Blackburn WwTW Sludge Treatment Facility
EPR/XP3638LJ
Application Form C6 – December 2023

Application Form C6 – Additional Responses

Question 3b: What is the maximum volume of effluent you will discharge in a day?
6,500m^3/day

Question 3c: What is the maximum rate of discharge in litres per second?
75.2 litres/second

Question 3d: What is the maximum volume of non-rainfall dependent effluent you will discharge in a day?
6,500m^3/day

Question 3f: For each answer in question 3, show how you worked out the figure on a separate sheet
The Lamella effluent (GBT filtrate and centrifuge centrate) can be discharged up to 18.5 l/s.

The rate of discharge of filtrate from the drum thickeners is not measured. However, the feed to each drum thickener is 75.6 m^3/hr. In theory all 3 thickeners can run at once, therefore 226.8m^3/hr (63 l/s) could be fed to the drum thickeners. The filtrate produced will be about 10% less than this due to the volume of thickened sludge sent for digestion i.e. 56.7 l/s.

Therefore, the rate of discharge is estimated at 18.5 + 56.7 = 75.2 l/s.

Q3b – The main elements of the effluent generated are the filtrate and centrate.

- Estimated rate of discharge of filtrate and centrate is 75.2l/s (27,000 litres/hour = 270.72m^3/hr)
- Assuming a constant discharge over 24 hours
- Condensate and boiler blowdown is estimated to be very small quantities, no more that 10ltrs/day or 0.01m^3/day.

Total therefore:

270.72m^3/hr x 24 = 6,497.28 + 0.01 = 6,497.29m^3/day

Q3c – As above

Q3d – As 3b

Question 5a: How far away is the nearest foul sewer from the boundary of the premises?
Not applicable – the installation is located within the curtilage of Blackburn wastewater treatment works (WwTW) and the installation wastewater emissions discharge into the Nereda wastewater plant inlet channel for full biological treatment.

Question 5b2: Discharges from all other premises including trade effluent
Not applicable – the installation is located within the curtilage of Blackburn WwTWs and the installation wastewater emissions discharge into the works UWWT inlet via the site's sealed drainage system.

Blackburn WwTW Sludge Treatment Facility
EPR/XP3638LJ
Application Form C6 – December 2023

Question 6a: Do you treat your effluent

Wastewaters generated by the sludge treatment process are not subject to pre-treatment. All wastewater emissions are returned to the head of Blackburn WwTW to undergo full biological treatment comprising primary treatment and an aerobic granular sludge (Nereda) treatment process in order to achieve the consented discharge limits.

Question 6b

No treatment is undertaken within the installation boundary.

Centrate and filtrate are pumped to a Lamella tank for solids removal. Settled solids are returned to the GBTs for processing. The liquor is discharged into a Liquor Return Pump Well where the installation ends. Liquors are returned to the inlet of Blackburn WwTW Nereda Plant to undergo full biological treatment.

Question 6c: No question

Table 1 identifies that Question 6c should be answered – it is noted that this question does not exist on the form.

Question 7b: Are any of the specific substances listed in 'Risk assessment for treated sewage or trade effluent discharges to surface water or groundwater' added to or present in the effluent as a result of the activities on the site?

No monitoring has been undertaken for the substances listed. See response to question 7e.

Question 7c: Have any of the specific substances listed in 'Risk assessment for treated sewage or trade effluent discharges to surface water or groundwater' been detected in samples of the effluent or in the sewerage catchment upstream of the discharge?

No monitoring has been undertaken for the substances listed. See response to question 7e.

Question 7d: Are there any other harmful or specific substances in your effluent not mentioned in 'Risk assessment for treated sewage or trade effluent discharges to surface water or groundwater'?

No monitoring has been undertaken for the substances listed. See response to question 7e.

Question 7e: If you have answered 'No' to any of questions 7a to 7d provide details on a separate sheet of how you have established that the effluent is not likely to contain specific substances

There are no direct emissions to surface water or groundwater from this installation however, on direction from the EA, we propose to carry out monitoring for all substances listed within the referenced guidance documents for the wastewater returns from the sludge treatment process that are routed into the WwTW. These wastewater emissions are limited to the following:

- W1 – Liquor return pump well (combined centrate, filtrate and drum thickening liquor);
- W2 - Site drainage;
- W3 - Digestion plant condensate pots;
- W4 - EEH Plant condensate pot;
- W5 - Gas bag condensate pots;
- W6 - Gas line to CHP condensate pot;

- W7 - Siloxane removal plant condensate pots;
- W8 - Steam boilers blowdown;
- W9 - Thickening and dewatering GBT filtrate;
- W10 - Drum thickeners filtrate;
- W11 - Centrifuge centrate;
- W12 - Run-off from digested sludge open cake bay;
- W13 - Run-off from raw sludge cake open cake bay;
- W14 – Run-off from digested sludge liming cake bay.

