Review of an Environmental Permit for an Installation subject to Chapter II of the Industrial Emissions Directive under the Environmental Permitting (England & Wales) Regulations 2016 (as amended)

Decision document recording our decision-making process following review of a permit

The Permit number is: EPR/SP3631LL
The Operator is: United Utilities Water Limited
The Installation is: Bury Wastewater Treatment Works Sludge Treatment Facility
This Variation Notice number is: EPR/SP3631LL/V009

What this document is about

We have reviewed the permit for this installation against the revised BAT Conclusions for the Waste Treatment industry sector published on 10 August 2018 in the Official Journal of the European Union. In this decision document, we set out the reasoning for the consolidated variation notice that we have issued.

It explains how we have reviewed and considered the techniques used by the Operator in the operation and control of the plant and activities of the installation. This review has been undertaken with reference to the decision made by the European Commission establishing Best Available Techniques (BAT) Conclusions (BATc) for Waste Treatment as detailed in document reference C(2018) 5070. It is our record of our decision-making process and shows how we have taken into account all relevant factors in reaching our position. It also provides a justification for the inclusion of any specific conditions in the permit that are in addition to those included in our generic permit template.

As well as considering the review of the operating techniques used by the Operator for the operation of the plant and activities of the installation, the consolidated variation notice takes into account and brings together in a single document all previous variations that relate to the original permit issue. Where this has not already been done, it also modernises the entire permit to reflect the conditions contained in our current generic permit template.

The introduction of new template conditions makes the Permit consistent with our current general approach and with other permits issued to Installations in this sector. Although the wording of some conditions has changed, while others

have been deleted because of the new regulatory approach, it does not reduce the level of environmental protection achieved by the Permit in any way. In this document, we therefore address only our determination of substantive issues relating to the new BAT Conclusions and any changes to the operation of the installation.

We try to explain our decision as accurately, comprehensively and plainly as possible. Achieving all three objectives is not always easy, and we would welcome any feedback as to how we might improve our decision documents in future.

How this document is structured

1. Our decision
2. How we reached our decision
3. The legal framework
4. Review of operating techniques within the Installation against the Waste Treatment BAT Conclusions.
5. Review and assessment of changes that are not part of the BAT Conclusions derived permit review
6. ANNEX 1 – Improvement Conditions

1 Our decision

We have decided to issue the Variation Notice to the operator. This will allow the operator to continue to operate the Installation, subject to the conditions in the Consolidated Variation Notice that updates the whole permit.

We consider that, in reaching our decision, we have taken into account all relevant considerations and legal requirements and that the varied permit will ensure that a high level of protection is provided for the environment and human health.

The Consolidated Variation Notice contains many conditions taken from our standard Environmental Permit template including the relevant annexes. We developed these conditions in consultation with industry, having regard to the legal requirements of the Environmental Permitting Regulations and other relevant legislation. This document does not therefore include an explanation for these standard conditions. Where they are included in the Notice, we have considered the techniques identified by the operator for the operation of their installation, and have accepted that the details are sufficient and satisfactory to make those standard conditions appropriate. This document does, however, provide an explanation of our use of “tailor-made” or installation-specific conditions, or where our Permit template provides two or more options.

2 How we reached our decision

<u>Requesting information to demonstrate compliance with BAT Conclusion techniques</u>

We issued a Notice under Regulation 61(1) of the Environmental Permitting (England and Wales) Regulations 2016 (a Regulation 61 Notice) on 1 April 2021 requiring the operator to provide information to demonstrate where the operation of their installation currently meets, or how it will subsequently meet, the revised standards described in the relevant BAT Conclusions document.

The Notice required that where the revised standards are not currently met, the operator should provide information that:

- describes the techniques that will be implemented before 17 August 2022 (BAT Compliance Date), which will then ensure that operations meet the revised standards, or
- justifies why standards will not be met by 17 August 2022, and confirmation of the date when the operation of those processes will cease within the Installation or an explanation of why the revised BAT standards are not applicable to those processes, or

- justifies why an alternative technique will achieve the same level of environmental protection equivalent to the revised BAT standards described in the BAT Conclusions.

Where the operator proposed that they were not intending to meet a BAT standard that also included a BAT Associated Emission Level (BAT-AEL) described in the BAT Conclusions Document, the Regulation 61 Notice required that the operator make a formal request for derogation from compliance with that BAT-AEL (as provisioned by Article 15(4) of IED). In this circumstance, the Notice identified that any such request for derogation must be supported and justified by sufficient technical and commercial information that would enable us to determine acceptability of the derogation request.

The Regulation 61 Notice response from the operator was received on 11 February 2022.

We considered it was in the correct form and contained sufficient information for us to begin the permit review but not that it necessarily contained all the information we would need to complete the determination.

We sent a request for further information on 23 July 2024 requiring the operator to provide information regarding several aspects of their Regulation 61 response. We received the operator's response on 20 August 2024.

The operator made no claim for commercial confidentiality. We have not received any information in relation to the Regulation 61 Notice response that appears to be confidential in relation to any party.

During the determination, the operator stated that digested sludge may be temporarily imported to the site before being transferred off-site. The sludge will not be undergo biological treatment via the sludge digesters. The receipt of digested sludge from other sites will be as a contingency measure due to abnormal events such as breakdown or maintenance. The import volumes will vary, and the sludge will not undergo any biological treatment via the sludge digesters.

We have excluded the receipt and storage of imported digested sludge from this permit review because this activity is a stand-alone waste operation and requires a formal permit application. We have informed the operator to submit an application to undertake this activity with the appropriate documentation following the completion of this permit review.

3 The legal framework

Article 21(3) of the Industrial Emissions Directive (IED) requires the Environment Agency to review conditions in permits that it has issued and to ensure that the permit delivers compliance with relevant standards, within four years of the publication by the European Commission of updated decisions on BAT Conclusions.

The BAT Conclusions for Waste Treatment were published on 17 August 2018 following a European Union wide review of BAT, implementing decision (EU) 2018/1147 of 10 August 2018. BAT applies to sewage sludge treatment sites treating waste not covered by the Urban Waste Water Treatment Regulations (UWWTR). The activities at Bury Wastewater Treatment Works Sludge Treatment Facility are existing and are covered by an IED permit. This permit review programme brings this site up to the Waste Treatment BAT standards for biological treatment.

The Consolidated Variation Notice will be issued under Regulations 18 and 20 of the EPR. The Environmental Permitting regime is a legal vehicle which delivers most of the relevant legal requirements for activities falling within its scope. In particular, the regulated facility is:

- an *installation* as described by the IED;
- subject to aspects of other relevant legislation which also have to be addressed.

We consider that, in issuing the Consolidated Variation Notice, it will ensure that the operation of the Installation complies with all relevant legal requirements and that a high level of protection will be delivered for the environment and human health.

We explain how we have addressed specific statutory requirements more fully in the rest of this document.

4 Review of operating techniques against the Waste Treatment BAT Conclusions.

Review of our own information in respect to the capability of the Installation to meet revised standards in the BAT Conclusions

The Best Available Techniques (BAT) Reference Document for Waste Treatment provides a minimum standard of operation across the waste industrial sector. Alongside BAT-AELs, the BREF outlines general BAT conclusions, which apply to all waste sectors namely; the biological treatment of waste and the treatment of water-based liquid wastes.

