Odour Management Plan

Prepared on behalf of:

Murrow AD Plant Ltd

Somerset Farm AD Plant at Somerset Farm Cants Drove, Murrow, Wisbech, Cambs, PE13 4HN

Document Information

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Quality control sign off V1.0, 02.07.21		
Document Author	M. Fuhrmann	
Quality Reviewer	A. Becvar	

This report has been prepared in house by our operations manager, taking into account current arrangements in place alongside following regulatory guidance. The report is to be reviewed by Earthcare Technical, who have prepared our EMS documentation and have an awareness of our site operations and procedures.

In reviewing this report, Earthcare Technical Ltd has exercised all reasonable skill and care, taking into account the objectives and the agreed scope of works and any contract between Earthcare Technical Ltd and the Client. Earthcare Technical Ltd does not accept any liability in negligence for any matters arising outside of the agreed scope of works. Earthcare Technical Ltd does not accept any responsibility for any unreviewed changes made by others.

Quality control sign off V3.0, 14.02.24		
Document amended by	J Chapman	*J Chapman*

Summary of Amendments Made 06.02.23

Amended to include the following changes and additions ;

1) Addition of the storage and transfer activity.
2) Addition of more waste codes of a plant/crop/farm based nature, including chicken manure on a just in time basis.
3) Addition of a CO_2 recovery facility for CO_2 removed during the biogas upgrading process.
4) Addition of the digestate storage lagoon into the permitted boundary, with vaccum tanker offtake odour abatement system and spill containment area.
5) Change from a standard rules AD installation permit to a bespoke AD installation permit.
6) Update to reflect installation of weather monitoring station at the site.
7) Update to reflect all odour complaints received at the site to current date.
8) Update to note most recent odour impact modelling assessment undertaken to take account of current site changes.
9) Update to make reference to intention to install cover to the liquid feedstock reception/leachate tank and the intention to install BAT compliant odour abatement treatment for displaced air from this tank.

Summary of Amendments Made 14.02.24

1) Removal of storage and transfer activity as no longer intended.
2) Removal of additional waste codes added in previous revision as no longer intended.
3) Removal of digestate storage lagoon from the permitted area as no longer intended to be brought into permitted operations.
4) Update to remove intention to install odour abatement on the liquid reception tank now that additional waste codes are no longer intended.
5) Addition of a further feedstock storage area/energy crops silage clamp to the permitted area.

Contents

1 Introduction

The Odour Management Plan (OMP) is written to cover the scope of operations for Murrow AD Plant at Somerset Farm Cants Drove, Murrow, Wisbech, Cambs, PE13 4HN ('the Site'). Murrow AD Plant Ltd (MUR) is the permit holder. Adapt Biogas Ltd is the operations and maintenance company for the site working on behalf of MUR. The OMP was written by Earthcare Technical Limited in collaboration with the Operator in July 2021. The document was subsequently amended in February 2023 to make allowance for changes to the site which require variation to the site permit. A further amendment was made in February 2024 following a change in scope to the ongoing permit variation.

The site was originally permitted under standard rules permit SR2012 No.12 Anaerobic digestion facility including the use of resultant biogas (less than 100 tonnes of waste per day).

The permit was then subsequently varied to operate according to standard rules permit SR2012 No.9 On farm anaerobic digestion facility using farm waste only, including use of the resultant biogas. Part A installation – treatment capacity over 100 tonnes of waste per day Environmental Permit No. EPR/FB3133AW/V005. The operator has now applied for a variation to a bespoke permit to allow for annual tonnages of feedstocks exceeding 100,000tpa to be accepted, and to allow for an additional feedstock storage area to be added to the site permitted area.

This OMP is to be implemented as part of the site's overall Environmental Management System (EMS). As such, the OMP also refers to a series of 'live' documents including standard agreed operating procedures, maintenance schedules and template forms used for record keeping.

The OMP will be reviewed on an annual basis (as a minimum) or immediately following any incident, complaints or a change in the operation or infrastructure to ensure that it continues to remain relevant to the site activities and in line with current guidance.

In the event of a revision to the OMP the EA will be notified, and a copy will be submitted for approval by the EA.

This OMP has been produced and updated in accordance with;

Environment Agency (EA) H4 Odour Management guidance[1];

EA guidance 'How to comply with your environmental permit. Additional technical guidance for: Anaerobic Digestion' and;

EA guidance 'Biological waste treatment: appropriate measures for permitted facilities' www.gov

[1] Environment Agency (2011) H4 Odour Management – How to Comply with your Permit. Horizontal Guidance Note IPPC H4.

It is the responsibility of the Operator and the Site Management to be fully aware of the contents of the OMP and to provide relevant training to staff.

Purpose

This OMP sets out the appropriate measures that Adapt Biogas undertake to control odour emissions from the anaerobic digestion (AD) facility to ensure that odour emissions do not extend beyond the permit boundary.

The OMP will enable the Operator to assess and where possible prevent emissions of odour from the site that may result in annoyance and/or adverse environmental impacts.

The OMP is written for all operational staff. Staff receive training in the aims and requirements of the OMP. A paper copy of the OMP is held in the Site Office such that all employees have access to the latest version. A copy will also be maintained electronically.

The OMP will ensure that odour emissions are considered throughout all operations, as part of routine inspections, controlled by good operational practices, that all appropriate measures are taken to prevent and/or minimise odour emissions including those from incidents or accidents.

Scope of the OMP

The scope of the OMP includes all on-site works within the permitted site boundary, and consideration of the sensitivity and potential impacts on nearby receptors.

The OMP does not include farm infrastructure outside of the permitted site boundary including the off-site storage of digestate and feedstock materials ensiled in clamps on adjacent farmland.

Digestate is removed and spread to land by Biocow Environmental Services Ltd who have a written EMS to manage this activity, including odour control.

Site Location

The site is located north of the A47 Peterborough-Norwich trunk road. Access to the Somerset Farm from the A47 is via the B1187, onto Cants Drove and then via the farm main access track.

The AD site benefits from security access gates and passes through Somerset Farm.

The site is in a rural location on Wisbech High Fen, characterised by a flat open fen landscape with fields artificially drained via a ditch and dyke drainage system. Somerset Farm itself is a mixed arable and livestock farm.

The AD Plant is situated more than 200 metres from the nearest sensitive receptor.

The AD site is approximately 2 hectares in extent. There are two digestate storage lagoons, which are located outside of the permitted site boundary. There is a drainage ditch over 10 metres from the western boundary of the site.

2 Process Overview

This section provides a summary of the treatment process which should be read in conjunction with the **MUR-OD-03 Process Flow Diagram**.

A current site layout and emissions plan has been prepared to support the permit variation application dated February 2023 and is reference CB2107-05a 24726 - 155 Rev N - Permit Boundary and Emissions Plan.

The operator processes purpose grown crops (principally maize), crop residues (such as onions, beetroot) and cattle manure within five primary and one secondary anaerobic digestion tank to produce biogas and digestate. The operator also intends to process on average one trailer load a day of broiler chicken manure. The site processes up to 125,000 tonnes of feedstock per annum through the onsite AD process.

Manure and crop-based feedstock materials are principally stored off-site and brought onto site as and when required. Chicken manure is brought to site on a 'just in time' basis and loaded directly into the feed hoppers from the delivery vehicle.

There is one on-site concrete storage area immediately adjacent to the AD process area which is 15m x 30m (1,500m^3 capacity). The area may either be used for storing prepared silage that is ready to be fed to the digesters or for the short-term storage of feedstocks such as crop residues prior to loading into one of four solid feed hoppers to maintain feedstock supply to the digesters. A further clamp/storage area adjacent to the main AD process bunded area is now also brought into the permitted area. This area is 150m x 84 metres with a capacity of around 40,000 tonnes. It is also used for short term feedstock storage and ensilement of energy crops intended for use in the AD process. Solid manure is transferred via front end loader from the adjacent farm and loaded directly into the solids feeders or stored on a short-term basis before being fed into the feeders.

The storage area is used for maceration of crop residues/manures (beetroot, onions and other crop or plant-based residues) and for the mixing of feedstock prior to loading into the solids feeders.

A pre-mixed liquid feedstock, that includes, dirty water and fruit juices from cattle feed from the adjacent farm is conveyed via pipeline to an on-site 120m^3 underground Leachate Pit.

The storage area benefits from an impermeable concrete surface with dirty water collection to the 57m^3 underground pre-pit from which it is either pumped to the 300m^3 Liquid Feedstocks Reception/Leachate Tank and fed back into the AD process as process water or can be removed from site to be spread to land for agricultural and/or irrigation benefit.

Feeding is currently three times per day; in the morning, the afternoon and with one 'top-up' feed. A loading shovel is used to load the feedstocks into the 4 No. open solids feeders. Each loading phase takes approximately one hour. There are weigh cells in the feed hoppers which are used by the Operator to ensure that the correct tonnages of solid feedstocks are added. Digester contents is recirculated back to the solid feeder mixing pumps and mixed with the solid feedstocks to make a pumpable mixture. The prepared feedstock is then pumped to the

five primary digesters. Dirty water and liquid feedstocks are added directly to the digesters from the liquid feedstock reception/leachate tank and pit.

There are currently five primary digesters (DG01, DG02, DG03, DG04, DG05) which operate in parallel. Digester DG01 has a working capacity of 1,664m^3, DG02 a capacity of 2,014m^3 capacity and DG03, DG04 and DG05 each have a working capacity of 2,396m^3 (35 days retention time).

DG06 is fed from DG03, DG04 and DG05 and is a secondary digester. DG06 has a capacity of 3,300m^3 (retention time 11 days).

All digesters have high level alarms, Pressure Relief Valves (PRVs) and have inspection windows. The PRVs are water filled; glycol is added in winter months to prevent the water from freezing. They also have burst plates. The Supervisory Control and Data Acquisition (SCADA) system ensures that the digesters operate in the mesophilic temperature range at 42 to 45°C.

The total biogas storage capacity above the digesters is approximately 3,662m^3. This storage capacity covers routine CHP maintenance events.

The biogas from the digesters is used within two 250kW combined heat and power (CHP) engines. These CHPs provide both heat and power for site operations as do a further two 500kW CHPs which are run on imported liquified natural gas (LNG).

The site also processes biogas to produce biomethane which is then injected directly to the high- pressure National Gas Transmission System (NTS) via 1km of pipework and a block valve connection. Site injection capacity is 15,000 standard m^3/hr into the NTS but typical production levels are 1,100m^3/hr. The biomethane does not need to be blended to a distribution specification, with for instance the addition of propane, because it is added to the NTS at 70 mbar pressure and is blended within the network. CO_2 removed from the biogas during upgrading is recovered to produce a food grade liquid CO_2 product.

Digestate is separated into a solid fibre and liquor fraction which are used as a soil improver and biofertiliser respectively on local farms.

Separated liquor is stored within 2 no. digestate storage lagoons both situated to the east of the site. Each lagoon has a working capacity of 38,000m^3.

The information generated by SCADA can be viewed on-site within the Control Room and remotely to ensure optimisation and safe operation of the anaerobic digestion and associated processes.

3 Odour Pathways - Dispersion

Odour impacts are generally dependant on the prevailing weather conditions. The wind strength and direction help to predict the path of likely aerial dispersion of odours generated on site.

A wind rose of the meteorological data from UK Met Office modelled data (GFS data) for a complete 5-year period shows the prevailing wind direction is from the southwest (including the south-southwest and west-southwest) (Figure 3.1).

The prevalence of winds from these directions means that those receptors that lie to the northeast of the site will be those most frequently 'downwind' of the site and therefore most likely to be impacted by odour emissions from the site.

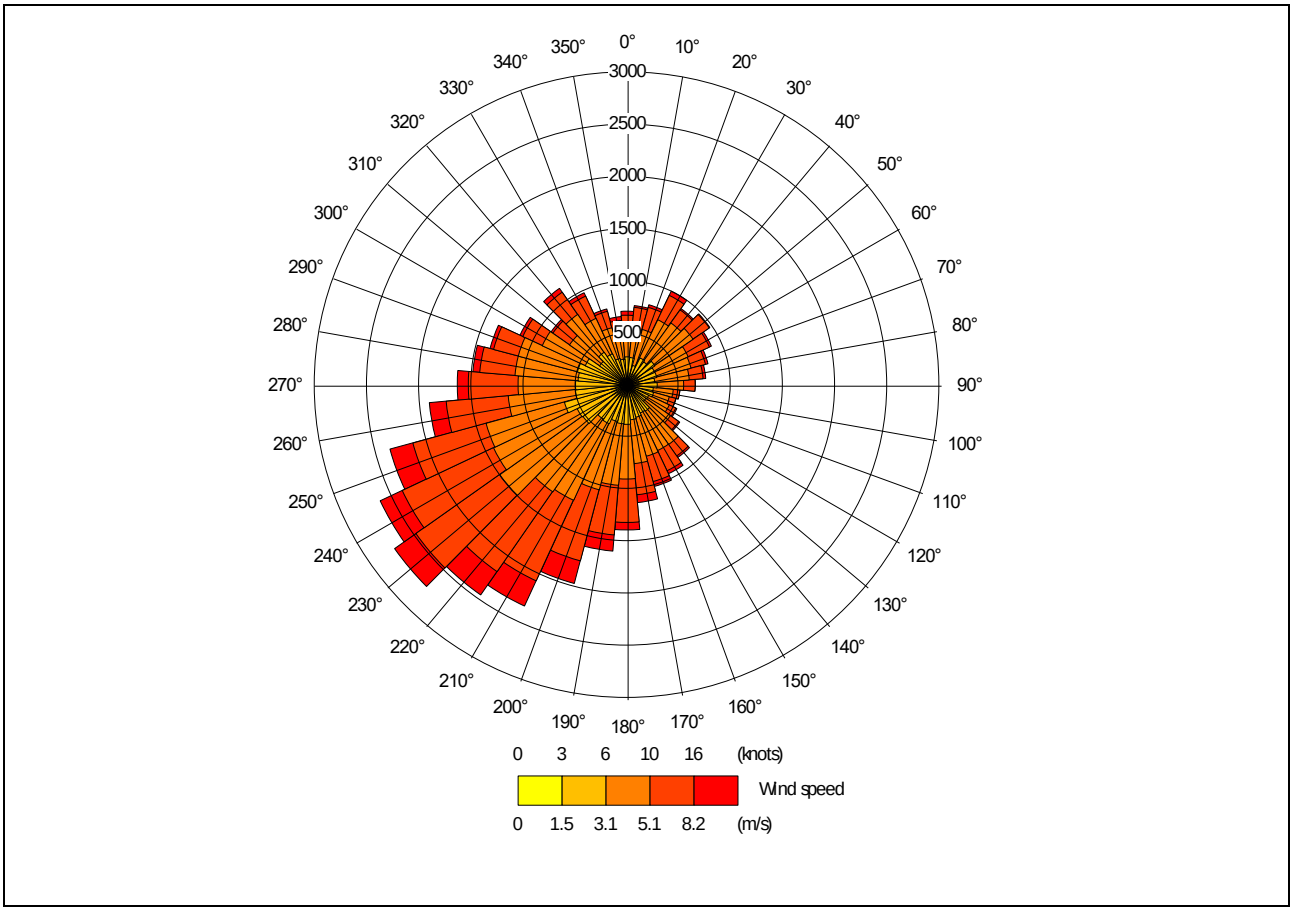
Site operatives will monitor daily weather conditions on site using information from online resources and an onsite weather station as part of the routine monitoring on site.