The proposed monitoring for wastewater returns to the WwTW inlet has been reviewed against BAT 6 and BAT 7 requirements. On direction from the EA, monitoring requirements have also been assessed with reference to EA Guidance on discharges to surface waters 'Surface water pollution risk assessment for your environmental permit'; Surface water pollution risk assessment for your environmental permit - GOV.UK (www.gov.uk). This guidance requires operators to evaluate and assess any hazardous chemicals and elements to be released into surface water. No monitoring has been undertaken to date to investigate the presence of hazardous substances in the wastewater returns.

As the final effluent from Blackburn WwTW discharges into the River Darwen via Hole Brook, testing will be undertaken for the hazardous and priority substances listed within the guidance for fresh waters. There are 60 priority hazardous pollutants and 96 specific pollutants listed in the tables contained in the EA Guidance on 'Surface water pollution risk assessment for your environmental permit'. The total number of parameters is 156.

UUW is committed to undertaking full characterisation of the wastewater streams to meet BAT 3, however we will assess whether it is possible to screen out any of these parameters based on the character of the wastewater coming into the works and, if so, provide a justification to the EA during the permit determination period for any reduction in the list of parameters to be analysed.

Monitoring for hazardous and priority substances will be undertaken at the Liquor Return Pumping Station (location W1), the point at which the combined liquor effluent stream leaves the installation (centrate, filtrate and drum thickening liquor). Twelve samples will be taken, in accordance with the minimum sampling requirement for screening in the EAs 'surface water pollution risk assessment' guidance, and the results screened against relevant environmental quality standards detailed in the EA guidance. Laboratory analysis will be undertaken to MCERTS or UKAS ISO17025 standards for determinands where available. However, it should be noted that only around 10% of the 156 hazardous and priority substances can be analysed in-house at UUWs laboratories and initial contact with commercial laboratories has indicated that for some parameters they would not be able to achieve the EQS levels as a limit of detection on a centrate/ filtrate matrix and potentially may not be able to analyse at all.

Monitoring for wastewater returns to the WwTW inlet has also been reviewed against BAT 6 and BAT 7 requirements.
BAT 6 specifies that 'for relevant emissions to water, as identified by the inventory of wastewater streams (see BAT 3), BAT is to monitor key process parameters (e.g. waste water flow, pH, temperature,

conductivity, BOD) at key locations (e.g. at the inlet and/or outlet of the pre-treatment, at the inlet to the final treatment, at the point where the emission leaves the installation)'.

BAT 7 states: BAT is to monitor emissions to water with at least the defined frequency, and in accordance with EN standards. The proposed BAT monitoring requirements have been compared with those for biological treatment of waste. The EA has directed that 'treatment of water-based liquid waste' BAT AELs are also appropriate.

Based on the BAT requirements, monitoring for the following parameters is proposed at W1 to characterise the centrate and filtrate wastewater streams:

- pH;
- Total nitrogen;
- Chemical oxygen demand (COD);
- Ammonia;
- Total phosphorous;
- Suspended solids;
- Hydrocarbon oil index;
- Benzene, toluene, ethylbenzene, xylene (BTEX);
- Free cyanide;
- Halogens (AOX);
- Metals (As, Cd, Cr, Cu, Pb, Ni, Zn, Hg, Mn, Cr(VI));
- PFOS; and
- PFOA.

All discharges to the surface water drainage system will be captured by sampling at the site drainage pump well (W2). Monitoring for a more limited suite of parameters is proposed to characterise the biogas condensate and site drainage/cake bay run-off at emission points W2, as these are smaller volume wastewater streams and/or have less potential for contaminants such as metals to be present. Monitoring for the following parameters is proposed:

- pH;
- Total nitrogen;
- COD;
- Total phosphorous;
- Suspended solids;
- Ammonia; and
- Oil and grease (visual assessment only)

Where monitoring is proposed, a minimum of 12 samples will be taken in accordance with the minimum sampling requirement for screening in the EAs 'surface water pollution risk assessment' guidance.

Flow meters are installed to record the flow of centrate and filtrate returns to the Nereda system. An MCERTS flow meter is installed at the final effluent outlet from the wider WwTW works.

Where monitoring is proposed, a minimum of 12 samples will be taken in accordance with the minimum sampling requirement for screening in the EAs 'surface water pollution risk assessment' guidance.

