



MURROW AD PLANT LTD PERMIT VARIATION APPLICATION MARCH 2023

Non-Technical Summary

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1. NON-TECHNICAL SUMMARY

1.1. Non-Technical Summary

- 1.1.1. The Murrow AD Plant Ltd is a wet mesophilic anaerobic digestion (AD) facility located at Somerset Farm Cants Drove, Murrow, Wisbech, Cambs, PE13 4HN, approx. central grid reference TF 37303 04635. Murrow AD Plant Ltd has entered into an operations and maintenance contract with Adapt Biogas Ltd who oversee operations and maintenance at the site working on behalf of Murrow AD Plant Ltd.
- 1.1.2. The site is currently permitted to operate according to standard rules permit SR2021 No.8; on farm anaerobic digestion facility using farm waste only, including use of the resultant biogas; Part A installation – treatment capacity over 100 tonnes of waste per day Environmental Permit No. EPR/FB3133AW/V005. Following the now requested variation to the permit, the operator will operate according to a bespoke installation permit with the capacity to process up to 125,000 tonnes of feedstocks a year in the AD process. The average hydraulic retention time for feedstocks processed at the site is 39 days.
- 1.1.3. In addition to the main Schedule 1 anaerobic digestion (AD) activity at the site, there are several other directly associated activities (DAA's) undertaken as follows; emergency flare operations, biogas combustion in CHP engines, biogas upgrading to biomethane, raw material storage, biogas treatment (desulphurisation), digestate separation, digestate storage, incoming waste storage, recovery of CO₂ to produce a food grade product, and storage of the final recovered liquid CO₂ product.
- 1.1.4. The operator processes purpose grown crops, (principally maize), non-waste crop residues, and animal manures and slurries within five primary and one secondary anaerobic digestion tank to produce biogas and digestate.
- 1.1.5. Solid farm-based feedstocks are stored in a series of outdoor concrete storage bays and a clamp area prior to processing, and liquid slurry feedstock is received into a liquid reception tank.
- 1.1.6. Feedstocks are introduced into the process via feeding units which are top loaded using a telehandler.
- 1.1.7. Biogas produced in the AD process is stored in gas storage roofs in the head space of the digesters. The biogas is used within two 250 kW combined heat and power (CHP) engines (each with thermal inputs of 0.619MW). These CHPs provide both heat and power for site operations as do a further two 500 kW CHPs (each with thermal inputs of 1.193MW) which are run on imported liquified natural gas (LNG). All four engines were commissioned after December 2018.
- 1.1.8. The remaining biogas produced at the site is upgraded to produce biomethane and injected directly to the high-pressure National Gas Transmission (NTS) system via 1km of pipework and a block valve connection. The biomethane does not need to be blended to a distribution specification, (with for instance the addition of propane or gas odorant), because it is injected to a high-pressure network and is blended within the network. As no odorant is needed, no odorant chemicals are handled at the site.

- 1.1.9. During the biogas upgrading process, carbon dioxide (CO₂) is removed from biogas and vented to atmosphere. The Murrow AD site undertakes an additional step to recover the CO₂ which might otherwise be vented to atmosphere. The CO₂ is processed in a CO₂ recovery facility that removes any final trace impurities and transforms the CO₂ into a liquid state. The recovered liquid CO₂ is then stored in a tank as a final product that reaches end of waste status and is fit for use in the food and drink manufacturing and supply industry.
- 1.1.10. Final digestate arising from the process is passed through a separator to produce a separated liquid and solid fraction. The separated solid fraction drops into a clamp and is routinely taken off site for interim storage in satellite field heaps at the intended site of spreading for use as an agricultural fertiliser or soil conditioner.
- 1.1.11. The separated liquid digestate is piped to one of two earth bank digestate stores/lagoons. The lagoons are filled via a direct pipeline connection from the AD site. A diverter arrangement allows the operator to select which lagoon digestate will be sent to. The pipeline is above ground in the vicinity of the AD site and is then located below ground on route to the more distant permitted lagoon.
- 1.1.12. Digestate produced at the site is not currently regulated as a waste as sole waste inputs are manures and slurries.
- 1.1.13. Separated liquid digestate is spread to land from store, for agricultural benefit.
- 1.1.14. Condensate arising from the gas line, CHPs and upgrading unit is collected in a dedicated collection system and pumped back through the process.
- 1.1.15. The site operates an emergency flare for management of excess gas during engine or upgrading unit downtime. This flare is capable of burning all biogas produced at the site in an emergency situation should the need arise. The site is also equipped with an emergency backup diesel generator which will provide sufficient power to operate key functions during power outage to maintain safe site operations until normal operations resume.
- 1.1.16. Hydrogen sulphide levels and associated damage to plant and equipment is managed via dosing of ferric hydroxide and ferric oxide via the feeder units. Oxygen injection is also undertaken to allow for biological management of hydrogen sulphide on sulphur nets in the heads of the digesters.
- 1.1.17. Process tanks and storage vessels are fitted with agitators, high level alarms, and in the case of gas tight vessels, emergency under/over pressure relief valves.
- 1.1.18. The whole facility is operated in accordance with an Environmental Management System (EMS) and technical competence requirements are met by in house staff who hold the relevant AD WAMITAB qualification.
- 1.1.19. All clean surface water and effluent/run off from storage areas is collected in a series of sumps and diverted for use within the AD process.

- 1.1.20. Clean water associated with discharge point W1 is collected in an offsite sump and then either stored in the digestate lagoon or used within the AD process.
- 1.1.21. Clean surface water arising from concrete/impermeable areas of the site that are at low risk of contamination may be collected in a low point sump, tested and released to surface water on a batch test basis if testing indicates that the water quality is within acceptable benchmark thresholds.

