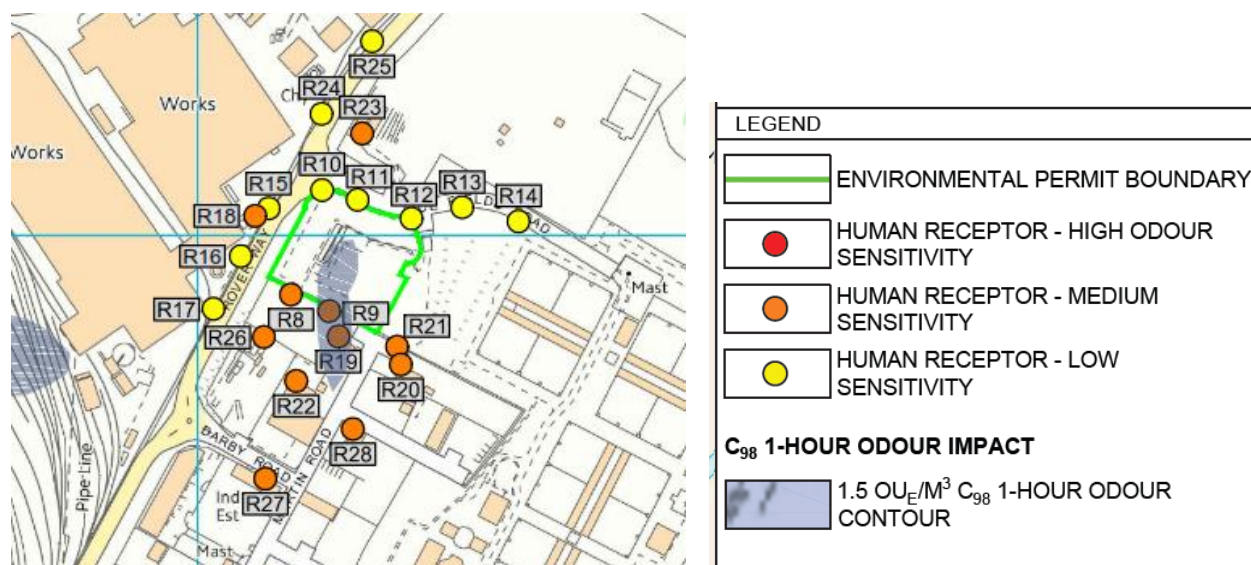
3.4.5 Site Sensitive Receptors

The likelihood and frequency of exposure to odour arising from the facility is determined by the magnitude of release, the prevailing meteorological conditions, and the distance and direction of receptors in relation to the facility.

Potentially sensitive receptor locations for odour are typically defined as locations where people spend time and expect a reasonable level of amenity. Therefore, residential properties are generally regarded as the most potentially sensitive locations and recreational areas being of medium sensitivity.

The site is located in an industrial estate, within land controlled by Dwr Cymru Welsh Water (DCWW). Other occupiers of this estate would be expected to have a higher tolerance to odours given the 'character' of the area. This was confirmed during the Hirose Electrical UK Ltd V Peak Ingredients Ltd 2011 legal judgement.

The closest sensitive receptors were assessed as part of the Odour Impact Assessment (see reference document) and the diagram below shows none fall within the immediate locality with the closest industrial and therefore low risk receptors include a steelworks facility, the DCWW Waste-water treatment facility, and a steel-asphalt producer.



4. Odour Control Measures – Normal Operations

This section presents the principles of controlling odour generation and release at the facility at the specific control and management measures employed at the facility. This includes measures to control the generation and release of odorous chemicals from the above inventory of sources, abatement, and dispersion of releases, and plans for mitigation of community impacts.

The overall aim in the operation is to apply Best Available Techniques (BAT). For this reason, the facility would be operated and managed in accordance with the accepted hierarchy of preferred controls, that is:

1. prevent the formation or emission of odorous compounds in the first place.
2. where this is not practicable, minimise the release of odour.
3. abate any excessive emissions; then
4. dilute any residual odour by effective dispersion in the atmosphere.

4.1 Reception Building

In order to abate emissions from the reception building, it is completely enclosed and include access doors that have specific fitments and seals to minimise the escape of odour.