The Operator has installed a meteorological station at the site which sends monitoring data to a data report screen interface in the site offices. This allows staff to always monitor weather conditions on an ongoing basis.

Meteorological data should be considered during routine odour surveys and prior to and during operations that have the potential to give rise to off-site odour impacts, for example feedstock loading and loading out of digestate fibre.

The potential also exists for nearby receptor locations to be impacted by odours, even if these locations are not directly downwind of operations. Implementation of the OMP will aid understanding of the facility and its operation and ensure Best Available Techniques (BAT) and best management practices are adhered to, to prevent/ minimise off-site odour impact from site activities.

Figure 3.1 Windrose from GFS data (01 January 2016 - 01 January 2021)



GFS Data Location: (Latitude_52.622, Longitude_0.028)

Table 3.1 Wind Speed/ Direction from GFS (01 January 2016- 01 January 2021)

Speed\ Direction	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Total
<0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.2**
0.3 - 1.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	**1.8**
1.0 - 2.5	0.9	0.7	0.9	0.9	0.9	0.8	0.9	1.0	1.1	1.0	1.3	1.6	1.4	1.3	1.0	0.9	**17**
2.5 - 5.0	1.5	2.2	2.7	2.2	1.7	1.4	2.0	2.5	3.2	4.2	5.5	5.1	3.8	3.8	2.7	2.0	**47**
5.0 - 7.5	0.8	1.1	0.9	0.9	0.6	0.3	0.6	1.1	1.9	3.3	4.4	3.8	2.3	1.2	1.1	0.9	**25**
7.5 - 10.0	0.3	0.3	0.2	0.2	0.1	0.0	0.1	0.4	0.5	1.1	1.6	1.3	0.7	0.2	0.2	0.3	**7.6**
10.0 - 12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.4	0.4	0.2	0.1	0.1	0.0	**1.7**
>12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	**0.3**
Total	**3.6**	**4.5**	**4.8**	**4.3**	**3.4**	**2.7**	**3.7**	**5.2**	**6.9**	**10.3**	**13.3**	**12.4**	**8.6**	**6.8**	**5.2**	**4.3**	**100**

GFS Data Location: (Latitude_52.622, Longitude_0.028)

Receptors and Impacts

Table 3.2 details the location of sensitive (human) receptors identified up to 1km from the site.

The nearest sensitive receptors include seasonal worker's accommodation at Somerset Farm and Coronation House located approximately 212m and 270m north of the site respectively. Both are residential premises, and they are partially downwind of the prevailing wind directions.

The nearest receptors downwind of the prevailing winds are the residential receptors R11, R8 and R9 which are between 847m and 896m from the site.

The nearest dwellings in the village of Murrow are approximately 1,480m to the north. Receptors situated to the north are predicted to be downwind of the site approximately 7% of the time.

The factors that will determine the degree of odour pollution at sensitive receptor locations are summarised by the FIDOR acronym as follows:

- **Frequency** of detection (frequent odour incidents are more likely to result in complaints).
- **Intensity** as perceived (intense odours are more likely to result in complaints).
- **Duration** of exposure (more complaints are likely with prolonged exposure).
- **Offensiveness** (with increased risk of complaints associated with more offensive odours).
- **Receptor** sensitivity (tolerance to odours will be reduced in areas where high levels of amenity are expected).

Dispersal Control

The nearest (third-party) sensitive receptor is located partially downwind of the facility, approximately 270m to the north. Should it be identified that additional restrictions need to be implemented based on wind direction and/or strength then an investigation into appropriate controls will be made and documented in this OMP.

Table 3.2 Sensitive Receptors

Receptor ID	Name	Distance from site (m)	Direction from site
R1	Hope Farm	579	SW
R2	Cooks Farm	759	SW
R3	Ivy Farm	831	SW
R4	Hundreds Farm	914	SW
R5	1, 2 Poplar Cottages and Poplar House	273	N
R6	Coronation House	270	N
R7	Fen View House	321	N
R8	Sidmouth House	880	NE
R9	Goose Cottage	896	NE
R10	Homefield	391	N
R11	Crossingate Cottage	847	NE
R12	Ivy Home	315	N
R13	The Cottage	641	NW
R14	White Lion Farm	390	N
R15	Willow Lodge	278	N
R16	Willow Tree Cottage	535	NW
R17	Jolise House Farm	344	S
R18	Towers Farmhouse	942	S
R19	1-6 Council Houses Long Drove	946	N
R20	New Bungalow (Hooks Drove)	918	N
R21	Adapt Biogas Ltd Offices	Not a receptor but shown on plan	
R22	Redfern House	373	N
R23	Seasonal workers accommodation, Somerset Farm	212	N

Complaints History

The Operator has received notification of odour issues direct from complainants. Table 3.2 summarises the three odour complaints recorded by the Operator (2015 – Feb 2024).

Table 3.2 Complaints History

Date/ Time	Location of complainant	Complaint Details	Action/ Findings
26/7/21	Northeast of the site between 0.5-1km away.	*Complainant unhappy as spreading for the 2nd time in a short period and the smell. Wants to know why and will be reporting issue to the Environment Authorities.*	Site staff communicated with Complainant and explained the process for spreading, that we use organic fertilizer, that it can be applied to a growing crop after its been cut, that it's is planned in prior to rain so the rain helps the plant uptake the fertilizer and subdues any odour. We will be notifying Complainant prior to any spreading in the future.
12/03/21	Directly opposite Somerset Farm site entrance	*"Complainant emailed the Adapt inbox (11/03/21) to notify that she was having an issue with recent odour emitted from the site. Complainant doesn't normally like to complain but has found recently that the smell is the worst it's been for the last couple of years."*	Operations Manager (OM) emailed complainant to reassure her that the matter would be investigated. OM also asked for more information as to when the complainant first noticed the odour to establish a link with on-site activities. OM also monitoring the Sign-in App via email notification for reports of odour (on arrival at the site). OM investigated and determined the potential on-site source of odour complaint to de due to maceration of onions (crop residue) feedstock. Investigation concluded that the timing of the activity to be inappropriate due to wind speed/ direction. In future, the maceration of onions will not be undertaken when prevailing winds are towards sensitive receptors.
20/07/20	Northeast of the site	*"Odour disturbing domestic neighbours."*	Complainant reported the smell to be due to muck spreading of fields behind her house during summer months. The complaint was made at 1:45 am. Complaint investigation therefore delayed. Previous compliance Manager, Kim Jones, undertook subsequent investigation. Odour levels 'low to undetectable'. Considered that the complainant has incorrectly assumed the source of the odour.
05/10/15	North - Hooks Drove	*"External complaint from complainant] on Hook Drove*	No further action.

		phoned to complain about smell of local spreading and also tankers."	

Odour Assessment

A qualitative Odour Assessment[2] was undertaken in support of planning application reference F/02015/11/CW. Planning permission was granted by Cambridgeshire County Council.

The Odour Assessment concluded that:

- The operation of the proposed AD plant is likely to reduce odour emissions when compared with the existing farm operation through reducing the retention time of manure and vegetable matter on site, avoiding the 'double movement' of vegetable matter not accepted for animal feed and removing the need to spread untreated manure to land.
- Any residual odours that are generated will tend to be 'agricultural' in nature and are therefore likely to be reasonably well tolerated in the local area.
- Any potential odour impact is most likely to occur at the nearest receptors to the north - Coronation Cottage and Poplar House.
- The mitigation measures in place combined with the remoteness of the site from sensitive receptors, were assessed as sufficient and odour impact unlikely.

An updated odour appraisal[3] was undertaken to review the proposed installation of a second digestate lagoon ('Lagoon 2'). The evaluation assessed the 'Source Odour Potential' of the additional lagoon as a function of:

- The disturbance/ agitation of contents (planned pumping, stirring of material) and wind stripping/ disturbance of lagoon surface;
- Decomposition of settled solid materials (and subsequent release of odorous gases);
- The nature of feedstock entering AD plant (digestate derived from predominantly agricultural sourced feedstocks considered 'at the lower end of the digestate odour potential range');
- Mitigation that includes the incorporation of a reinforced floating plastic cover that would prevent surface 'wind stripping', evaporation/ volatilisation of odours, disturbance from stirring/ mixing.

The evaluation, made in accordance with IAQM Odour Guidance criteria,[4] concluded that the risk of an adverse odour impact being caused by the proposed development was 'low'.

An odour impact dispersion modelling assessment was prepared by Redmore Environmental to support the updated site risk assessment prepared to assess impacts of proposed site changes that are subject of a variation application submitted in February 2023. The subsequently updated assessment report dated 15th February 2024 Ref 5500-2r4 and submitted with the application as appendix 2 to the site Environmental Risk Assessment CB2107-08) concludes that based on the new plant configuration, the predicted odour

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[2] ADAS (2011) Odour Impact Assessment of Proposed Agricultural Anaerobic Digester with Silage Clamp Store at Somerset Farm, Cant's Drove, Murrow, Cambridgeshire.

[3] Odour Appraisal provided in Correspondence dated 22nd May 2018. RSK - Proposed Digestate Storage Lagoon at Somerset Farm, Murrow. Ref: RSK/MA/661918-OA.

[4] Institute of Air Quality Management (IAQM) (2014) Guidance on the assessment of odour for planning.

concentrations were below the relevant benchmark at all sensitive receptor locations in the vicinity of the site for all modelling years. As such, potential impacts associated with odour emissions from the facility are not considered to be significant.

4 Feedstock Description

The AD process treats biodegradable materials which have the potential to produce odour.

Feedstock Quantities

The quantities of feedstocks to be used are listed in Table 4.1. The balance of quantities between feedstock types may be adjusted annually.

Table 4.1 Feedstock description, source, form, storage location and approximate annual throughput

Feedstock description	Source(s) of feedstock	Form	Storage location	Approximate tonnages accepted/ treated per year
Maize/Energy Crops	Grown on farm/ under contract at other farms or imported from local sources	Solid	Somerset Farm	26,000
Cattle FYM	Produced by Somerset Farm livestock	Solid	Somerset Farm	30,000
Crop Residues	Somerset Farm and imported from external animal feed producers or farm premises.	Solid	Somerset Farm and just in time storage area on site and ensiled in adjacent clamp area in preparation for use.	42,320
Animal Slurries, Wash Waters and Liquid Feedstocks	Produced on-site or imported from other farm premises.	Liquid	Liquid feedstock reception tank and onsite drainage system.	22,000
Poultry Litter	Third party poultry farms	Solid	Received on a 'just in time' basis and loaded directly from trailers into feed hoppers.	4,680
Approx. annual tonnage				**125,000**

Livestock manures are considered a waste for treatment within the AD process under EWC 02 01 06.

Feedstock Inventory

Table 4.2 provides an assessment of each potentially odorous material, identifying the feedstock source, form, waste classification, storage (location and maximum tonnages), typical composition of those materials, the types of odorous compounds that may be generated and an overall odour potential of that material without controls.

