Blackburn WwTW Sludge Treatment Facility EPR/XP3638LJ

Request For Information Response March 2024

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Attachments

Blackburn WwTW Sludge Treatment Facility Application Support Document - March 2024

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1. Introduction

United Utilities Water Limited (UUW) submitted a permit application for the biological treatment of waste by anaerobic digestion at Blackburn Wastewater Treatment Works (WwTW). The application was required due to the implementation of the Industrial Emission Directive (IED) for the biological treatment of waste following the issue of the waste treatment Best Available Technique Reference (BREF) document.

A request for further information regarding the permit variation application was received from the EA on 1st March 2024 as the application was considered to be missing information. This document supplies the missing information.

2. Requesting Additional Information

2.1. Question 1: Application Fee

Unfortunately, the application payment you sent is incorrect. The correct application charge as per the information you have provided and subject to confirmation of the waste activities identified is £27,904. This leaves a balance of £10,496.60 to pay as our records show that you have only paid £17,407.40.

Please note the following:

- *1.16.12 - £3,965 application fee for the addition of the dewatering of digested sludge only. We will only progress this activity if the information is provided in line with the further questions below.* – As per response to Question 7, Blackburn WwTW Sludge Treatment Facility will not receive imported digested sludge for dewatering (that will not be processed through the AD facility), therefore this fee does not apply.
- *1.16.14 - £7,930 application fee for the addition of the liming activity Note: We will only progress this activity if the information is provided in line with the further questions below. (Note this may change subject to further confirmation of activity volumes and interaction with the anaerobic digestion activity) –* As per the response to Question 5, the liming process will only receive cake produced as part of the onsite AD process and will be operated by United Utilities. Therefore, this fee does not apply.

As such we confirm that the correct permit variation application fee has been supplied.

2.2. Question 2: National Grid Reference

The NGR you have provided is not within your permit boundary. ***Update your ASD to reflect the correct NGR.***

The NGR for the centre of the site is SD60385 29537. The updated ASD is included with this document.

2.3. Question 3: Open Pre-anaerobic Digestion (AD) Tanks

You have advised that there are a number of open topped tanks at the site, namely: four mixing and balancing tanks, one emergency storage tank, and one sludge chamber holding undigested imported sludge pre-AD. You have further stated that "UUW recognise that these open tanks represent a potential source of fugitive emissions of volatile organic compounds, hydrogen sulphide and ammonia to the atmosphere. A programme of monitoring is proposed to characterise and quantify emissions from the tanks. The monitoring data collected will be used to confirm the level of emissions and to determine the need to provide mitigation, i.e. if BAT 14 should or should not apply. The base design solution highlighted by the EA is that tanks should be enclosed and directed to an appropriate abatement system. Our approach will be to confirm the need and then, if required, develop an appropriate solution to prevent or, where that is not

practicable, to reduce emissions"

Your activity includes prior to the AD, (the biological treatment of waste) the thickening and dewatering process which is a directly associated activity (DAA) of the AD process. The BAT AELs are appropriate for the activity defined under the BREF as 'Treatment of water-based liquid waste'. The BREF provides examples of wastes that would be considered as water-based liquid wastes. These include wastes under the category '19 08 wastes from waste water treatment plants not otherwise specified'. The treatment of this waste in the dewatering and thickening stage and the subsequent emissions to air from connected abatement will be subject to the BAT AELs specified within BAT conclusion 8 and any odour control unit that serves this DAA must meet the requirements of BAT 53.

BAT 53 requires that "In order to reduce emissions of HCl, NH3 and organic compounds to air, ***BAT is to apply BAT 14d*** *(Containment, collection and treatment of diffuse emissions) and to use one or a combination of the techniques including adsorption, biofilter, thermal oxidation and/or wet scrubbing.*

a. Provide commitment to cover all pre-anaerobic digestion tanks identified as the four mixing and balancing tanks and a sludge chamber in line with BAT 53 and14d.

