

Accident management plan

April 2023

EA

Bio Dynamic (UK) Ltd
Colwick Anaerobic Digestion Facility
Private Road No. 4
Colwick Industrial Estate
Nottingham
NG4 2JT



Revisions

This is a version controlled document. All changes are to be detailed below and a new version issued after changes are made.

Version control			
Version no.	Date	Author or Reviewer	Comments on amendments
01	24/01/2014	Stephen Locke	Initial H1 Risk Assessment
02	26/08/2014	Robert Apaya	Added sections 1, 2, 3 & 5 Incorporated H1 Risk Assessment; edited to change future tense to present
03	30/10/2014	Robert Apaya	SOP numbering revised & updated
04	09/10/2015	Robert Apaya	SOP BIO022 added
05	03/10/2016	Robert Apaya	Annual review
06	27/02/2017	Robert Apaya	Emergency contact information – updated Mitigation measures – added SOP BIO004, BIO005, BIO017, BIO021 - added SOP BIO006, SOP BIO007 – renamed OPS BIO001, BIO019, BIO020, BIO022, BIO023, BIO025, BIO026, BIO027 – added AH BIO007, BIO009 – added
07	05/02/2018	Robert Apaya	Review after 170920-001 Buffer tank accident H&S advisors - updated Control measures - updated H1 risk assessment – removed EA BIO011; SOP BIO002, BIO003, BIO012, BIO036, BIO045 – added H&S BIO006 form – updated; H&S BIO010 – added H&S FRA001 – added H&S PBG001, PBG002; EA PBG001 – added OPS BIO027 – removed; OPS BIO044 – added; OPS BIO019, BIO023 - renamed SOP BIO006 – renamed Waste Coordinator – added EOP replacements: SOP BIO007 renamed EOP BIO002; SOP BIO010 renamed EOP BIO006; SOP BIO022 renamed EOP BIO008 & BIO009; SOP BIO036 removed Table 2 – added COSHH BIO016 & SDS BIO016 – added
08	01/07/2019	Robert Apaya	Review after EPR/DP3935ER/V005 variation Table 1, 3 – updated Figure 1, 2, 3 - updated 3.3 Roles & responsibilities - updated OPS BIO046 – removed; OPS BIO049 – added SOP BIO044, SOP BIO046 – added Updated Accidents & incidents procedure H&S BIO016, H&S FSS004 - added EPR/DP3935ER/V005 – updated throughout
09	10/08/22	Jo Chapman	Review to support permit variation application HC1677 to reflect site refurbishment changes Update emergency contacts Remove reference to Cat 1 tank which is now decommissioned
10	25/04/23	Jo Chapman	Review to remove reference to digestate dewatering/MBR plant.

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1 Introduction

1.1 Background

The Colwick Anaerobic Digestion facility has been designed and built by Bio Dynamic (UK) Ltd to provide an environmentally favourable alternative to the disposal of food waste in landfill. Up to 150,000 tonnes per year of food waste from local commercial sources (waste food originating from restaurants, catering facilities and commercial kitchens) is treated at the facility by harnessing anaerobic digestion (AD); the biochemical process by which naturally occurring bacteria breakdown the organic matter in food waste in the absence of oxygen to produce biomethane (a source of renewable energy) and digestate (a nutrient-rich organic fertilizer). A small proportion of the waste processed is depackaged and bulked at the site and then exported offsite for use as a feedstock at other facilities.

1.2 Scope

The Accident management plan (AMP) is based on the updated Environmental Risk Assessment which has been prepared to support a variation to the site permit following a major infrastructure refurbishment at the site. This updated risk assessment is submitted as document reference HC1677-08.

The purpose of the AMP is to identify all activities on site which could potentially lead to an environmental accident during normal day-to-day operations and to prepare for emissions caused by abnormal events or incidents. The AMP is intended to assess the risk of emissions from those activities or events, and to detail the appropriate operational, monitoring and contingency measures in use to ensure that those risks are controlled and minimised as far as is practicable. The AMP should be implemented by the Site Manager in the event of an accident on site.

The AMP forms part of the set of site management documents required by the environmental permit for the operation of the Colwick AD facility granted by the Environment Agency.

All references to handling and treating 'category 3 material' in the AMP include low-risk category 2 animal by-products and category 1-derived glycerol unless otherwise stated.

1.3 Review

The AMP is reviewed annually and updated, if required. Additional reviews may take place in response to planned changes in operational practices or in response to unplanned incidents on site.

2 Accidents & incidents prevention

In order to prevent accidents or manage their consequences employees are required to ensure all accidents, incidents, dangerous occurrences and emergencies are reported promptly, investigated and recorded accurately. Remedial actions will be put in place, where appropriate.

The company complies with the requirements of the Reporting of Incidents, Diseases and Dangerous Occurrences Regulations 2013 (RIDDOR) in all relevant cases.

To help minimise the risk of accidents, key health and safety and environmental issues will be communicated to all new employees working on site during their employment inductions and to all contractors and visitors to site during their site inductions.

All employees receive appropriate training, including use of standard operating procedures, exceptional operating procedures, and risk assessments for specific operational tasks, to help minimise accidents. Training records are kept to ensure training needs are addressed, and employees are fully competent to carry out those tasks assigned to them.

Accidents, incidents and near misses will be investigated and the findings recorded (see section 8). This information will be used to develop both immediate mitigation measures and long-term remedial measures, as appropriate to prevent future accidents.

3 Accidents & incidents procedure

Immediate and medium to long term actions to take following an accident or incident are detailed in the exceptional operating procedure *EOP BIO001: Accidents & incidents* and reproduced here.

If an accident or incident occurs

1. In the event of an accident or incident employees must:
 - a. raise the alarm before doing anything else; inform anyone working nearby and the Site Manager
 - b. call the emergency services, if appropriate
 - c. shut down specific plant and equipment using local emergency stop buttons, if appropriate
 - d. shut down all plant and equipment on site using the firefighter's switch outside the Control panel room, if appropriate (see Figure 1)
2. If the accident or incident involves a fire or other immediate danger to employees or visitors, employees must:
 - a. raise the alarm before doing anything else; inform anyone working nearby and the Site Manager
 - b. collect a copy of the *EA BIO003: Accident management plan* and the *H&S BIO001: Sign-in register*
 - c. evacuate all employees and visitors to the emergency assembly point, at the main site entrance (see Figure 1)
 - d. the Site Manager must take a head count of employees using *OPS BIO044: Contacts – Emergency & non-emergency* (see Table 1) and visitors using *H&S BIO001: Sign-in register*; if anyone is missing use their mobile phone number to try to contact them
 - e. no one should attempt to tackle any fire unless it is safe and they are trained to do so
 - f. if anyone is missing inform the emergency services when they arrive; do not re-enter any building until the emergency services or a Fire Warden says it is safe to do so
 - g. provide the emergency services with the inventory of materials on site listed in *EA BIO003: Accident management plan*, Table 3
3. If anyone has been injured:
 - a. call the emergency services, if appropriate
 - b. qualified first aiders (see Table 1) should treat minor injuries using the first aid kits available on site (see Figure 1) while waiting for the emergency services to arrive
 - c. if the injured person is an employee, notify their emergency contact, if appropriate (see *OPS BIO049: Contacts – Employee emergency contacts*)
4. If the accident or incident involves containment failure or spillage of material, or gas detected, when it is safe to do so, carry out the standard and/or exceptional operating procedures:
 - a. *EOP BIO003: Containment failure - Spillages*
 - b. *EOP BIO004: Hazardous gases*
 - c. *EOP BIO002: Cleaning & disinfection after handling ABP category 1 or 2 material*, if appropriate
5. If the accident or incident involves foaming in the digester tanks, when it is safe to do so, carry out the exceptional operating procedures:
 - a. *EOP BIO005: Digester tanks - Foaming*

6. If the accident or incident is the result of a failure of main services on site, when it is safe to do so, carry out the exceptional operating procedures:
 - a. *EOP BIO006: Main services failure*
 - b. *EOP BIO009: Exporting waste - Exceptional operations*, if appropriate
7. **Accidents involving serious injury to employees must legally be reported** to the Health & Safety Executive under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) **as soon as possible**:
 - a. go to www.hse.gov.uk/riddor/report.htm
 - b. select the relevant option under 'Reporting online' and complete the electronic form
 - c. complete a *H&S BIO006: Accident, incident & near miss report*
8. **Accidents or incidents involving significant actual or potential environmental pollution must be reported** to the Environment Agency **immediately**:
 - a. call the EA incident hotline (0800 80 70 60); make a note of the **EA incident number**
 - b. complete an *EA SCH05A: Schedule 5 notification - Part A* (contained in the environmental permit)
 - c. send the *EA SCH05A* notification to RegulatedIndustryDNL@environment-agency.gov.uk
 - d. when the accident or incident has been investigated in more detail complete an *EA SCH05B: Schedule 5 notification - Part B* (contained in the environmental permit)
 - e. complete an *EA BIO011: Accident & incident record*
 - f. send the *EA BIO011* report and the *EA SCH05B* notification to RegulatedIndustryDNL@environment-agency.gov.uk **as soon as practicable**

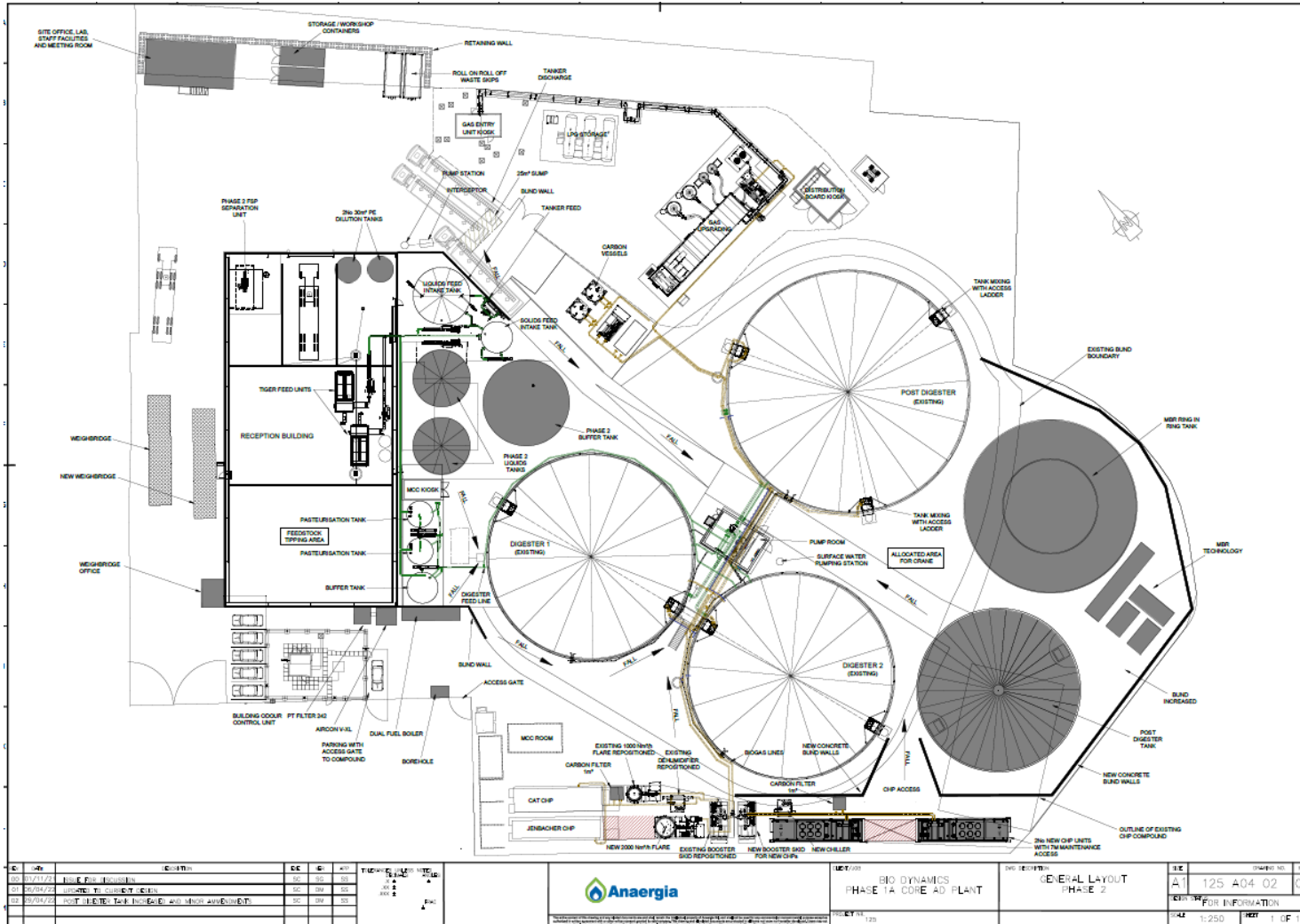
In the days following the accident or incident