The BAT Conclusions for the Waste Treatment sector, were published by the European Commission on 17 August 2018. There are 53 BAT Conclusions. These Conclusions identify techniques that can be considered BAT and specify BAT associated emission limits (BAT-AELs) for waste treatment installations. The BAT-AELs are mandatory emission levels. These are generally numerical limits on point source emissions to water and air. We recognise that many sludge treatment facilities were constructed prior to the current permitting requirements and their design may not be readily compatible with the best available techniques as described in the BREF and BAT conclusions. Where this is the case, risk assessments and alternative proposals can be used to demonstrate that an equivalent level of environmental protection is being or can be achieved. Where an operator is not yet compliant with relevant BAT conclusions, we set improvement conditions which requires the operator to meet the required BAT conclusion within an acceptable timeframe.

We assessed the information provided by the operator in response to the Regulation 61 Notice. In this section, we provide a discussion of the following BAT points which are relevant to the waste water treatment sector which helped determine how the operator complies with requirements of the Waste Treatment BAT conclusions:

- Inventory of waste waters (BAT conclusion 3)
- Indirect discharges to surface water (BAT conclusions 7 and 20)
- Management of Odour (BAT conclusions 10 and 12)
- Management of diffuse emissions (BAT conclusion 14)
- Secondary containment (BAT conclusion 19)

Where this document does not discuss a BAT conclusion in detail, we have accepted the operator's supporting information and justifications that they are compliant with the respective BAT conclusion.

Bespoke permit conditions

During the permit review, we identified key issues where the operator was unable to demonstrate how they would meet the relevant BAT conclusion requirements. These are standard pieces of information and evidence which

would be expected upon receipt of a permit application for a new bespoke anaerobic digestion installation facility. These key issues were:

- Sufficient secondary containment measures
- Enclosure of tanks storing and treating digestate still generating biogas (post-digestion)
- Preventing waste water emissions to the waste water treatment works during storm overflow
- Monitoring digestate stability

We assessed the above aspects during the permit review. A detailed account of these assessments is outlined in the sections below. Where we have not been able to fully assess the operator's proposals to meet BAT conclusion requirements, but have received commitments to implement BAT, we have set time sensitive improvement conditions alongside backstop bespoke permit conditions.

Improvement conditions alone would not contain sufficient legal certainty to require an operator to have BAT in place. However, we acknowledge that this is an existing activity which has been operating for several years and we recognise that a pragmatic approach was needed to bring several aspects of this installation into environmental regulation.

To issue permits without agreeing that an activity fully meets BAT is in essence a permitted local enforcement position (LEP). LEPs are used by the Environment Agency for activities operating outside of a permit. This method will be implemented by setting prescriptive bespoke conditions in the permit for the outstanding BAT issue. These bespoke conditions include the definitive requirement plus a deadline for those techniques to be implemented – a backstop. We have also set improvement conditions for the timely submissions of detailed plans. Should an operator not comply with an improvement condition, a bespoke condition will be in place for the Environment Agency to enforce against, in accordance with our enforcement and sanctions policy.

For these improvement conditions, we have set a final deadline of 31 March 2025. It should be noted that the implementation date for operators to be compliant with the Waste Treatment BAT conclusions was 17 August 2022. Our deadline specified in the improvement condition provides a sufficient timeframe in which the operator can produce detailed plans to meet BAT and a timetable for their implementation. Where operators do not satisfy the requirements of the improvement condition by 31 March 2025, the Environment Agency may commence enforcement action against the WaSC. Failure of the WaSCs to achieve BAT or failure to take steps to implement BAT by the backstop will be at the operator's risk.

Inventory of waste water (BATc 3)

Anaerobic digestion (AD) installations produce a series of waste waters (also known as ‘liquid digestate’ or ‘liquors’) and are discharged to the adjacent WwTW. Following discharge to the WwTW and treatment under UWWTR, the treated effluent is discharged to surface waters (rivers or streams) or in some cases directly to sea.

Effluent is generated on site through the screening and dewatering of indigenous and imported sludges prior to the anaerobic digestion process, the production of biogas condensate, biogas pipeline transfer, post-digestion storage and digestate transfer.

The Waste Treatment BAT Conclusions require operators to establish and to maintain an inventory of waste water, as part of the environmental management system (BATc 3) as follows:

In order to facilitate the reduction of emissions to water and air, BAT is to establish and to maintain an inventory of waste water and waste gas streams, as part of the environmental management system, that incorporates all of the following features which are identified for waste water as:

Information about the characteristics of the waste water streams, such as:

- *average values and variability of flow, pH, temperature, and conductivity;*
- *average concentration and load values of relevant substances and their variability (e.g. COD/TOC, nitrogen species, phosphorus, metals, priority substances / micropollutants);*
- *data on bioeliminability (e.g. BOD, BOD to COD ratio, Zahn-Wellens test, biological inhibition potential (e.g. inhibition of activated sludge))*

The Environment Agency has found that across the waste water sector, WaSCs have not undertaken a comprehensive analysis of their indirect emissions to water from the installation activities to the WwTW. The waste materials treated via the AD installation are potentially diverse and the composition of the feedstock and treated digestates could contain significant variation in pollutants as the indigenous and imported sludge is produced from the WwTW which accept trade effluents (via consented discharges in the catchment).

The waste water emissions inventory informs treatment methodologies, environmental risk assessments and monitoring requirements. However, across the sector, this information is not available. The Environment Agency recognises that the operator’s emissions discharged to the WwTW have never been fully quantified, and therefore, accept that emissions to the WwTW have not been subject to a quantitative risk assessment. In addition, the operator also cannot demonstrate that they are compliant with BAT-AELs for indirect discharges to water (as specified within BAT conclusion 20 of the Waste Treatment BREF).

We understand and recognise that this industrial activity is already existing and consider it appropriate, where possible, to bring these activities into environmental regulation. While the operations are a pollution risk, the operator is not introducing new risks to the environment. It is important to note that any applications including a new emission to water would require a demonstration that emissions would not adversely impact any receiving waters, or breach relevant BAT-AELs before a permit could be issued.

Our guidance, *Surface water pollution risk assessment for your environmental permit*, indicates that establishing a representative composition of the waste water streams requires a number of samples over a long period (12 – 36 samples). The scope of pollutants to be identified in the waste water depends on what substances are likely to be within the waste water at the point it is discharged from the installation. To determine what is in the waste water, the operator will need to examine and have a good understanding of the inputs to the installation. It is the responsibility of the operator producing the effluents/waste waters/liquors to understand what pollutants need to be assessed based on their understanding of the waste waters.

To establish a waste water inventory and to facilitate a quantitative risk assessment from this indirect emission point, we have set improvement conditions. Our processes state that we generally do not set improvement conditions that require BAT to be demonstrated at some date after the permit application has been determined. Generally, we should be satisfied whether operations will be BAT at the appropriate time, and we should make that assessment at the time we issue any permit or variation. However, for the reasons set out above, this assessment is not possible due to the lack of data in this area across the WaSC sector. We consider setting improvement conditions as a pragmatic approach to identify what is in the waste water to then implement future improvements.