Collections of food waste are generally weekly; the feedstock therefore has the potential to arrive at the facility in an advanced state of decomposition. The receipt of waste, pre-treatment and vessel loading operations takes place within the dedicated enclosed building with a dedicated air extraction system. The reception building is kept under negative pressure to ensure odour does not escape to the air outside. The air extracted from the building passes through a biofilter prior to discharge from the stack.

During the working day the fast action roller shutter doors open to facilitate the entry/exit of waste collection vehicles. The roller shutter doors are typically open for approximately 53 seconds during each vehicle movement. With an average of 34 deliveries per day, this source is active for a

cumulative period of approximately 60 minutes per day. During the short periods of time when the doors are open, the air extraction system will continue to operate at 3 air changes per hour to ensure negative pressure is maintained to ensure air flows back into the building, thereby minimising odour release.

Fast acting roller shutter doors remain closed with the exception of when vehicles enter and exit, thus, reducing the fugitive emissions of odour during vehicle entry / exit. A traffic light is used to indicate that the door can be opened.

Further details regarding this process have been communicated to all staff within WWOE(3)06 Waste Acceptance Procedure.

4.2 AD Process Control

The AD process is undertaken within sealed tanks and managed by automatic controls. Successful management however requires specification of actions that would be taken should there be abnormal / emergency operating conditions at the facility as a result of a failure or breakdown in the process management systems. These can be found within WWOE (2) 2 – Emergency Response Procedure.

The biogas produced during AD will be extracted and fed directly into the CHP units for combustion before discharge via a stack. Combustion is recognised as an effective form of abatement of odour.

4.3 Digestate Storage & Transfer Control

Digestate is stored on site in the digestate storage tank prior to removal from the site. The digestate tank is attached to the biogas collection system with extracted air sent directly to the CHP unit.

The displaced air during the direct transfer of digestate from the storage tank into the tanker for transfer off site is considered to be of low offensiveness and therefore not considered to require additional treatment prior to release to atmosphere.

4.4 Odour abatement system

The odour abatement system consists of an above ground biofilter located to the west of the reception building. The size of the biofilter is designed to ensure the minimum recommended residence time of the extracted air with the media to allow 3 air changes of the reception building per hour.

The media within the biofilter is coconut fibre (coir). The conditions within the media will be monitored and will be changed when a downward trend in efficiency is identified. The operating life of the media is estimated to be between 6-10 years, and will be inspected by the manufacturer in Year 6 for compliance, and thence as recommended.

4.5 Control measures during Routine Maintenance

The facility will have no need for planned maintenance shutdown, individual pieces of equipment will be able to be isolated from the process to allow for service/maintenance.

During necessary maintenance works, there is the potential that the facility is more vulnerable of a risk of a small odour release (i.e. replacing a pipeline, taking off a pump etc.)

Frequency of inspections and site monitoring techniques described in Section 5 will increase during routine maintenance to ensure the risks during such actions are appropriately managed.

5. Monitoring and Maintenance

Monitoring of process controls, odour containment and abatement performance, odorous releases, and dispersion pathways as described in the sections below.

5.1 Odour Containment Monitoring

Odour containment is the key to minimising emissions and will be monitored through routine maintenance checks on roller shutter door use, building structural integrity, and the extraction systems. Olfactory observations are also an important monitoring measure and are addressed in Section 5.4.

5.1.1. Containment System Monitoring

The effectiveness of the containment measures is monitored in the following ways:

- The structural integrity of the fast action roller shutter doors (including fit) is visually checked on a monthly basis by site operational staff.
- The structural integrity of the building fabric is visually checked on a routine annual basis.
- Containment and Structural Integrity of all storage tanks and buffer tanks are visually checked on a monthly basis.
- Biogas storage and gas train are routinely monitored to ensure a safe working environment. Containment is monitored routinely by visually checking structural integrity and olfactory observation. These visual checks will be conducted daily (Mon-Fri) and recorded on the WWOEF006 Daily Check List (also known as Site Walkaround).

5.1.2 Extraction System Monitoring

The effectiveness of the extraction system in affording collection of odours generated within the Reception building relies upon the balancing of structural integrity of the ducting and the overall extraction rate which is monitored in the follow ways:

- The ductwork was balanced during the commissioning phase. Any modifications to the ductwork or balancing will be documented and stored with site O&Ms.
- The structural integrity of the ductwork will be visually checked on a routine basis by site operational staff and the findings documented in the daily site report.
- The operation of the blower will be monitored on SCADA and proved through pressure readings logged on the Daily Process Monitoring Log (DPM).

