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R100 LTD

AD FACILITY AT SPALDINGTON AIRFIELD

ODOUR MANAGEMENT PLAN

NOVEMBER 2018

DATE ISSUED: NOVEMBER 2022
JOB NUMBER: ST19734
REPORT NUMBER: RPT 006
VERSION: V1.0
STATUS: FINAL

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ODOUR MANAGEMENT PLAN

NOVEMBER 2018

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1 INTRODUCTION

- 1.1 Wardell Armstrong has been commissioned by R100 Limited (R100) to prepare an Odour Management Plan (OMP) for the proposed anaerobic digestion (AD) facility at Spaldington Airfield, Spaldington.
- 1.2 The OMP has been prepared with due regard to Environment Agency (EA) environmental permitting guidance H4 Odour Management: How to comply with your environmental permit. The OMP supplements the odour risk assessment included in the Amenity and Accident Risk Assessment included with the permit application.
- 1.3 The OMP provides details of the potentially sensitive receptors in Section 2. Potential odour sources are discussed in Section 3 whilst the odour control measures and environmental monitoring to be provided at the facility are discussed in Sections 4 and 5 respectively. R100 will investigate all instances where odour is detected or reported by third parties and this system is discussed in Section 6.
- 1.4 The site will be operated in accordance with an Environmental Management System (EMS) developed in accordance with the Environment Agency's guidance. Furthermore, all operations at the site will be managed by a Technically Competent Manager.
- 1.5 The OMP concludes that whilst that the site presents a low risk of odour, appropriate measures will be employed to control any potential malodorous emissions from the site. Monitoring will provide the checks to ensure that odour control is effective at the site and to trigger remedial actions, in the event that odour is detected at the site boundary.

2 POTENTIALLY SENSITIVE RECEPTORS

- 2.1 Spaldington Airfield is located at National Grid Reference SE 74425 32682, approximately 1km south west of Spaldington, in the East Riding of Yorkshire. The surrounding area is mainly rural.
- 2.2 There are relatively few potential receptors within 2km of the site. Table 2:1 below identifies the potential receptors and their distances from the proposed facility.

Receptor	Type of receptor	Approximate Distance from facility
Changing Waste food waste treatment facility	Industrial	100m
Wood Treatment Facility	Industrial	265m
Farmland	Agricultural	<50m
Golf course	Leisure	265m
Newsome Farm	Residential	720m
Brindleys Farm	Residential	1,150m
Spaldington village	Residential	1,300m

2.3 The sources of potential odour that could impact on these receptors are discussed in Section 3.

3 POTENTIAL ODOUR SOURCES

3.1 The proposed AD facility will treat up to 90,000 tonnes per annum of food wastes, source segregated kitchen and catering wastes, including animal by-products that fall under Category 3 of the Animal By-products Regulations 2005, along with a small quantity of similar non-hazardous biodegradable materials. Putrescible and biodegradable wastes have the potential to be malodorous.

3.2 The AD facility will not be located within a building as there is no requirement for a traditional waste reception hall or process building. All wastes received at the site will be in the form of a liquid or sludge. This means all aspects of the waste delivery, storage and treatment will be within sealed, appropriately constructed tanks and vessels. Deliveries and transfers of waste are carried out using sealed tanks, pipes and sealed non-return valves. This means that wastes are never open to the outside world. The AD process will operate 24 hours per day, 7 days per week.

3.3 There will be three main emission points to air, from the biomethane upgrade unit, the back-up boiler and the back-up flare. Emissions to air from the Biomethane Upgrade Unit stack will consist largely of carbon dioxide whilst emissions from the back up boiler and back up flare (which will only be used intermittently, eg when the Gas Upgrade Unit is undergoing maintenance) will be by-products of combustion processes. None of these emissions presents a risk of odour. Odorous compounds will be treated by the condenser and carbon filter associated with the first part of the

gas clean up plant. Any odorous compounds entering the flare or boiler will be destroyed during combustion.

- 3.4 There are also a number of pressure relief valves (PRVs) fitted to tanks and plant, from which short-term emissions may occur in an emergency situation. Emissions from these tanks could present risk of odour but emissions from these points are expected to be a rare occurrence as in general gas pressure will be managed through the biodome and if necessary the flare, preventing any over pressure in the system. There is also an exhaust associated with the biodome but the only emission from this source will be air.
- 3.5 The permit originally allowed for two CHP engines utilising biogas. The permit is being varied so that these engines will now operate using natural gas, sourced from the gas to grid plant. Use of this cleaner fuel will reduce potential emissions to air from the installation.
- 3.6 Gas may be stored as liquid natural gas (LNG) in a 80,605 l capacity tank. The tank would be kept no more than 85% full (68,685 l). The tank is properly constructed for the storage of gas and will be inspected and maintained to prevent any leaks.
- 3.7 The permit variation also allows for a new activity, recovering bio-oil from the waste stream, which will be sent off site for recycling elsewhere. The centrifuge system that separates the oil from the other food wastes is fully enclosed. It will be fed by a pipe from the heat exchanger feed line. Following treatment, water and solids will be fed back into the AD plant whilst the oil will be piped to a sealed storage tank pending removal from site by tanker.
- 3.8 The oil storage tank and centrifuge will have breathing vents which may be a potential source of odour when vessels are being filled and air is displaced. To manage this carbon filters will be attached to all breathing vents to capture any odorous compounds.