Table 4.2 Inventory of Potentially Odorous Materials

Type	Source	Form	EWC[5]	Storage location	Max. on-site storage quantity	Max. holding time	Typical composition	Likelihood of abnormal composition	Odour type/ Odorous compounds	Odour potential (without controls)
Dirty water (fruit juices from cattle feed/ dirty water)	Off-site drainage from Somerset Farm	Liquid	N/A	Underground pre-pit. Breather vent(s) (unabated)	57m^3	Constant flow; use of leachate will be used within tanks depending on biology and dry matter	Composition will vary with rainfall.	Dependent on degree of rainwater dilution and degree of soiling of yard areas. May become stronger during periods of low rainfall or if collection areas become soiled.	Odours: drain-type, foul Key compounds: NH_3, H_2S	**Low**
'Cleaned' biogas	Biogas Upgrade Unit (BUU)	Gas	N/A	N/A	N/A	N/A	Fairly consistent	Unlikely. Due to reduction in performance of carbon filter scrubbers prior to BUU Planned maintenance schedule in place for filters and gas upgrade equipment.	Odours: Faint, sweet gas, H_2S. Key compounds: NMVOCs, H_2S.	**Low**

[5] See Appendix 5 for the European Waste Catalogue code

Type	Source	Form	EWC[5]	Storage location	Max. on-site storage quantity	Max. holding time	Typical composition	Likelihood of abnormal composition	Odour type/ Odorous compounds	Odour potential (without controls)
Maize/ Energy Crops	On-farm/ local farms	Solid	N/A	Silage clamp in AD permitted area. Temporary on-site storage on clamp in AD process area.	1,500m^3 finished material taken from silage clamp ready for use. Silage clamp ensiled material up to 40,000max immediately following harvest.	2-3 days maximum	Composition monitored at harvest to be of sufficient quality (dry matter) for ensiling and use.	Minimal	Odours: Agricultural/ malt-like/ fermented. Key compounds: Lactate, (butyric acid / ammonia if not well fermented)	**Medium**
Whole digestate	On-site: substrate from AD process	Solid Liquid	N/A in current regulator context 19 06 06 if dispatched as a waste	Sealed digester tanks (with PRVs) (Primary Digesters DG01 – DG05 - Site Layout Plan)	DG01 (1664m^3) DG02 (2014m^3) DG03-DG06 (2396m^3)	DG01-26 days, DG02- 34 days, DG03, 04 and 05-35 days DG06 – 11 days	Typical dry matter content 7%	Fairly consistent due to feedstock management, long retention times and process controls. May vary if AD process not managed correctly.	Odours: Earthy, agricultural. Key compounds: low residual concentrations of VFAs, H_2S, NH_3.	**Low - Medium**

Type	Source	Form	EWC[5]	Storage location	Max. on-site storage quantity	Max. holding time	Typical composition	Likelihood of abnormal composition	Odour type/ Odorous compounds	Odour potential (without controls)
Separated Liquid Digestate	On-site: separated liquid substrate from process	Liquid	N/A in current regulator context 19 06 05 if dispatched as a waste	Stored offsite in covered lagoons outside the permitted area	Lagoon 1 (38,000m^3) (not in permitted area) Lagoon 2 (38,000m^3) not (in permitted area)	Capacity for 4.9 months storage	Separated liquid digestate. Dry matter ~5%	Minimal. Ineffective separation process may alter dry matter content.	Odours: Earthy, agricultural. Key compounds: low residual concentrations of VFAs, H_2S, NH_3	**Low - Medium**
Solid Digestate	On-site: separated solid substrate from process	Solid	N/A in current regulator context 19 06 06 if dispatched as a waste	Beneath separator screw press. Moved onto clamp area and removed regularly (twice weekly) No abatement.	Stored to a height of 2.0m which provides a 50 - 60 tonnes storage capacity.	Store has capacity for two days' worth of fibre	Separated solid digestate.	Minimal. May vary if AD process not managed correctly.	Odours: Earthy, agricultural. Key compounds: low residual concentrations of VFAs, H_2S, NH_3	**Low - Medium**

Type	Source	Form	EWC[5]	Storage location	Max. on-site storage quantity	Max. holding time	Typical composition	Likelihood of abnormal composition	Odour type/ Odorous compounds	Odour potential (without controls)
Combusted Biogas	CHPs/ emergency flare	Gas	N/A	N/A	N/A	N/A	Fairly consistent	Unlikely. Due to reduction in performance of carbon filters prior to CHP and/or performance of CHP/ flare. Planned maintenance schedule in place for filters and combustion equipment.	Odours: Faint, sweet gas. Key compounds: Unburnt NMVOCs	**Low - Medium**
Dirty water	On-site drainage of secondary containment area	Liquid	N/A	Dirty water pit (unabated breather vent)	120m^3 Dirty water Pit	Fairly continuous flow - recirculating, depending on rainfall	Composition will vary with rainfall.	Dependent on degree of rainwater dilution and degree of soiling of yard areas. May become stronger during periods of low rainfall or if collection areas become soiled.	Odours: drain-type, foul Key compounds: NH_3, H_2S	**Low - Medium**

Type	Source	Form	EWC[5]	Storage location	Max. on-site storage quantity	Max. holding time	Typical composition	Likelihood of abnormal composition	Odour type/ Odorous compounds	Odour potential (without controls)
Cattle manure	Somerset Farm	Solid	02 01 06	Somerset Farm. Temporary on-site storage on clamp.	1,500 m^3	2 - 3 days maximum (depending on farm activity)	Manure, cattle	Supply from Somerset Farm livestock therefore should be consistent. Variance of type of manure, feed nutrient density, bedding material and amount, time in use. Manure shall be transported to site as required via trailer and is used daily.	Odours: Manure/ agricultural. Key compounds: ammonia (NH_3), hydrogen sulphide (H_2S), volatile fatty acids (VFA), mercaptans	**Medium to High**
Poultry manure	Third party poultry farms	Solid	02 01 06	Received on a 'just in time' basis and loaded directly from delivery trailer into feed hoppers on receipt.	No stored – max quantities are 1 trailer load at a time/a day.	Received on a 'just in time' basis and loaded directly from delivery trailer into feed hoppers on receipt.	Manure, poultry	Likely to be from an intensive crop farming sites so manure will be reasonably consistent in supply and quality due to farming system.	Odours: Manure/ agricultural. Key compounds: Ammonia (NH_3), hydrogen sulphide (H_2S), volatile fatty acids (VFA), mercaptans	**High**

Type	Source	Form	EWC[5]	Storage location	Max. on-site storage quantity	Max. holding time	Typical composition	Likelihood of abnormal composition	Odour type/ Odorous compounds	Odour potential (without controls)
Crop residues	Somerset Farm and imported from external sources	Solid	N/A	Somerset Farm. Temporary on-site storage bay.	400 m^3	2 to 3 days maximum	Vegetable out grades and other plant-based crop residues	Minimal as product will be received 'fresh' from source and in undegraded form. May degrade if not previously stored correctly and securely.	Odours: sweet/ pungent, onion Key compounds: Esters, sulphur compounds terpenoids	**Low - High**
Leachate and Liquid Feedstocks	On-site drainage of dirty areas Third party farms	Liquid	N/A	Underground leachate pit (unabated breather vent)	57m^3 pre-Pit 300m^3 Liquid Feedstock Reception Tank	Leachate - continuous flow - recirculating, depending on rainfall. 1-2 days for	Composition will vary with rainfall.	Dependent on degree of rainwater dilution. May become stronger during periods of low rainfall or if collection areas become soiled.	Leachate odours: drain-type, foul Key compounds: NH_3, H_2S	**Low - High**

Type	Source	Form	EWC[5]	Storage location	Max. on-site storage quantity	Max. holding time	Typical composition	Likelihood of abnormal composition	Odour type/ Odorous compounds	Odour potential (without controls)
				Covered liquid feedstock reception/ leachate tank (displaced air abated)		liquid feedstocks received at the site.				
'Raw' Biogas	AD tank PRVs	Gas	N/A	Gas storage above digester tanks (6 no.)	DG01 (519m^3) DG02 (519m^3) DG03, 04, 05 (668m^3) DG06 (668m^3)	1,100m3/hr of biogas is produced which approximates to 2.86 hours of production	Fairly consistent	Unlikely. Elevated H_2S concentrations if desulphurisation process in digesters not managed effectively. Gas quality is continuously monitored via in-line analysers prior to the CHP	Odours: Strong, sweet/ cabbage, rotten eggs Key compounds: Wide range of NMVOCs, H_2S, NH_3	**High**

5 Odour Sources - Normal Operating Conditions

Odour Sources

Table 5.1 provides an inventory of potential odour sources and controls under normal operating conditions.

The primary source of odour generation is from the temporary storage and handling of feedstock material.

The odour sources from the on-site processes that have the potential to cause an off-site odour impact during **normal** operating conditions include:

1. Feedstock materials – release from solid feedstock material (maize, crop residues, manure) in temporary storage
2. Feedstock materials – intermittent release from maceration of manure/crop residues prior to loading
3. Intermittent release from feedstock material during transfer to the solid feeders;
4. Release from feedstock material within the hopper;
5. Diffuse release of displaced air from the underground leachate pit ;
6. Release of displaced air from covered liquid feedstocks/leachate reception tank;
7. Diffuse release of displaced air from the underground dirty water pit;
8. Release of odours from surface of deliveries of poultry manure delivered in trailers on a 'just in time' basis and loaded directly from the trailer into the feed hopper.

The potential for odour release from feedstock material will be managed through feedstock pre-acceptance assessment and acceptance controls, permitted quantities, storage times (Table 4.1 and 4.2) and just in time deliveries and loading work instructions in the case of poultry manure.

Odour Controls

The following sections describe the series of measures that Adapt Biogas has put in place to ensure that odours created during the processing of feedstock are:

- prevented from occurring, where possible;
- are contained within premises;
- are treated at source when produced;
- are not emitted by vehicles transiting to or from site;
- do not transgress the site boundaries.

Table 5.1 summarises the odour process control measures and contingency measures to be followed if the critical limits are breached or an odour complaint is received.

The general approach to receipt of an odour complaint is that an investigation by Adapt Biogas will be undertaken, as described in Section 8.

Table 5.1 Summary of Odour Sources and Control – Normal Operating Conditions

ODOUR SOURCE	NORMAL CONTROL	PROCEDURE(S)	CRITICAL LIMIT/ CONTINGENCY MEASURES	MONITORING RECORD SYSTEM
Vehicle Movements (Import/ export of material)	**SECTION 5.5 – Management** • Cattle farmyard manure is transferred over short distances from the adjacent farm via telehandler • Ensiled feedstocks transferred over short distances from adjacent fields or clamp via a farm trailer • Crop and plant-based residues transferred in sealed lorries/ sheeted trailers • Fibre digestate is routinely transferred off-site via farm trailer • Liquid digestate is transferred off-site via in situ pipeline • Poultry manure is received in sheeted trailers average of one load a day on a just in time basis. • Pre-acceptance assessment of third party sourced feedstocks ensures that material has been assessed for odour potential that can be managed at the site without impacts. **SECTION 7 – Monitoring** • Routine odour monitoring by site personnel • Site 'Sign-in App' that requires all visitors to record odour observations on arrival	Feedstock Acceptance Criteria, Pre-Acceptance Assessment, and Acceptance & Rejection Procedure **(MUR-SOP-01)** Training Procedure **(MUR-SOP-11)**	On detection of feedstocks with high odour concentrations (intensity 5 and above) load into AD process immediately and where this is not possible arrange for it to be removed from site and immediately clean the storage area and/or vehicle following removal. Extremely odorous feedstock (intensity score 6) will be rejected. If odour complaints are attributed to this aspect of site operations, the Operator will, through discussions with the EA, review the requirement for regular cleaning of delivery vehicles, or the suitability of materials for acceptance at the site. Contingency measures will be confirmed as effective through additional documented odour surveys at the on-site odour source, at the downwind site boundary and at the affected off-site receptor location(s).	Feedstock Acceptance Criteria (CB2107-11 Appendix 1) New Supplier Assessment Form (CB2107-11 Appendix 2) Daily Inspection (Smartsheet) **(MUR-MM-03)** Odour Monitoring Form **(MUR-FT-05)** Feedstock Rejection Form **(MUR-FT-04)**
Solid Feedstock Reception	**SECTION 5.5 – Management** • Adherence to feedstock acceptance/ rejection procedures. • Highly odorous feedstocks may be rejected. • Cattle farmyard manure supply limited to Somerset Farms. Reduced potential for variation in the feedstock and holding times prior to	Feedstock Acceptance & Rejection Procedure **(MUR-SOP-01)**	On detection of feedstock with high odour concentrations (intensity 5 and above) load into AD process immediately and where this is not possible arrange for it to be removed from site and immediately clean the storage area and/or vehicle following removal.	Daily Inspection (Smartsheet) **(MUR-MM-03)** Odour Monitoring Form **(MUR-FT-05)**

ODOUR SOURCE	NORMAL CONTROL	PROCEDURE(S)	CRITICAL LIMIT/ CONTINGENCY MEASURES	MONITORING RECORD SYSTEM
	delivery on-site. This will further limit the potential for seasonal variations to affect the release of odours from the material. Whilst dry manure tends to be less odorous than wet (slurries) in all cases manures will be delivered fairly 'fresh' from source. • Cattle farmyard manure will be transported to site on an as required basis only. Up to six deliveries of cattle farmyard manure per day in line with loading phases. Cattle farmyard manure will be fed directly into the hopper during delivery or stored temporarily in the storage areas for subsequent use that day. Cattle farmyard manure will therefore typically be subject to short holding times (2-3 days average) • Poultry manure will be received at an average of one trailer load a day. Poultry manure will be received on a 'just in time' basis and fed directly into the feeder units from the trailer to reduce handling. The poultry manure will be covered with a layer of energy crops in the feeder to reduce exposed surfaces. • Odour awareness and contingency measures included within staff inductions and training. • In the event of plant failure, feedstocks would not be delivered to site to prevent build-up of material. • Once vehicles have tipped, they immediately vacate. **SECTION 5.8 – Housekeeping** • Operational areas shall be maintained in a clean condition and regularly scraped/swept/ washed using hoses/ harvested surface water. **SECTION 7 – Monitoring**	Monitoring Procedure **(MUR-SOP-04)** Training Procedure **(MUR-SOP-11)**	Extremely odorous feedstock (intensity score 6) will be rejected. The supplier will be contacted to advise of non-compliance. In the event of re-occurrence, the contract arrangements with the supplier will be reviewed/ terminated as necessary. Increase the frequency of cleaning. In the event that odour complaints are attributed to this aspect of site operations, the Operator will, through discussion with the EA, reduce the quantity of material stored. Contingency measures will be confirmed as effective as outlined above.	Stock Sheet **(MUR-MM-08)** Feedstock Rejection Form **(MUR-FT-04)**