5.2 Odour Control System Monitoring

The odour control system comprises of a biofilter made up with coconut fibre media.

Biomass accumulates in a biofilter when growth from the introduced carbon exceeds endogenous respiration. Excess accumulation may clog the filter bed and packaging material and produce large pressure drops and create air flow channels.

Back pressures in a bio filtration system can cause excessive wear and tear on blowing equipment, and air channelling will reduce the contact time between odorous air and filter medium, therefore negatively affecting removal efficiencies.

If blockages or clogging are identified during periodic inspections (see below), the material should be broken up using mechanical forces (known as 'repacking').

The biofilter exhaust air characteristic including temperature and pressure will be monitored continually by the SCADA system and recorded on the DPM daily.

The biofilter irrigation water will be monitored for pH continually by the SCADA system and recorded on the DPM daily, in line with the Biofilter O&M document.

Further inspections that will be undertaken to ensure the biofilter is working at optimum efficiency include the following:

- The exterior of the biofilter will be inspected daily for signs of damage or leaks.
- Visual inspection of the coir and irrigation system will be undertaken once per month to ensure the top of the media remains saturated but not ponding.
- Olfactory monitoring (Odour, NH₃ *Ammonia* & H₂S *Hydrogen Sulphide*) of the exhaust gas from the biofilter stack will be undertaken with samples analysed by a laboratory to BS EN 13725 standards on a 6 monthly basis.

5.3 Biogas Flare and Engine

The biogas flare and engine is routinely monitored and tuned to ensure efficient operations, with routine maintenance (i.e. oil changes) undertaken in accordance with manufacturers specification. In turn, this will minimise the risk of methane slippage and release of unburned biogas.

5.4 Monitoring Ambient Odour

Monitoring ambient odour provides a broad indication of the effectiveness of the odour management system as a whole, i.e. odour minimisation, containment, treatment and dispersion. This is a reactive process and should be considered as a final indicator of odour control effectiveness.

Sniff testing is employed for the following reasons:

- as part of a survey at the site boundary during normal operations, to confirm the effective performance of odour control measures in place.
- at the site boundary during periods of adverse meteorological conditions, breakdowns or during other abnormal events to evaluate the effectiveness of the control measures in place and the likelihood that odour complaints will be received; and
- in the event that complaints are received, at the locations of sensitive receptors as part of the complaint investigation procedure outlined in Section 5.6.

'Sniff tests' of the exhaust stack sample point will be undertaken weekly and recorded alongside site walkaround readings (WWOEF006).

5.5 Emergency Pressure Relief Valves

The emergency pressure relief vents (PRVs) will be tested on an annual basis. The method adopted will be dependent on the type of PRV installed. Testing will therefore be in accordance with the manufacturer's recommendations.

Emergency Pressure Relief Vents (PRVs) will only be used in the unlikely event of an over pressure in the system.

5.6 Complaint Logging

A site board is displayed at the entrance to the site, which includes a phone number and other relevant contact details for members of the public to contact WWOE with any complaints. Following the receipt of a complaint the Operator will endeavour to contact the complainant to provide feedback on actions taken to both assess the event and convey any remedial actions.

All complaints will be handled in line with the SP(2)09 Internal and External Communications Procedure, and the information recorded will contain but not be limited to the below:

- Date and time of odour complaint and odour detection
- Location/address of complainant (where provided); and
- A description of the odour from the complainant.

Following an odour complaint, a WWOE colleague will undertake a sniff test and record the results within the daily site report. Where possible the sniff test will be undertaken by a member of staff that does not routinely work within the reception building and would not therefore be accustomed to any malodours. If an odour is encountered, the source will be investigated by site management and the outcome recorded.

Investigations will include the likely source and cause of the odour and a review of the meteorological data. Suitable remedial action will be instigated, where required. The complainant will be informed of any action taken and all actions will be recorded.

Should no odour be observed, a record of the monitoring round will be taken, and the meteorological conditions checked and a report provided to NRW with suitable feedback provided to the complaint.