The monitoring suite proposed for the combined point of discharge for the process liquors (W1) includes PFOS which is on the list of priority hazardous substances.

Flow meters are installed to record the flow of centrate and filtrate returns to the Nereda system. An MCERTS flow meter is installed at the final effluent outlet from the wider WwTW works.

Monitoring of the wastewater returns to the head of the works is summarised below in Table 7.1.

Table 7.1 Monitoring of the Wastewater Returns

Source	Emission Point	Current Monitoring	Proposed Monitoring	Frequency
Filtrate and centrate	Combined liquor returns pump well (W1)	Five times testing in a fortnight for: COD, BOD, Ammonia as N, Total Nitrogen, Phosphorous, Suspended Solids	To further characterise the filtrate, monthly testing over a 12 month period for: pH; Total nitrogen; COD; Total phosphorous; Suspended solids; Ammonia; Hydrocarbon oil index; BTEX; Free cyanide; Halogens; Metals (As, Cd, Cr, Cu, Pb, Ni, Zn, Hg, Mn, Cr(VI)); PFOS and PFOA.	Monthly – 12 samples
Liquors into UWWT flow	Liquor returns pump well (W1)	None	156 hazardous and priority substances as per separate list	Monthly – 12 samples
Biogas condensate, boiler blow down, run off from cake bays	Site drainage pump well (W2)	None	pH; Total nitrogen; COD; Total phosphorous; Suspended solids;	Monthly – 12 samples

Source	Emission Point	Current Monitoring	Proposed Monitoring	Frequency
			Ammonia; Hydrocarbon oil index.	

Question 8d: Discharges to groundwater
Not applicable – the installation does not discharge to groundwater.

Question 8e: Discharges to freshwater (non-tidal) rivers from an installation, including discharges via sewer
Not applicable – the installation discharges to a tidal river.

Question 8f: Environmental Impact Assessment
Not applicable – an environmental impact assessment has not been undertaken as this is an existing facility/installation.

Question 9a: What is the national grid reference of the inlet sampling point? (for example, SJ 12345 67890)
Not applicable to this installation.

Question 9b: What is the national grid reference of the effluent sample point?
- W1 - Liquor Return Pumping Station (SD 60320 29598). This location is where the combined process liquors effluent (i.e. centrifuge centrate, GBT filtrate, and drum thickening filtrate) leaves the installation and joins the wider works for flow to full biological treatment. The new effluent sampling point will be available from permit issue.
- W2 - Site drainage pump well (SD 60395 29481). All site drainage and other wastewater emissions (biogas condensate boiler blow down and cake bay drainage) discharge into this pump well.

Question 9d: What is the national grid reference of the flow monitoring point?
A flow meter is installed on the pipework conveying the process liquors to the Nereda inlet channel. An MCERTS flow meter is installed at the final effluent outlet from the wider WwTW works.

Question 9e: Does the flow monitor have an MCERTS certificate?
No.

Question 9f: Do you have a UV disinfection efficacy monitoring point?
No this is not installed as part of this installation. The wider WwTW undertakes UV treatment of effluent.

Question 9h: You should clearly mark on the plan the locations of any of the above that apply to this effluent
Refer to Blackburn Application Support Document - Appendix D

Question 9i: Do you intend to do your own effluent monitoring?
Yes. Monitoring will be carried out in accordance with established process monitoring procedures using appropriate equipment, which will be calibrated to manufacturer's instructions where required. All samples will be collected and stored in an appropriate manner by suitably qualified personnel, with

analysis carried out in line with BAT 3, as appropriate. All analysis is undertaken at UU Scientific Services Lingley Mere Laboratory, which is a United Kingdom Accreditation Services (UKAS) laboratory accredited to ISO/IEC 17025:2017 (included at Appendix J). Wherever possible sampling and analysis is accredited to MCERTS by UKAS.

However, it should be noted that only around 10% of the 156 hazardous and priority substances (to be analysed at monitoring location W1) can be analysed in-house at UUWs laboratories and initial contact with commercial laboratories has indicated that for some parameters they would not be able to achieve the EQS levels as a limit of detection on a centrate matrix and potentially may not be able to analyse at all.

Question 10: Where will the effluent discharge to?

Not applicable. There are no direct emissions to water from the sludge treatment activities. The wastewater streams are returned to the head of Blackburn WwTW for full biological treatment, before being discharged (indirectly) via the WwTW final effluent discharge into the River Darwen via Hole Brook (Environmental Permit/Consent (017160024)). The receiving watercourses are freshwater. The final effluent outlet is at NGR SD 60470 29410.