9. The Site Manager and Compliance Manager must:
 - a. investigate the cause of the accident or incident, calling in additional technical experts to assist with the investigation, if required
 - b. submit the results of the investigation to the company Directors and relevant regulators
 - c. cooperate with any investigations carried out by the Environment Agency and/or Health & Safety Executive, if required
 - d. assess any damage to plant and equipment and organise repairs in accordance with the manufacturer's instructions, if required
 - e. review standard and exceptional operating procedures and implement any required changes to prevent a reoccurrence of the accident or incident
 - f. ensure employees are trained on any changes to standard and exceptional operating procedures
 - g. inform the Environment Agency of any changes to standard and exceptional operating procedures

3.1 Site plan

An updated site plan has been prepared to show the new site layout following completion of the site refurbishment activities. This plan is submitted with the permit variation application as document HC1677-06d and can be seen below in figure 1.

Figure 1 – New Site Layout HC1677-06d



3.2 Emergency phone numbers

A contact list for emergency services, employees, regulators, plant and equipment, and service providers for the AD facility (re-produced in *OPS BIO044: Contacts – Emergency & non-emergency*).

EMERGENCY SERVICES			
Emergency services	Police, Fire Brigade & Ambulance Service	999	24 hours
Local hospital (A&E)	Queen's Medical Centre	0115 924 9924	24 hours
NHS	(Non-emergency)	111	24 hours
Local police	(Non-emergency)	101	24 hours

REGULATORS			
Animal & Plant Health Agency	Animal by-products, England	03000 200 301	
Environment Agency	Incident hotline	0800 80 70 60	24 hours
	East Midlands, Nottingham	03708 506 506	08.00 – 18.00
Health & Safety Executive	Incident Contact Centre (Major incidents only)	0345 300 9923	08.30 – 17.00
	Duty Officer (Out of hours)	0151 922 9235	17.00 – 08.30

BIO DYNAMIC (UK) EMPLOYEES			
Site telephone	Weighbridge Office	0115 987 9431	24 hours
Director	Maxwell Bagnall	07814 919449	
Director	Billy Bagnall	07721 420052	
Site Manager	Tony Calpin	07827912606	7 7
Accounts & Payroll Manager	Anaergia	07872 455817	
Engineering Manager	Richard Last	07436 098815	7
Supervisor	Harry Williamson	07766 396515	7 7
Supervisor	Dion Sentance	07360 297321	7
Site Operative	Michal Mielniczuk	07745 729994	7
Site Operative	Liam Trussell	07570 237482	7 7
Site Operative	Brian Jamson	07761 235171	
Site Operative	Cheikh Sankhor	07547 534699	7
Site Operative	Dalton Hardy	07491 684242	
Weighbridge Operative	James Waldegrave	07306 221998	7

BIO DYNAMIC (UK) CONSULTANTS			
Biology (Digester tanks)	Anaergia	01480 477608	
Compliance	H & C Consultancy	0115 9232253	
DSEAR	Anaergia	01480 477608	
Health & Safety	Anaergia	01480 477608	

Table 1 Emergency & non-emergency contacts (reproduced from *OPS BIO044*) 7 Fire warden; 7 First aider

UTILITIES & SITE SERVICES			
Electricity supplier	DRAX Power		01473 851945
Electricity network	Western Power Distribution		105 24 hours
Electrical maintenance	Anaergia	Service	01480 477606
Gas supplier	<i>No gas supply connection</i>		N/A
Local authority	Gedling Borough Council		0115 9013972
Mechanical maintenance	Anaergia	Service	01480 477606
Sampling & analysis	NRM Ltd	Customer Services	01344 886338
	Sciantec Analytical Services Ltd	Customer Services	01757 242000
Cesspit	Alegco		0247 6325200
Water supplier	Severn Trent Water Ltd		0800 783 4444 24 hours
Vermin control	Dealey Environmental LTD		01359 269713
PLANT & EQUIPMENT			
Boiler	TBC		
CHP 1 (Jenbacher)	Clarke Energy Ltd	Neil McElwee	07760 175050
CHP 2 (Caterpillar)	Finning (UK) Ltd	Helpdesk	01753 497352
CHP 3&4 (new Cat)	TBC		
De-packager/shredder (Tiger)	Blue Machinery (Spares) Ltd	John Dennan	0345 1300 669
Digester tanks 1 & 2	A-Consult Ltd	Jason Parker	01777 249444
Emergency gas flare	Uniflare Ltd	Mike Lee	07795 515320
Gas detector	Pellinno	Douglas Bedford	07971 195430
Gas domes 1 & 2	Anaergia	Service	01480 477606
Odour control units 1 & 2	Anaergia	Service	01480 477606
	TBC		
Pumps (Motors)	Netzsch	Adam Jones	01935 483900
SCADA system	Anaergia	Service	01480 477606
Ventilation fans	Anaergia	Service	01480 477606
EXPORTS			
Waste export	Prestons Contractors	Adam Preston	07968 309140
Electricity export	EDF		0800 111 999
Biomethane Export	Air Liquide	Matt Mckenna	07766 442344
SITE NEIGHBOURS			
Commercial	Enva England Ltd	Paul Needham	07767 225122
Railway	Network Rail Ltd	Emergency Helpline	03457 114141 24 hours
River Trent	Environment Agency	Incident Hotline	0800 80 70 60 24 hours
SPILLAGES			
Minor roadways	Gelding Borough Council		0800 096 0306 Out of hours
Motorways/A roads	Highways England		0300 123 5000 07.00 – 19.00
Specialist spill contractors	UK Spill Association Ltd		0333 444 1890

Table 1 (Continued) Emergency & non-emergency contacts (reproduced from OPS BIO044)

3.3 Roles & responsibilities

Fire & Evacuation Wardens

In the event of an accident or incident the designated Fire & Evacuation Wardens are:

Chief Fire & Evacuation Warden: 7 Harry Williamson – Site Manager

Day Fire & Evacuation Warden: 7 Richard Last – Engineering Manager

Night Fire & Evacuation Warden: 7 Liam Trussell – Site Operative

Fire & Evacuation Wardens are responsible for evacuating the site and calling the emergency services if required, in accordance with *EOP BIO001: Accidents & incidents* if the Site Manager is unable to do so for any reason.

First aiders

The first aiders on site are:

First aiders:

- 7 Richard Last – Engineering Manager
- 7 Harry Williamson – Site Manager
- 7 Dion Sentence – Supervisor
- 7 Micheal Mielniczuk – Site operator
- 7 Liam Trussell – Site operator
- 7 Cheikh Sankhor – Site operator
- 7 James Waldegrave – Weighbridge operator

External contact

Points of contact with external organisations during an on-going accident or incident listed below. Emergency contact details for the next of kin for employees are held confidentially (see *OPS BIO049: Contacts – Employee emergency contacts*):

Emergency services: Harry Williamson – Site Manager

Bio Dynamic (UK) employees: Harry Williamson – Site Manager

Next of kin/ Emergency contact: Harry Williamson – Site Manager

Regulators (APHA & EA): Maxwell & Billy Bagnall – permit holders

Health & Safety Executive: Maxwell Bagnall & Billy Bagnall – Directors

Bio Dynamic (UK) waste suppliers: Maxwell Bagnall & Billy Bagnall – Directors

Media: Maxwell Bagnall & Billy Bagnall – Directors

3.4 Emergency access to EMS documents

In the event of an accident or incident the AD facility and EMS documents may not be accessible (for example, if the documents have been damaged or destroyed as a result of the accident or incident, or if access to the site is restricted by emergency services or regulators). A complete electronic copy of the EMS documents is maintained off-site by the Compliance Manager, usually updated daily, or weekly at the least.

3.5 Exceptional operating procedures

A set of exceptional operating procedures (EOPs) are used to establish how to respond in the event of an accident or incident; these are reviewed at least annually or in the event of an accident or incident, or a change in operational circumstances. The current set of exceptional operating procedures in use is listed in Table 2; copies of these operational documents are held in the Weighbridge Office.

EOP	EXCEPTIONAL OPERATING PROCEDURE
EOP BIO001	Accidents & incidents
EOP BIO002	Cleaning & disinfection after handling ABP category 1 or 2 material
EOP BIO003	Containment failure – Spillages
EOP BIO004	Hazardous gases
EOP BIO005	Digester tanks – Foaming
EOP BIO006	Main services failure
EOP BIO007	Severe weather
EOP BIO008	Importing waste - Exceptional operations
EOP BIO009	Exporting waste - Exceptional operations

Table 2 Exceptional operating procedures held in the Weighbridge Office, kept as paper and/or electronic copies

4 Inventory of equipment on site for accidents & incidents

LOCATION	INJURY		FIRE		SPILLAGE	
	FIRST AID KIT	EYE WASH KIT	FIRE ALARM	FIRE EXTINGUISHER	SPILL KIT (OIL)	ABSORBENT
Site reception	✓	✓		F P		
Weighbridge office	✓			CO2 F		
Laboratory	✓	✓		C	✓	
Employee welfare facilities	✓	✓		F		
Waste reception building			✓	F P ● ●		
Buffer tanks' bund (wall)						✓ (Sand)
Odour control unit		✓				
Rainwater harvesting tank						✓ (Sand)
Control panel room				F P		
CHP engines 1 - 4			✓		✓	✓ (Sand)
Category 3 digestate discharge						✓ (Sand)

5 Inventory of materials on site

LOCATION	TANK / VESSEL / STORAGE AREA	MATERIAL	STATE	LOCATION	QUANTITY m ³	PROPERTIES / USAGE
PROCESS STEP A: WASTE IMPORT						
Waste reception building	Solid food waste reception bays	Food waste & packaging	Solid	Reception Building	450m ³	<ul style="list-style-type: none"> • Cat 3 ABP food wastes • Mon to Fri deliveries
	Rainwater/borehole water/washwater tanks	Water	Liquid	Reception Building	4 tanks each with 30m ³ capacity	<ul style="list-style-type: none"> • Low risk material in use to contain water from onsite borehole/harvested surface water/wash water for use in process
	A plan of the updated internal layout of the waste reception building has been submitted with permit variation application HC1677 and document HC1677-06e.					
PROCESS STEP B: WASTE DE-PACKAGING & PRE-TREATMENT						
Waste reception building	Waste reception building floor sumps	Wash waters and leachate	Liquid	Reception Building	Two sumps capacity c 1m ³ each	<ul style="list-style-type: none"> • Low-risk category 3 ABP material
	De-packager & shredder sump (Tiger Cesaro x2)	Food waste; macerated	Liquid	Reception Building	15.0	<ul style="list-style-type: none"> • Low-risk category 3 ABP material • Processing of packaged food wastes
	Rejected plastics skip	Plastic packaging; shredded	Solid	Reception Building	26.8	<ul style="list-style-type: none"> • Non-ABP packaging material (washed)