The current notional solution is to cover the four mixing and balancing tanks (Tank No's 18-21), individually identified as Bio Buffer Tank, GBT Feed Tank, Emergency Storage Tank 1 and Emergency Storage Tank 2 and connect them to a new odour control unit (OCU). The open centrate/ filtrate storage tank (Tank No.17) will also be covered and connected to the OCU.

At present the intention is also to cover and connect the drum thickeners emergency storage tank for thickened sludge (No.5) to the same OCU. However, we do not believe this tank will be in regular use and following further review we may propose this tank is not subject to covering and abatement.

The permit application refers to the unthickened sludge chamber (No. 43). This is a below ground concrete chamber with a capacity of approximately 10m^3 that holds screened, unthickened, undigested imported sludge. Due to the intermittent nature of the chambers use with periods when it remains empty and its relatively small volume, we are currently assessing the necessity for covering and abatement as it will provide minimal benefit.

b. Provide the specification of the abatement technology that will be implemented in line with BAT 14d and BAT 53 to treat air emissions.

The cover containment and OCU system is yet to be subject to detailed design, but the current notional solution is for the open processes to be enclosed using either conventional rigid cover design using GRP or aluminium or combination of the two, or a hybrid system using flexible membrane covers. The tank covers will be designed to sustain a negative pressure differential (current target minimum of -25Pa) to ensure containment of emissions/prevent of fugitive release.

The associated OCU is presently sized to treat an airflow of 15,500m^3/hr. The OCU has been provisionally sized to treat a range of compounds including Ammonia, Hydrogen Sulphide, Organo-sulphides, and miscellaneous non methane Volatile Organic Compounds (VOCs).

The current notional solution of the abatement technology is to utilise multiple stages of biological treatment (bio trickling filters), followed by activated carbon/dry media (adsorption) scrubbing. As part of BAT 53 Bio filtration and Adsorption are recognised techniques to remove emissions such as hydrogen chloride, ammonia and organic compounds.

c. Provide the proposed NGR of the OCUs air abatement plant emission points.

Final location has yet to be confirmed but current proposed location has the emission point in the vicinity of NGR 360322,429470.

d. Provide a written statement which explains why the abatement plant will be effective at treating point source waste gas and odour emissions.

The OCUs basis of design with respect to target compound speciation and associated loading rates has been derived from the results of an emissions characterisation survey which was undertaken in July 2023. This included sampling for the following compounds with the following methods:

- Odour to BS EN 13725
- Speciated VOC by GCMS (full scan) to PD CEN/TS 13649
- Hydrogen sulphide (H_2S) PD CEN/TS 13649 – sample collection PD CEN/TS 13649 – sample analysis
- Hydrogen Chloride (HCl) NIOSH 7907 – sample collection NIOSH 7907 – sample analysis
- Ammonia (NH_3) NIOSH 6016

In addition to the above, hydrogen sulphide, hydrogen chloride, ammonia, and di-methyl sulphide were sampled using colorimetric tubes to provide a comparison with laboratory based analysis. Additional VOC analysis was undertaken using a photo-ionisation detector and sampling for methane was undertaken using an infra-red methane detector.

As part of BAT 53, biofiltration and adsorption are recognised techniques to remove emissions of compounds such as hydrogen chloride, ammonia and organic compounds.

The OCU system has yet to be subject to detailed design but the current notional solution for the abatement technology is to utilise multiple stages of biological treatment (biotrickling filters), followed by activated carbon/dry media scrubbing. The biological treatment stages will be configured as counter current flow and operate in a combination of series and parallel operation to allow different stages to be optimised for the removal of specific contaminants. Potentially the biofilter beds and irrigation systems

within individual vessels maybe also be designed to achieve the same. The biological trickling filters are presently sized to provide a longer residence time than the typical industry guidance value of (30 seconds) and also provide sufficient media volume to ensure elimination capacity/critical loading rate for certain specified compounds is not exceeded.

