

Liquor Monitoring Proposal - Long Reach – September 2023

TWUL are committed to providing information about the characteristics of the wastewater streams at Long Reach and are undertaking a review of our commitment to BAT 3, 6 and 7 further details of which are set out below.

Our review includes, but is not limited to, requesting companies providing national laboratory services to provide information relating to their capacity to analyse return liquor matrix for the determinants listed in the guidance you refer to in question 6 a).

Such information is essential in order for us to complete the review of our current Liquor monitoring proposal and delivery of BAT 3, 6, and 7. We plan to complete this at the earliest opportunity and at the point of writing these enquires remain open with each of the laboratories.

We will provide an updated proposal to the Environment Agency in line with a revised IED programme and in the meantime, we would like to assure you of our commitment to sample liquor returns at Long Reach, our commitment to BAT 3, 6, and 7 and the following:

a) Summary of the sampling and analysis methodology of the effluent discharged and likely pollutants in the effluent (Guidance Monitoring discharges to water: guidance on selecting a monitoring approach - GOV.UK and Surface water pollution risk assessment for your environmental permit - GOV.UK).

Under the BREF guidance Best Available Techniques (BAT) conclusion 3 Thames Water should establish and maintain an inventory of waste water and waste gas streams. Thames Water will carry out the sampling and analysis methodology of the effluent discharged at defined and recorded locations. All Thames Water staff involved in the sampling, analysis and reporting will be trained personnel, accredited to the Environment Agency's (EA) Monitoring Certification Scheme (MCERTS) standards or appropriate alternatives. Thames Water will ensure to document sampling procedures with details such as:

- precise location of the discharge sampling point including a grid reference.
- sampling process.
- storage conditions and transport of samples.
- types of bottles or containers and their closures.

A management system will be used to ensure the results are recorded and subject to review to include, but not be limited to, the following procedures:

- sampling programme, including procedures for resampling.
- data review and reporting
- training and audit.

b) A written statement with a commitment to undertake the sampling and analysis in line with BAT3.

The purpose of BAT3 in relation to return liquors is to establish and maintain an inventory of wastewater streams, as part of the environmental management system, to facilitate the reduction of emissions to water. In accordance with BAT3 the following data will be provided:

- I. Simplified process flow sheets that show the origin of the emissions. Flow calculation based on an assessment of throughput may be used.
- II. Descriptions of process-integrated techniques and wastewater treatment at source including their performances. Chemicals used for thickening and dewatering should also be stated.
- III. Thickening and dewatering liquors, which comprise the major component of the returns, will be subject to monitoring for: Ammonia; BOD; solids; flow and pH.
- IV. Data on bio-eliminability (e.g. BOD)

Thames Water is committed to providing information about the characteristics of the identified liquor return sampling points, namely average values and variability of calculated daily flows. In addition, Thames Water is committed to further undertake the sampling and analysis of ammonia, BOD, solids and pH.

- c) **A written statement with a commitment that those undertaking the sampling and analysis will be by accredited to MCERTs or provide evidence of equivalent standards.**

Thames Water is committed to perform sampling and analysis in accordance with MCERTS or ISO/IEC 17025.

The chemical analysis of the effluent and liquor return samples will be analysed in a United Kingdom Accreditation Service (UKAS) accredited laboratory.

- d) **A plan which identifies the effluent sampling point(s) and emission point for the effluent discharge from the installation and the NGR of the effluent sampling point/s**

Thames Water has identified process/drainage lines, at Long Reach STW, which return liquors and wastewater from the sludge treatment area to the head of works. The primary wastewater streams identified as follows:

- Picket Fence Thickening Liquors
- SAS Thickening Liquors.
- Pre - THP Thickening Liquors
- Digested Sludge dewatering liquors.
- Biogas condensate.
- OCU waste waters

Other streams identified are:

- Site surface rain run-off.
- Washdown for maintenance and cleaning.