We have included improvement conditions IC25a, IC25b and IC25c in the permit to address these deficiencies. There are three stages to this improvement programme. The first (IC25a) requires the operator to submit and carry out a sampling and analysis program and gather the relevant data on the waste water. In accordance with the Waste Treatment BREF, the IC requires the operator to determine the composition of the pollutants which have BAT-AELs (these include heavy metals). Due to the variety of inputs to the waste treatment process and the unknown composition of the waste waters proposed for discharge to the WwTW, we cannot consider this effluent as straightforwardly a ‘biodegradable waste’. Therefore, the IC also sets the requirement on the operator to establish an inventory of pollutants of ‘all relevant substances’. The scope of pollutants the operator must identify depends on what substances are likely to be within the waste water at the point it is discharged from the installation. To determine what is in the waste water, the operator will need to examine and have a good understanding of the inputs to the installation. This installation accepts waste inputs from indigenous and imported sludges.

Due to this variety of inputs and the requirement for a minimum of 12 samples, we have specified that this monitoring period be for at least a year to determine a representative understanding of the discharge. The Environment Agency recognises that 12 months is a long period but establishing the composition of the waste water will facilitate long term improvements and ensure that all potential pollutants are able to be controlled.

On completion of IC25a, IC25b requires the operator to undertake a full assessment of the results providing a summary of the sample results, a completed H1 risk assessment(s) and detailed modelling (where necessary) with an assessment made against the parameters specified in the relevant environmental standards as specified within our guidance. We also require the operator to submit proposals and/or additional measures required to prevent or minimise any significant emissions from the installation along with timescales for implementation. IC25c requires the implementation of any relevant improvements identified.

The operator has provided written confirmation that they will undertake sampling and analysis of wastewater returns to the head of the WwTW in line with BATc 3, subject to the outcome of ongoing discussion with the Environment Agency and agreement on an industry wide approach.

The overarching aim of the improvement programme is to establish comprehensively what the operators of AD installations discharge to WwTW and to drive long term improvements. The lack of existing data across the industry means that the Environment Agency, rather than taking enforcement action on existing installations, facilitates a process for WaSC operators to achieve BAT and to meet environmental standards for long term environmental protection.

Monitoring indirect discharges to surface water (BATc 7 and 20)

The waste waters from Bury Wastewater Treatment Works Sludge Treatment Facility are discharged to the adjacent Bury WwTW. Any treatment of the waste waters once it arrives at the WwTW is currently regulated under UWWTR, not under control of an environmental permit. The discharge of waste waters to a WwTW is a point source emission and is termed as an “indirect discharge” under the Waste Treatment BAT Conclusions. Currently, indirect discharges from the sludge digestion activity are not subject to monitoring or control in the existing permit.

The operator reports that process wastewaters are generated from filtrate returns, biogas condensate and liquors from the odour abatement plant. The effluent streams arising from the sludge treatment process primarily comprise biodegradable organic compounds, ammonia and suspended solids. Wastewater emissions are returned to the head of Bury WwTW to undergo full biological treatment comprising primary treatment, secondary and tertiary treatment, in order to achieve the consented discharge limits.

The only other wastewater generated routinely is from cleaning activities. This is also returned to the WwTW for biological treatment via the site drainage system. This is a circular process and is considered to represent BAT.

The operator proposes to carry out the following monitoring to characterise the wastewater streams and to verify that the wastewater treatment plant abates the pollutants concerned:

- Biogas condensate and OCU wastewater: pH, COD and BOD on four occasions over 12 months – very little variability expected
- Filtrate: pH, COD, BOD, NH_4, PO4 and N - monthly for 12 months

We asked the operator via a request for further information to identify all point source emissions to sewer from the installation. The operator provided an updated site plan which included all sampling and discharge points to the adjacent WwTW. We have included the updated site plan in the permit. We have applied monitoring requirements and the BAT-AELs for indirect discharge to surface waters as required under BATc 7 and BATc20, Table 6.2.

Management of Odour (BATc 10 & 12)

The Waste Treatment BREF outlines techniques for minimising the impact from odour pollution from operations which are likely to cause odour. Anaerobic digestion and the handling /storage of various waste sludges and organic wastes can be highly odorous. The Waste Treatment BREF includes general BAT conclusions which operators must implement (BAT 10 and 12 where odour nuisance at sensitive receptors is expected and/or has been substantiated.

We asked the operator to confirm whether or not the site has a current, up-to-date odour management plan, as part of the Regulation 61 Notice. The operator provided a copy of the site odour management plan in their response to support compliance with BAT 10 and 12. We have reviewed the odour management plan and we are satisfied that the site complies with the requirements of Waste Treatment BAT conclusion 10 and 12.

Effectiveness of existing abatement systems

The installation includes industrial processes which produce waste gas and odour emissions that are discharged to air via vents or stacks. BAT conclusion 14 of the Waste Treatment BREF states that emissions from diffuse sources should use techniques like, *collecting and directing the emissions to an appropriate abatement system via an air extraction system and/or air suction systems close to the emission sources*. BAT conclusion 34 and 53 describe the use of appropriates techniques to reduce channelled emissions to air of dust, HCl, organic compounds and odorous compounds, including H_2S and NH_3. These are adsorption, biofilter, fabric filter, thermal oxidation and wet scrubbing.

The abatement technique employed at this installation is catalytic iron filtration with two stage carbon filtration). The abatement system covers the majority of

the pre-anaerobic digestion assets (imported sludge wet well, imported thickened sludge tank, strain presses, raw sludge holding tank, gravity thickening belts, thickened sludge holding tank, filtrate pumping station). The treated air stream is then discharged to atmosphere via a stack (emission point A4).

We did not assess the operator's abatement plant and its suitability in providing effective abatement during the permit review. As part of the Environment Agency approach to reduce emissions in the biowaste treatment sector, we have set an improvement condition (IC28). The improvement condition requires the operator to demonstrate via determining the composition of waste gas emissions, monitoring and additional risk assessment that the existing abatement system effectively treats the emissions to air. Where further improvements are identified, the operator is required to implement these measures. It should be noted that a review of the existing system could determine that the existing systems are not suitable for the waste gas emissions. Where this is the case, further improvements on site may be required which may include the installation of new abatement plant. The installation of a new abatement plant will require a variation to the existing permit.

Any new abatement plant will need to be designed to reduce odours and where required ammonia. For new abatement plant, an operator will need to ensure that new abatement systems achieve the BAT-AEL for odour or limits defined by the plant design, whichever is less. The BAT-AEL for odour concentration is 1,000 ou_E/m^3. Should the operator seek to install an abatement system which cannot meet this requirement, it is unlikely that the abatement plant will be BAT.

Management of diffuse emissions (BAT conclusion 14)

BAT conclusion 14 requires operators to contain, collect and treat diffuse emissions from site process and it states as follows:

In order to prevent or, where that is not practicable, to reduce diffuse emissions to air, in particular of dust, organic compounds and odour, BAT is to use an appropriate combination of the techniques given below:

Containment, collection and treatment of diffuse emissions. This includes techniques such as:

- *storing, treating and handling waste and material that may generate diffuse emissions in enclosed buildings and/or enclosed equipment (e.g. conveyor belts);*
- *maintaining the enclosed equipment or buildings under an adequate pressure;*
- *collecting and directing the emissions to an appropriate abatement system (see Section 6.1) via an air extraction system and/or air suction systems close to the emission sources.*

Furthermore, the Waste Treatment BAT Reference Document requires that waste stored which produces waste gases must be enclosed. Gases must then be appropriately abated.
Section 2.3.5.5 of the Waste Treatment BREF states:
Because flaring is both a source of pollution and leads to the burning of a potentially valuable product, its use should be limited to non-routine, momentary stoppages or emergency releases. Uncontrolled emissions (especially VOCs) from vents and relief valves should be routed to recovery systems, with flares serving only as a backup system.