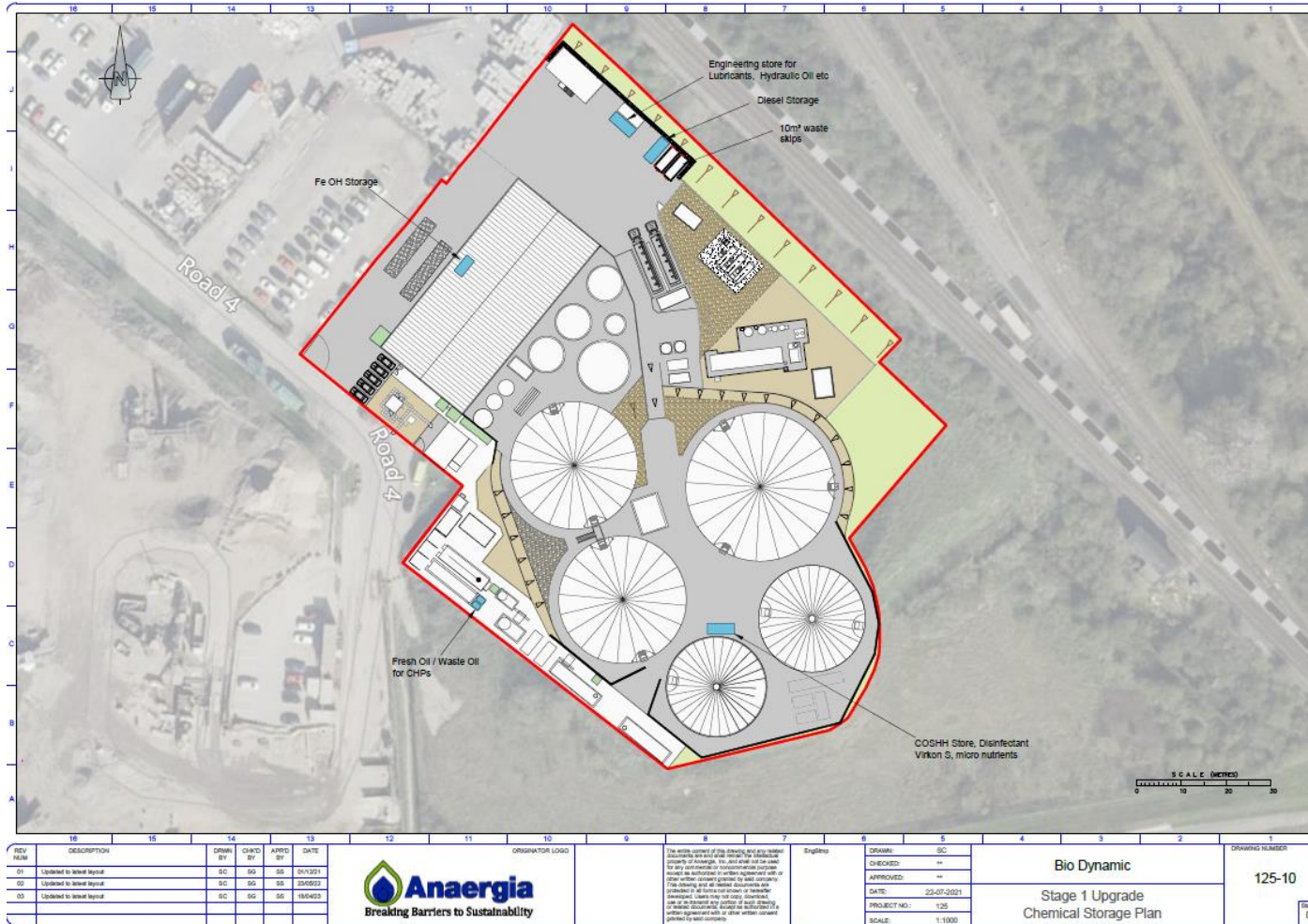
LOCATION	TANK / VESSEL / STORAGE AREA	MATERIAL	STATE	LOCATION	QUANTITY m ³	PROPERTIES / USAGE
PROCESS STEP C: PASTEURISATION & POST-PASTEURISATION						
External feedstock tanks' bund	Liquid feeds intake tank	Food waste; macerated (55-70°C)	Liquid	External tank farm bund	400	• Low-risk category 3 ABP material
	Solids feed intake tank	Food waste; macerated (55-70°C)	Liquid	External tank farm bund	150	• Low-risk category 3 ABP material
	Phase 2 liquid tank 1	Food waste	Liquid	External tank farm bund	400	• Low-risk category 3 ABP material
	Phase 2 liquid tank 2	Food waste	Liquid	External tank farm bund	400	• Low-risk category 3 ABP material
	Phase 2 buffer tank	Food waste	Liquid	External tank farm bund	1000	• Low-risk category 3 ABP material
	Pasteurisation tank 1	Food waste; macerated (> 70 °C)	Liquid	External tank farm bund	68	• Low-risk category 3 ABP material
	Pasteurisation tank 2	Food waste; macerated (> 70 °C)	Liquid	External tank farm bund	50	• Low-risk category 3 ABP material
	Buffer tank	Food waste	Liquid	External tank farm bund	188	• Low-risk category 3 ABP material
PROCESS STEPS D & E: ANAEROBIC DIGESTION & STORAGE – DIGESTATE						
Main bund	Anaerobic digester tank 1 (AD1)	Digestate	Liquid	Main bund	3360.0	• Low-risk category 3 ABP material
	Anaerobic digester tank 2 (AD2)	Digestate	Liquid	Main bund	3360.0	• Low-risk category 3 ABP material

	Anaerobic digester tank 3 (AD3)	Digestate	Liquid	Main bund	4600.0	<ul style="list-style-type: none"> • Low-risk category 3 ABP material
PROCESS STEP G: BIOGAS, ELECTRICITY & HEAT						
Main bund	Anaerobic digester tank 1 – Gas dome	Biogas	Gas	Main bund	2000.0	<ul style="list-style-type: none"> • Explosive & flammable • Sits above digester tank 1
	Anaerobic digester tank 2 – Gas dome	Biogas	Gas	Main bund	2000.0	<ul style="list-style-type: none"> • Explosive & flammable • Sits above digester tank 2
	Anaerobic digester tank 3 – Gas dome	Biogas	Gas	Main bund	2000.0+	<ul style="list-style-type: none"> • Explosive & flammable • Sits above digester tank 3
	Biogas condensate pots	Biogas condensate	Liquid	Main bund	3.0	<ul style="list-style-type: none"> • Water containing dissolved traces of H₂S & NH₃ • Recirculated to digester tanks

LOCATION	TANK / VESSEL / STORAGE AREA	MATERIAL	STATE	LOCATION	QUANTITY m ³	PROPERTIES / USAGE
GENERAL OPERATIONS						
Various site locations	Odour control unit 1 (waste reception building)	Carbon filter media	solid	Adjacent to reception building		<ul style="list-style-type: none"> • Carbon media in user for abatement of odour emissions
	Odour control unit 2 (tank farm)	Carbon filter media	solid	Adjacent to tank farm		<ul style="list-style-type: none"> • Carbon media in user for abatement of odour emissions
	Odour control unit 3 (digestate offtake)	Carbon filter media	solid	Adjacent to digestate offtake		<ul style="list-style-type: none"> • Carbon media in user for abatement of odour emissions
Staff welfare facilities	Cesspit	Sewage/foul water	Liquid	Integral to welfare facilities		<ul style="list-style-type: none"> • Risk of infectious disease (bacteria & viruses) • Emptied by specialist contractor
<p>The operator has developed a site plan showing the location of other raw material chemicals at the site. This is submitted with the permit variation application HC1677 as document HC1677-06c. The plan is shown below in figure</p>						

Table 3 Inventory of tanks, vessels & areas storing materials on site during routine operations. Locations: see Figure 2 (a) & (b) [* assuming 10% average packaging for solid food waste]

Figure 3 – Chemical Storage Location Plan – HC1677-06d



REV	DESCRIPTION	DRWN BY	CHKD BY	APPR BY	DATE	ORIGINATOR LOGO	ENGINEER	DRWING NUMBER	
01	Updated to latest layout	SC	SC	SC	20/10/21		The entire content of this drawing, and any related documents, are the intellectual property of Anaergia. No part shall be used for any commercial or non-commercial purpose without the written approval of Anaergia. All rights reserved.	125-10	
02	Updated to latest layout	SC	SC	SC	20/05/22			ENGINEER SC	Bio Dynamic Stage 1 Upgrade Chemical Storage Plan
03	Updated to latest layout	SC	SC	SC	18/04/23			DRAWN: SC CHECKED: -- APPROVED: -- DATE: 22-07-2021 PROJECT NO.: 125 SCALE: 1:1000	125-10 Sheet 03

6 Accidents & incidents risk assessment

ACCIDENT / INCIDENT	IMPACT Before controls			EXISTING CONTROL MEASURES To eliminate/reduce environmental risk	RESIDUAL RISK After controls			IMMEDIATE ACTION If controls fail/not properly implemented
	L	S	R		L	S	R	
<p>Non-permitted waste</p> <p>Delivered waste is non-permitted and/or contains contraries that cannot be accepted by the Colwick AD facility</p> <ul style="list-style-type: none"> • Potential contamination of waste reception area • Potential contamination of de-packaging & pre-treatment line plant & equipment 	Likely 3	Significant 2	High 6	<ul style="list-style-type: none"> • <i>SOP BIO001: Pre-acceptance assessment</i> – to evaluate & approve potential waste streams before acceptance • <i>SOP BIO002: Importing waste</i> – to ensure waste deliveries and waste transfer information are correctly processed on arrive at the AD facility • <i>SOP BIO003: Handling solid waste deliveries</i> – to ensure solid waste is properly examined before acceptance • <i>SOP BIO004: Rejecting & quarantining waste deliveries</i> - to isolate & contain non-permitted wastes • <i>EPR/DP3935ER/V005 Schedule 2, table S2.2</i> - Delivered waste will only be accepted in accordance with list of permitted wastes 	Highly unlikely 1	Significant 2	Low 2	<ul style="list-style-type: none"> • Stop waste imports • Carry out <i>SOP BIO004: Rejecting & quarantining waste deliveries</i> • If Category 1/2 material is found in the delivery, issue the vehicle driver with an <i>OPS BIO026</i> written notification of the requirement to steam clean and/or disinfect the delivery vehicle before transporting category 3 or non-ABP material • Carry out <i>EOP BIO002: Cleaning & disinfection after handling ABP category 1 or 2 material</i> • Contact the EA (and APHA if required) immediately
<p>Overfilling vessels</p> <p>Transferring ABP category 3 liquid waste imports, pre-treated food waste & ABP category 3 digestate</p> <ul style="list-style-type: none"> • Spillage in waste reception building • Spillage in bund(s) • Potential contamination of ground, or surface water • Potential odour nuisance 	Likely 3	Significant 2	High 6	<ul style="list-style-type: none"> • All material movements after de-packaging & pre-treatment are via pumps and valves controlled and monitored by the SCADA system • Timed cut off when digester feed pumps run in manual mode • Waste tanks equipped with high level sensors linked via the SCADA system to visual & audio alarms; SCADA system automatically stops material movements feeding forwards when high level sensors are triggered in receiving tanks • Local level displays on liquid waste reception tank to prevent overfilling during waste import • Large freeboard maintained in tanks as buffer • All tanks & vessels used for the storage of pre- and post-pasteurised waste material, fuel for plant & equipment are banded; the capacity of the bunds is maintained at all times 	Highly unlikely 1	Significant 2	Low 2	<ul style="list-style-type: none"> • Carry out <i>SOP BIO045: SCADA system</i> • Stop material movements • Carry out <i>EOP BIO003: Containment failure - Spillages</i> • Contact the EA and APHA if a pollution incident has occurred (<i>OPS BIO044</i>)