It is noted that within vicinity of site is the DCWW Wastewater Treatment Works, which can periodically produce odorous emissions which may well be misconceived to be emitted by WWOE. Where WWOE colleagues note periods of malodour from our DCWW neighbours, this will also be recorded within the daily site report so complainants can be directed appropriately.

5.7 Monitoring meteorological conditions

A weather station is installed at the facility, with monitoring terminal located within the control room. Operators will record this information as part of their daily checks (WWOEF006 Daily Walkaround).

5.8 Recording of Results and Reporting

Daily records are maintained and include the following:

- Results of any inspections and odour checks carried out by WWOE colleagues.
- Weather conditions including wind direction
- Operational problems including date, time, duration and cause of problem
- Complaints received including postcode (if available); and
- Details of corrective actions taken and any subsequent changes to operational procedures.

Records will be held on site and kept for inspection by NRW as and when required.

In the event that odour is detected at the site boundary, this will be noted within the daily site report and WWOE team leaders or management will be informed to allow for appropriate steps to be taken to mitigate the odour. The results of daily odour monitoring will not be reported to NRW, however it will be commented on in the Annual Monitoring Report.

5.9 Notifying NRW

In the event that an accident or incident occurs which could result in an uncontrolled odour release, the Operator will notify NRW as soon as practicably possible using the emergency 24hr phone line (0800 870060). The Plant Manager for the facility will also notify the Regulatory Office should any complaints be received directly to the Site, and advise what remedial measures have been undertaken. Copies of any complaints will be made available for NRW to review.

5.10 Monitoring Equipment

Monitoring equipment used at the facility will be calibrated and operated in accordance with the manufacturer's recommendations. All site equipment will be logged and referenced on the site calibration register located within Sharepoint. Calibration certificates and records will be kept within Sharepoint.

6. Contingencies

In accordance with NRW Guidance on Odour Management Plans, contingency plans have been defined to react to situations where monitoring indicates that a potential odour source is not completely under control, or that an adverse impact has occurred.

This includes accidents (or incidents) which would result in the loss of control of odorous substances and have the potential to cause an unacceptable short-term impact on the local community, but are not considered an emergency situation (which are details in Section 7.)

6.1 Waste Reception – Contingency Arrangements

In the unforeseeable event of complete plant failure, the contingency plan document contains alternative permitted facilities for the diversion of waste. The closest alternative sites for food waste where contingency agreements are in place are as follows:

- Lamby Way Emergency Transfer Station (2.1 miles from facility);
- Bryn Power Ltd (21.9 miles from facility)
- Biogen – Tomorrows Valley (22 miles from facility)
- Biogen – Westwood (177.4 miles from facility)

6.2 Digestate Removal – Contingency Arrangements

Established outlets for digestate will be in place if there are any unforeseen delays in obtaining suitable deployments of the digestate or delays in receipt of testing analysis in time for material to be sent off site. A storage capacity of six months (both on and offsite) takes into account situations where the land-bank is unavailable for prolonged periods i.e. where the land is waterlogged or frozen.

In the event that storage becomes limited, the contingency disposal routes are for '4 Recycling' to use contingency land (Gloucestershire and Pembrokeshire) and to use the DCWW landbank.

6.3 Detection of odour at the site boundary or off-site during routine odour surveys or response to complaints

The olfactory survey will be followed, and the odour source or sources identified by determining the sources of greatest odour intensity, contingency actions will be implemented as identified above

The first assessment of an odour at the site boundary will be whether the odour has or is likely to leave site, if it has not and is not likely to leave site the problem that caused the odour shall be remedied to prevent continuation of odour. All information regarding action taken shall be recorded on the external odour assessment sheet.

If an odour at a level which is likely to cause pollution is likely to leave the site boundary or has already done so) the plant manager or representative will be notified immediately.

The olfactory survey will be repeated on consecutive days after initiation of corrective actions, until odour has reduced to an acceptable level.

NRW will be informed in line with Permit reporting requirements.

6.4 Out of Hours Contact Details

During abnormal events or during out of hours operations, a contact duty standby staff member will have remote access to the SCADA system or will be available to undertake immediate attendance on site. An Emergency Duty Standby Number will be made available which will always be answered in the event of an emergency.