ODOUR SOURCE	NORMAL CONTROL	PROCEDURE(S)	CRITICAL LIMIT/ CONTINGENCY MEASURES	MONITORING RECORD SYSTEM
	• Routine odour monitoring • Site 'Sign-in App' for visitors/ contractors			
Solid Feedstock storage	**SECTION 5.5 – Management** • Control and monitoring of inputs. The feed plan is determined by the Operations Manager. • A first in first out (FIFO) principle will be applied but any particularly odorous material will be treated as a priority. • Restricted feedstock quantities and storage times permitted. • Sheeting of feedstocks if stored for longer than usual turnaround times or unusually odorous in character. **SECTION 5.8 – Housekeeping** • Implementation of strict housekeeping regime to prevent build-up of feedstock material. • Ensure drains are free-flowing and no dirty water is allowed to collect on hardstanding. **SECTION 7 – Monitoring** • Routine odour monitoring • Site 'Sign-in App' for visitors/ contractors	Monitoring Procedure **(MUR-SOP-04)** Training Procedure **(MUR-SOP-11)**	On detection of odour (intensity 3 or above) at the site boundary and corresponding off-site receptor location and/or if substantiated odour complaints are confirmed to have been caused by odour from feedstock storage: • Identify the stockpile for priority (immediate) processing (loading). Wash-down the storage area; • the Operator will review adherence to feedstock acceptance/ rejection procedures (i.e. review the quantity and length of time for respective feedstock storage together with other factors such as source, age, composition). • Feedstocks that may exceed maximum storage times of 2-3 days to be prioritised for use or sheeted. • Only the working face of ensiled crops to be exposed. The Operator will review the use of impermeable covers over material temporarily stored on the clamps/ storage area if this is found to be the source of off-site odour impact. The impermeable cover(s) will help to reduce rates of evaporation by: • ensure that rainwater and oxygen are kept out and any odours generated are kept in	Daily Inspection (Smartsheet) **(MUR-MM-03)** Odour Monitoring Form **(MUR-FT-05)** Stock Sheet **(MUR-MM-08)**

ODOUR SOURCE	NORMAL CONTROL	PROCEDURE(S)	CRITICAL LIMIT/ CONTINGENCY MEASURES	MONITORING RECORD SYSTEM
			• contain humidity, reducing rates of evaporation and the release of dissolved odorous chemicals; and • eliminating airflow over the surface of odour-releasing materials to reduce the rate of evaporation.	
Solid Feedstock Handling/ Treatment	**SECTION 5.5 – Management** • Feedstock quantities restricted. • Maceration feedstocks undertaken daily for 2-3 hours. • Meteorological monitoring and forecasting at the site will be performed daily to identify times when plant conditions and/or odour abatement techniques feedstock loading operations need to be adjusted to account for adverse conditions that may result in an off-site odour impact. A dynamic risk assessment would be carried out by the Operator taking into account the wind direction. • Maceration of odorous material such as onions, will not be undertaken when the prevailing wind direction is towards sensitive receptor locations • Poultry manure to be covered with a layer of energy crops in the feeder unit to reduce exposure to atmosphere. **SECTION 5.8 – Housekeeping** • Operational areas shall be maintained in a clean condition and regularly scraped/swept/ washed using hoses/ harvested surface water. • Solids feeder rotors cleaned monthly, external surfaces quarterly. **SECTION 7 – Monitoring** • Routine odour monitoring • Site 'Sign-in App' for visitors/ contractors	Feedstock Loading Procedure **(MUR-SOP-02)** Monitoring Procedure **(MUR-SOP-04)** Training Procedure **(MUR-SOP-11)** Feedstock Processing Procedure **(MUR-SOP-38)**	On detection of odour (intensity 3 or above) at the site boundary and corresponding off-site receptor location and/or if substantiated odour complaints are confirmed to have been caused by odour from feedstock handling/ treatment processes: • Cease treatment process; • Review the source of the feedstock and check adherence to feedstock acceptance/ rejection procedures. • Check adherence to Feedstock Treatment Procedure and meteorological conditions at the time of the complaint/ transfer activity • Where immediate loading is not possible due to operational constraints, remove the material from site, wash down the clamp area and/or take other mitigation measures. If the odour complaint is confirmed to have been caused by odour from the maceration of material, the Operator through discussion with the EA will consider alternative methods to achieve the required blend (and thus dry matter balance of feedstock) to be fed into the solids feeder.	Daily Inspection (Smartsheet) **(MUR-MM-03)** Odour Monitoring Form **(MUR-FT-05)** Stock Sheet **(MUR-MM-08)**

ODOUR SOURCE	NORMAL CONTROL	PROCEDURE(S)	CRITICAL LIMIT/ CONTINGENCY MEASURES	MONITORING RECORD SYSTEM
	• Odour from the storage area during maceration will be continuously monitored by personnel and observations documented on the Daily Inspection (Smartsheet) (MUR-MM-03). • Odour from the feed hoppers will be continuously monitored by personnel during loading and observations documented on the Daily Inspection (Smartsheet) (MUR-MM-03).		Contingency measures will be confirmed as effective as outlined above.	
Liquid Feedstock Transfer/ Storage – Leachate Pit	**SECTION 5.3 – Containment** • Dirty water from the: clamp/ storage area for silage/crop residues; and the secondary containment area, is contained within an underground pit prior to re-use within the AD process **SECTION 5.5 – Management** • Restricted permitted feedstocks accepted • Transferred in sealed pipework to underground sealed Leachate Pit with breather vent • The Operator will monitor liquid levels on a weekly basis **SECTION 5.8 – Housekeeping** • Emptying and cleaning of the pit is undertaken as required and in accordance with odour observations. **SECTION 7 – Monitoring** • Site 'Sign-in App' for visitors/ contractors • Daily odour checks downwind of Leachate Pit	Monitoring Procedure **(MUR-SOP-04)** Training Procedure **(MUR-SOP-11)**	On detection of odour (intensity 3 or above) at the site boundary and corresponding off-site receptor location and/or if substantiated odour complaints are confirmed to have been caused by odour from liquid feedstock storage: • the Operator through liaison with the EA will consider further measures that can be implemented to manage operations. • Contingency measures will be confirmed as effective as outlined above.	Daily Inspection (Smartsheet) **(MUR-MM-03)** Odour Monitoring Form **(MUR-FT-05)** Stock Sheet **(MUR-MM-08)** Feedstock Rejection Form **(MUR-FT-04)**
Liquid Feedstock Transfer/ Storage	**SECTION 5.3 – Containment** • Leachate from the clamp/ storage area together with dirty water is transferred in sealed pipework	Monitoring Procedure **(MUR-SOP-04)**	On detection of odour (intensity 3 or above) at the site boundary and corresponding off-site receptor location and/or if substantiated odour	Daily Inspection (Smartsheet) **(MUR-MM-03)**

ODOUR SOURCE	NORMAL CONTROL	PROCEDURE(S)	CRITICAL LIMIT/ CONTINGENCY MEASURES	MONITORING RECORD SYSTEM
– Liquid Feedstock Reception/ Leachate Tank	to the covered Liquid Feedstock Reception/Leachate Tank. **SECTION 5.5 – Management** • Site personnel will monitor odour levels through a daily site boundary 'sniff' test and will check emissions from the Liquid Feedstock Reception/Leachate Tank during daily site AD plant checks • The Operator will monitor leachate levels on a weekly basis. **SECTION 5.8 – Housekeeping** • Emptying and cleaning of the tank is undertaken as required and in accordance with odour observations. **SECTION 7 – Monitoring** • Site 'Sign-in App' for visitors/ contractors • Daily odour checks downwind of Leachate Tank	Training Procedure **(MUR-SOP-11)**	complaints are confirmed to have been caused by odour from liquid feedstock storage: • Cover to be installed on the tank.	Odour Monitoring Form **(MUR-FT-05)** Stock Sheet **(MUR-MM-08)**
Dirty Water Transfer and Storage – Dirty Water Pit	**SECTION 5.3 – Containment** • Dirty water fully contained within the pit. **SECTION 5.5 – Management** • The Operator will monitor dirty water levels on a weekly basis. **SECTION 5.8 – Housekeeping** • Adapt Biogas are responsible for keeping external areas swept and tidy to avoid solids being washed into the dirty water containment system in order to limit levels of total suspended solid (TSS) and biological oxygen demand (BOD) and therefore the potential for the dirty water to become odorous during warmer periods.	Monitoring Procedure **(MUR-SOP-04)** Training Procedure **(MUR-SOP-11)** Spill Procedure **(MUR-OD-05)**	On detection of odour (intensity 3 or above) at the site boundary and corresponding off-site receptor location and/or if substantiated odour complaints are confirmed to have been caused by odour from the Dirty Water pit breather vent: • Notify Plant Manager if a spillage occurs within the site that may contaminate the Dirty Water Pit with a material that is not suitable for AD. • If the Dirty Water pit is found to be giving rise to malodours, the pit will be covered with a flexible PVC cover to reduce odour emissions.	Daily Inspection (Smartsheet) **(MUR-MM-03)** Odour Monitoring Form **(MUR-FT-05)** Digestate & Dirty Water Dispatch Spreadsheet **(MUR-MM-01)**

ODOUR SOURCE	NORMAL CONTROL	PROCEDURE(S)	CRITICAL LIMIT/ CONTINGENCY MEASURES	MONITORING RECORD SYSTEM
	• Emptying and cleaning of the pit is undertaken as required and in accordance with odour observations. **SECTION 7 – Monitoring** • Site personnel will monitor odour via a daily site boundary 'sniff' test and will check emissions from the Dirty Water Pit vent during daily site AD plant checks • Site 'Sign-in App' for visitors/ contractors		• Contingency measures will be confirmed as effective as outlined above.	
Liquid digestate storage/ dispatch – Digestate Lagoons	**SECTION 5.3 – Containment** • Liquid digestate is fully contained within the process vessels and within the network of sealed pipework until it is discharged to the covered Digestate Lagoons. • Liquid digestate is transferred off-site to lagoons via sealed pipeline. **SECTION 7 – Monitoring** • Site 'Sign-in App' for visitors/ contractors • Daily odour checks downwind of lagoons	Digestate Dispatch Procedure **(MUR-SOP-06)** Monitoring Procedure **(MUR-SOP-04)** Training Procedure **(MUR-SOP-11)** Spill Procedure **(MUR-OD-05)**	On detection of odour (intensity 3 or above) at the site boundary and corresponding off-site receptor location and/or if substantiated odour complaints are confirmed to have been caused by odour from the digestate lagoons: • Check lagoon cover/ seals for damage • Check carbon filter abatement unit at tanker offtake point for optimum operation and need for replacement. • Halt the dispatch operation (if applicable) • Recommence dispatch when meteorological conditions, in particular wind direction, are less likely to cause an odour nuisance to nearby sensitive receptors. In the event of uncontrolled liquid release/ spillage, the Plant Manager is to be notified immediately to investigate and rectify the problem without delay. Actions may include: • Stop pumps/ close valves as necessary/ contain liquid	Daily Inspection (Smartsheet) **(MUR-MM-03)** Odour Monitoring Form **(MUR-FT-05)** Digestate & Dirty Water Dispatch Spreadsheet **(MUR-MM-01)** Accident /Incident Report Form **(MUR-FT-02)**

ODOUR SOURCE	NORMAL CONTROL	PROCEDURE(S)	CRITICAL LIMIT/ CONTINGENCY MEASURES	MONITORING RECORD SYSTEM
			• Use suction tanker to retrieve liquids and subsequently load to process • Corresponding odour monitoring to be undertaken. • The Plant Manager will advise the EA of the circumstances. Contingency measures will be confirmed as effective as outlined above.	
Solid digestate storage/ dispatch – Separation areas	**SECTION 5.5 – Management** • Solid fibre digestate deposited from the separator and transferred off-site or subject to temporary storage locations. • Transferred off-site on average every two days. Therefore, each batch is subject to short holding times on-site, and stockpiles on site are always minimal. **SECTION 5.8 – Housekeeping** • Minimum (weekly) cleaning of operational areas **SECTION 7 – Monitoring** • Site 'Sign-in App' for visitors/ contractors • Daily odour checks	Digestate Dispatch Procedure **(MUR-SOP-06)** Monitoring Procedure **(MUR-SOP-04)** Training Procedure **(MUR-SOP-11)**	On detection of odour (intensity 3 or above) at the site boundary and corresponding off-site receptor location and/or if substantiated odour complaints are confirmed to have been caused by odour from the fibre digestate: • Investigate if/ why the fibre/ separation area is particularly odorous • Cover digestate and remove for use off-site • Contingency measures will be confirmed as effective as outlined above.	Daily Inspection (Smartsheet) **(MUR-MM-03)** Odour Monitoring Form **(MUR-FT-05)** Digestate & Dirty Water Dispatch Spreadsheet **(MUR-MM-01)**
Biogas	**SECTION 5.3 – Containment** • The tanks are bonded to the flexible membrane biogas stores to ensure digestion process takes place in sealed, airtight vessels and that there are no fugitive emissions. • Odour control is a key feature of the design as capture and recovery of the biogas is central to the plant's efficiency. The likelihood of gas leaks is therefore very low. • Third-party specialist leak detection testing	Process Monitoring Procedure **(MUR-SOP-03)** Monitoring Procedure **(MUR-SOP-04)** Training Procedure **(MUR-SOP-11)**	On detection of odour (intensity 3 or above) at the site boundary and corresponding off-site receptor location and/or if substantiated odour complaints are confirmed to have been caused by odour from biogas: • Notify Plant Manager immediately • Check operation of PRVs on all tanks • Portable monitors will be used to check gas type and concentration.	SCADA process control monitoring system Daily Inspection (Smartsheet) **(MUR-MM-03)** Odour Monitoring Form **(MUR-FT-05)**

ODOUR SOURCE	NORMAL CONTROL	PROCEDURE(S)	CRITICAL LIMIT/ CONTINGENCY MEASURES	MONITORING RECORD SYSTEM
	SECTION 5.4 – Abatement • Biogas desulphurisation within digesters and prior to combustion in CHPs and Gas Upgrade Unit. Addition of CO_2 recovery step will reduce emissions further and result in further site monitoring measures. **SECTION 5.5 – Management** • Routine inspection and maintenance schedule for the AD tanks and integrity of associated infrastructure. • Conduct additional leak detection and repair surveys (LDAR) or accelerate date of campaigns if leaks detected or suspected from other onsite monitoring. • Any excess gas will be flared to ensure that there will be no fugitive emissions of odorous gas. **SECTION 5.7 – Process** • The AD process is fully regulated using a SCADA process control monitoring system that includes monitoring of the gas flow to the engines to ensure that gas is not released into the atmosphere and that the flare is operated (where necessary) to avoid emissions of unburnt biogas. Feed rates and mixing rates are controlled to regulate gas production. **SECTION 7 – Monitoring** • Site 'Sign-in App' for visitors/ contractors • Daily odour checks		• If required, the plant engineers will be contacted to resolve the issue immediately. • Contingency measures will be confirmed as effective as outlined above.	