ACCIDENT / INCIDENT	IMPACT Before controls			EXISTING CONTROL MEASURES To eliminate/reduce environmental risk	RESIDUAL RISK After controls			IMMEDIATE ACTION If controls fail/not properly implemented
	L	S	R		L	S	R	
<p>Containment failure ABP & non-ABP material</p> <ul style="list-style-type: none"> • Spillage in waste reception building • Spillage in bunds • Potential contamination of ground, or surface water • Potential odour nuisance 	Unlikely 2	Serious 3	High 6	<ul style="list-style-type: none"> • All pipework, tanks & vessels are constructed from materials certified as fit for purpose • All tanks & vessels used for the storage of pre- and post-pasteurised waste material, fuel for plant & equipment are bunded; the capacity of the bunds is maintained at all times • All pipework, tanks, vessels & bunds are inspected & maintained weekly (<i>OPS BIO002</i>) • Raw materials/chemicals stored in fit for purpose containers with secondary containment. • Oil spill kit available in laboratory 	Highly unlikely 1	Serious 3	Moderate 3	<ul style="list-style-type: none"> • Stop waste imports • Stop material movements • Carry out <i>EOP BIO003: Containment failure - Spillages</i> • Contact the EA and APHA if a pollution incident has occurred (<i>OPS BIO044</i>)

ACCIDENT / INCIDENT	IMPACT Before controls			EXISTING CONTROL MEASURES To eliminate/reduce environmental risk	RESIDUAL RISK After controls			IMMEDIATE ACTION If controls fail/not properly implemented
	L	S	R		L	S	R	
<p>Hazardous gases</p> <ul style="list-style-type: none"> • Damage to plant & equipment • Potential odour nuisance 	Unlikely 2	Serious 3	High 6	<ul style="list-style-type: none"> • All pipework, tanks & vessels are constructed from materials certified as fit for purpose • All pipework, tanks & vessels are inspected & maintained weekly (OPS BIO002) • DSEAR plan identifies potentially explosive atmospheres within waste reception building vessels (H&S PBG001: DSEAR assessment; H&S PBG002: DSEAR zones) • Processed food waste stored in enclosed tanks & moved in sealed pipework • Fixed gas detector continuously monitors for NH₃, CO, H₂S & CH₄ • Personal gas monitors worn in waste reception building & main bund area • Waste reception building air is extracted continuously & discharged to air via abatement system • Digester tanks designed with a twin-skinned upper membrane • Daily sniff tests carried out in the vicinity of the digester tanks to monitor potential fugitive odour release (EA BIO005) • Digestate is pumped directly from storage tanks via a sealed coupling into tankers on hard standing (SOP BIO021, SOP BIO033) • Fugitive emissions management plan in place which includes leak detection and repair programme (LDAR) • Odour abatement units treat displaced air from tank farm and digestate offtake • Emergency under/over pressure relief valves are subject to regular maintenance and checks 	Highly unlikely 1	Serious 3	Moderate 3	<ul style="list-style-type: none"> • Carry out EOP BIO004: Hazardous gases • Carry out EOP BIO001: Accidents & incidents, if required • Contact the emergency services (OPS BIO044) • Contact the EA and APHA if a pollution incident has occurred (OPS BIO044)

ACCIDENT / INCIDENT	IMPACT Before controls			EXISTING CONTROL MEASURES To eliminate/reduce environmental risk	RESIDUAL RISK After controls			IMMEDIATE ACTION If controls fail/not properly implemented
	L	S	R		L	S	R	
<p>Spillages</p> <p>Transferring ABP category 3 liquid waste imports & pre-treated food waste</p> <ul style="list-style-type: none"> • Spillage in waste reception building • Potential odour nuisance 	Likely 3	Significant 2	High 6	<ul style="list-style-type: none"> • Waste is pumped directly from tankers via a sealed coupling to external bunded reception tanks • Displaced air from tanks is treated via an odour abatement system • Tankers offload on a sealed concrete surface. Spills drain to a sealed catch pit which pumps liquid back into the AD process. The catch pit has the capacity to contain a spillage from a whole tanker. • Tanks fitted with level alarms to prevent over filling. • Site equipped with approved disinfectant for cleaning and control of ABP spills. • Transfer between main process tanks takes place in a concrete bund. Bund has catch pits which pump contents automatically back into the AD process. 	Highly unlikely 1	Significant 2	Low 2	<ul style="list-style-type: none"> • Carry out EOP B10003: Containment failure - Spillages • Contact the EA and APHA if a pollution incident has occurred (OPS B10044)

ACCIDENT / INCIDENT	IMPACT Before controls			EXISTING CONTROL MEASURES To eliminate/reduce environmental risk	RESIDUAL RISK After controls			IMMEDIATE ACTION If controls fail/not properly implemented
	L	S	R		L	S	R	
<p>Spillages</p> <p>Transferring ABP category 3 digestate and food waste discharge area(s)</p> <ul style="list-style-type: none"> • Potential contamination of ground, or surface water • Potential odour nuisance 	Likely 3	Significant 2	High 6	<ul style="list-style-type: none"> • Waste is pumped directly from digestate storage or liquid food waste tanks into export tankers via a sealed coupling on hardstanding • Pipework constructed from materials fit for purpose for temperature/pressure of material transferred • <i>SOP BIO021: Exporting digestate</i> - to ensure ABP category 3 digestate is safely exported • <i>SOP BIO005: Cleaning & inspecting waste vehicles</i> – to ensure vehicles are thoroughly cleaned and inspected before exiting the category 3 digestate discharge area • Employees to supervise all category 3 digestate discharge operations • Displaced air from tankers is passed through an odour abatement system prior to release. 	Unlikely 2	Significant 2	Moderate 4	<ul style="list-style-type: none"> • Carry out <i>EOP BIO003: Containment failure - Spillages</i> • Contact the EA and APHA if a pollution incident has occurred (<i>OPS BIO044</i>)
<p>Foaming in digester tanks</p> <ul style="list-style-type: none"> • Potential contamination of ground, or surface water • Increased odour potential • Damage to infrastructure, plant & equipment 	Likely 3	Serious 3	High 9	<ul style="list-style-type: none"> • Daily sampling & process monitoring to control digester performance & minimise factors that amplify foaming & respond to changing digester tank conditions • Consistent organic loading rate maintained • Consistent material movement to maintain material volume allowing freeboard capacity to reduce potential for foam to block gas collection pipes/pressure relief valves • Circulating pumps & heaters fully mix the material distributing fresh waste material & anaerobic breakdown products evenly to prevent stagnation, scum layer formation & entrainment of biogas bubbles • Daily visual inspection for foam formation on the surface of the material using viewing ports in digester tanks and foam suppressant system installed • Digester tanks bunded to contain spillages away from unmade ground or watercourses • Anti-foaming agent on site and can be deployed quickly via anti foaming dosing system 	Unlikely 2	Serious 3	High 6	<ul style="list-style-type: none"> • Stop feeding digester tanks • Carry out <i>EOP BIO005: Digester tanks - Foaming</i> • Carry out <i>EOP BIO003: Containment failure - Spillages</i> • Contact the EA and APHA if a pollution incident has occurred (<i>OPS BIO044</i>)

ACCIDENT / INCIDENT	IMPACT Before controls			EXISTING CONTROL MEASURES To eliminate/reduce environmental risk	RESIDUAL RISK After controls			IMMEDIATE ACTION If controls fail/not properly implemented
	L	S	R		L	S	R	
<p>Main services failure</p> <p>Power</p> <ul style="list-style-type: none"> • Potential removal of delivered/partially-processed waste by birds, vermin or animals • Potential odour nuisance • Excess biogas build up in digesters gas domes <p>Water</p>	<p>Highly unlikely</p> <p>1</p>	<p>Significant</p> <p>2</p>	<p>Low</p> <p>2</p>	<ul style="list-style-type: none"> • Vehicle door only open for delivery vehicle entry/exit; personnel doors are self-closing • SCADA system server automatically switches to an uninterruptable power supply (lasting approximately 1 hour) allowing for data back-up & controlled system shut down • All items of plant & equipment default to safe mode; pumps shut down • CHP engineers on site within 4 hours; CHP engineers have remote access to CHP's • Back-up power generator to be hired onto site and made available if needed • Emergency gas flares for thermal destruction of the biogas if CHP engines are unavailable or insufficient biogas storage volume • Pressure relief valves operate when biogas pressure reaches set point in emergency situations 	<p>Highly unlikely</p> <p>1</p>	<p>Insignificant</p> <p>1</p>	<p>Very low</p> <p>1</p>	<ul style="list-style-type: none"> • Stop waste imports • Carry out EOP BIO006: Main services failure • Carry out EOP BIO009: Exporting waste – Exceptional operations after 12 hours shut down <ul style="list-style-type: none"> • Stop waste processing • Site Manager to source additional liquid waste imports to dilute incoming solid waste