The activated/dry media second stage has been sized to provide a minimum of 12 months media life based on average load and the anticipated performance of stage one biological treatment. The activated carbon unit will utilise different media types e.g. a combination of impregnated and catalytic carbons for the removal of sulphide based compounds and non-impregnated media for miscellaneous VOC removal, in addition to which the carbon filter/dry media system will be fitted with a pre-heater to reduce relative humidity maximising the removal potential of VOCs.

The combination of the two technologies (biofiltration and adsorption) provides the capability to treat the widest range of compounds. The use of a carbon second stage will provide an additional level of resilience to provide treatment in the event of operational issues within the biological stages. The OCU basis of design will have an appropriate design safety factor applied to provide a more conservative basis of design, which in turn will provide additional biofilter media and carbon/dry media volume and provide further process resilience.

2.4. Question 4: Open Tanks Post AD

Under BAT conclusion 14 you must ensure that diffuse emissions are contained. This includes techniques such as storing, treating and handling waste and material that may generate diffuse emissions in enclosed buildings and/or equipment, and collecting and directing the emissions to an appropriate abatement system. If digestate is still biologically active, and you are producing combustible biogas you must take steps to collect the biogas. Biogas should not be vented to the environment. If the source does not produce an explosive environment (i.e. less biologically active) you will need to propose plans to enclose, collect and direct the waste gas emissions to an appropriate abatement system.

a. *If digestate is still biologically active and you are producing combustible biogas you will take steps to collect the biogas and direct this to your gas collection system in line with BAT 14.*
b. *For open tanks that do not produce an explosive environment (i.e. less biologically active) you will enclose, collect and direct the waste gas emissions to an appropriate abatement system in line with BAT 14 and 34.*

In order to manage/prevent the release of residual methane in the post AD sludge stream, the intention is to modify the existing sludge treatment process and install a “flash aerator” immediately downstream of the Anaerobic Digesters. The flash aerator will be designed to strip entrained methane from the sludge and prevent further methane production. The tank headspace will be contained and the intention is to transfer this air stream to the sites existing CHP engines into the combustion air supply of the system. The feasibility of doing this is currently being confirmed. If this treatment option is not progressed the air

stream from the flash aerator tank will be connected to a thermal treatment process (thermal oxidiser or similar).

Due to provision of the flash aerator, residual methane in the downstream storage will be minimal, therefore the intention is to connect the post AD assets into the new multistage odour control unit. These assets comprise:

- Post Digestion Storage Tanks 1, 2 (Tank No. 37 & 38)
- Post Digestion Storage Tank 3 (Tank No. 36)
- Centrifuge sludge feed buffer tank (in the dewatering building)
- Centrate Buffer Tank (external to the dewatering building).

Please note that all of these tanks are currently enclosed. The Centrate Buffer Tank is currently connected to a dedicated odour control unit (Emission Point A12), but the proposal is that this would be removed to rationalise the number of OCUs on site.

The details of the OCU design have been provided in our response to Question 3.

2.5. Question 5: Liming Process

You have identified a liming process onsite which we believe (based on the limited information provided) will be a separate waste activity and not operated by United Utilities. On review of this process you have not provided us with enough information to be able to progress this element of your application. Provide the following information. Please note that if you do not provide us with enough information in relation to this activity then we will not be able to process this element of your application.

a. Confirm if the liming process will only receive cake produced as part of the onsite AD process and will be operated by United Utilities.

We confirm that the liming process is solely for treating cake produced by the on-site AD process at Blackburn.

b. You have stated that "the lime treatment process is owned (or rented) by a third-party operator (4R Group Ltd)" are you advising that UU do not carry out this activity? If so have you considered the requirements for a 'multi-operator permit'(https://www.gov.uk/guidance/legal-operator-and-competence-requirements-environmental-permits). Please explain your outcome and why this would or would not be applicable.