This section of the BREF makes reference to the flaring of biogas and is not directly relevant to open tanks. However, it is important to note that due to the pollution potential from uncontrolled emissions of biogas, it is essential that these emissions are collected and utilised either as a fuel, in storage or for further treatment to refine the biogas. It is not appropriate to store or treat digestate producing biogas within open tanks.

We acknowledge that BAT conclusion 14d provides limits on the applicability for enclosing waste where there is a potential risk from explosion. Storage of unstable digestate will release unspecified quantities of combustible gases. However, the standard industry practice within the commercial anaerobic digestion sector is to minimise unstable digestate storage by typically using longer residence times within sealed digesters to maximise biogas generation.

The Health and Safety Executive (HSE) provide general guidance on bulk storage tank design:
Design Codes – Plant
https://www.hse.gov.uk/comah/sragtech/techmeasplant.htm
Storage of flammable liquids in tanks
Storage of flammable liquids in tanks HSG176 (hse.gov.uk)

We have been advised that, in the view of the HSE, the competent installation of tank covers is possible using current tank standards. We believe it is possible to design and modify tanks that meet both the specific circumstances and relevant engineering standards.

We also recognise that the covering of tanks may have an impact on whether the site needs to consider the requirements of the Control of Major Accident Hazards (COMAH) Regulations 2015. The creation of additional enclosed space(s) in the site (inside the newly enclosed tanks and any associated new abatement equipment) where dangerous substances are present (or anticipated to be present) would have the consequence of increasing the COMAH inventory, which could in turn move a site from *Lower* to *Upper* Tier or bring a site into the scope of the regulations. An operator will need to consider these requirements when producing plans and designs for tank covers.

Open topped tanks /floating roof digesters – post-digestion

We asked the operator to provide a site layout plan which showed all open-topped tanks used for storage and treatment of waste on site and to provide a full commitment to cover all open-topped tanks in line with BATc 14d.

The Environment Agency considers the covering of tanks generating biogas (and channelling the gas to utilisation plant/storage) as BAT. It must be undertaken by any operators treating waste via anaerobic digestion (and subsequent storage). Any alternative approach to this must form part of a permit application supported by evidence-based justifications.

This installation currently uses 3 primary digester tanks/vessels to undertake anaerobic digestion. The site's annual throughput of waste treated via anaerobic digestion is 2,080,500 tonnes. The waste undergoes this treatment in these tanks with a Hydraulic Retention Time (HRT) of 9.4 days. HRT is defined as the working volume of the digester divided by the rate of feeding as volume per unit time and is expressed in days. It is a fundamental design parameter and is typically a determining factor in sizing the AD plant. Biogas produced during this stage is collected in in the roof space of digestion tanks and standalone gas storage infrastructure and subsequently channelled via sealed pipework to gas utilisation structures. This site uses one CHP engine to combust the biogas to use the energy generated on site.

The treated waste, described as sludge or digestate is discharged into Digested Sludge Holding Tank and Secondary Digested Sludge Holding Tanks. These tanks are uncovered, therefore, any waste gases, including biogas will be emitted from the tank to atmosphere. The large quantities of waste feedstock and relatively short HRT indicate that the digestate could still be producing biogas after it has been discharged into the open Digested Sludge Holding Tank and Secondary Digested Sludge Holding Tanks. From our regulatory experience, we know biogas levels are still discharged to air from post digestion treatment (such as dewatering). This step can be over a week since the digestate was stored in open tanks. Therefore, emissions of biogas is likely to be even higher during the periods of storage in open 'secondary digester' tanks.

We asked the operator to provide written confirmation that they will commit to covering the Digested Sludge Holding Tank and Secondary Digested Sludge Holding Tanks. and a description that shows the tank enclosure will be in line with guidance, *Biological waste treatment: appropriate measures for permitted facilities*. We also asked how biogas generated from the Digested Sludge Holding Tank and Secondary Digested Sludge Holding Tanks. will be utilised as a fuel or stored for utilisation off site.

The Environment Agency recognises that the use of open tanks across the wastewater industry is widespread. While the operator did not provide detailed proposals to enclose tanks, they have committed to develop plans to put these infrastructure changes in place to prevent uncontrolled emissions of biogas from open tanks in the near future.

To ensure the operator implements these changes, we have set an improvement condition (IC23) to capture the gases produced within the open secondary digester storage tanks. The IC requires the tanks to be enclosed and connected to the gas management infrastructure, or in rare cases, to a suitable odour abatement system which treats the potentially polluting components of the waste gas. We state that an odour abatement system will only be suitable in rare cases because without evidence to demonstrate otherwise, these tanks and storage infrastructure likely continuously emit a methane rich gas to the environment. It is unlikely that emissions will be comprised of gases which can be controlled by traditional odour abatement techniques. It is therefore most likely that the operator will need to capture and use the gas or treat for the purpose of producing a viable biomethane.

The methane component of a biogas will not be treated by odour abatement techniques and will be discharged into the atmosphere. Only if methane is not a relevant component in the waste gas will odour abatement plant be justified for use on Digested Sludge Holding Tank and Secondary Digested Sludge Holding Tanks.

This improvement condition does not allow the operator to determine that the open tanks can remain uncovered. The improvement condition is not an opportunity for the operator to propose alternative methods to enclosing tanks, capturing gases and treating/using the gas.

The operator did not propose an appropriate alternative to the BAT technique of enclosing their tanks with any supporting evidence. The operator is therefore required to enclose the open Digested Sludge Holding Tank and Secondary Digested Sludge Holding Tanks.

IC23 requires the operator to produce a ‘post anaerobic digestion vessel cover plan’. The plan requires the operator to include detailed design information on tank cover design and associated biogas gas management infrastructure (or in rare cases waste gas abatement plant). In addition to the design requirements, the operator must present appropriate evidence that the waste gases will be controlled by the proposed design. The operator has confirmed their commitment to enclosing these tanks and to the requirements of the improvement condition.

The permit also includes bespoke permit conditions alongside the ICs. This bespoke permit condition requires the operator to have the appropriate infrastructure installed on the site by 31 March 2025. Should the operator fail to implement the changes required by that deadline, the Environment Agency may undertake enforcement proceedings against the operator. This position is in place to facilitate the opportunity for operators to become BAT compliant and install necessary infrastructure. The Environment Agency recognises that this approach is different to standard environmental permitting processes. However, we consider that the operator has provided sufficient commitment that they will undertake the necessary improvements to prevent uncontrolled

biogas emissions and/or other waste gas emissions from open tanks. Backstop conditions in the permit will ensure this is achieved.

Secondary containment (BAT conclusion 19)

Secondary containment is a fundamental principle of pollution prevention at industrial sites and waste management facilities. We assess secondary containment provision when determining permit applications. Secondary/tertiary containment is an appropriate protective measure and is a standard requirement of an environmental permit. The Waste Treatment BREF includes BAT conclusion 19 which identifies several relevant techniques *to prevent or, where that is not practicable, to reduce emissions to soil and water*.