<p>Vandalism</p> <ul style="list-style-type: none"> • Damage to infrastructure, plant & equipment • Potential contamination of ground, ground water or surface water • Potential odour nuisance 	<p>Unlikely</p> <p>2</p>	<p>Significant</p> <p>2</p>	<p>Moderate</p> <p>4</p>	<ul style="list-style-type: none"> • The AD facility operates 24 hours per day, 7 days per week; employees are always present • The entire site is fenced & gated • The waste reception building is monitored by CCTV from the Weighbridge Office • All visitors required to sign in & sign out of the site • Manual discharge valves padlocked; keys held securely; pumps can only be operated with SCADA system log in • Critical spares kept on site for key plant & equipment (<i>OPS BIO032</i>) • Daily/weekly checks of plant & equipment (<i>OPS BIO002</i>) • Maintenance contract in place with on-site servicing/repairs within 12 hours 	<p>Highly unlikely</p> <p>1</p>	<p>Significant</p> <p>2</p>	<p>Low</p> <p>2</p>	<ul style="list-style-type: none"> • Stop waste imports • Stop waste processing • Carry out <i>EOP BIO003: Containment failure - Spillages</i> • Carry out <i>EOP BIO009: Exporting waste – Exceptional operations</i> – to divert waste imports and/or export unprocessed waste to another facility • Contact the EA and APHA if a pollution incident has occurred (<i>OPS BIO044</i>)
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ACCIDENT / INCIDENT	IMPACT Before controls			EXISTING CONTROL MEASURES To eliminate/reduce environmental risk	RESIDUAL RISK After controls			IMMEDIATE ACTION If controls fail/not properly implemented
	L	S	R		L	S	R	
<p>Enforced shutdown</p> <ul style="list-style-type: none"> • Build-up of waste materials • Incomplete treatment of waste materials • Potential odour nuisance • Potentially explosive atmosphere build up in pre-treatment tanks • Excess biogas build up in digesters gas domes 	Likely 3	Serious 3	Very high 9	<ul style="list-style-type: none"> • EA PBG001: Decommissioning plan for controlled shut down • Fixed gas detector continuously monitors for NH₃, CO, H₂S & CH₄ in waste reception building • Forced ventilation dilutes potentially flammable atmospheres in waste reception building • DSEAR plan identifies potentially explosive atmospheres within waste reception building pre-treatment tanks (H&S PBG001, H&S PBG002) • All pipework, tanks & vessels used for the storage of potentially flammable materials are constructed from materials certified as fit for purpose • All tanks & vessels used for the storage of potentially flammable materials are banded; the capacity of the bands is maintained at all times • Emergency gas flares for thermal destruction of biogas if CHP engines are unavailable or insufficient biogas storage volume 	Highly unlikely 1	Significant 2	Low 2	<ul style="list-style-type: none"> • Carry out EOP BIO009: Exporting waste – Exceptional operations – to divert waste imports and/or export unprocessed waste to another facility • Carry out SOP BIO006: Cleaning & inspecting plant & equipment
<p>Severe weather</p> <ul style="list-style-type: none"> • Damage to infrastructure, plant & equipment • Potential contamination of ground, ground water or surface water • Potential odour nuisance 	Unlikely 2	Serious 3	High 6	<ul style="list-style-type: none"> • Daily weather monitoring; Site Manager receives Met Office severe weather warnings and on site weather station • Infrastructure, plant & equipment inspected/regularly maintained according to manufacturer's instructions (OPS BIO001, OPS BIO002) • Regular visual checks of infrastructure, plant & equipment (SOP BIO013, BIO017, BIO023, BIO024, BIO025, BIO035) • Boiler water supply pipe, OCU 1 & 2 water supply line & condensate pipework lagged for cold weather • Regular flow of heated waste material prevents frost damage to pipework in cold weather • Digester air blower pipes constantly warmed by proximity to digester tanks at 40 °C prevents frost damage from frozen condensate in cold weather; condensate volume small • CHPs self-diagnostics automatically shut down engines if signs of damage are detected • Maintenance contract in place with on-site servicing/repairs within 12 hours 	Highly unlikely 1	Serious 3	Moderate 3	<ul style="list-style-type: none"> • Stop waste imports • Stop waste processing • Carry out EOP BIO007: Severe weather • Carry out EOP BIO003: Containment failure - Spillages • Carry out EOP BIO009: Exporting waste – Exceptional operations – to divert waste imports and/or export unprocessed waste to another facility • Contact the EA and APHA if a pollution incident has occurred (OPS BIO044)

ACCIDENT / INCIDENT	IMPACT Before controls			EXISTING CONTROL MEASURES To eliminate/reduce environmental risk	RESIDUAL RISK After controls			IMMEDIATE ACTION If controls fail/not properly implemented
	L	S	R		L	S	R	
<p>Fire; explosive/flammable atmospheres; fire water</p> <ul style="list-style-type: none"> • Damage to infrastructure, plant & equipment • Potential contamination of ground, groundwater or surface water • Potential odour nuisance 	Unlikely 2	Serious 3	High 6	<ul style="list-style-type: none"> • No smoking on site • Ignition sources removed by strict control on hot working • Preventative maintenance plan includes regular inspection of electrical equipment to ensure that any faults are identified and repaired • Fire alarm fitted in the waste reception building; fire extinguishers are located throughout the AD facility • All fire extinguishers are clearly marked and tested, to confirm their functionality • Employees have fire safety training • DSEAR plan identifies potentially explosive atmospheres within waste reception building vessels (<i>H&S PBG001: DSEAR assessment; H&S PBG002: DSEAR zones</i>) • Employees have DSEAR training • Appropriate ATEX-certified tools & equipment used in DSEAR zones • Any potentially flammable dust from waste reception building continually removed by the extraction system • All tanks & vessels used for the storage of potentially flammable materials are constructed from materials certified as fit for purpose • All tanks & vessels used for the storage of potentially flammable materials are bunded; the capacity of the bunds is maintained at all times • Emergency gas flares for thermal destruction of the biogas if CHP engines are unavailable or insufficient biogas storage volume • Waste reception building drainage is discrete and does not enter the main site drainage system • Run-off water from bunded structures remains in the bund. There are no release points to surface water. 	Highly unlikely 1	Serious 3	Moderate 3	<ul style="list-style-type: none"> • Carry out <i>EOP BIO001: Accidents & incidents</i> • Contact the emergency services (<i>OPS BIO044</i>) • Carry out <i>EOP BIO003: Containment failure - Spillages</i> – to contain of fire water temporarily outside existing bunds • Carry out <i>EOP BIO009: Exporting waste – Exceptional operations</i> – to divert waste imports and/or export unprocessed waste to another facility • Contact the EA and APHA if a pollution incident has occurred (<i>OPS BIO044</i>)

ACCIDENT / INCIDENT	IMPACT Before controls			EXISTING CONTROL MEASURES To eliminate/reduce environmental risk	RESIDUAL RISK After controls			IMMEDIATE ACTION If controls fail/not properly implemented
	L	S	R		L	S	R	
<p>Plant & equipment failure</p> <ul style="list-style-type: none"> • Damage to plant & equipment • Spillage in waste reception building • Spillage in bund(s) • Contamination of ground, or surface water • Potential odour nuisance • Build-up of waste materials • Incomplete treatment of waste materials 	Unlikely 2	Significant 2	Moderate 4	<ul style="list-style-type: none"> • Plant & equipment operated/regularly maintained according to manufacturer's instructions (<i>OPS BIO002, SOP BIO023, SOP BIO037, SOP BIO038</i>) • Critical spares kept on site for key items of plant & equipment (<i>OPS BIO032</i>) • Regular visual checks of plant & equipment (<i>OPS BIO004 & SOP BIO023</i>) • Maintenance contract in place with on-site servicing/repairs within 12 hours • Vehicle reversing under supervision of trained banksman only to prevent collision damage • Waste handling & processing occurs in the enclosed waste reception building • Waste reception building maintained under negative pressure to avoid odour escaping • Waste reception building air is extracted continuously & discharged to air via two-stage odour control system • Weekly H₂S monitoring of airflow from odour control units to ensure effectiveness 	Highly unlikely 1	Significant 2	Low 2	<ul style="list-style-type: none"> • Stop waste imports • Stop waste processing • Carry out <i>EOP BIO009: Exporting waste – Exceptional operations</i> – to divert waste imports and/or export unprocessed waste to another facility • Contact the EA and APHA if a pollution incident has occurred (<i>OPS BIO044</i>)
<p>Operator error</p> <ul style="list-style-type: none"> • Damage to plant & equipment • Spillage in waste reception building • Spillage in bund(s) • Contamination of ground, or surface water • Potential odour nuisance 	Likely 3	Significant 2	High 6	<ul style="list-style-type: none"> • The AD facility is operated under the direction of a TCM qualified under the WAMITAB scheme to run an AD facility • All employees required to comply with the EMS and associated SOPs/EOPs • Additional technical guidance provided by external technical consultants • All employees trained and qualified to operate the AD facility and are competent to deal with the environmental risks associated with site activities • Tasks only assigned to technically able and competent employees • Processes after de-packaging and pre-treatment are monitored and controlled via the SCADA system; access to make operational changes can only be made with secure login details 	Highly unlikely 1	Significant 2	Low 2	<ul style="list-style-type: none"> • Stop waste imports • Stop waste processing • Contact the EA (<i>OPS BIO044</i>) • Additional staff training/capabilities procedures

ACCIDENT / INCIDENT	IMPACT Before controls			EXISTING CONTROL MEASURES To eliminate/reduce environmental risk	RESIDUAL RISK After controls			IMMEDIATE ACTION If controls fail/not properly implemented
	L	S	R		L	S	R	
<p>Flooding</p> <ul style="list-style-type: none"> Contamination of ground, ground water or surface water Damage to plant & equipment 	Unlikely 2	Serious 3	High 6	<ul style="list-style-type: none"> Site lies within a flood zone 2 (medium probability of flooding) A flood risk assessment was carried out in July 2013 (see <i>PLA DKA002: Design & access statement</i>) The site has not flooded for at least 35 years, even during times when the River Trent has overflowed The floor level of the waste reception building is 600mm above the natural ground level & adjacent roadway External plant & equipment are all double sealed structures or raised on concrete plinths 600mm above the natural ground level Substation is housed in flood-proof structure All pipework & valves are sealed to prevent the ingress of air; digesters are double-skinned Site Manager receives Met Office severe weather warnings & EA flood warnings 	Highly unlikely 1	Serious 3	Moderate 3	<ul style="list-style-type: none"> Stop waste imports Stop waste processing Carry out <i>EOP BIO009: Exporting waste – Exceptional operations</i> – to divert waste imports and/or export unprocessed waste to another facility Contact the EA and APHA if a pollution incident has occurred (<i>OPS BIO044</i>)

Table 4 Accidents & incidents risk assessment, control measures and immediate actions during exceptional operations.
 Probability (1 = Highly unlikely; 2 = Unlikely; 3 = Likely); Severity (1= Negligible; 2 = Significant; 3 = Serious); Overall risk (after controls) = probability x severity

7 Control measures

7.1 Non-permitted waste

Category 3 & non-ABP material

Pre-acceptance assessment

Pre-acceptance arrangements for waste deliveries are detailed in *SOP BIO001: Pre-acceptance waste assessment*. Waste material arriving at the Colwick AD facility is covered by waste supply contracts pre-arranged between Bio Dynamic (UK) and the waste supplier directly or through specialist waste brokers. Only waste types on the list of permitted wastes in the environmental permit and listed on the site APHA approval (category 3, specific low-risk category 2 or category 1-derived glycerol) or non-ABP by are considered by the Colwick AD facility.

The majority of material accepted at the Colwick AD facility consists of waste food originating from restaurants, catering facilities and commercial kitchens. Information on potential new waste streams is gathered using the form *OPS BIO020: Waste pre-acceptance information*, including the nature of the waste material, the conditions under which the waste has been stored prior to delivery and the quantity, and frequency of the proposed deliveries. For atypical waste material a representative sample of the waste is collected for pre-acceptance checks in order to analyse and characterise the material. All proposed waste streams are assigned a unique reference number identifying the waste producer, the location the waste originates from, the EWC code and ABP category of the waste, the physical state of the waste, the waste carrier and the waste broker (if applicable).

The information provided is assessed by the Site Manager/TCM. The decision whether ultimately to accept or reject the material is taken by the Site Manager and is recorded in every case (see *OPS BIO019: Waste suppliers register*). The pre-acceptance arrangements ensure that only waste streams suitable for treatment by anaerobic digestion arrive at the facility at times when there is adequate capacity to accept and treat the waste without causing undue issues.

Waste acceptance

All waste deliveries are transported to the AD facility using licenced waste carriers. All waste vehicles entering or leaving the AD facility are fully enclosed; solid organic waste is transported in dedicated, enclosed waste collection and delivery vehicles; liquid waste is delivered in sealed tankers. The quantity of all incoming waste is recorded using a weighbridge.