As stated in the permit application, the lime treatment activity at Blackburn is provided as a service by 4R Group. 4R Group provide the equipment and an operator. However, the overall sludge treatment process is managed by the United Utilities Water (UUW) Site Production Manager, and the liming operation specifically is managed day to day by UUW Agricultural Services department who set the required

production rate and are responsible for compliance of the limed product recovered to land. The liming process is covered by a UUW HACCP, the implementation of which falls under the responsibility of the UUW Production Engineer, and the Biosolids Assurance Scheme (BAS) which is certified to UUW. The liming process is included within the sludge facility Accident Management Plan and OMP. UUW maintains responsibility for any emergency situation relating to the liming activity. UUW maintain operational control of the activity. For these reasons UUW maintain that we are the legal operator of the activity and do not consider a multi operator permit to be appropriate in this situation. UUW will be responsible for compliance with the permit in all aspects related to the liming activity.

c. If the liming process is not only to treat cake produced by the onsite AD process, and will be operated by United Utilities provide the below information;

- *i. Provide a full assessment of how you will comply with Non-hazardous and inert waste: appropriate measures for permitted facilities (https://www.gov.uk/guidance/non-hazardous-and-inert-waste-appropriate-measures-for-permitted-facilities)*
- *ii. Provide a completed B4 form (https://www.gov.uk/government/publications/application-for-an-environmental-permit-part-b4-new-bespoke-waste-operation)*
- *iii. Provide the application fee as outlined above*
- *iv. You have stated that this activity has a generator. Have you considered if this meets the requirements of a specified generator? If it does you will need to provided information and assessments in line with our guidance.*

Question 5c is not applicable as the process will only treat cake produced by the on-site AD process.

d. If you cannot provide the above information or clarification please remove this element from your application.

The liming process remains part of the permit application.

2.6. Question 6: Secondary Containment

Your secondary containment solution has provided a solution based on tank groupings. We would expect containment solutions proposed as part of any application to meet the requirements of CIRIA 736, section 4.2.1, which advises that:

- *Where a single bulk liquid tank is bunded, the recommended minimum bund capacity is 110% of the capacity of the tanks*
- *Where two or more tanks are installed within the same bund, the recommended capacity of the bund is the greater of;*
  - *110% of the capacity of the largest tank within the bund,*
  - *25% of the total capacity of all the tanks within the bund, expect where tanks are hydraulically linked in which case they should be treated as if they were a single tank.*

Your containment solution proposes a bund for all tanks and as such we would expect it to meet 25% of the total capacity of all the tanks within the bund.

To confirm we 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, we 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.

2.7. Question 7: Receipt of Digested Sludge Imports into the Post Digestion Tank

You have identified within your application that digested sludge will be received at the post digestion tank following AD. If you are importing digested sludge for dewatering that will not be processed through the AD this will be a separate waste activity. In order to progress this activity, you will need to provide all information identified within our application process, this includes but is not limited to the below. (Please note it is your responsibility to ensure that information is provided in line with our requirements, failure to provide this will mean that we will not be able to progress this element of your application:)

a. Payment as identified above.
b. Non-technical summary, and process flow including how you will keep this activity separate from your installations activity (https://www.gov.uk/guidance/waste-environmental-permits) i.e. how will you batch process this material and keep cake produced separate.
c. Assessment against Non-hazardous and inert waste: appropriate measures for permitted facilities https://www.gov.uk/guidance/non-hazardous-and-inert-waste-appropriate-measures-for-permitted-facilities
d. Completion of relevant forms – B4 new bespoke waste operation - https://www.gov.uk/government/publications/application-for-an-environmental-permit-part-b4-new-bespoke-waste-operation
e. Updating and inclusion of this activity in all relevant management plans such as the Odour management plan, accident management plan, residue management plan etc.

Questions 7 a-e are not applicable. UUW no longer propose to accept digested sludge from other works into the post digestion tanks following AD. The ASD has been updated and supplied with this RFI response.

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Attachment 1 – Blackburn WwTW Sludge Treatment Facility Application Support Document – March 2024