5.3 Containment

Odour containment and control is a key feature of the installation layout and operation. The key containment and abatement measures are detailed in the following sections.

AD Plant

The AD process is anaerobic and has to be maintained without a direct link to air and as such the process is within a fully enclosed system. Capture and recovery of the biogas is central to the plant's efficiency as the gas is extracted from all digestion process tanks to the CHP engine and the gas upgrading unit. Therefore, any biogas generated in the process will be contained within the sealed chambers so that there will be no external emissions.

The material within the system will be gravity fed via pipes and valves from one tank to another. The displacement that this may cause is taken up in the headspaces of the tanks, and the biogas storage vessels that are designed to rise and fall in capacity to absorb displacement within the tanks, and to absorb any variations in the biogas production rate and consumption rate (e.g., to the CHPs). Under normal operating conditions, the combustion of odorous biogas in the CHP engines will not result in an emission that will be significant in terms of an off-site odour impact.

The only possible connection with ambient air will be via a series of hydraulic or mechanical safety valves within the digester tank systems. PRVs will vent biogas to atmosphere or take in air in the event of an under pressure event. Apart from atypical operational conditions, the PRVs should not operate, as the emergency flare is designed to operate at a lower set pressure than the pressure relief valves to burn excess biogas and will always therefore be the default management measure for managing surplus biogas. The flare has a greater capacity than maximum biogas production.

Liquid Feedstock Transfer and Storage

Dirty water, slurry, and fruit juices from cattle feed from the off-site farm pre-pit and off-site farm dirty water pond is transferred within sealed pipework to the on-site 120m^3 underground Leachate Pit.

From the underground Leachate Pit, liquid feedstock is either transferred directly to DG01 or used within the process via the on-site 300m^3 Liquid Feedstock Reception/Leachate Tank. This tank is scheduled to be covered, and displaced air will vent through a carbon filtration abatement system to abate odours prior to release.

Diffuse emissions of odours from the sealed dirty water drainage system at the site are not anticipated to be significant. There should be no route for odour release from the system.

Dirty water from AD Plant secondary containment area

All areas used for the storage, handling and treatment of feedstock benefit from an impermeable surface and sealed drainage system i.e., all dirty water is routed back through the process via the 120m^3 Dirty Water/Leachate Pit and thereafter the 300m^3 Liquid Feedstock Reception/Leachate Tank as process liquid or removed to be spread to land for agricultural benefit. This tank was not previously covered, but following recent BAT assessment and uplift, the operator now intends to install a cover to this tank.

Dirty water is therefore contained in the drainage system, transportation is in the pipeline to the leachate pit and leachate tank and digesters, i.e., in an entirely contained system.

Liquid Digestate Transfer

Separated liquid digestate is transferred for storage in one of two offsite digestate storage lagoons which are located nearby and outside of the permitted boundary. Transfer is made via a dedicated pipeline and digestate removed from the lagoons for further use/spreading as needed by tanker.

5.4 Abatement

Biogas Desulphurisation

The biogas is stored within in the gas storage domes on top of the digesters and the digestate storage tank. Iron oxide is added to the digesters in order to reduce the production of H_2S.

These tanks have desulphurisation nets and low-level oxygen injection to encourage microbial growth to reduce H_2S levels and precipitate sulphur.

Once out of storage the biogas passes through a gas cooling system to reduce moisture (condensate goes to condensate pit then digestate storage tank) then through a carbon filter to remove any excess H_2S prior to combustion within the CHPs or biogas upgrading.

The biogas cleaning process is carried out within an enclosed system.

The carbon filtration system includes:

- 1 x carbon filter prior to the 250 kW CHPs;
- 3 x carbon filters prior to the Biogas Upgrade Unit (BUU). Biogas from all digesters may be directed to the BUU, via a carbon filter.

It is designed/ appropriately sized according to the specification of the plant to ensure that the capacity of the filtration system is not exceeded.

The efficacy of the carbon filters is determined through:

- Continuous monitoring of in-line gas analysis of H_2S before and after the filter
- Continuous monitoring of inlet gas temperature
- Continuous monitoring of gas flow rate

The filtration system is subject to planned maintenance. Timescales for the filter media renewal will be adjusted in accordance with the filter performance. The performance of the media will depend on the flow rate and concentrations of H_2S over time, airflow characteristics and filter maintenance. Levels of H_2S will be monitored downstream the carbon filters; a slight increase in H_2S concentrations (e.g., of 1ppm) will enable sufficient early identification that the media requires replacement prior to the media breakpoint occurring.

There will be a set of carbon for replacement stored on site ready for use when the spent material is removed. It will take the Operator between 2-3 hours to replace the filter. Spent media is stored for up to 2 weeks in a suitable sealed container and removed by a specialist waste company.

The biogas treatment is designed to protect the CHP units. It also minimises the potential risk of odour from fugitive biogas emissions and CHP emissions. 'Ultra DS' activated carbon is used with enhanced adsorption capacity for H_2S, SO_2, mercaptans and acid compounds, developed with high sulphur loading capacities.

The addition of a CO_2 recovery facility as part of ongoing site developments will reduce emissions to atmosphere, and result in installation of further gas monitoring and polishing measures.

5.5 Management Controls

Odour emissions from the storage of feedstock materials will be minimised. Energy crops are ensiled in the silage clamp adjacent to the main AD processing area which is now added to the AD permitted area. Only the working face of the clamp is exposed during operations to minimise exposure of stored/ensiled material. Finished silage is taken from the clamp and moved across to the main AD process area on a near-daily basis prior to loading. The maximum short term storage capacity in the main AD site process area is limited to 1,500m^3 and will be subject to maximum storage times of 72 hours.

The storage times of potentially odorous material awaiting processing is limited such that farmyard manure are brought onto site on an as required basis and will only be stored temporarily in the concrete storage area prior to loading within the feed hoppers.

If odours from the storage of feedstock are found to be the cause of off-site odour impact, are found to exceed standard short term storage times, of found to be excessively odorous in nature, then the Operator will cover/sheet the material concerned to minimise impacts.

Vehicle Movements

The potential for odours to be released from vehicles arriving and leaving the site will be reduced by ensuring that loads are sheeted or contained as follows:

- All manure (unless from Somerset Farm) will be delivered to the site on sheeted trailers;
- Liquid digestate will be transferred off-site via sealed direct pipeline or in closed tankers if required;

- Fibre digestate will be transferred in a sheeted trailer.

Feedstock Pre-acceptance Criteria

In terms of odour, the potential for odour emissions at the feedstock delivery and reception stage is influenced by the content and nature of the feedstock. Before any feedstock arrives at the site, an initial characterisation is undertaken during the pre-acceptance screening process.

All potential feedstock sources are assessed to determine that they are suitable, and the suppliers are approved. All feedstock deliveries are quantified, characterised, and pre-booked before they arrive at the site. The potential to create odours, and the measures in place at the site to manage these odours will be considered as part of this assessment and taken into account when deciding whether the material stream will be approved as a feedstock or not.

All imported feed stock materials will be required to be pre-booked following implementation of the feedstock pre-acceptance procedure. This will enable the operator to exercise control over the quality of the feedstocks at source and control the quantities of material at the point of delivery to the facility to minimise odour risk and ensures that the facility will not exceed storage capacity and reduce the requirement for long storage times.

Feedstock Acceptance Criteria

All feedstock is subject to feedstock acceptance control (WAC) procedures.

Most feedstock materials are sourced within the wider Somerset Farm operation and are therefore well characterised and subject to the Operator's control. This includes cattle manure, ensiled crop, and farm-derived dirty water (including slurry, fruit juices from cattle feed and dirty run-off). Other crop-based feedstocks received at the site are generally received fresh from source.

All feedstock is pre-booked based on the required daily inputs to ensure sufficient capacity at the site. This management control minimises the risk of offensive or non-compliant feed stocks arriving at the facility and ensures that there is sufficient capacity at the site to receive materials. Solid and liquid feedstocks are brought to the site when needed reducing the quantity and length of time feedstocks are stored on site. They are managed on a first in first out basis (FIFO).

Feedstocks are fed into the system at the earliest opportunity to prevent decomposition, degradation in quality and any associated reduction in calorific value.

Solid feedstocks undergo visual inspection on receipt from suppliers/farms in accordance with the **Feedstock Acceptance & Rejection Procedure (MUR-SOP-01)** and will only be accepted if:

- They conform to the type and maximum quantity that is specified in the Environmental Permit.

- They conform to the description in the documentation supplied by the producer and holder.

Loads will be rejected at the weighbridge, and either diverted to an appropriate third-party operator or disposal facility, in the following circumstances:

- If the load is identified as containing non-permitted materials/wastes;
- if the load contains particularly odorous materials and/ or the composition combine to give rise to malodours that have been detected outside of the sealed container by the driver and are considered to be of an odour intensity of 5 or above;
- if the facility is already operating at full capacity; and/or
- if there are operational difficulties at the site that would delay operations beyond the routine holding times for the materials.

If a load is deemed to be malodorous prior to tipping (an odour intensity score of 5 or above i.e., very strong, detected outside the vehicle/ container) the material will not be tipped and the load rejected.

If incoming feedstock material is tipped and is subsequently identified by the Plant Manager as being malodorous i.e., is identified as being of 'very strong' odour (intensity score of 5) the material will be processed immediately.

If the material is assessed as having an 'extremely strong' odour having (an intensity score of 6) it will be kept separate and reloaded into the original delivery vehicle and rejected from the site. If a load is rejected from site in this way, Adapt Biogas's database will be updated and should the problem re-occur, all future loads from the supplier will be cancelled. If it is not possible to return rejected feedstock with 'extremely strong' odour (intensity score of 6) it will be processed immediately.

In circumstances where immediate processing is not possible, the material will be quarantined within a sealed container and removed from site for disposal within 24-hours.

Incoming loads of broiler poultry manure are received at a frequency of on average one sheeted trailer load a day. The poultry manure is received on a 'just in time' basis and loaded directly into the feed hoppers from the delivery trailer. Inspection of the material takes place during loading which can be stopped at any point should the material not deemed to be in accordance with the agreed specification.

Feedstock Storage

Solid feedstocks are received and stored in the designated concrete storage area which benefits from concrete impermeable surfacing and a sealed drainage system. The quantities and types of material on the storage area at any one time may vary due to availability/ seasonality. The maximum height of feedstock in short term storage will not exceed 2 metres. The capacity of the short-term storage area in the main AD processing area is 1,500m^3, therefore a maximum of c. one week's processing capacity can be stored in this area at any one time.

The liquid reception areas are contained and include the 120m^3 Leachate Pit, the 300m^3 Liquid Feedstock Reception/Leachate Tank and the 120m^3 Dirty Water Pit. The residence time of liquids within the pits/ tank will be dependent on rainfall. In general terms the flow of liquid feedstock through is continuous, although liquid feedstock may be stored for in excess of 7 days within dedicated tanks.

The combined storage volume for liquid and solid feedstocks is approximately 800m^3 at any one time for storage at the main AD processing area. There is adequate capacity for the maximum quantities of feedstock held on site at any one time. The Operator adheres to maximum holding times to restrict the potential for anaerobic conditions to develop and cause malodorous emissions.

Daily checks are undertaken to ensure that conditions giving rise to odour do not occur.

Feedstock Handling

Principally feedstock material such as silage and manure are imported to site from on-site and off-site storage areas. Feedstocks are moved to the AD site at the point of use. Broiler chicken manure is brought to site for use on a 'just in time' basis to minimise handling at the site.

The **Feedstock Loading Procedure (MUR-SOP-02)** and **Feedstock Processing Procedure (MUR-SOP-38)** details the feedstock handling procedures which are followed by Adapt Biogas prior to the use of the feedstocks in the AD process.

Feedstocks will be managed using a first in first out (FIFO) principle.

Solid feedstocks are placed into the open solid's feeders using the telehandler. Feedstock is loaded into the hoppers three times a day. Solid feedstocks will be transferred, using a front-end loader, to the feed hopper and deposited within the hopper from the minimum drop height required, to prevent increased odour release. The hoppers are situated within close proximity to the feedstock storage areas such that haulage distances are kept to a minimum.

Each day solid feedstock is transferred to the solid feed system. This comprises 4 no. 40m^3 feed hoppers. Once the hoppers are filled material passes automatically along the augers into the liquid pipework and then onto the appropriate digester.

All solid feedstock handling and processing is undertaken is two main phases during periods when the site is staffed.

Poultry manure feedstocks will always be covered with a layer of energy crops in the feeder units to minimise exposure to atmosphere.

Management of Excess Biogas

Pressure in the tanks and gas volume are monitored continuously via the SCADA system. If a failure is detected the biogas will be directed to the flare to prevent a build-up of biogas.

During emergency situations, or during scheduled down time, biogas can be directed to the emergency gas flare. The flare ensures that 'raw' (non-combusted) biogas is not released to the atmosphere during emergency situations, giving rise to odour. If the flare fails, the pressure relief valves (PRVs) will vent raw biogas to the atmosphere. These two processes will act as a backup to normal processing and, only should there be a failure of both systems, would odour release to atmosphere occur. Section 6 and Table 6.1 discuss emissions under abnormal conditions.

The flare is to be used as an emergency back-up to the other odour control procedures and will not be used under normal operating conditions or used with any regularity as a form of odour control.

The gas pressure is continuously monitored and parameters (e.g., feed rate and mixing) are changed to regulate gas production and reduce the likelihood of excess biogas and the need to operate the flare.

Digestate Storage and Handling

MUR-SOP-06 Digestate Dispatch Procedure details dispatch of digestate liquor from the digestate storage tanks via sealed vacuum tankers should the need to dispatch liquid digestate from the site arise, and the solid fibre fraction from the separated fibre storage area/ clamp via trailer. Digestate liquor will be moved to the two offsite storage lagoons via closed pipeline.