The procedure following the arrival of waste deliveries at the AD facility is detailed in the standard operating procedure *SOP BIO002: Importing waste*. All waste deliveries must be accompanied by the correct documentation from the supplier and waste carrier and must be accurately described by the appropriate EWC code and ABP category. The waste transfer information accompanying each delivery is checked by the Waste Coordinator who transfers the key information from the waste producer's waste transfer document onto a standard electronic form *OPS BIO025: Waste in – Delivery information*. Waste deliveries with incomplete or incorrect waste transfer information, or waste deliveries which are not pre-registered are automatically rejected and cannot be processed further by the Waste Coordinator. Completed *OPS BIO025* forms are printed and signed by the Waste Coordinator and the vehicle driver as a record of the delivery.

Waste handling

The procedures followed during and after the delivery of waste at the site are detailed in *SOP BIO003: Handling solid waste deliveries*, *SOP BIO004: Rejecting & quarantining waste deliveries* and *SOP BIO012: Handling liquid waste deliveries*. A Site Operative is assigned responsibility for monitoring each delivery.

Waste rejection

The circumstances for rejecting waste are detailed in *SOP BIO004: Rejecting & quarantining waste deliveries*. Waste may be rejected before delivery if it is accompanied by incorrect and/or incomplete waste transfer documents, or if the delivered waste stream has not been through the pre-acceptance checks.

During or after delivery, partial or complete waste deliveries must be quarantined if the supervising Site Operative and the Site Manager identify them as highly odorous and/or in an advanced state of deterioration or unacceptably contaminated with contrary material, and therefore unsuitable for processing. The Site Manager is authorised to reject the entire load, or just the contraries/highly odorous wastes and waste in the area surrounding if they can safely be removed by hand. The removal of contraries by hand is permitted only where they can safely be removed without presenting a health and safety risk to the Site Operative; where they present no risk to animal health; where they have not caused chemical or biological contamination of the remaining waste; or where they do not constitute unacceptable levels of contamination as defined in the contract with the waste carrier or the waste supplier. If contraries can be successfully removed under these circumstances the load will not be rejected.

Contaminated loads or contraries/highly odorous wastes and the waste surrounding them must be moved to the correct rejected loads container or the dedicated quarantine area until arrangements can be made for collection and disposal at a suitably licensed facility. All equipment and surfaces contaminated by contraries/highly odorous wastes must be thoroughly cleaned before further use, in accordance with *SOP BIO006: Cleaning & inspecting plant & equipment*.

The removal by hand of ABP category 1 or 2 waste is not permitted under any circumstances; if category 1 or 2 contraries are present at any point the entire load must be quarantined and rejected and the vehicle driver must be issued with written notification of the requirement to steam clean and/or disinfect the vehicle before it is used for further loads (see *OPS BIO026: Rejected delivery notification*). The Environment Agency and the Animal & Plant Health Agency must be informed immediately. Any equipment and surfaces contaminated by category 1 or 2 ABP material must be cleaned in accordance with exceptional operating procedure *EOP BIO002: Cleaning & disinfection after handling ABP category 1 or 2 material* after the load has been removed from the waste reception building, with the approval of the regulators. If the regulators require the quarantined rejected waste to remain on site for longer than 48 hours, the stockpiled waste will be monitored automatically for the risk of rising levels of ammonia by the fixed gas detector installed in the waste reception building. If an alarm is triggered at any point the building must be evacuated in accordance with *EOP BIO004: Hazardous gases*.

The Site Manager must investigate to determine how and why the non-permitted waste was not identified and rejected before delivery and make any necessary changes to standard operating procedures.

Rejected loads are documented in each case (*OPS BIO023: Rejected deliveries register*) and the waste carrier and/or waste supplier will be notified (*OPS BIO026: Rejected delivery notification*).

Category 1 material

No category 1 material will be delivered to the site.

7.2 Overfilling vessels

Category 3 & non-ABP material

A local level display on the liquid waste reception tank allows Site Operatives supervising waste deliveries to see the current fill level of the tanks to prevent overfilling during liquid waste imports. In addition a large freeboard is maintained in the waste tanks as an additional buffer against overfilling.

Processes after de-packaging and pre-treatment are monitored and controlled via the SCADA system. Pre- and post-pasteurisation tanks contain high level sensors monitored by the SCADA system which only allow material to be fed forwards when there is capacity in the receiving tank, to prevent overfilling. The sensors are also linked to audio/visual alarms in the event that employees are not in front of the HMI screen. Klaxons with flashing lights are located in the waste reception building, outside the control room and outside the employee welfare facilities. The SCADA system HMI identifies the abnormal readings or situations; employees must acknowledge the alarm and take the necessary actions detailed in *SOP BIO045: SCADA system*. The digester feed pump can be run in manual mode, but it is timed to cut off automatically as a precaution against overfilling caused by operator error.

All tanks & vessels used for the storage of pre- and post-pasteurised waste material, fuel for plant & equipment are bunded; the capacity of the bunds is maintained at all times

7.3 Hazardous gases

Hazardous gases may result from a leak due to containment failure, or as a result of bacterial degradation of stockpiled, unprocessed waste materials built up on site during abnormal operations. These gases can be toxic and/or explosive; they may be heavier or lighter than air.

Biogas (and its constituent gases methane, CH₄ and hydrogen sulphide, H₂S) is a dangerous substance that could cause fire or an explosion. Areas where explosive atmospheres may occur continuously, frequently, periodically or for short periods (see *H&S PBG003: List of source of release at pre-treatment area* and *H&S PBG004: List of sources of release at digestion area*) are classified into DSEAR zones, based on the likelihood of an explosion; these zones are shown on the site plan *H&S PBG002: DSEAR zones*. The risks of potentially explosive atmospheres within waste reception building vessels have been fully assessed in the DSEAR plan.

All pipework, tanks & vessels containing biogas are constructed from materials certified as fit for purpose and are inspected and maintained weekly (see *OPS BIO002: Preventative maintenance plan* and associated standard operating procedures and checklists). Digester tanks 1, 2 and 3 are designed with a twin-skinned upper membrane to be gas-tight in order to maintain anaerobic conditions. The emergency gas flares can be used to burn off biogas during periods of abnormal operation if the CHP engines are unavailable or if there is insufficient biogas storage volume. In an emergency, pressure relief valves on the digester tanks will vent the biogas to atmosphere at elevated positions for controlled dispersion. All persons in or around the main bund must wear a personal gas monitor at all times. Daily sniff tests are carried out in the vicinity of the digesters and site boundary to monitor potential fugitive odour releases (see *EA BIO005: Daily odour sniff tests*).

In the waste reception building, de-packaged and pre-treated food waste is stored in concrete bays and moved in sealed pipework. Potentially explosive atmospheres may be generated inside pre-treatment

tanks when normal waste processing is interrupted; if there is no mixing or movement of waste material heated for pre-pasteurisation for an extended period methanogenic bacteria may have an opportunity to degrade the food waste sitting in the tanks and produce methane (CH₄). Methane is a colourless, tasteless gas which is odourless in its natural form; it is lighter than air and extremely flammable.

Although highly flammable and very toxic, any hydrogen sulphide (H₂S) generated poses a risk to human health through its toxicity rather than as a potentially flammable atmosphere. Hydrogen sulphide is a colourless gas which is heavier than air; it will collect in low-lying and enclosed, poorly-ventilated areas. It has a 'rotten eggs' odour at low concentrations, however the ability to smell the gas can be lost during continuous low-level exposure, or through exposure to high concentrations. Excess hydrogen sulphide can result from feedstock high in sulphur and inhibits methane production.

In addition, ammonia gas (NH₃) is produced by the natural breakdown of organic waste; exposure to very low levels occurs in the environment and is not considered a risk to human health. However, the local concentration of ammonia gas inside the waste reception building may be higher if stockpiled waste remains unprocessed due to abnormal operations. Ammonia is a colourless gas, lighter than air; in dry atmospheres it will rise and dissipate and will not settle in low-lying areas. Ammonia readily dissolves in water, so in moist/humid atmospheres such as the waste reception building it could form a caustic ammonia solution and give off fumes close to the ground. It can potentially be flammable under certain circumstances. Although the odour detection threshold of ammonia is low enough to provide warning of its presence – the strong smell, similar to urine, is detectable in small amounts – it becomes difficult to detect after prolonged exposure.

Air flow in the waste reception building is enhanced using forced ventilation. Air in the waste reception building is extracted continuously and discharged to air an odour control system. The outflow from the odour abatement unit is monitored weekly for the presence of H₂S in order ensure the effectiveness of the arrangements (see *SOP BIO013: Odour control units – Visual checks and maintenance*)

A fixed gas detector inside the building continuously monitors for NH₃, CO, H₂S and CH₄. In addition, all persons in the waste reception building must wear a personal gas monitor at all times. Excess levels of hydrogen sulphide in pre-treatment tanks can be reduced by the addition of a chemical control agent, a powder based on iron hydroxide (see *COSHH BIO016: BC.ATOX Scon* and *SDS BIO016: BC.ATOX Scon*). When dissolved in food waste slurry, the iron compounds will react with hydrogen sulphide, converting it into harmless iron sulphide; this will decrease the level of hydrogen sulphide in the food waste slurry and the biogas it is producing. The actions to be taken in the event a gas alarm is triggered are detailed in *EOP BIO004: Hazardous gases*.

The operator carries out a six monthly leak detection and repair exercise (LDAR) by way of proactive monitoring and maintenance for small gas leaks from tanks and pipework.

7.4 Containment failure

Category 3 & non-ABP material

Under normal operating conditions waste is processed as soon as possible after delivery; all wastes are processed within 24 hours of delivery. All tanks and containers used for the storage of pre- and post-pasteurised waste material, and fuel or lubricants for plant and equipment are constructed from materials

certified as fit-for-purpose and are bunded. Procedures are in place for maintenance and inspection of all pre-treatment and de-packaging line tanks and associated bunds (see *SOP BIO023: Waste reception building - Visual checks & maintenance*). The digester tanks, main bund, the buffer tanks and buffer tanks' bund are inspected as part of weekly operations and also emptied as needed during periods of heavy/persistent rainfall to minimise rainwater accumulation (see *SOP BIO017: Digester tanks – Visual checks & maintenance*, *SOP BIO046: Pipework – Visual checks & maintenance* and exceptional operating procedure *EOP BIO007: Severe weather*). The capacity of the bunds is maintained at all times. An inventory of substances stored on site and any hazardous properties they possess is maintained and regularly updated, for use in the safe clean-up of any spillages). No waste is stored outside of the waste reception building.

In the event of a containment failure maintenance contracts are in place which provide on-site servicing and repairs within 12 hours. Scheduled waste deliveries will be diverted, and stockpiled material will be exported if necessary (see *EOP BIO009: Exporting waste - Exceptional operations*) under a reciprocal agreement with another AD facility (see *EA BIO008: Agreement to export/import wastes in exceptional operational circumstances*).

7.5 Spillages

Category 3 & non-ABP material

Minor spillages may occur as a result of containment failure during material transfers or from damaged containers or pipework. All movements of waste material take place on sealed, impermeable surfaces which can be cleaned thoroughly if accidental spillages occur (see *EOP BIO003: Containment failure - Spillages*). Solid waste deliveries vehicles are brought directly into the waste reception building. Drainage within the waste reception building is discrete and does not enter the main site drainage system. The concrete floor of the waste reception building is sloped in an 'open-book' arrangement inclined away from the building's gable ends. This ensures that any wash down water or leachate flows away from the vehicle door at the northern end of the building and the de-packaging and pre-treatment process line at the southern end of the building and into one of two grated blind sumps located in the waste reception building. The liquid collected in the sumps is regularly added to the Tiger Cesaro de-packager and shredder using a submersible pump. Once the waste material enters the pasteurisation step of the pre-treatment process it remains contained in sealed tanks and pipework. Liquid waste deliveries are made to a series of outdoor liquid waste reception tanks. Tankers are located on concrete surfaces during deliveries, and spills are contained on the surface, or in spill containment sump, sized to contain spillage from a whole tanker if necessary. Spills in the containment sump are pumped from the sump into the AD process.