WaSC Sludge AD facilities store and treat significant volumes of waste sludge and liquids that have the potential to cause pollution to land, air and water and to impact detrimentally on any nearby sensitive habitats or areas of human occupation (also known as sensitive receptors). These facilities are co-located with wastewater treatment works (WwTW) and, by the nature of these operations, are usually located near to watercourses. They have tended to have little in the way of secondary containment, such as impermeable surfacing or bunding, that would protect the environment in the event of a loss of containment.

The most common receptors we consider could be impacted by a loss of containment include groundwater (aquifers), water courses, designated conservation areas (such as Sites of Special Scientific Interest (SSSI), Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Ramsar sites), the adjacent WwTW and nearby human receptors such as residential and commercial premises.

We have provided advice on what WaSC operators should have regard to with respect to secondary containment, including making references to guidance documents as follows:

- Waste Treatment BAT Conclusions.
- *Environmental permitting guidance on the control of emissions* (gov.uk).
- *How to comply with your environmental permit. Additional guidance for: Anaerobic Digestion* Reference LIT 8737 Report version 1.0 dated November 2013.
- *Appropriate measures for the biological treatment of waste* – consultation document and response comments.
- *Biological waste treatment: appropriate measures for permitted facilities* - Guidance - GOV.UK (www.gov.uk)
- *Emissions control - Non-hazardous and inert waste: appropriate measures for permitted facilities* - This is not directly applicable to biological treatment but will be replicated in the appropriate measures as mentioned in the above bullet point.

- SR2021 No 10: anaerobic digestion of non-hazardous sludge at a waste water treatment works, including the use of the resultant biogas. This specifically applies to sludge AD facilities.

As well as highlighting all relevant guidance, we advised the WaSc (including this operator) of the requirements of containment assessments on multiple occasions, including:

- At a workshop held by Water UK in February 2020 (Water UK members are UK water and wastewater service suppliers for England, Scotland, Wales and Northern Ireland, the operator is a member of Water UK) – Presentation Title: Permitting Overview – Including section on containment – Surfacing, bunding and capacity, presented by a Senior Permitting Officer of the Environment Agency National Permitting Service.

- Written advice sent in March 2021 by us including.
    - Sector specific pre-application advice note.
    - BAT gap analysis template tool.

- Presentation on 14 July 2021, delivered to Water UK, titled, *IED Permitting TaF + Spill Modelling*, which the operator attended, in which spill modelling was specifically discussed, along with a reiteration of application requirements. Spill modelling seminar presented by a Member of the Project Steering Group of CIRIA C736.

CIRIA C736

CIRIA C736 is considered the industry containment assessment standard of choice and is based on the source-pathway-receptor approach to risk assessment. It provides a clear methodology for demonstrating BAT, appropriate measures and compliance with permit conditions.
It is applicable for identifying and managing the risk of storing substances which may be hazardous to the environment and applies to activities ranging from small commercial premises to large chemical facilities. It primarily considers the potential consequences of tank failure and provides a risk assessment methodology to support a classification system for containment, providing different levels of performance for different risks. The aim is to break the pathway between source and receptor.

The guidance provides containment options and examples of good practice, but it is not prescriptive and there may be circumstances where it could be appropriate to use other methods where at least an equivalent level of environmental protection is provided, however this would need to be provided at the point of permit determination.

Due to the nature of sewage sludge, waste cake or waste liquors, it is clear that this would be considered to be both a short and long-term hazard to the environment if released. Given the locations of sites that deal with these materials generally, it is reasonable to conclude that any major tank failure at an individual site will have the potential to cause significant damage to sensitive receptors.

It should be recognised that CIRIA C736 includes specific guidance for secondary containment provisions at existing facilities. Where CIRIA C736 measures cannot easily be achieved at existing sites, we expect site based specific risk assessments and any alternative measures to be proposed by operators which achieve at least the same level of environmental protection.

ADBA tool and guidance

The ADBA tool and guidance have been specifically designed as a guide for secondary containment for anaerobic digestion. The guide states 'Both the guide and the classification tool draw upon the principles and methodologies within CIRIA C736. The principles within CIRIA C736 are generally accepted as good practice in the design and construction of containment systems. The principles of CIRIA C736 are distilled into this accessible guide, which attempts to draw out the parts relevant to the AD sector'.

The tool itself is clearly set out to provide an inventory of sources, pathways and receptors and aligns with the containment system class types in CIRIA C736. It provides risk ratings and allows mitigation measures to be considered.

Alternative assessment methods

Where our guidance refers to CIRIA C736, it also allows for other equivalent approved standards. This does provide operators with the option of using other approved standards, but they must offer at least the same level of environmental protection.

Assessment of this facility

In their response to the Regulation 61 Notice, the operator stated that there is no secondary containment for underground structures on site. A quantitative risk assessment was undertaken in 2010 to ascertain the risk to controlled waters in relation to sludge leakage. The risk of leakage into the ground and migration of contamination to surface water (River Irwell) and shallow groundwater at the edge of the site was considered to be low and not applicable to deeper groundwater. An updated EQRA undertaken in 2021 confirmed that the risk to controlled waters from the sludge tanks and pipework still remained low.

The operator reported that site inspection tours are carried out daily by site-based staff and monthly by the site's Environmental Regulatory Advisor (ERA).

These tours include tank level monitoring, visual inspection of asset integrity, where possible, and general ground conditions. If any evidence of leaks or ground contamination is seen further investigations or remedial actions will be instigated immediately. Process control monitoring will also be used to assess tank and pipework integrity, e.g. comparison of flow meters throughout the system to identify any losses.

We asked the operator via a request for further information to confirm that secondary containment will be provided in line with CIRIA C736 or an equivalent standard. The operator confirmed that secondary containment will be provided at the installation in line with the requirements of CIRIA C736 or an equivalent standard to the Environment Agency for approval.

The operator confirmed that they will adhere to containment assessment against the recommendations of CIRIA C736 guidance - Containment systems for the prevention of pollution: Secondary, tertiary and other measures for industrial and commercial premises. The guidance provides containment options and examples of good practice, but it is not prescriptive and there may be circumstances where it could be appropriate to use other methods where at least an equivalent level of environmental protection is provided. Where CIRIA C736 measures are not considered to be relevant or appropriate, the operator reports that they will provide an explanation using a risk-based approach. Where measures cannot easily be achieved, alternative measures will be proposed which achieve at least an equivalent standard to provide the same level of environmental protection. It should be recognised however that CIRIA C736 includes specific guidance for operators who need to implement secondary containment provisions at existing facilities.

The Environment Agency recognises that this industrial activity is already existing and being undertaken and consider it appropriate, where possible, to bring these activities into environmental regulation as an installation. While the current operations are a pollution risk, the operator is not introducing new risks to the environment. It is important to note that any applications including new plant and bulk tanks would require a demonstration that secondary containment is designed in line with CIRIA C736 (or possible equivalent alternative) before a permit could be issued. We have therefore included an improvement condition (IC22) in the permit for the operator to provide a ‘secondary containment implementation plan’ which includes the finalised designs and an implementation schedule for a secondary containment system. We require that the proposals to be implemented by 31 March 2025.

5 Review and assessment of changes that are not part of the BAT Conclusions derived permit review

Emissions to air – Combustion

Biogas generated through the AD of waste contains a high quantity of methane and is often used to provide energy to onsite operations. Biogas is commonly combusted within on-site combined heat and power engines (CHP) or boilers which produce heat and electricity. Heat is used to provide energy in the form of steam or hot water and is directed to the anaerobic digestion plant processes, while electricity can be utilised to power other plant on site.