Each loading area will be monitored both routinely and more often when in use, as part of the daily odour monitoring check. Mobile spill kits are available for use on-site.

Spills will be dealt with in accordance with Spill Procedure (**MUR-OD-05**).

Cleaning and maintenance will be performed as required in accordance with observations made during the daily checks and as a minimum there will be weekly cleaning of operational areas.

Digestate fibre is removed on a frequent basis to satellite stores at the intended site of spreading via a tractor and trailer.

Drainage System Control

All feedstock storage and treatment operations will be undertaken upon concrete surfacing benefitting from a sealed drainage system.

The Plant Manager or deputy will carry out a weekly inspection of external working surfaces, drainage channels and other on-site drainage systems. A record of the inspection(s)/ defects, damage and repairs will be made on the **Daily Inspection (Smartsheet) (MUR-MM-03).**

Maintenance of Plant and Equipment

Routine maintenance plans and inspection schedules for equipment and any mobile plant that may be in use on-site will be undertaken by the Operator in order to minimise the risk of breakdowns and operational delays which may increase potential for odour emissions.

Plant maintenance records will be kept at the site in the site office and shall be open to inspection.

A list of critical spares required (**MUR-MM-06 Spares List**) and the procedure for reordering is included as part of the facility's maintenance plans.

An inventory of spare critical equipment will be held at the site. This will include key items of processing equipment such as screens, processing panels, pumps and pump casings and motors.

5.6 Evaporation

The release of odorous chemicals can be partly controlled by reducing evaporation rates.

Due to the short temporary holding times, feedstock materials in short term storage waiting to be fed into the AD process are not stored on-site under cover. In the event that feedstock storage is considered to be the cause of off-site odour impact, that usual sort term storage times are exceeded, or if material is assessed to be highly odorous in character, then the Operator will cover the material concerned. The covers will help to reduce rates of evaporation by:

- lowering the temperature by avoiding direct sunlight; or
- otherwise reducing the water evaporation rate and the release of dissolved odorous chemicals; and
- reduce airflow over the surface of odour-releasing materials to reduce the rate of evaporation.

Only the working face of the ensiled energy crops in the permitted silage clamp area will be exposed during operations.

When beetroot and onions are used, they are chopped (macerated) prior to feeding into the AD system. Activities such as maceration and transfer significantly increase the exposed surface area and emissions.

Maceration and mixing of feedstock are undertaken for a maximum duration of 1-hour up to four times per week using mobile plant. Weather conditions will be checked before any chopping is undertaken Shredding /chopping will not be undertaken unless the weather conditions are suitable to ensure that the wind direction is appropriate and will not cause fugitive emissions of odour to be transmitted off–site to the nearest sensitive receptors.

Materials are transferred via telehandler over short haulage distance from the temporary storage clamp to the feed hoppers such that the period of time agitated material is exposed to air is kept to a minimum before loading.

Reinforced floating plastic covers (comprised of 1.5mm polyethylene) have been installed on both off-site digestate lagoons that prevent surface 'wind stripping', evaporation/ volatilisation of odorous compounds, and disturbance from stirring/ mixing of the lagoon contents.

Poultry manure is delivered and loaded into the feed hoppers on a 'just in time' basis and covered with a layer of energy crops in the feeder units to reduce exposure and evaporation.

5.7 Process Controls

AD Process

The AD process and use of biogas and other outputs will be closely controlled by management systems and technical devices. These systems are continually monitored and checked by computer systems (SCADA) on-site and remotely. The systems have back-up systems that can be used when required.

Process monitoring can be sub-divided into:

- Automated monitoring via (Supervisory control and data acquisition system or 'SCADA')
- Visual checks of the surface and contents of the digesters
- On-site testing
- Off-site testing at an external laboratory

All process data is acquired from the relevant parts of the process continuously by specialised monitoring and measurement devices, including:

- Feedstock quality – physical and chemical (analytical) measurements and electronic measurements for pH, conductivity, chemical constituents, volatile solids.
- Biogas flow and pressures including, biogas holder capacity and system pressure, biogas flow rates.
- Volumetric metering, pipe and process pressures, safety system pressures and status, compressor pressures (mixing systems and CHP systems); and
- Biogas operating pressure, CH_4 content and chemical composition, H_2S, NH_3.

The SCADA system will alert the Plant Manager and technology provider if any part of the system goes out of the normal working range.

Parameters will be checked each day by the Operator and there will be a routine for daily and weekly visual inspections of the mechanical systems and leak detection checks made to determine any fugitive biogas escape.

Process monitoring is key to ensure a stable anaerobic digestion process, to minimise the risk of abnormal events which may lead to abnormal emissions of odour.

Digesters

The SCADA system ensures that the digesters operate at the optimum set-point of 42-45°C and that the minimum hydraulic retention time of approximately (35 days) is observed in the respective tanks. With the exception of PRVs, installed as a necessary safety feature, the entire process is enclosed and therefore no odours are released to the atmosphere during this process.

Biogas Treatment - Desulphurisation and Utilisation

The biogas cleaning process is carried out within an enclosed system. The SCADA system manages the desulphurisation process. The odour abatement performance testing procedure of the carbon filters includes in-line gas analyser measurements for H_2S concentrations. The SCADA system will also regulate gas flow to ensure that the capacity of the filtration system is not exceeded. The carbon filtration system will be subject to planned maintenance. There should therefore be no odorous emissions to air from this process.

CHP Engines

The CHPs are subject to routine services and maintenance plan that includes leak detection and emissions testing. Specialist contractors will undertake leak detection investigation.

There will be continuous process control monitoring / periodic gas quality analysis. Combustion emissions will be released at height that will ensure effective emissions dispersal.

Emissions to air from the CHP stacks are monitoring annually, by an external contractor, in line with environmental permit conditions. Emissions from the combustion of biogas should not give rise to an off-site odour impact.

5.8 General Housekeeping

Washing and Cleaning Procedures for Reception

Once materials have entered the AD processing system, there is the potential for the residues of any odorous material on the clamp/ storage areas to carry on generating odours even after the main mass of material has been taken into the enclosed system.

Where the concrete storage and processing areas have been fouled, then this will be cleaned daily, in order to remove remnants of the material and so minimise the further release of malodour.

The following management of processes and cleaning procedures will be employed to minimise evaporation of odorous chemicals from materials:

- early removal of odorous feedstocks into the processing system;
- removal of odorous feedstocks and the residues of that feedstock, using mechanical cleansing followed by;

- water-based wash-down procedures;
- quarantined feedstocks e.g. contrary material removed from the feedstock will be removed within 5 days.
- Quarantined malodourous feedstock will be removed within 24-hours.

General Housekeeping Measures

The following measures will be undertaken to reduce the potential for odour:

- Carry out daily inspection, monitoring and maintenance of abatement equipment (carbon filters) to ensure working effectively and operational.
- Carry out daily inspection of all pipework and process storage tanks to ensure that they are sound.
- Auditing housekeeping and maintenance records.
- All litter/ debris shall be removed from working areas, around the interior perimeter walls/ underneath pipe work, etc.
- Any faults/ damage to be recorded on the relevant maintenance form and the **Daily Inspection (Smartsheet) (MUR-MM-03).**
- Carry out regular housekeeping to ensure any spills cleaned up immediately in accordance with **Spill Procedure (MUR-OD-05)** and wash-down of all hardstanding areas, as follows:
  - routine cleaning of clamp – once weekly as a minimum (or more frequently if needed) using pressure washer;
  - routine cleaning of solids feeder – rotors are to be cleaned monthly, external surfaces washed-down quarterly as a minimum (or more frequently if needed) using pressure washer;
  - external areas of AD plant – once weekly as a minimum (or more frequently if needed) using pressure washing/ floor squeegies;
  - external area around digestate store – following fibre digestate out loading (and before the end of the working shift) using pressure washing/ floor squeegies.
- Fugitive emissions to air shall be dealt with in accordance with the **Fugitive Emissions Plan (MUR-SOP-05)**. The procedure is in place to ensure that as far as possible, fugitive emissions from the operations at the AD plant do not impact on the local environment or amenity.

6 Odour Sources - Abnormal Operating Conditions

Odour Sources

Table 6.1 provides a summary of the foreseeable situations that may compromise the Operator's ability to prevent and/or minimise odorous releases from the process (including emergencies, maintenance, breakdowns, weather anomalies, etc.).

Potential odour sources under abnormal operating conditions, may include:

1. AD plant infrastructure compromised (leading to gas/ liquid release from storage tanks, pipework).
2. CHP failure/ reduction in performance (incomplete combustion, gas over-pressure).
3. Emissions from the operation of the PRVs on the digesters.
4. Periods of maintenance.
5. Absence of key staff.
6. Flood.
7. Fire/ explosion.
8. Unavailability of transfer vehicles.

It is expected that, any emissions arising due to abnormal operations, incidents and/or due to periods of maintenance at the site would not occur frequently and would not be sustained or of prolonged duration.

Control Measures

The control measures and response requirements to minimise the impact to abnormal event scenarios are also summarised in Table 6.1.

Maintenance Works

When maintenance work is undertaken, there is the potential that the facility is more vulnerable, or there is a risk of a small odour release, e.g. removing a pump, replacing a pipeline, or rodding/flushing a pipe/chamber etc. Suitably qualified and competent contractors will complete maintenance works. Rules/work permits will be required for all contractors working on site. Sections of the plant which require maintenance will be sealed off from the main process to control and limit the potential release of odours during maintenance works.

The Operator will immediately inform the EA when planned or emergency maintenance of plant items must be carried out and there is a likelihood of odour being released to atmosphere to the degree that an adverse off-site impact may occur. The Operator will provide details of the event, actions being taken to resolve the issue and likely timescale to rectify.

Critical Failure(s)

A list of contingency contacts in the event of abnormal operations/ critical failures is provided in **MUR-OD-05 Accident Management Plan (AMP).**

In the event of a critical failure of the facility which results in restricted feedstock reception capacity, additional mitigation measures will be put in place to minimise the impact of the incident. These will include:

- Stop receipt of feedstock and export onsite feedstocks to third party users.
- Containment of spillages or odour releases.
- Clean-up/ wash-down procedures; and
- Containment of feedstocks either into sealed containers/by covering or removal to an alternative facility within 24-hours.

In the case of operational difficulties, in accordance with **MUR-OD-10 – Emergency Response Plan,** in the event of operational difficulties feedstock would be diverted to a nearby AD facility. If the plant failed to operate over a period of a few weeks, there would be a build-up of crop residues and cattle manure which could be spread direct to field or stored in field heaps temporarily.

In the event of serious odour issues and disaster or emergency situations, measures are also in place to divert or remove feedstocks for landfill disposal as a last resort.

A 240kW diesel backup generator is available on-site to avoid mains electricity failure impacting the operation. The generator will be subject to routine servicing.

Water supply is available from the mains. There is no business-critical gas usage on site. Deputies are available for any individual key staff member should they be unavailable for any reason.

Table 6.1 Contingency for Odour Control during Maintenance and Abnormal Events

LOCATION OF EMISSION	CONTINGENCY EVENT	CONSEQUENCES OF ABNORMAL EMISSION	MEASURES TO PREVENT/ REDUCE LIKELIHOOD OF EVENT	ACTIONS AND RESPONSIBLE PERSON(S)
AD PLANT INFRASTRUCTURE COMPROMISED	**Small odorous gas release from digester pipework or tanks, or odorous liquid release**	Odour emitted from release of odorous air, gas, or biogas. Odorous gas may contain H_2S, which is toxic even in low concentrations, e.g. in confined spaces. Biogas is potentially explosive and is an asphyxiant.	• Operations management: AD plant automated systems monitoring (SCADA) - continuous technological measurements and data acquisition is made automatically for the parameters that are designed to the control system and includes leak detection. • Systems alerts, and overrides will be integral to the automated system. In addition, there will be a number of daily checks and measurements required by management personnel. • System fitted with fail-safes for blockages, high or low pressure stops and valve interlocks. • Area will be within containment and will be bunded. • Maintain spill-kit supplies on-site (absorbent materials to include absorbent granules, absorbent boom). • Staff training and inductions - everyone to be aware of Spill Procedure (**MUR-OD-05**). • Odour awareness and contingency measures included within staff inductions and training.	• Plant Manager to be notified immediately in order to investigate and rectify the problem without delay. • Invoke **MUR-OD-05 Accident Management Plan** as appropriate. • Plant Manager to provide direction regarding safety of working in the affected area. • PPE including personal gas alarms will be worn by site operatives. • Portable monitors will be used to check gas type and concentration. Isolate the affected section of pipe. • Call Maintenance Technician. • Stop pumps/ close valves as necessary • Use suction tanker to retrieve liquids and subsequently load to process. • Clean affected area with squeegee, apply absorbents. Clean equipment surfaces. • The Plant Manager will advise the EA of the circumstance and corresponding odour monitoring results no later than by the end of the working shift.