Digestate exports take place on sealed, impermeable surfaces which can be cleaned thoroughly if accidental spillages occur. Potential spills that occur during digestate removal will also be contained by the drainage sump. (see *EOP BIO003: Containment failure - Spillages*).

Minor spills should be contained at, or near to, their source, if practicable. Spills by from damaged pipework may be temporarily contained by closing relevant manual valves, or turning off pumps to stop,

or reduce the volume of the spillage. An appropriate sorbent should be applied to the outer edges of the spill to contain and absorb the material using the spill kits available on site for oils, or sand. Temporary suitable containers may be used to catch the spillage, providing the container is not made of, or has not previously contained, anything that could react negatively with the spilled material. Minor spills from small, damaged containers may be temporarily contained by turning the damaged container so that any holes or leaks are above the fill level of the container, or by putting the damaged container into a suitable, larger container to temporarily contain the spillage. It is safe to do so, spilled material can be transferred into another, undamaged container using a manual pump or a suitable automatic pump if there is too much material (an ATEX-rated pump may be required, see *H&S PBG001: DSEAR assessment* and *H&S PBG002: DSEAR zones*).

Spreading spillages which cannot be contained near the source must be prevented from spreading onto unmade ground, watercourses or into open drainage systems where it could cause significant environmental pollution. Physical barriers can contain the spillage on hardstanding by either using a containment barrier/boom to contain the spill, isolate a drain or to divert the spillage towards a specific area, or by using a sorbent sock/boom to soak up the spillage and stop it spreading further. Drain mats can be used to cover and seal surface drain openings or manhole covers and stop the spillage from entering drainage systems; areas where spillages held back by drain mats will accumulate need to be identified so they can be isolated until the spillage can be cleaned up. A plan of the drainage on site is available in the Weighbridge Office.

If spillage handling equipment is not available, it may be possible to improvise a method to contain the spillage using tarpaulins and wooden planks to create a temporary barrier/boom, earth or sand to spread as a sorbent and/or sandbags to act as a spreading barrier or a car foot well mat or a sheet of polythene, weighed down with sand or earth to seal a drain.

Contained spillages will be cleaned up as soon as possible to prevent further risk to the environment and people by transferring spillages contained temporarily or held in place by barriers/booms into suitable, portable tanks (positioned as near to the spillage as possible) using suitable pumps. Specialist spill contractors may be required for oil and chemical spills.

Major spills should be contained in bunded areas; however, if they have spread rapidly and exceeded the capability of employees to respond, or if they have entered the environment through the ground or water, employees should raise the alarm immediately, to ensure that everyone working nearby is aware of the spill, and evacuate the area. If possible, relevant manual valves should be closed and pumps turned off to stop, or reduce the volume of the spillage, along with powered equipment. The emergency services must be called in accordance with *EOP BIO003: Containment failure - Spillages*.

7.6 Foaming in digester tanks

Category 3 material

Excessive foaming can cause several problems within the tanks including; clogged mixing pumps, creating temperature fluctuations and stagnant regions with no active digestion of fresh waste material or blocked gas collection pipework reducing the efficiency of biogas capture from the digesters. In the worst case, blocked pressure relief valves could lead to over-pressurisation and structural failure of the digester tanks and fugitive release of odours.

Measures are in place to prevent excessive foaming in the first instance. Daily sampling and monitoring is used to control the performance of the digesters and to minimise the factors that amplify foaming in the tanks by maintaining a consistent organic loading rate and responding appropriately when monitoring results indicate changing digester tank conditions (see *SOP BIO040: Sampling digestate for FOS-TAC ratio analysis*).

SCADA system monitoring ensures that material is added to, and removed from, the digester tanks consistently to maintain the material volume at a level which reduces the potential for foam to block gas collection pipes or pressure relief valves by allowing for freeboard capacity.

The digester tanks are equipped with circulating pumps controlled from the SCADA system and heaters to keep the material fully mixed, distributing both fresh waste material and anaerobic breakdown products evenly and preventing the formation of cool spots in the material mass and stagnation leading to formation of a layer of floating scum. Vertical mixing jets within the tanks break up the surface so that biogas bubbles are stripped off of the digesting solids, rather than remaining entrained in the mixture or in a scum layer which can also lead to foaming, maximising biogas production.

These measures are supplemented by visual inspection for foam formation on the surface of the material inside the digester tanks using dedicated viewing ports set at the top of the tanks. In exceptional situations if evidence of foaming is found it can be brought under control by applying an anti-foaming agent to the digester tanks, or managed by exporting digestate to reduce the volume of material in the tanks. If the foaming cannot be brought under control, in an emergency only and when all other measures have failed, the Site Manager can authorise release of the digestate into the main bund (see *EOP BIO005: Digester tanks – Foaming*). A clean-up operation must be carried out in accordance with *EOP BIO003: Containment failure - Spillages*.

Power failure

Category 3 & non-ABP material

If a power failure occurs for any reason during or directly after a waste delivery the vehicle access door must be immediately closed using the manual procedure specified in the equipment manual, to prevent the release of odorous air and/or the ingress of vermin. The Site Manager must contact Bio Dynamic (UK)'s external maintenance contractors to advise them of the power failure and to get assistance in determining the cause of the incident and the likely length of time for repair work. If either CHP engines are down the Site Manager should contact the suppliers; if there is a wider problem the electricity distribution network operator should be contacted (see *OPS BIO044: Contacts - Emergency & non-emergency*).

If the incident cannot be resolved within 12 hours, the Site Manager must arrange for further waste deliveries to be diverted to another facility for processing until repairs have been completed. If the incident cannot be resolved within 24 hours, the Site Manager must arrange for stockpiled waste to be sent to another suitable facility (see *EOP BIO006: Main services failure* and *EOP BIO009: Exporting waste - Exceptional operations*).

All items of plant and equipment default to a safe mode during a power failure and pumps will shut down. The SCADA system server automatically switches to an uninterruptable power supply, which provides back-up power for up to 1 hour; this allows time for process data to be properly backed-up and for the system to execute a controlled shut down sequence.

In the unlikely event that power cannot be restored, and the process brought under control, the emergency gas flares can be used to burn off biogas during periods of abnormal operation if the CHP engines are unavailable or if there is insufficient biogas storage volume. Should for any reason the flare not be available to manage excess biogas in a controlled way, emergency pressure reliefvalves on the digester tanks (where biogas will continue to be generated) will vent the biogas to atmosphere. However, venting will not be triggered unless gas pressures reach emergency level set points.

Water supply

Category 3 & non-ABP material

If the mains water supply is interrupted, liquids stored on site can be added to incoming solid waste material as needed, to maintain the consistency of the waste material at approximately 15% dry matter for pumping and processing in the short term - non-pre-digested liquid waste (from the liquid waste reception tank), harvested rainwater (from the rainwater harvesting tank) or fresh water (from the fresh water reserve tank or site borehole). The Site Manager can also source additional liquid waste imports to supplement the liquids available on site until the water supply is restored.

Scheduled waste deliveries will be diverted, and stockpiled material will be exported if necessary (see *EOP BIO009: Exporting waste - Exceptional operations*) under a reciprocal agreement with another AD facility (see *EA BIO008: Agreement to export/import wastes in exceptional operational circumstances*).

7.7 Vandalism

Category 3 & non-ABP material

The normal operating hours of the AD facility are 24 hours per day, 7 days per week, so employees are always present. The entire site is fenced and gated. The waste reception building is monitored by CCTV from the site offices; the building can also be locked if the site is not in operation. Exterior manual discharge valves are padlocked; material cannot be discharged even if the valves are opened without starting pumps from the SCADA system, which can only be accessed with a password.

A preventative maintenance and visual inspection system forms part of routine operations on site (see *OPS BIO002: Preventative maintenance plan*). This includes regular plant and equipment maintenance as required by manufacturers (monthly, quarterly and annually); additional visual inspections of other key items of plant and equipment for signs of damage or failure are made as part of daily and weekly inspections of site infrastructure. Critical spares are kept on site (see *OPS BIO032: Critical spares list*) and maintenance contracts are in place which provide on-site servicing and repairs within 12 hours.

7.8 Enforced shutdown

Category 3 & non-ABP material

Hazardous gases may result from bacterial degradation of stockpiled, unprocessed waste materials built up on site during an enforced shutdown of normal operations. These gases can be toxic and/or explosive (see section 7.3). All persons in the waste reception building must wear a personal gas monitor at all times. The actions to be taken in the event a gas alarm is triggered are detailed in *EOP BIO004: Hazardous gases*.

In the event of a temporary shutdown of the Colwick AD facility scheduled waste deliveries will be diverted, and stockpiled material will be exported as soon as possible (see *EOP BIO009: Exporting waste - Exceptional operations*) under a reciprocal agreement with another AD facility (see *EA BIO008: Agreement to export/import wastes in exceptional operational circumstances*). All plant and equipment will be cleaned and disinfected, in accordance with *SOP BIO006: Cleaning & inspecting plant & equipment*.

The emergency gas flare can be used to burn off biogas in the event of an extended shutdown if the CHP engines are unavailable or if there is insufficient biogas storage volume. If the AD facility is required to shut down for an extended period for any reason, a controlled shut down will be carried out (see *EA PBG001: Decommissioning plan*).

7.9 Severe weather

Severe weather conditions may cause damage to infrastructure, plant and equipment which could compromise containment and lead to unauthorised release of waste materials, causing an environmental pollution incident.

The Site Manager and the Waste Coordinator receive Met Office National Severe Weather Warning Service emails warning of rain, snow, wind, fog and ice. These include information on the impact that the forecast weather is expected to bring and the likelihood of those impacts occurring, colour coded:

- Yellow - possibility of severe weather over the next few days; plan ahead thinking about possible disruption of daily operational activities; be aware that the weather may change or worsen
- Amber - an increased likelihood of bad weather, which could potentially disrupt daily operational activities, cause road closures, interruption to power and the potential risk to life and property; be prepared to change plans to protect personnel and infrastructure
- Red - extreme weather is expected; take action now to keep personnel and infrastructure safe from the impact of the weather; widespread damage, power disruption and risk to life is likely; avoid dangerous areas and follow the advice of the emergency services and local authorities

If severe weather is expected mobile items of plant or equipment that could be damaged themselves or cause damage or injury will be moved inside, where possible. After severe weather additional visual inspections of infrastructure, buildings and key items of plant and equipment will be made for signs of

damage or failure. Roofs and gas domes may sustain damage in high winds or storms. Some items may be at risk from frost damage; for example the water tanks in the odour control units are at risk of freezing if the units have been standing still for more than 3 days with temperatures below 0°C. In that scenario all of the water in the water tanks must be discharged. Bunds are inspected as part of weekly operations and are also emptied as needed during periods of heavy/persistent rainfall to minimise rainwater accumulation, in order to maintain the effective capacity of the bunds (see *EOP BIO007: Severe weather*).