Combustion of biogas or other fuels such as natural gas produces waste gas emissions which are discharged to the atmosphere via a stack. The combustion of biogas releases the following products of combustion; oxides of nitrogen (expressed as NO_2), sulphur dioxide (SO_2), carbon monoxide (CO) and volatile organic compounds (VOC).

Existing combustion plant

We asked the operator to provide information on all combustion plant on site in the Regulation 61 Notice as follows:

- Number of combustion plant (CHP engines, back-up generators, boilers);
- Size of combustion plant – rated thermal input (MWth)
- Date each combustion plant came into operation
- Confirmation as to whether or not the combustion plant is subject to a capacity market agreement (2014 or 2015 auction) or whether or not a Feed-in Tariff preliminary accreditation application was received prior to 1 December 2016

The operator provided the information in the table(s) below:

Combined heat and power (CHP) engines /boilers

1. Rated thermal input (MW) of the combustion plant.	MCP 1: 1.088 MW (emission point A6) MCP 2: 2.93 MW (emission point A5a) MCP 3: 2.93 MW (emission point A5b)
2. Type of combustion plant (diesel engine, gas turbine, dual fuel engine, other engine or other medium combustion plant).	MCP 1: Biogas CHP engine MCP 2: Boiler No. 1 MCP 3: Boiler No. 2
3. Type and share of fuels used according to the fuel categories laid down in Annex II.	MCP 1: Biogas CHP engine – 100% biogas MCP 2: Boiler No. 1 – 100% biogas MCP 3: Boiler No. 2 – 100% biogas

4. Date of the start of the operation of the combustion plant or, where the exact date of the start of the operation is unknown, proof of the fact that the operation started before 20 December 2018.	CHP engine installed 2007 Boilers installed 1990
5. Confirmation of capacity market agreement arising from 2014 or 2015 capacity auctions.	N/A
6. Confirmation of Feed-in Tariff preliminary accreditation application received by the Gas and Electric Markets Authority prior to 1 December 2016.	N/A

We have reviewed the information provided and we consider that the declared combustion plant qualify as “existing” medium combustion plant.

For existing medium combustion plant with a rated thermal input of less than or equal to 5 MW, the emission limit values set out in tables 1 and 3 of Part 1 of Annex II MCPD shall apply from 1 January 2030. We have included the appropriate emission limit values for existing medium combustion plant as part of this permit review.

Bioaerosols

Site-specific bioaerosols risk assessments (SSBRA) are required where:

- The operational area (including abatement plant) is located within 250 metres of sensitive receptors: or
- Where area or point source emissions may pose a risk to the nearest sensitive receptor’s location.

SSBRAs demonstrate that the process and/or abatement measures adequately prevent, or where this is not possible, significantly reduce the risk of bioaerosols release, and that the resulting activity will be unlikely to expose the nearest sensitive receptor to elevated concentrations of bioaerosols.

There are no external site operational processes and/or channelled /point sources within 250 metres of a sensitive receptor. Monitoring of bioaerosols is not required at the installation.

Soil & groundwater risk assessment (baseline report)

The IED requires that the operator of any IED installation using, producing or releasing “relevant hazardous substances” (RHS) shall, having regarded the possibility that they might cause pollution of soil and groundwater, submit a “baseline report” with its permit application. The baseline report is an important reference document in the assessment of contamination that might arise during

the operational lifetime of the regulated facility and at cessation of activities. It must enable a quantified comparison to be made between the baseline and the state of the site at surrender.

At the definitive cessation of activities, the operator has to satisfy us that the necessary measures have been taken so that the site ceases to pose a risk to soil or groundwater, taking into account both the baseline conditions and the site's current or approved future use. To do this, the operator has to submit a surrender application to us, which we will not grant unless and until we are satisfied that these requirements have been met.

We asked the operator to carry out a risk assessment considering the possibility of soil and groundwater contamination at the installation, where site activities involve the use, production or release of a relevant hazardous substance (as defined in Article 3 (18) of the Industrial Emissions Directive[1]). Where any risk of such contamination is established, the operator was to either:

i. prepare and submit a baseline report containing information necessary to determine the current state of soil and groundwater contamination or

ii. provide a summary report referring to information previously submitted where they are satisfied that such information represents the current state of soil and groundwater contamination.

The operator submitted a risk assessment /summary report which considered the possibility of soil and groundwater contamination at the installation. The operator reported that the only relevant hazardous substances used by the installation are gas oil (diesel), which is used as a back-up fuel supply for the boiler, and clean and waste lubricating oil for the CHP engines. Gas oil and lubricating oils are stored in bunded tanks that are fully compliant with the Control of Pollution (Oil Storage) (England) Regulations 2001. The risk assessment concluded that there is low risk of soil and groundwater contamination from the storage and use of hazardous substances such as gas oil, lubricating oils, antifreeze etc. There have been no spillages/ releases of the gas oil into the environment that may have resulted in contamination of soil and/or groundwater. There are no activities undertaken by the installation that result in the production or release of a relevant hazardous substance.

The operator submitted a site condition report [UU ID: 80007181, June 2006] during the original application duly made on 30 June 2006. We reviewed that report and considered that it adequately described the condition of the soil and groundwater at that time. Consequently, we are satisfied that the baseline conditions have not changed. We have included the periodic monitoring of soil and groundwater in the permit as required by the IED.

[1] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32010L0075&from=EN

Primary containment

We recognise that many sludge storage and treatment vessels were constructed prior to the current permitting requirements and their design may not be compatible with BAT as described in the relevant BREF documents. The operator provided an inventory of their tanks and described the condition of those assets. Comprehensive evidence was not provided to assess the condition of the tanks and determine whether they are suitable for containing potentially polluting wastes and waste waters. However, as these tanks are already existing and perform an ongoing industrial operation, we have set an improvement condition in the permit to address any potential deficiencies in the existing site's primary containment.

IC24 requires the operator to review (undertaken by an appropriately qualified engineer) the physical condition of the primary containment and establish a program of works to implement any necessary individual measures to ensure that the primary containment is fit for purpose. The Environment Agency will review these submissions with regard to the guidance, *CIRIA C736 Containment systems for the prevention of pollution*.

Stability of whole digestate

The Waste Treatment BREF indicates that to prevent diffuse pollution to air, waste which potentially poses a risk should be stored in enclosed buildings or equipment. Solid digestates, also described as sludge cake are routinely stored externally before being removed from the site. Instead of requiring the sludge cake to be covered and fugitive emissions to be collected and abated, we are requiring operators to determine the stability of this material. A digestate or sludge cake which is unstable will produce fugitive emissions including biogas, odour and ammonia. The operator has not presented evidence of the stability of the externally stored digestates. Stability is defined in the specification for digestate, BSI PAS 110:2014. The standard defines digestate stability as the '*point at which the rate of biological activity has slowed to an acceptably low and consistent level and will not significantly increase under favourable, altered conditions*'. The wider water industry does not have reliable data on the stability of the digestate they produce. We have therefore set an improvement condition (IC29) for the operator to produce stability data for their output digestate. This improvement condition applies to all sludge treatment installations and will enable the Environment Agency to gather data to understand the levels of stability across the industry. Where operators produce digestates which have not been stabilised by the AD process, the Environment Agency will require an operator to:

- Improve the stability of the AD process (for example longer residence times)
- Enclose cake storage areas and treat diffuse gas emissions.