LOCATION OF EMISSION	CONTINGENCY EVENT	CONSEQUENCES OF ABNORMAL EMISSION	MEASURES TO PREVENT/ REDUCE LIKELIHOOD OF EVENT	ACTIONS AND RESPONSIBLE PERSON(S)
CHP	**CHP failure or reduction in performance**	If odour strength or nature varies at the plant and or the following checks reveal a problem, then a qualified engineer will be contacted.	• Routine maintenance contract with supplier (or associated contractor) for equipment. • Continuous system checks (SCADA system) undertaken to validate function of biogas treatment technology.	• Plant Manager to be notified immediately • Plant Manager to provide direction regarding safety of working in the affected area • PPE including personal gas alarms will be worn by site operatives. • Portable monitors will be used to check gas type and concentration. • Isolate the affected section of pipe. • Call technology provider for support. • The Plant Manager will advise the EA of the circumstance and corresponding odour monitoring results once the situation has been resolved and no later than by the end of the working shift.
DIGESTERS	**Emissions from the operation of the PRVs**	Odour emitted from release of odorous air, gas, or biogas. Odorous gas may contain H_2S, which is toxic even in low concentrations, e.g. in confined spaces. Biogas is potentially explosive and is an asphyxiant.	• PRVs designed as a safety feature and subject to routine inspection to ensure correct operation (abnormal operating scenarios only) • Operations management: AD plant automated systems monitoring (SCADA) - continuous technological measurements and data acquisition is made automatically for the parameters that are designed to the control system and includes leak detection. • Systems alerts, and overrides will be integral to the automated system. In addition, there will be a number of daily checks and measurements required by management personnel.	• Plant Manager to be notified immediately • Plant Manager to provide direction regarding safety of working in the affected area. • PPE including personal gas alarms will be worn by site operatives • Portable monitors will be used to check gas type and concentration • Check SCADA/ system parameters. Investigate reason for PRV operation

LOCATION OF EMISSION	CONTINGENCY EVENT	CONSEQUENCES OF ABNORMAL EMISSION	MEASURES TO PREVENT/ REDUCE LIKELIHOOD OF EVENT	ACTIONS AND RESPONSIBLE PERSON(S)
ENTIRE FACILITY	**Periods of maintenance**	Affect the ability of the site to operate effectively	• Maintenance can be planned and scheduled in order not to impair the plant performance. • Daily odour monitoring will identify reduced performance. • Complaints notified by the Council, EA or the public may also indicate an odorous release.	• Plant Manager to be notified immediately • Measures may include: - Stopping maintenance activities. - Implement **MUR-OD-05 AMP** as appropriate. • The Plant Manager will advise the EA of the circumstances immediately. Progress updates to be provided to EA until resolved. • Corresponding odour monitoring to be undertaken.
ENTIRE FACILITY	**Absence of key staff**	Affect the ability of the site to operate effectively	• Deputy/ technically competent personnel will be available at all times. • Adapt Biogas' primary point of contact will be the Plant Manager for the site on all matters associated with site operations and its environmental performance. • Odour awareness and contingency measures included within all staff inductions and training, including that for drivers. • System processes will be automated and monitored remotely by technology provider.	• In the short-term, 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 non- critical roles whilst other more experienced staff members are reassigned.

LOCATION OF EMISSION	CONTINGENCY EVENT	CONSEQUENCES OF ABNORMAL EMISSION	MEASURES TO PREVENT/ REDUCE LIKELIHOOD OF EVENT	ACTIONS AND RESPONSIBLE PERSON(S)
ENTIRE FACILITY	**Flood** (the site is situated in a Flood Zone 3 and is therefore at **high probability** for flooding)	Affect the ability of the site to operate effectively.	• In the event of a flood alert being received locally an **Emergency Response Procedure** (**MUR-OD-10)** is in place for the site.	• Plant Manager to be notified immediately • Invoke **MUR-OD-10 Emergency Response Procedure** • The site can remove groundwater rising by pumping the clean water into a nearby ditch. • Invoke **AMP** as appropriate. • If due to a man-made incident and is covered under the **Spillage Procedure** (**MUR-OD-05)**. Use suction tanker to retrieve liquids from sumps and subsequently load to process. • The Plant Manager will advise the EA of the circumstances immediately. Progress updates to be provided to EA until resolved. • Corresponding odour monitoring to be undertaken. • Odour monitoring results provided to EA before the end of the working shift.
BIOGAS STORE AND ENTIRE FACILITY	**Fire and/or Explosion**	Odour and gas release	• No wastes shall be burnt on site. • There will be no smoking on site • The use of welding/cutting tools (i.e. with naked flame) should be sanctioned first by the Plant Manager/ competent person. • Appropriate fire extinguishers shall be kept within the site boundary and made easily accessible. • All site operatives shall be trained in accordance with the Company Fire and Evacuation Procedure.	• Invoke **MUR-OD-05 AMP** • The Plant Manager shall make an immediate assessment of the situation before informing the Operator for advice. • The fire shall be extinguished as soon as practicable in accordance with **Emergency Response Procedure (MUR-OD-10).**

LOCATION OF EMISSION	CONTINGENCY EVENT	CONSEQUENCES OF ABNORMAL EMISSION	MEASURES TO PREVENT/ REDUCE LIKELIHOOD OF EVENT	ACTIONS AND RESPONSIBLE PERSON(S)
			• Biogas storage: AD system fitted with fail- safes for blockages, high or low pressure stops and valve interlocks. • The process is continuously monitored for signs of increased heat. • Routine (annual) assessments are completed in accordance with DSEAR and action taken as identified necessary.	
DIGESTATE STORES	**Unavailability of Transfer Vehicles**	Poor weather, road closures or strikes prevent vehicles removing digestate from the facility.	• Several farm trailers are available from the adjacent farm for use on-site • Offsite dispatch of digestate by pipeline • Meteorological monitoring and forecasting at the site will be performed daily to identify times when plant conditions and/or odour abatement techniques need to be adjusted to account for adverse conditions.	• The Plant Manager is responsible for overseeing the supplier policy and a contingency plan. • Contingency storage for liquid digestate will be secured.

7 Odour Monitoring

Odour Monitoring Under Normal Conditions

Meteorological Monitoring

Meteorological conditions are key to understanding the potential odour impacts to downwind receptors. Meteorological monitoring at the site will therefore be performed:

- during routine odour monitoring;
- to predict periods when conditions for the dispersion of odour are likely to be poor, enabling planned maintenance operations to be re-scheduled to avoid such times;
- at the time of abnormal events to predict where odour impacts could potentially occur;
- to identify times when plant conditions and/or odour abatement techniques need to be adjusted to account for adverse conditions; and
- for the investigation of odour complaints.

Meteorological data will be sourced by site operatives from the on-site weather station and additional online resources e.g. metcheck.com.

Monitoring Odorous Releases

This section of the OMP sets out the monitoring procedures that will be implemented, during normal operations.

Routine (Daily) Olfactometry Monitoring

Adapt Biogas will carry out routine daily odour checks Observations will be recorded on **Odour Monitoring Form (MUR-FT-05).**

Predetermined monitoring locations (that includes locations listed below from number 1 to number 6 inclusive) should be surveyed on every occasion.

Two flexible downwind monitoring locations (locations numbered 8 and 9 below) will be chosen at the time of the survey.

An additional survey will be undertaken once weekly at the nearest downwind off-site receptor location(s) (even if odours are not detected at site boundary). This is to acknowledge that odours may ground beyond the site boundary even where no on-site or site boundary odour is detected.

As a minimum monitoring will be undertaken at the following (with upwind locations to be surveyed first):

To be undertake **daily**:

1. Between lagoons 1 and 2 (outside of permitted area)
2. Flare
3. Perimeter fence (opposite ROV compound)

4. Cants Drive (where the HP pipeline traverses it)
5. Site main entrance
6. Coronation House (Long Drove & Cants Drove junction)
7. Flexible downwind site boundary location
8. Flexible downwind off-site receptor location (if odours are perceived at the downwind site boundary)
9. Additional localised monitoring will be undertaken during poultry manure deliveries at the time of delivery for the first three months during which the material is received at the site.

Weekly:

10. Flexible downwind nearest off-site receptor location(s) (even if odours are not detected at site boundary)

An Odour Monitoring Locations Plan is included in Appendix 1.

Monitoring will be undertaken at different times each day during operational hours to capture a range of conditions and at times when there is a risk of off-site odour impact, for example due to operational changes or due to weather conditions. Additional odour monitoring surveys will be undertaken during the following circumstances:

- During operational hours, where the risk of odour dispersion is towards off-site receptors. This may be due to prevailing wind direction and/or during periods of still air conditions. During these periods an odour survey will be conducted at the downwind site boundary and at the downwind off-site receptor location(s). Any off-site odours will be traced to their potential source which may include a full inspection on-site of the area of operations.

- During routine operations where there is an increased risk of odour release (e.g., poultry manure deliveries, shredding operations).

- During periods of maintenance and/or abnormal operating conditions (Table 6.1) where there is increased risk of odour release, for example, periods of PRV operation or during times of CHP or flare failure. During these periods an odour survey will be conducted at the downwind site boundary and at the downwind off-site receptor location(s) to establish the presence of odour off-site.

- In order to verify the success of any contingency measures implemented on-site to control odour in response to either the detection of abnormal odour release during routine odour monitoring (Section 7.3) or as a result of measures implemented in response to verified odour complaint(s). The survey will be undertaken on-site at the location of the verified odour source(s), at the downwind site boundary and at the off-site affected receptor location(s).

- In order to qualify the presence or absence of odour from other sources beyond the site boundary, if there is no established pathway between the site but odour has been detected at a potential offsite sensitive receptor.

The results will be recorded on the **Odour Monitoring Form (MUR-FT-05)** and **Daily Inspection (Smartsheet) (MUR-MM-03).** This data can be used to inform proactive odour management.

The Odour Assessor

Monitoring staff must not be desensitised to odour. A variety of trained odour monitoring personnel should be used and, where possible, selected from office-based staff who are unlikely to have been exposed to on-site odours.

The odour assessor must not be subject to significant odour in the 30-minutes prior to the assessment or consume strongly flavoured food or drink within this time period. This is to ensure that the assessor is not suffering from odour fatigue and will be sensitive to on-site odours. In the event that odour complaints are received, and the results of routine odour testing suggest that site personnel are unable to detect odour whilst on-site the Operator will consider using independent contractors for sniff testing until the source of the odour is established and/or issue is resolved.

It is important to note that olfactory monitoring ('sniff tests') are subjective and both the hedonic tone and intensity may be experienced differently by different people. A copy of the Hedonic Scale and Odour Intensity Scale is included in Appendix 2.

Routine Monitoring Inspection Methodology

1. The tester will walk slowly, breathing normally, and starting at points with least expectation of odour (at the downwind site boundary). If an odour cannot be detected in this way, the inspector will periodically stand still and inhale deeply facing upwind.

2. If no odour is perceptible in this manner, then the intensity will be 0. If odour is detected but there is some doubt as to whether an odour is present, then the intensity will be recorded as 1 (very faint). If odour is detected but cannot be described using precise words or terms, then intensity will be recorded as 2 (faint). If odour is detected while walking and the odour character is recognisable, the intensity will be recorded as at least 3 (distinct). If the odour character is easily recognisable then the intensity is 4 (strong). If the odour is considered offensive the intensity is 5 (very strong) and if the odour is offensive and possibly nauseous i.e. an instinctive reaction is to reduce personal exposure to the odour, then the intensity is 6 (extremely strong). The score used to classify odour are provided on the **Odour Monitoring Form (MUR-FT-05).** Other supporting classification systems and information are provided in Appendix 5.

3. If a recognisable or ‘distinct’ odour or stronger (i.e. intensity of 3 and above) is detected at the downwind site boundary and/or at off-site receptor locations, an on-site inspection of operations will be carried out to trace any observed off-site or site boundary odour to the source, or identification of the direction of an off-site odour, so that appropriate corrective action can be taken.

4. On reporting results, it is important that additional observations including time, date, weather conditions, odour type, location, intensity, extent, and sensitivity are recorded in the **Odour Monitoring Form (MUR-FT-05).**

5. Abnormal site operating conditions at the time of the survey e.g. maintenance to process equipment will also be recorded.

Actions in the Event of Abnormal Emissions

Investigate Pollution Incident and Cause

If odour monitoring indicates that abnormal emissions from the facility are taking place the Plant Manager will be informed immediately and will check relevant items of odour control equipment in order to identify the possible cause of the abnormal emission.

Bring the Process back under Control

1. Cease the activity causing the abnormal situation and/or if necessary, arrange for the immediate removal of any odorous materials giving rise to the problems;
2. take immediate steps to eliminate the cause of the abnormal situation;
3. contact the relevant maintenance contractor if necessary;
4. record the response to the situation and the remedial actions taken; and
5. advise the EA with regards to the possibility of complaints, details of the problem, and mitigation/improvement measures undertaken.

Temporary Problem Rectification

If the default procedure does not provide a satisfactory resolution, the following actions will be considered until the problem is resolved:

- Temporarily restrict feedstock acceptance at the site; and/or
- Temporarily reduce the feedstock throughput.

Problem Resolution

Once the cause of the problem is identified and the improvements implemented, the following actions will be undertaken:

1. A further odour survey will be completed to ensure that the improvements have addressed the source of the elevated levels.

2. If the cause is due to inadequately followed odour management controls re-training of employees will take place to ensure that all employees operate to the required standards.
3. If the odour management controls are determined to be inadequate it will be raised as part of the review of control measures detailed in the OMP; and
4. All parties affected by the problem event will be notified of the cause, actions, and resolutions by the Plant Manager.

Table 7.1 summarises the routine odour monitoring the responsive monitoring following an odour release.