4 ODOUR CONTROL MEASURES

- 4.1 Wastes will be delivered by road tanker or enclosed bowsters or tanks and will be discharged into the liquid waste storage tank using appropriate pipework and connectors, ready to be prepared for the digestion process. A suitably trained site operative will supervise the delivery.

- 4.2 Where oil or pre-treated waste is sent off site for recycling at another permitted facility it will be collected by road tanker. Again, appropriate pipework and connections will be used and filling will follow the written procedure for tanker transfers. This includes, checking the capacity of the receiving tank before any transfer takes place, checking all connections are made correctly before filling commences, supervising the transfer so that any leaks or spills are detected quickly, ceasing filling in the event of a leak until the problem has been resolved. These procedures will minimise the risk of leaks and any odour associated with them.
- 4.3 All pipework on site will be sealed/airtight to prevent emissions of odour.
- 4.4 All site plant will be subject to regular inspection and will be serviced, maintained and repaired as necessary to prevent leaks. New plant such as the LNG tank, bio-oil separator and bio-oil tank will be added to the preventative maintenance programme to ensure that they are inspected and maintained on a regular basis. Servicing will be in line with the manufacturer's recommendations for all plant and equipment.
- 4.5 To control the production of hydrogen sulphide in the biogas, which is malodorous, Ferric Chloride will be dosed, as required, to the anaerobic digestion tank, via the recirculation cooling loop.
- 4.6 Ammonia, hydrogen sulphide and non-methane volatile organic compounds will be present to some degree in the produced biogas and are potentially malodorous. However the system will be sealed to maintain anaerobic conditions. The biodome will inflate and deflate to manage changes in gas pressure without release to atmosphere.
- 4.7 Ammonia is highly soluble and will be removed in the condensate at the Gas clean up unit. Condensate will be collected and directed to the existing liquid waste tank.
- 4.8 Within the gas to grid plant two activated carbon filters will be used to adsorb (and effectively trap) the hydrogen sulphide and non-methane volatile organic compounds. Hydrogen sulphide will tend to be adsorbed in the first filter and VOCs in the second filter.
- 4.9 The proposed odorant for odourising the gas before injection into the gas grid is also a potential odour risk. Odorant will be stored in a dedicated specialist container and injected into the biomethane at a rate of 7mg/m³. Only small quantities of odorant will be stored and it will be managed in accordance with written procedures.

- 4.10 Where pre-treated waste is removed and stored in a tank there is potential for losses to atmosphere via breathing (i.e. air is displaced when the tank is filled, this must be vented to manage pressure in the tank). All breathing vents have been (or will be) fitted with activated carbon filters to control odours, including those on the post pasteurisation storage tank, oil separator and bio-oil storage tank.
- 4.11 Carbon filters are known to effectively trap VOCs and hydrogen sulphide, which may be emitted from food wastes.¹ To demonstrate their effectiveness in this case, measurements have been taken before and after the carbon filter fitted to the post pasteurisation storage tank. This monitoring confirmed a reduction in odour of over 93% (See “R100 Limited Spaldington Anaerobic Digestion Facility, Pre-Operational Measure 6 – Odour Abatement”, Wardell Armstrong July 2022, submitted in compliance with the pre-operational conditions for the site).

5 ENVIRONMENTAL MONITORING

- 5.1 Daily olfactory monitoring will be undertaken by the site manager or nominated site operative along the site boundary.
- 5.2 Olfactory checks will also be carried out during tanker delivery to the process to detect any odour that might signify non-compliance or non-standard wastes in the slurry.
- 5.3 Monitoring frequencies will be reviewed in the event of an odour event occurring.
- 5.4 Where such monitoring indicates an issue, the cause will be investigated and measures will be put in place to resolve the problem. A spare carbon filter is kept on site so that any damaged filter can be replaced as soon as possible.

6 INVESTIGATION AND MANAGEMENT OF ODOUR EVENTS

- 6.1 The site will be operated in accordance with an Environmental Management System. All operations at the site will be managed by a Technically Competent Manager.

¹ Eg [How to Purify Biogas Using Activated Carbon Filtration into Biomethane \(anaerobic-digestion.com\)](https://www.biogas.com/technology/How-to-Purify-Biogas-Using-Activated-Carbon-Filtration-into-Biomethane-(anaerobic-digestion.com))

- 6.2 In the event that odour nuisance is detected at the site boundary, an investigation will be undertaken to determine the cause.
- 6.3 Where odour nuisance arises due to particular wastes being accepted at the site, the offending materials will be identified and the waste producer will be advised these wastes may no longer be accepted.
- 6.4 Any incidence of odour nuisance will be recorded in the site log, together with details of the cause and actions taken to resolve the situation.
- 6.5 The site log will be made available for inspection by authorised officers of the Environment Agency.
- 6.6 In the event of any odour complaints from the public or local businesses, an investigation will be undertaken to determine the cause and mitigation measures implemented as appropriate. Details will be recorded in the site log and reported through the EMS.

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