Furthermore, this data will feed into future work with the industry in establishing a benchmark to determine stability of the digestate.

The stability of the digestate depends on numerous factors, including type of feedstock, pre-treatment and digestion process and how this is managed in terms of organic load and residence time. For example, shortening residence times will increase the organic load and reduce the degree to which organic matter within the digester is converted to gas. Where this happens the digestate will be more active and capable of further biodegradation.

The method for understanding the stability of the digestate is by determining the residual biogas potential within the digestate. Residual biogas potential can be worked out by using the methodology, OFW004-005 [N6] as outlined within *BSI PAS 110: Producing Quality Anaerobic Digestate or an equivalent methodology for determining digestate stability*. We have not specified a threshold for residual biogas potential. The threshold defined within PAS 110 is part of a published standard operators use for producing an 'end-of-waste' digestate and not necessarily for establishing a definitive assessment of the potential for biogas generation. However, establishing the residual biogas potential will contribute to the operator's understanding of how stable the anaerobic digestion process has been.

This IC will allow the operator to gather evidence and produce an evaluation of their digestate. There are no definitive thresholds for the operator to meet.

Methane slip and Leak detection and repair (LDAR)

As part of the Environment Agency approach to reduce methane emissions in the biowaste treatment sector, we have included improvement condition (IC26) in the permit which requires the operator to assess methane slip resulting from the combustion of biogas via the CHP engines. Following an assessment of the data, the Environment Agency shall consider whether emission limits for volatile organic compounds are applicable for this installation.

We have also included improvement condition (IC27) requires the operator to review all sources of methane leaks from the site using a leak detection and repair (LDAR) programme. We have therefore set an improvement condition for the operator to submit a revised LDAR programme to detect and mitigate the release of VOCs (including methane) from diffuse sources and set up a monitoring regime.

Waste types

We have specified the permitted waste types, descriptions and quantities, which can be accepted at the regulated facility. The wastes are specified in Table S2.2 in the permit.

We are satisfied that the operator can accept these wastes for the following reasons:

- they are suitable for the proposed activities
- the proposed infrastructure is appropriate

- the environmental risk assessment is acceptable.

ANNEX 1 Improvement Conditions

Based on the information in the operator's Regulation 61 Notice response and our own records of the capability and performance of the installation at this site, we consider that we need to set improvement conditions so that the outcome of the techniques detailed in the BAT Conclusions are achieved by the installation. These improvement conditions are set out below - justifications for them is provided at the relevant section of the decision document.

Improvement programme requirements		
Reference	**Requirement**	**Date**
IC1 – IC21	Improvement conditions completed.	Completed.
Improvement condition for secondary containment design		
IC22	The operator shall submit a written 'secondary containment implementation plan' and shall obtain the Environment Agency's written approval to it. The plan shall contain the finalised designs and an implementation schedule for a secondary containment system for all liquids that could cause pollution from tanks, sumps and containers. The finalised design(s) and specifications shall be produced by appropriate competent individuals (qualified civil or structural engineer), in accordance with BAT 19 of the Waste Treatment BREF and the risk assessment methodology detailed within CIRIA C736 (2014) guidance or an equivalent standard that will provide an equivalent level of environmental protection. The plan shall include but not be limited to the following components: • An assessment of the suitability for providing containment when subjected to the dynamic and static loads caused by catastrophic tank failure. • Finalised designs and specifications of the proposed secondary containment proposal completed by appropriate competent individuals. • A program of works with timescales for the commissioning of the secondary containment systems to comply with CIRIA C736 (2014) guidance, or equivalent standard. • An updated site and infrastructure plan. • A preventative maintenance and inspection regime. The plan shall be implemented in accordance with the Environment Agency's prior written approval.	31/03/2025 Implementation of all required and approved containment improvements must be completed by 31/03/2025.

Improvement programme requirements		
Reference	**Requirement**	**Date**
	(Note that approval of reports under this improvement condition does not preclude the need for permit variation applications to implement the improvements identified in the report. Any variation may include the insertion of necessary emission limit values).	
Improvement conditions for enclosure of tanks storing (or treating) digestate		
IC23	The operator shall submit a written 'post anaerobic digestion vessel cover' plan and obtain the Environment Agency's written approval to it. The plan shall contain the final designs and an implementation schedule for the installation of covers for vessels storing and/or treating digestate in tanks identified as one Digested Sludge Holding Tank and two Sludge Holding Tanks. The plan shall also contain a detailed description of the proposed gas utilisation/abatement plant, gas storage infrastructure for the biogas produced during anaerobic digestion, pressure relief valves and gas pipework. The plan shall include but not be limited to the following components: • Evidence that the pollutants of the waste gas (including methane) produced in one Digested Sludge Holding Tank and two Sludge Holding Tanks will be controlled and/or abated either by the proposed gas utilisation plant or proposed abatement system. • Evidence that the vessel covers, gas utilisation/ abatement plant and ancillary equipment have been designed by appropriately qualified engineers. • Evidence that the vessel covers, and gas utilisation/abatement plant will be designed and installed in accordance with guidance, *Biological waste treatment: appropriate measures for permitted facilities*. • An updated Hazard and Operability Study (HAZOP) and DSEAR risk assessment. • An assessment of gas storage capacity and gas utilisation/abatement capacity including proposals for additional gas utilisation/ abatement plant. • A program of works with timescales for the commissioning of the vessel cover(s), gas utilisation/ abatement infrastructure and ancillary equipment.	31/03/2025 Implementation of all required and approved containment improvements must be completed by 31/03/2025.

Improvement programme requirements		
Reference	**Requirement**	**Date**
	The plan shall be implemented in accordance with the Environment Agency's prior written approval. (Note that approval of reports under this improvement condition does not preclude the need for permit variation applications to implement the improvements identified in the report. Any variation may include the insertion of necessary emission limit values).	
Improvement conditions for primary containment tanks		
IC24	The operator shall submit a written 'primary containment plan' and shall obtain the Environment Agency's written approval to it. The plan shall contain the results of an inspection and program of works undertaken by an appropriately qualified engineer and shall assess the extent, design specification and condition of primary containment systems (including associated pipework) where polluting liquids and solids are being stored, treated, and/or handled. The plan shall include, but not be limited to: • An assessment of the physical condition of all primary containment systems (storage and treatment vessels and associated pipework) using a Written Scheme of Examination and their suitability for providing primary containment when subjected to dynamic and static loads. • A program of works with timescales for the implementation of individual improvement measures necessary to demonstrate that the primary containment is fit for purpose or alternative appropriate measures to ensure all polluting materials will be contained on site. • A preventative maintenance and inspection regime. The plan shall be implemented in accordance with the Environment Agency's written approval.	11/03/2026 or such other date as agreed in writing with the Environment Agency.
Improvement conditions for establishing an inventory of liquid waste water discharged from anaerobic digestion and associated activities (AR1 – AR10)		
IC25a	The operator shall submit a sampling programme in relation to waste water streams and shall obtain the Environment Agency's written approval to it. The sampling programme shall be designed to fully characterise the waste waters discharged to Bury Wastewater Treatment Works (WwTW) from emission points S4 and S9 in table S3.2 of this permit.	Within 2 months of issue of this permit or such other date as agreed in writing with the