6.5 Cessation or Reduction of Operations

Due consideration during the decommissioning phase will be given to any potential odour risks during the dismantling or removal of plant/equipment from site. A specialist consultant, such as Marches Biogas or equal and approved, will be consulted regarding the site decommissioning to ensure work takes place in a controlled manner.

WWOE also hold a Site Closure Plan within the Environmental Policy and NRW H5 Site Condition report. These will be updated as circumstances change, for example, should there be any process changes or change of land use.

Records will be maintained of the location of facilities, as well as the services and sub-surface structure installed during the construction and operating phases of the Facility.

6.6 Summary of Control Measures

To ensure adequate mitigation measures are in place to address all possible odour emission scenarios, the various scenarios and their response measures are presented in Table 5.1.

Table 5.1 – Summary of Contingency Control Measures

Scenario	Operations	Location	Likely effect on emissions inventory	Contingency/Control Measure
Severely odorous wastes received	Abnormal	Reception building	Increased in emissions from waste reception and pre-treatment area whilst wastes are processed	Non-conforming wastes will be rejected and taken off site or stored in quarantine area. Conforming yet odorous waste will be prioritised for being processed in the digesters, and if from a commercial source, that source will be suspended pending a review.
Mechanical/Electrical failure preventing pre-treatment and feeding of digesters	Abnormal	Reception building	Potential increase in emissions of odour from waste storage on site.	Immediate investigation and remedial action. Building doors kept closed if waste is likely to be backlogged until it can be processed/removed. A review regarding receipt of further waste undertaken.

Failure of air management system	Abnormal	Reception building	Increased risk of fugitive emissions from building	Investigation of failure with remediation as required. Building doors kept closed if waste is likely to be backlogged until it can be processed/removed. A review regarding receipt of waste undertaken.
Failure of air management system	Abnormal	Other areas linked to biofilter	Increased odour potential of materials in pasteurisation tanks.	
Elevated Odours from leachate	Abnormal	Reception building	Increase in emissions from reception building due to odour from drainage system	Flush leachate into digesters or remove leachate from drainage system.
Elevated Odours from digestate during tanker filling	Abnormal	Tanker filling station	Risk of increased fugitive emissions during digestate transfer	Investigation into the use of vacuum tankers or back venting of displaced air into the digestate storage tank
Restricted staff availability	Abnormal	All operational locations	Risk of increased impact from area of site where normal operations are affected	Several members of staff will be trained to operate loading machinery and other mobile plant. Hiring of additional staff would be reviewed. Contractual relationships will be maintained with employment agencies to ensure staff can be onboarded at relatively short notice. If incoming waste cannot be processed within 72 hours the receipt of waste would be suspended.
Plant breakdown	Abnormal	All operational locations	Risk of increased impact from area of site where normal operations are affected during and after breakdown.	A supply of spares critical to the operations will be kept on site. Skilled staff will either be employed, or be contractually arranged with DCWW to promptly undertake any repairs, or plant would be hired if required. If not available the relevant operations would be suspended if necessary. Contingency arrangement for

				diversion of feedstock implemented if required.
Extreme Meteorological Conditions	Abnormal	All operational locations	No change anticipated.	Potential odour generating activities reviewed and operations restricted to minimise impact on nearby receptors.
Sub-optimal biofilter performance	Abnormal / During replacement of bio-media (every 6-10yrs)	Biofilter	Increased emissions whilst biofilter is operating sub-optimally.	Increase frequency of sniff tests at site boundary to review potential odour impact off site.

7. Emergency Plans

This section details the emergency actions that would be undertaken in case of accidents (or incidents) which would result in the loss of control of odorous substances and could have an unacceptable short-term impact on the local community.

This section considers the emergency scenarios, measures taken to minimise their occurrence and short-term measures to minimise impacts.

WWOE(3)02 Emergency Response Procedure should be referred firstly in relation to site safety. Below are dictated additional steps which can be undertaken to minimise impact to odour.

7.1 Fire

The key principals for management of odour impact in the event of fire are prompt responses that contain the fire and attempt to extinguish it, minimise damage to containment and extraction infrastructure.

NRW will be informed of any such occurrence, and information would be made available to local residents if requested by NRW with regard to the measures being taken and the timescale to completion.