7.10 Fire, explosive/flammable atmospheres & fire water

Category 3 & non-ABP material

In the event of a fire, employees should raise the alarm immediately to ensure that everyone working nearby is aware of the fire and evacuate the area. The emergency services must be called in accordance with *EOP BIO001: Accidents & incidents*.

The solid waste material delivered to the site generally has a high moisture content; additional liquids are added to the waste to maintain the consistency of the waste material at approximately 15% dry matter for pumping and processing. Rejected packaging material (mainly plastic) recovered during the de-packaging process is stored within the waste reception building and regularly exported for disposal.

An updated fire risk assessment for the site has been carried out and will continue to be updated a further site development is undertaken. In addition, representatives from the Fire Brigade have regularly visited the site since it opened to ensure that they remain familiar with the site layout, operations and materials held on site. The Colwick AD facility is a no smoking site and no material is burned on site. Fire alarms are fitted in the waste reception building and fire extinguishers are located throughout the AD facility (see *H&S BIO010: Site plan – H&S information*). All fire extinguishers are clearly marked and tested, at appropriate intervals, to confirm their functionality and employees have been trained to use them correctly. The normal operating hours of the AD facility are 24 hours per day, 7 days per week, so employees are always present. Fire drills are carried out every month and tests of fire safety equipment are carried every week.

A DSEAR assessment of the risks of fire and explosion from potentially flammable atmospheres created by dangerous substances on site was carried out in March 2018 (see *H&S BIO001: DSEAR assessment*). Solid and liquid waste materials present on site are capable of generating explosive atmospheres as they degrade. Biogas (and its constituent gases methane, CH₄ and hydrogen sulphide, H₂S) is a dangerous substance that could cause fire or an explosion. Areas where explosive atmospheres may occur continuously, frequently, periodically or for short periods (see *H&S PBG003: List of source of release at pre-treatment area* and *H&S PBG004: List of sources of release at digestion area*) are classified into DSEAR zones, based on the likelihood of an explosion; these zones are shown on the site plan *H&S PBG002: DSEAR zones*. All pipework, tanks & vessels containing biogas are constructed from materials certified as fit for purpose and are inspected and maintained weekly (see *OPS BIO002: Preventative maintenance plan* and associated standard operating procedures and checklists). Digester tanks 1 and 2 are designed with a twin-skinned upper membrane to be gas-tight in order to maintain anaerobic conditions. All persons in or around the main bund must wear a personal gas monitor at all times.

In the waste reception building, de-packaged and pre-treated food waste is stored in enclosed tanks and moved in sealed pipework. Potentially explosive atmospheres may be generated inside pre-treatment tanks when normal waste processing is interrupted; if there is no mixing or movement of waste material heated for pre-pasteurisation for an extended period methanogenic bacteria may have an opportunity to degrade the food waste sitting in the tanks and produce methane. Any hydrogen sulphide generated poses a risk to human health through its toxicity rather than as a potentially flammable atmosphere. The risks of potentially explosive atmospheres within waste reception building vessels have been fully assessed in the DSEAR plan.

Air flow in the waste reception building is enhanced using forced ventilation which will have the effect of reducing potentially hazardous atmospheres. Air in the waste reception building is extracted continuously and discharged an odour control system. The outflow from the unit is monitored weekly for the presence of H₂S in order ensure the effectiveness of the arrangements (see *SOP BIO013: Odour control units – Visual checks and maintenance*)

A fixed gas detector inside the building continuously monitors for NH₃, CO, H₂S and CH₄. In addition, all persons in the waste reception building must wear a personal gas monitor at all times. The actions to be taken in the event a gas alarm is triggered are detailed in *EOP BIO004: Hazardous gases*.

Employees have DSEAR training and ATEX zones are clearly marked on site. Only appropriate ATEX-certified tools & equipment is used in DSEAR zones. Any potentially flammable dust from the waste reception building is continuously removed by the odour control system.

The *OPS BIO002: Preventative maintenance plan* includes regular inspection of electrical equipment to ensure that any faults are identified and repaired. The condition of portable appliances is assessed regularly (see *H&S BIO016: Portable appliance register*). All tanks & vessels used for the storage of potentially flammable materials are constructed from materials certified as fit for purpose.

Run-off firewater from bunded structures will remain contained in the bunded areas. The waste reception building drainage is discrete and does not enter the main site drainage system. Run-off firewater from the other structures on site would drain directly into the main site bund or areas or to ground via small areas of hardcore, without measures to contain it (see *EOP BIO003: Containment failure - Spillages*).

7.11 Plant & equipment failure

A preventative maintenance and visual inspection system forms part of routine operations on site (see *OPS BIO002: Preventative maintenance plan*). This includes regular plant and equipment maintenance as required by manufacturers (monthly, quarterly and annually); additional visual inspections of other key items of plant and equipment for signs of damage or failure are made as part of daily and weekly inspections of site infrastructure. Procedures are in place for maintenance and inspection of the digester tanks and bunds, all pre-treatment and de-packaging line equipment, the control and power systems, the CHP engines, vehicles and pipework (see *SOP BIO017: Digester tanks – Visual checks & maintenance*, *SOP BIO023: Waste reception building - Visual checks & maintenance*, *SOP BIO024: Control room - Visual checks & maintenance*, *SOP BIO025: Power island - Visual checks & maintenance*, *SOP BIO037: De-packager & shredder – Visual checks & maintenance*, *SOP BIO038*, *SOP BIO044: Vehicles – Visual checks & maintenance* and *SOP BIO046: Pipework – Visual checks & maintenance*).

In addition to the service contracts for maintenance of plant and equipment by external contractors site records are also be kept of the maintenance carried out on all major items of equipment. Checklists are used when inspections have been carried out and the results of these inspections and any actions taken are recorded (see *OPS BIO004: Waste reception building – Weekly visual checks*, *OPS BIO006: Control room – Weekly visual checks*, *OPS BIO007:*

Power island – Weekly visual checks and OPS BIO008: De-packager & shredder / Attritor - Weekly visual checks). The condition of portable appliances is assessed regularly (see *H&S BIO016: Portable appliance register*). Records are also kept to ensure that supplies of key spare parts and consumables are available (in particular drive belts, bearings, seals and wear parts for the Tiger Cesaro and the attritor) – see *OPS BIO032: Critical spares list*.

Vehicles on site are only reversed under supervision of trained banksman to prevent accidental collision damage to infrastructure, plant and equipment.

Scheduled waste deliveries will be diverted, and stockpiled material will be exported if necessary (see *EOP BIO009: Exporting waste - Exceptional operations*) under a reciprocal agreement with another AD facility (see *EA BIO008: Agreement to export/import wastes in exceptional operational circumstances*).

7.12 Operator error

All employees are required to comply with the site's Environmental Management System and all associated standard operating procedures. Waste processing operations at the Colwick AD facility are run by the Site Manager, supported by six Site Operatives, the Engineering Manager and the Waste Coordinator; additional technical guidance is provided by external technical consultants and office-based employees provide administrative support.

All employees are suitably trained and qualified for the management and operation of the Colwick AD facility and are competent to deal with the environmental risks associated with activities on site. Tasks are only assigned to employees when they are sufficiently technically able and competent to ensure that the risks to the environment and human health are minimised. The AD facility is operated under the direction of a technically competent manager qualifying under the Waste Management Industry Training and Advisory Board (WAMITAB) scheme to run an anaerobic digestion facility (including use of the resultant biogas).

Processes after de-packaging and pre-treatment are monitored and controlled via the SCADA system. The main SCADA HMI control screen is housed in the Weighbridge Office. Access to make operational changes can only be made with appropriate secure login details.

7.13 Flooding

The site lies within a flood zone 2, with a medium probability of flooding. The site has not flooded for at least 35 years, even during times when the River Trent has overflowed. A flood risk assessment was carried out in July 2013 (see *PLA DKA002: Design & access statement*).

The floor level of the waste reception building is 600mm above the natural ground level & adjacent roadway; external items of plant and equipment are all either double-sealed structures or raised on concrete plinths 600mm above the natural ground level. The substation is housed in flood-proof structure, as agreed with Western Power Distribution. The facility operates as an anaerobic digestion plant, so all pipework and valves are sealed to prevent the ingress of air; the digester tanks are double-skinned.

Foul water from the site offices and employee welfare facilities discharges into a sealed cesspit. This is emptied periodically by a specialist contractor.

The Site Manager and Waste Coordinator receive EA flood warning emails/texts and Met Office severe weather warning emails.

8 Accident, incident & near miss report

H&S > REPORTING		H&S BIO006
Accident, incident & near miss report		
REFERENCE NO: Bio Dynamic (UK)	REPORT DATE:	

This form must be completed & returned within 3 working days of the accident/incident to the Site Manager.
THIS DOCUMENT & ANY COPIES ARE CONFIDENTIAL & MUST BE FILED SECURELY.


ACCIDENT/INCIDENT INFORMATION	ACCIDENT/INCIDENT TYPE	
Accident/incident date:	<input type="checkbox"/> Health & Safety	<input type="checkbox"/> Environmental
Accident/incident time:	<input type="checkbox"/> Accident	<input type="checkbox"/> Incident
Location on site:	<input type="checkbox"/> Near miss	<input type="checkbox"/> Fire
	<input type="checkbox"/> Dangerous occurrence (RIDDOR)	


DESCRIPTION OF EVENTS Before, during & after the accident/incident

WITNESSES Name & address	
Witness 1:	Witness 2:

A: PERSONAL INFORMATION Affected/injured party		
Name:	<input type="checkbox"/> Employee	<input type="checkbox"/> Contractor
Address:	<input type="checkbox"/> Visitor	<input type="checkbox"/> Public
	<input type="checkbox"/> Male	<input type="checkbox"/> Female
Age:		

DETAILS OF INJURY Nature of injury & body parts affected	FIRST AID Describe first aid treatment
Injury sustained? <input type="checkbox"/> Yes <input type="checkbox"/> No	First aid given? <input type="checkbox"/> Yes <input type="checkbox"/> No
Person sent to: <input type="checkbox"/> Hospital <input type="checkbox"/> Home	Name of first aider:
<input type="checkbox"/> Return to work <input type="checkbox"/> Other (specify)	

H&S > REPORTING		H&S BIO006
Accident, incident & near miss report		 biodynamic
REFERENCE NO: Bio Dynamic (UK)	REPORT DATE:	
B: ENVIRONMENTAL IMPACT Provide details of materials/liquids/gases spilt/discharged, the amounts & type of damage		
Discharge to: <input type="checkbox"/> Air <input type="checkbox"/> Water <input type="checkbox"/> Drains <input type="checkbox"/> Permeable ground		
Clean up needed? <input type="checkbox"/> Yes <input type="checkbox"/> No		
IMMEDIATE MITIGATION Describe action taken		
LONG-TERM MITIGATION Describe action needed		

H&S > REPORTING		H&S BIO006
Accident, incident & near miss report		
REFERENCE NO: Bio Dynamic (UK)	REPORT DATE:	
C: ACCIDENT/INCIDENT FOLLOW UP Investigation to be completed by Site Manager/Line Manager		
Name of investigator:	Date ceased work (Affected/injury party):	
Job title:	Date returned to work (Affected/injured party):	
BRIEF STATEMENT Affected/injured party		
ACTUAL/POSSIBLE CASUAL FACTORS Identify & state potential root cause		
PREVENTATIVE ACTION (NEAR MISSES) OR CORRECTIVE/REMEDIAL ACTION To prevent re-occurrence		
SIGNATURE Investigator	SIGNATURE Affected/Injured party	
Date:	Date:	