Table 7.1 Schedule of Odour Monitoring ('Sniff Tests')

Frequency	Person Responsible	Method	Reason	Records	Actions
Daily	Trained office-based staff or non-operational staff	Perform sniff test at locations indicated on **Odour Monitoring Locations Plan**	**Routine monitoring** to establish normal working conditions and check for odour emissions/ issues.	Odour Monitoring Form **(MUR-FT-05)**	If a distinct odour (intensity 3 or above) is detected at site boundary/ at off-site receptor investigate and establish source **during the survey** and identify the requirement for remedial measures. Record the details of the odour using the **Odour Monitoring Form (MUR-FT-05).**
On request	Trained office-based staff or non-operational staff	Perform sniff test at relevant receptor locations, boundary locations and at suspected on-site sources	In response to **odour complaint**	Odour Monitoring Form **(MUR-FT-05)** Odour Complaint Form **(MUR-FT-06)**	In the event of an odour complaint during the working shift, investigate **without delay.** Out of hours complaints will be investigated during the next working shift. If an odour complaint is verified (i.e., a distinct odour of intensity 3 or above is detected off-site in the vicinity of the complainant's address – where this is known) establish the source and, if necessary, identify appropriate remedial measures to be agreed with the EA. Notify the EA within **24-hours** in the event of an **odour complaint.** Record the details using the **Odour Complaint Form (MUR-FT-06).** If required, refer to **Complaints Procedure (MUR-SOP-10).**
Ad-hoc	Site visitors and site personnel	Perform sniff test on arrival at site	To establish odour emissions/ issues	**Sign-in App** (Site Office)	An alert is sent to the OM if a strong odour (intensity 4 or above) is reported by visitors. Investigate and establish source and identify the requirement for remedial measures. Record the details of the odour using the **Odour Monitoring Form (MUR-FT-05).**
In the event of odour release	Trained office-based staff or non-operational staff	Walk around installation boundary. Perform sniff test at locations indicated on **Odour Monitoring Locations Plan**	To establish/ confirm odour source e.g. during operations where there is an increased risk of odour release	Odour Monitoring Form **(MUR-FT-05)**	If a distinct odour (intensity 3 or above) is detected at off-site receptors identify appropriate remedial measures. If odour generation cannot be prevented with additional mitigation in place, consideration will be given to the suspension of the activity, where safety and operational constraints allow, until appropriate action, as agreed with the EA, can be implemented. Record the details of the odour using the **Odour Monitoring Form (MUR-FT-05).**

8 Odour Complaints

Odour Complaints Management and Investigation

Complaints data is recognised by the EA as the most direct and reliable form of monitoring which odours are causing a problem outside of the site boundary. Adapt Biogas understands the importance of addressing both internal and external complaints in a prompt and comprehensive manner to resolve any issue as quickly as possible.

All complaints will be collected, registered, and validated following the **Complaints Procedure (MUR-SOP-10).** If an odour complaint is received, the Operations Manager or deputy will complete form **Odour Complaint Form (MUR-FT-06).**

In order that odour complaints can be substantiated it is imperative that the site is immediately informed either by the complainant themselves or by the EA. Local residents will be encouraged to immediately contact the site in the event of an off-site odour to enable site personnel to verify the presence, extent and cause of the odour. A site contact telephone number will be displayed at the site entrance.

Following receipt of the complaint, this will be passed to the Operations Manager/SHEQ Manager to investigate as soon as possible. If the Operations Manager/SHEQ Manager feels that their deputy is better placed to deal with the response, then control of the issue may be handed over to the relevant personnel.

A stepwise approach to odour complaint investigation and reporting is presented in Figure 8.1.

Complaint Screening

The complaint investigation will start with an initial screening exercise to verify the odour incident to screen out those odour complaints that are unlikely to be due to the facility. The initial screening exercise will consider the following:

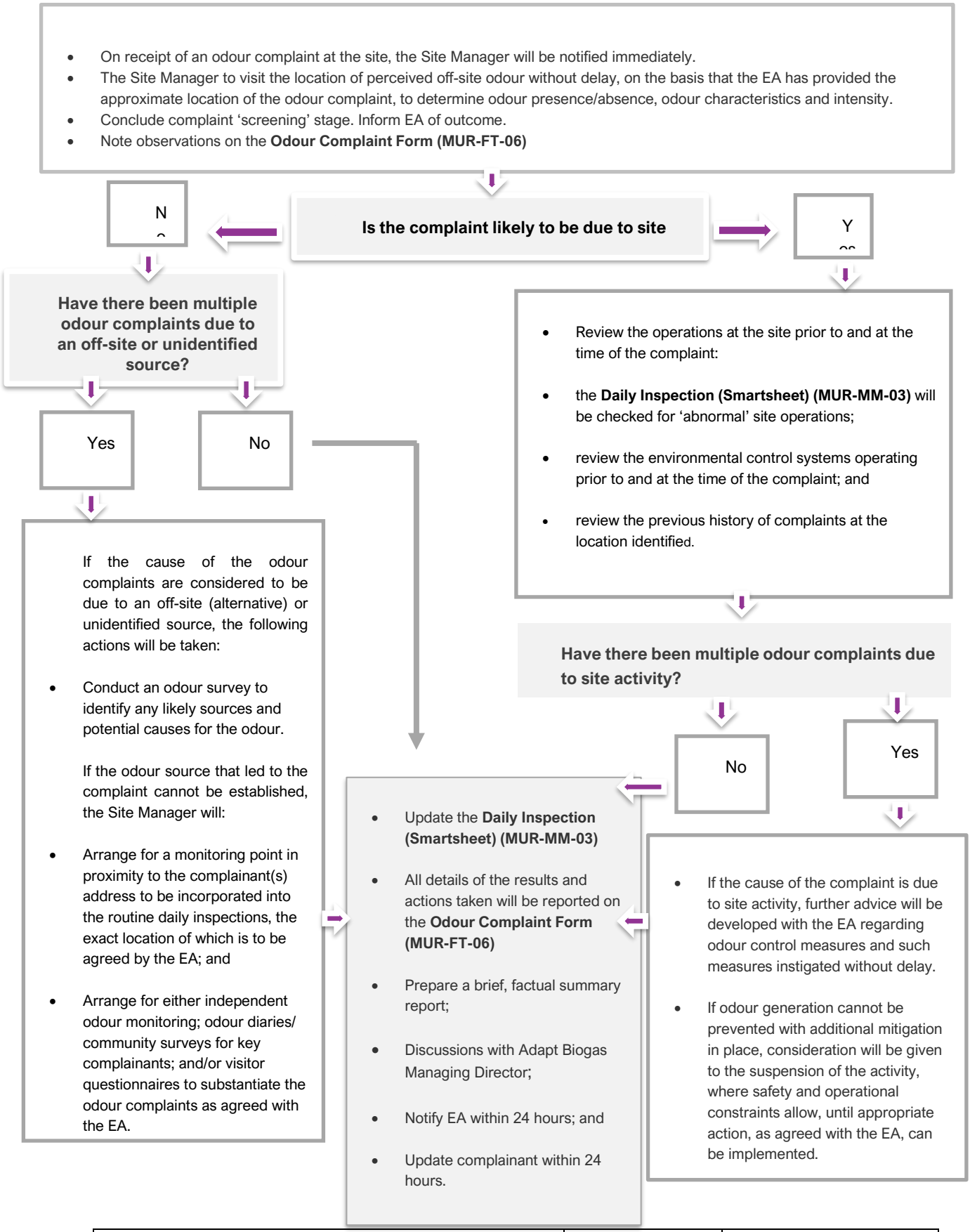
- potential odour sources at the facility (Table 5.1, Table 6.1);
- routine/ additional odour monitoring data; and
- meteorological conditions considered in relation to the location of the complainant.

If the Operations Manager/SHEQ Manager can attend the complaint location quickly, it may be possible to carry out effective appraisal of the complaints independently by a ‘sniff test’.

Adapt Biogas will liaise with the EA immediately to inform of the outcome of the screening assessment and whether any action is to be taken. If the site is not confirmed to be the odour source, then the investigation will stop at that point.

If the screening process confirms the odour incident, then a more detailed investigation will be carried out.

Figure 8.1 Odour Complaints Procedure – Stepwise Procedure



Odour Complaint Investigation

The actions outlined in Figure 8.1 will be followed if the site is identified as the origin/cause of the odour complained about. Figure 8.1 also outlines the actions that will be undertaken by Adapt Biogas in circumstances where the source of the odour cannot be confirmed.

If the odour complaint is received during operational hours the complaint will be investigated immediately. The investigation will involve identifying the odour source and implementing measures to bring the source under control. The corresponding odour investigation report will detail the actions taken to minimise the potential for re-occurrence.

After recording the complaint on the **Odour Complaint Form (MUR-FT-06)** and completing an appropriate level of investigation the Operations Manager/SHEQ Manager will discuss the matter with the Managing Director.

The **Odour Complaint Form (MUR-FT-06)** will be forwarded to the EA together with the outcome of the investigation by the end of the working shift to enable timely review in addition to complaint validation results and any corrective and preventative actions taken in response to the complaint.

The Operator will summarise the details of validated complaints to the EA within 24-hours of investigation and validation.

All complaints forms will be kept until the surrender of the Permit. All records will be available for inspection by EA representatives.

Complaints Monitoring

The Operator will maintain a system of complaints monitoring and analysis. Complaints will be registered on a database, validated where possible and reviewed on a monthly basis.

Community Engagement

The Operator will ensure that they are approachable and open to discussion at all times, the primary objective being to encourage complainants to feel comfortable to contact the Operator in the first instance so that problems can be identified and rectified at the earliest opportunity.

Liaison with local residents in closest proximity to the site operations (subset of the receptors given in Table 3.2) and the EA will be co-ordinated through the Operations Manager/SHEQ Manager. Both parties will be notified of activities that have the potential to generate significant odour emissions, and of any activities programmed to take place outside of normal site operating conditions or hours.

Odour Diaries and Community Surveys

In circumstances where, over an extended period, odour complaints from the community do not match the results of the regular sniff-test monitoring Adapt Biogas will engage with

members of the community, in key locations, to participate in a period of community monitoring.

These designated residents would perform offsite surveys, recording the data in an **MUR-FT-07 Odour Diary** for an agreed length of time. Adapt Biogas will maintain logs of community involvement and keep all completed odour diaries for future reference.

9 Management and Document Review

Policy and Commitment

Adapt Biogas is committed to managing any potential off-site odour impacts from the proposed AD facility. This commitment extends from company policies produced at Director level (Managing Director) through to managing odour-critical work-based activities on-site.

Overarching Management Responsibility

The key roles and responsibilities of site personnel are summarised in Table 9.1 with specific regard to odour prevention and control.

Site staff will be responsible for maintaining an awareness of general site performance during their daily activities and will report any unusual odour occurrences to the Plant Manager.

Table 9.1 Key Roles and Responsibilities - Odour Control

ROLE	RESPONSIBILITIES
MANAGING DIRECTOR (MD) **(James Thompson)**	• Overall responsibility for review and implementation of the OMP • Responsibility for ensuring compliance with environmental legislation • Oversee the management of the site by the OM and compliance by the GCM • Ensuring that relevant training and competencies are maintained • Providing extra resources / contingency arrangements • Providing the Operations Manager with support and guidance •
OPERATIONS MANAGER (OM) **(Vacancy)**	• Ensuring the site processes and procedures are implemented and upheld • Feedstock control • Implementing and overseeing emergency response procedures • Overseeing the implementation of corrective actions where required • Observing trends in process management data and discussing process management decisions with the OD • Responsibility for implementation of the OMP • Carry out any environmental awareness training and work with contractors to ensure implementation of good practice. • Will prepare and manage dissemination of information on project programme, site contacts and health and safety information to site neighbours.

Marie Cookson SHEQ MANAGER **(Marie Cookson)**	• Responsible for all aspects of environmental, and health and safety compliance including: - Document control and record keeping - Oversight of site audits - responsibility for editing, updating or superseding of documents - Implementing and overseeing emergency response procedures as required; - Overseeing the implementation of corrective actions where required; • Responsible for the completion of routine inspections • Responsibility for delivering environmental aspects of site inductions. • Day to day responsibility for public liaison, and complaints handling • Reporting site issues or incidents to MD or OD
SITE MANAGER **(Ricky Maylin - Temporary Manager)**	• Day to day responsibility for the operation of the site including: - Fulfilling the specific role requirements of individual procedures - Establishing and reviewing the daily feed recipe for the AD Plant - Responding to SCADA alarms or delegating this responsibility to a Nominated Competent Person - Implementing the planned preventative maintenance plan with respect to the AD plant and associated infrastructure including maintenance of odour control equipment - Implementing site management plans as specified in the EMS - Retaining inspection and maintenance records - Managing external contractors carrying out planned/ adhoc maintenance - Reporting site issues or incidents to MD or OD and working closely with the GCM. - Holds WAMITAB and is TCM for site
TECHNICALLY COMPETENT MANAGER (TCM)	• Maintain technical competence including Continuing Competence assessments • Ensuring that operations at the site comply with all relevant environmental and health and safety legislation and where possible relevant guidance • Recording attendance hours on site in the site sign in system

Records

The Operator will maintain records of all monitoring carried out under this OMP, including details of maintenance of plant and/or equipment including odour abatement equipment, the results of calibration tests performed on plant/ equipment, odour monitoring surveys and any assessment or evaluation made based on such data.

Details of odour non-conformances, including subsequent investigations, timescales and remedial measures taken, and notifications of the relevant internal and external bodies will be recorded by the Plant Manager and copies will be maintained within the Site Office.

All records will be kept for a minimum of six years as specified in the permit conditions; however, if the records involve any off-site impacts then those records must be kept until

the surrender of the permit. All complaints forms will be kept until the surrender of the permit(s). All records will be available for inspection by EA representatives.

Reporting

The requirements for the reporting of monitoring undertaken at the site are set out within the Site's environmental permit. If an odour complaint is received, the investigation of each individual complaint and subsequent report to the EA is to be undertaken without delay.

OMP Update and Review

This OMP sets out the appropriate measures that Adapt Biogas will undertake in controlling any odorous or potentially odorous activities from the facility.

In urgent circumstances where the Operator requires the immediate implementation of changes to the OMP to prevent or reduce significant odorous emissions, these changes will be discussed with the EA without delay but may be implemented by the Operator ahead of formal agreement.

Where the Operator proposes changes to the OMP that involve a longer-term phased approach, a proposal will be submitted by Adapt Biogas to the EA that outlines the approach within an updated OMP. Once agreed, the required changes will then form the future measures for the site about odour management and control.

Review Timescales

While 'normal' operations continue at the site that could give rise to the generation of odour, this OMP will be formally reviewed by Adapt Biogas annually, as a minimum, to ensure the stated management controls and conditions continue to reflect best available techniques and the operational requirements/ sensitivities at the site. Any technical and managerial changes on site will also initiate a review of the OMP.

An updated copy of the OMP will be submitted to the EA following review, as required. Any required changes to the conditions set out within this document will be formally agreed with the regulator prior to their implementation.

Following a period of abnormal operations (i.e., immediately following an accident/incident at the facility) the OMP will be reviewed immediately, and further advice may need to be developed regarding odour control measures and such measures instigated without delay