7.2 Explosion

The risk of explosion of biogas is considered to be an extremely unlikely event given the management of the site. All tanks are located within the bunded area that has been sized to contain any material in the event that an explosion and/or rupture of the tank(s) occur. Pressure sensors are provided on the top of the digestion tanks and gas storage tank to identify any occurrences of excessive pressure build up and an alarm would be triggered with immediate venting systems instigated. A PRV, set to operate at a higher but safe pressure will be on the dome of the gas collection vessel and on top of the digesters.

Other potential incidents include power failure or total plant failure on site. In such a scenario the PRVs will ensure there is no gas pressure built up within the gas system during the event.

7.3 Major Spillage / Leak

Details of emergency procedures to be initiated in case of failure of containment and major spillage/leaks are detailed in the site's Integrated Management System (IMS) (i.e. WWOE(3) 15 – Spillage Procedure)

Major spillage or leaks as a result of failure of digestate containment of substrate containment may result in release of odours. With regard to mitigating the odour impact the most measures are:

- Initiate repair of containment system; and
- Provide temporary cover to minimise volatilisation of odorous organic or if necessary use of treatment chemicals (oxidising agents) to remove the odorous components of the digestate; and
- Removal of material to a contained area (other tanks) or tankered off-site to an alternative permitted facility)

NRW would be informed of any such occurrence, information would be made available to local residents if requested by NRW with regard to the measures being taken and the timescale to completion.

7.4 Flooding

The site is not located in an area of high-risk flooding (as assessed in 2013 during build) and has not been flooded historically. However, if site becomes flooded, this would inhibit effective reception and processing of delivered waste. Material will either be rapidly processed; or where not possible removed from site.

Widespread flooding of the site may also prevent the operator of key electrical equipment and vehicular access. Under such extreme conditions no further operations would be undertaken (i.e. opening of doors) and no further waste would be received and it is likely that the NRW would be involved in any clean-up operation. Waterlogged material will either be rapidly processed; or where not possible removed from site.

Widespread flooding may prevent access to site. In such a situation no further waste would be able to access the site and priority would be given to ensuring the ongoing effective processing of waste.

7.5 Power failure

The site generates it's own electricity. In the event it is unable to generate, due to low gas yield for instance, it has the facility to import electricity from the National Grid.

In the event of a failure of the National Grid locally at a time when electricity is not being generated, critical systems are supported by Uninterrupted Power Supply (UPS) devices which will safely manage critical operations until either the CHP can operate again or the national grid is restored.

7.6 Failure of equipment

A routine maintenance plan and inspection schedule for equipment will be implemented by the operators. This includes inspection of fast action roller doors.

7.7 Staff Absence

Short-term staff shortages (such as a few days illness) will not affect the ability of the site to operate effectively as other staff members can be reassigned to critical operations. In the event of prolonged absence of staff members, temporary staff will be recruited and appropriately trained to fulfil noncritical roles whilst other experienced staff members are reassigned.

7.8 Summary of Emergency Control Measures

To ensure adequate mitigation measures are in place to address all possible odour emission scenarios, the various scenarios and their response measures are presented in Table 7-1.

Table 7.1 – Summary of Emergency Control Measures

Scenario	Location	Likely effect on emissions inventory	Contingency/Control Measure
Failure of air management system	Reception Building / Other areas linked to biofilter	Increased risk of fugitive emissions from building Increased odour potential of materials in pasteurisation tanks.	Investigation of failure with remediation as required. Building doors kept closed if waste is likely to be backlogged until it can be processed/removed. A review regarding receipt of waste undertaken.
Plant Breakdown	All operational locations	Risk of increased impact from area of site where normal operations are affected during and after breakdown	A supply of spares critical to the operations will be kept on site. Skilled staff employed to promptly undertake any repairs, or replacement plant would be hired if required. If not available the relevant operations would be suspended if necessary. Contingency arrangement for diversion of feedstock implemented if required.
Fire	Reception Building Biofilter	Risk of impact from any area of the site affected by fire.	Fire risk procedures adopted, if required operations will cease in building until all plant restored. The biofilter would be inspected and media replaced / repaired as necessary. Further receipt of waste will be reduced or suspended until biofilter operation is restored.
Flood	All operational locations	Risk of increased impact from area of site where normal operations are affected during and after flood	Risk of flooding regarded to be low. If it should occur and waste is submerged, there is a high likelihood of rapid onset of degradation and anaerobic conditions. Waste requires immediate feed into the digester where possible or re-processed in preparation of infeed.