1) Picket Fence Thickener liquors

The Picket Fence Thickening (PFT) process produces approximately 4,091 m³/day liquor, which drains back to the works inlet. The PFTs tanks receive pumped sludge from the primary settlement tanks. The PFT thickening process relies solely on settlement and no polymer is added. Solids captured from the thickening process equipment in operation are analysed as it is a key thickening performance measure. The solids are associated with a biological demand (measured as BOD) hence the objective is to keep them as low possible. The ammonia loading at this point is expected to be significantly low.

2) SAS Thickening liquors

SAS thickening produces approximately 2,302 m³/d or liquors. The sludge is thickened using belt thickeners with addition of a bulk powder polymer used to aid coagulation. Polymer solution is input into the thickening process, as well as the biological surplus activated sludge from the final settlement tanks onsite. The solids levels coming off the thickening equipment in operation are monitored to ensure the equipment is performing as required. The aim is to capture as many solids as possible and not return them to add un-necessary load back to the effluent stream. The ammonia loading at this point is also expected to be significantly low

3) Pre THP Thickening Liquors

Sludge is subjected to thickening prior to THP using a centrifuge. Approximately 1,110 m³/d of pre digestion dewatering liquors is produced. The solids levels coming off the thickening equipment in operation are monitored to ensure the equipment is performing as required. The aim is to capture as many solids as possible and not return them to add un-necessary load back to the effluent stream. The ammonia loading at this point is also expected to be significantly low

4) Digested Sludge Dewatering Liquors

Digested biological sludge is dewatered using presses to produce a solid cake, with the separated liquors being returned to the head of works. A polymer is used in the dewatering process to aid in binding the solids and predominantly remains in the dewatered sludge solids. Approximately 962 m³/d of post digestion dewatering liquors are produced. This waste water drains together with the OCU waters back to the works inlet via Liquor Return Pumping station. The ammonia concentration is higher than the other liquor return streams.

5) Biogas Condensate

A very small volume, approximately 1.5m³/d in total, of condensate is produced from gas condensate traps on biogas lines. The result of this is a liquid waste stream made up mostly of condensed water vapour. The condensate trap systems are sealed, with no chemical addition. There is no solids, BOD or ammonia load in the condensate.

6) OCU Liquors

The OCU within this permit application produces on average a total of approximately 67 m³/ day of OCU Liquor are returned to head of works.

Site Surface Rain Run-off

There are surface water drains in the sludge treatment area of Long Reach STW which are returned to the head of the works.

Washdown for Maintenance and Cleaning

There is maintenance and cleaning within the sludge treatment area onsite at Long Reach STW. These flows will only contain biological sludges produced onsite and final effluent from the wash water system. Flows will be adequately diluted.

Sample Locations

We propose to sample the wastewater streams described above as set out below in Table 1 which lists the locations identified as sampling points and waste waters present. These flows are also shown in the accompanying documents: Process Flow Diagram (A.5) and the sample locations in Site Emission Point Plan (A.2) B22849AZ-JA-LREAS1ZZ-LSX-DR-P-003 and B22849AM-JAC-LGR-DR-002 respectively.

Table 1: Sample points

Sample Point	Grid Reference
S1: PFT Liquors , SAS Thickening Liquors, THP Centrifuge Thickening Liquors, Digested Sludge Dewatering Liquors, OCU Waste Waters, Biogas Condensate, Boiler Waste Water, Surface Water Runoff	TQ 55302 76423
S2: PFT Liquors	TBC

Composite Sampling

The returns from thickening/dewatering equipment identified above combine as indicated in Table 1 and the Process flow diagram.

Thames Water will sample each location listed in Table 1 in accordance with Environment Agency Guidance. Where individual flow proportional samples are taken at each sample point, each flow proportional composite sample may be combined to provide a single flow proportional 'bulk' composite sample for analysis. Return flow data will be used to ensure the single bulk composite sample is representative of the total flow returned.

Location of Liquor Return.

The waste-water emissions identified in this document enter the inlet after the storm overflow and therefore these emissions cannot bypass the WwTW treatment or be emitted as a direct discharge to water.