Improvement programme requirements		
Reference	**Requirement**	**Date**
	The programme shall include but not be limited to a methodology for a minimum of one 24-hour flow proportional sample a month, for each emission point, for a period of 12 months. The programme shall detail the sampling methods/standards used. Sampling methods shall be in accordance with BAT conclusion 20 of the Waste Treatment BREF. The programme shall include the National Grid Reference (NGR) of the sampling point location(s). The programme shall establish the characteristics of the liquid waste water streams and shall include as a minimum for each emission point: • Average values and variability of flow, pH, temperature and conductivity. • Average concentration and load values of all relevant substances and their variability. • Data on bioeliminability. The programme shall sample for all relevant substances and must include: • Hydrocarbon oil index (HOI) (mg/l) • Free cyanide (CN^-) (mg/l) • Adsorbable organically bound halogens (AOX) (mg/l) • Metals and metalloids; arsenic (expressed as As), cadmium (expressed as Cd), chromium (expressed as Cr), hexavalent chromium (expressed as Cr(VI)), copper (expressed as Cu), lead (expressed as Pb), nickel (expressed as Ni), mercury (expressed as Hg), zinc (expressed as Zn) (µg/l) The operator shall submit the collected monitoring data in writing to the Environment Agency according to agreed reporting periods. The sampling programme shall be produced in accordance with Environment Agency guidance: • Specific substances and priority hazardous substances – *Surface water pollution risk for your environmental permit* Surface water pollution risk assessment for your environmental permit - GOV.UK (www.gov.uk). • *Monitoring discharges to water: guidance on selecting a monitoring approach* Monitoring discharges to water: guidance on selecting a monitoring approach - GOV.UK (www.gov.uk) The monitoring programme shall be carried out and the monitoring data submitted in accordance with the Environment Agency's written approval.	Environment Agency.

Improvement programme requirements		
Reference	**Requirement**	**Date**
Improvement conditions for indirect discharges to water discharged from anaerobic digestion and associated activities (ARX – AR10)		
IC25b	The operator shall submit a report for approval by the Environment Agency, following completion of the sampling programme approved under IC25a. The report shall include but not be limited to; a summary of the sample results, a completed H1 risk assessment(s) and modelling outputs where appropriate. The operator shall provide conclusions on whether the waste waters discharged from S4 and S9 will have any adverse impact on the receiving waters once discharged from Bury Wastewater Treatment Works (WwTW). An assessment shall be made against the parameters specified in the relevant environmental standards as specified within Environment Agency guidance as follows: • Specific substances and priority hazardous substances – *Surface water pollution risk for your environmental permit* Surface water pollution risk assessment for your environmental permit - GOV.UK (www.gov.uk). • Sanitary substances – *H1 annex D2: assessment of sanitary and other pollutants in surface water discharges* 1076_14 H1 Annex D2 - Assessment of sanitary and other pollutants within Surface Water Discharges (publishing.service.gov.uk) The report shall include any proposals and/or additional measures required to prevent or minimise any significant emissions from the installation along with timescales for implementation.	Within 15 months of the Environment Agency's written approval of the sampling programme submitted under IC25a or such other date as agreed in writing with the Environment Agency
IC25c	The operator shall implement any improvements identified within the report approved under IC25b in accordance with the Environment Agency's written approval and provide written confirmation to the Environment Agency that the improvements have been completed. (Note, approval of reports under this improvement condition does not preclude the need for permit variation application(s) to operate the improvements identified in the report and/or include any necessary emission limit values).	Within 6 months of the report in relation to IC25b being approved by the Environment Agency or such other date as agreed in writing with the Environment Agency

Improvement programme requirements		
Reference	**Requirement**	**Date**
Improvement condition to address methane slip emissions from gas engines burning biogas		
IC26	The operator shall submit a written plan for approval by the Environment Agency which establishes the methane emissions in the exhaust gas from engines burning biogas and or biomethane and compare these to the manufacturer's specification and benchmark levels. The plan shall develop proposals to assess the potential for methane slip and take corrective actions where emissions of methane above the manufacturer's specification are identified. The operator shall establish methane emissions in the exhaust gas and methane slip using the following standards: • EN ISO 25139 • EN ISO 25140	11/09/2025 or such other date as agreed in writing with the Environment Agency
Improvement condition for establishing a Leak detection and repair programme		
IC27	The operator shall establish a site-specific leak detection and repair (LDAR) programme to detect and mitigate the release of volatile organic compounds, including methane from diffuse sources. The programme shall include, but not be limited to an LDAR survey, diffuse emissions source inventory and associated monitoring arrangements. The programme shall be submitted to the Environment Agency for approval. The programme shall take into account the appropriate measures for LDAR plans specified in Section 11.9 of *Environment Agency guidance, Biological waste treatment: appropriate measures for permitted facilities*. The operator shall also have regard to BS EN 17628 when designing the LDAR programme and consider the use of optical gas imaging cameras and/or application of 'sniffer' techniques according to BS EN 15446.	11/09/2025 or such other date as agreed in writing with the Environment Agency
Improvement condition for review of effectiveness of abatement plant		
IC28	The operator shall carry out a review of the abatement plant (catalytic iron filter and carbon filter, emission point A4) on site, to determine whether the measures have been effective and adequate to prevent, or where this is not possible to minimise, emissions released to air (including but not limited to odour, ammonia, HCl, and TVOC if applicable).	11/09/2025 or such other date as agreed in writing with the Environment Agency

Improvement programme requirements		
Reference	**Requirement**	**Date**
	The operator shall submit a written report to the Environment Agency following this review for assessment and approval. The report shall include but not be limited to the following aspects: • Full investigation and characterisation of the waste gas streams. • Evidence that the emission of pollutants in the waste gas stream is being prevented or where this is not possible minimised by the abatement plant. • Abatement stack monitoring results (including but not limited to odour, ammonia, HCl, and TVOC). • Abatement process monitoring results (including but not limited to odour, ammonia, HCl, and TVOC). • Details of air quality quantitative impact assessment including modelling and a proposal for site-specific "action levels" (including but not limited to odour, ammonia, HCl, and TVOC) • Odour monitoring results at the site boundary. • Records of odour complaints and odour related incidents. • Recommendations for improvement including the replacement or upgrading of the abatement plant. • Timescales for implementation of improvements to the abatement plant. The operator shall implement any improvements in line with the timescales as approved by the Environment Agency. (Note that approval of reports under this improvement condition does not preclude the need for permit variation applications to implement the improvements identified in the report. Any variation may include the insertion of necessary emission limit values).	
Improvement condition for monitoring digestate stability		
IC29	The operator shall submit a written report, with supporting evidence, on the stability of whole digestate, (i.e. prior to dewatering), stored within the Digested Sludge Holding Tank and Sludge Holding Tanks and obtain the Environment Agency's written approval to it. The report shall assess whether biogas emissions from post digestion storage or treatment of digestate is likely to have been minimised. The report shall include but not be limited to:	11/09/2025 or such other date as agreed in writing with the Environment Agency

Improvement programme requirements		
Reference	**Requirement**	**Date**
	• An assessment of residual biogas potential in accordance with the OFW004-005 [N6] methodology specified by *BSI PAS 110: Producing Quality Anaerobic Digestate* or an equivalent methodology for assessing residual biogas potential of the digestate stored within the Digested Sludge Holding Tank and Secondary Digested Sludge Holding Tanks.	