Extreme Meteorological Conditions	All operational locations	No change anticipated.	Potential odour generating activities reviewed and operations restricted to minimise impact on nearby receptors.
Biofilter Failure	Reception building / biofilter	Increased emissions whilst biofilter is operating sub-optimally	Immediate investigation and remediation. If long term failure anticipated remove malodorous wastes from affected areas and cease receipt of waste until system repaired.
Digestate Storage Failure	External hard standing areas	Increased emissions during any observed leachate / remediation activities.	Immediate investigation and remediation. Co-ordinate off-site / remote storage of digestate to allow for plant to continue operation until suitable storage arrangements found.

8 Document Updates and Management Review

The company has appointed managers with the executive authority and responsibility for implementing the IMS. The IMS is managed in line with document IMS(1)01.

It is the responsibility of every manager, with the support of environmental professionals, to identify environmental risks that are relevant to the site and determine if a particular activity or service is environmentally significant.

Once identified it is the responsibility of the manager to highlight the significant aspects to all relevant employees and contractors. The manager is also responsible for monitoring and managing all activities under WWOE's control to improve environmental performance.

8.1 General Procedures for Training and Competency of Staff

Training and competency of staff is controlled by the IMS. WWOE identifies training requirements of its employees and provides suitable resources to ensure they have the required knowledge, skills and expertise to carry out their duties.

This includes their roles and responsibilities in complying with policy statements.

8.2 Odour Complaints: Mitigation of Community Impacts

The site has 2 key industrial neighbours with whom a shared environmental approach needs to be considered, these being the DCWW Wastewater Treatment Plant and Celsa Steels. The Plant Manager will engage with both of these companies to discuss environmental issues within the locality.

8.3 Odour Management Plan Review

This OMP is a controlled document, and forms part of the IMS. A comprehensive record of the results of the monitoring and inspection programme contained within this OMP will also form part of the IMS. The specification of the periodic review and update of the OMP will be set out in the WWOE(2)02 Document Control Register. In line with the recommendations of the H4 Odour Guidance, this occurs on an annual basis, as a minimum.




However, the OMP is intended to be a live document which serves as a reference during daily operations and as such would be updated on a more frequent basis should the following occur:

- Significant changes are made to the plant or operational practices.
- There is a change to the management structure, designation of responsibility or training provision.
- The NRW requests that the OMP is updated, in their role as regulator or;
- Complaints are received which on subsequent investigation result in the identification of further control measures or remedial action, in addition to those set out within this OMP.

9 Records

Record	Reference	Retained by
Daily Check List	WWOEF006	Site
Daily Process Monitoring Log	DPM	Sharepoint
Daily Site Report	N/A	Sharepoint

10 References

Document	Document Reference
Environmental Agency H4 Odour Management Guidance	 H4 Odour management.pdf
Odour Management Plan SLR Ref:416.04012.00006/OMP	 4.4.1.3.7.2.3.1 150408_416 04012 00
Odour Impact Assessment (Sensitive Receptors Map)	 04012.00006.01.AQ6. 0 AQA ODOUR IMPAC
Waste Acceptance Criteria (WAC)	WWOE(3) 07
Emergency Response Procedure	WWOE(3) 2
Waste Acceptance Procedure.	WWOE(3)06

The above document has been changed as a result of a periodic review and it is important that you familiarise yourself with the revised document.

Please take the time to understand the document thoroughly and to discuss with your line manager.

Date of Issue:	21/9/2021
Document Reference	WWOE(3)32
Document Type (Policy, Procedure, COSHH Assessment, Risk Assessment)	Procedure
Document Name	Odour Management Plan
Previous Issue No:	SLR Consulting Document
New Issue No:	1.0

Once you have read and understood the revised document please sign and date below.

Employee Name	Signature	Date Reviewed
Head of Service		
Plant Manager		
Contracts Manager		
Team Leader		
Team Leader		
Business Support Coordinator		
Operator		
Operator		
Operator		
Operator		
Operator		
Operator		