

100123523_SamplingPlan_AFA

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Afan STC Effluent Sampling Proposal

Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
A	September 2024	Shannon Stone	Anita Manns	Anita Manns	First Issue

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Commitment

Dwr Cymru Welsh Water (DCWW) commits to undertaking (using a United Kingdom Accreditation Service (UKAS) accredited laboratory or equivalent - where suitable and available):

- a) chemical analysis of the waste water which tests for ALL likely pollutants which DCWW expect to find in the discharge (not just Ammonia, BOD, Solids, flow, pH and data on bio-eliminability) and that DCWW will use an appropriate 'minimum reporting value' (MRV) (usually 10% of the environmental quality standards (EQS) where this is analytically achievable); and
- b) the sampling and chemical analysis being undertaken in line with the guidance on surface water pollution risk assessment for your environmental permit – GOV.UK (www.gov.uk) for all pollutants expected to be found.

Liquor Monitoring Proposal

DCWW are committed to providing information about the characteristics of the wastewater streams from the Afan STC, entering the adjacent Afan WwTW and are undertaking a review of our commitment to (under the BREF guidance Best Available Techniques (BAT) conclusion) 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.

Such information is essential in order for DCWW to complete the review of our liquor monitoring proposal and delivery of BAT 3, 6, and 7. DCWW plan to complete this at the earliest opportunity. These enquiries remain open with each of the applicable laboratory services, at the time of writing, with no confirmed date for receipt of a response.

DCWW will provide an updated proposal to the NRW in line with a revised IED programme and in the meantime, we would like to assure the NRW of our commitment to sample liquor returns at Afan, 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 BAT 3, DCWW will establish and maintain an inventory of wastewater. DCWW will carry out the sampling and analysis methodology of the effluent discharged at defined and recorded locations. All sampling, analysis and reporting will be undertaken by trained personnel, accredited to the Environment Agency's Monitoring Certification Scheme (MCERTS) standards or equivalent, where this is suitable and available. DCWW 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.

DCWW propose a minimum of 12 sampling runs over a 12-month period (1 full sampling spec per month), initially, to establish a baseline, in accordance with the surface water pollution risk assessment guidance or other applicable guidance.

DCWW will then take an informed viewpoint of the determinands the samples contain demonstrating those that are not in the sample. DCWW will use an appropriate MRV (usually 10% of the environmental quality standards (EQS) where this is analytically achievable). An H1 assessment to screen out any that are not applicable or relevant will be completed.

b) A written statement with a commitment to undertake the sampling and analysis in line with BAT 3.

The purpose of BAT 3 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 BAT 3 the following data will be provided:

- i. Simplified process flow sheets that show the origin of the emissions. Flow calculations 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)

DCWW 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, DCWW is committed to further undertake the sampling and analysis of ammonia, BOD, solids and pH.

Sampling and analysis will be undertaken in line with BAT 3 using a UKAS accredited, or equivalent, laboratory, where available.

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.

DCWW is committed to perform sampling and analysis in accordance with MCERTS, ISO/IEC 17025 or equivalent standards.

The chemical analysis of the effluent and liquor return samples will be analysed in a UKAS accredited laboratory, where available.

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

DCWW has identified process/drainage lines, at Afan STC, which return liquors and wastewater from the sludge treatment area to the head of works. The primary wastewater streams are currently identified, as per drawing Site Layout Plan document reference 100123523_SiteLayoutPlan_AFA September 2024 as follows:

- S1/M1 – Liquor returns well

Other streams identified are – all divert to the liquor returns well

- Uncontaminated site surface water run-off.
- Washdown for maintenance and cleaning.
- Digester bund rainwater
- Condensate

Sludge thickening liquors

Sludge is thickened to approx. 7-8% dry solids. A polymer is used in the thickening plant dewatering process to aid in binding the solids and predominantly remains in the thickened sludge solids. Approximately 1616m³/day of liquor is produced from the processes. This wastewater drains back to the works inlet via a liquor returns well. The ammonia concentration at this point is low, the same as the urban wastewater stream it has come from.

Digested sludge dewatering liquors

Digested sludge is dewatered in the centrifuge which is designed to raise the percentage of dry solids in the sludge to approximately 25%. The centrifuge, by means of a rapidly rotating centrifuge bowl, removes additional water from the sludge before continuously discharging the processed sludge into the cake barn.

The separated liquors are returned to the head of works currently via the SBR tanks although there is an option to send this direct to the inlet works. A polymer is used in the dewatering process to aid in binding the solids and predominantly remains in the dewatered sludge solids. Approximately 315m³/day of Digested Sludge dewatering liquors are produced.

After the dewatering process, the centrate discharges into drainage pipes feeding the underground liquor return well. This diverts the flow to the sump, which is pumped to inlet works for treatment. The ammonia concentration is likely to higher than the other liquor return streams.

Biogas Condensate

A very small volume, approximately 3m³/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 which returns via the liquor returns well.

OCU liquors

The OCU wastewater is returned to head of works via the liquor returns well following the same process as the other liquors.

All sludge treatment processes are covered or enclosed, with the exception of the SAS tank and post digestion tank. The Site has two OCUs. OCU 1 extracts and treats air from the cake import hoppers, the THP feed silo and THP plant. OCU 2 (not in use) extracts and treats air from belt press building, which also houses the cake bays.

OCU 1 is a two-stage odour treatment system comprising a Euro Environment John Cockerill Biomod 6.15 4m biofilter as the first stage and TCA2200 1.4 m carbon filter as the second stage. OCU 1 has design flow of 3,030m³/h. The biofilter is continuously irrigated using final effluent which is recirculated through the media with a partial bleed off to waste. The system is fitted with duty and standby fans which draw air through the biofilter and the push air through the carbon filter. By-pass provisions are in place to enable both stages to be isolated for maintenance. Following treatment, the treated air is discharged through a 2m height stack.

The biofilter system removes odorous components from the airstream by a process of absorption and microbial breakdown. The carbon filter then removes residual odorous components by a process of adsorption onto the activated carbon media.

Although not currently in use, OCU 2 is a single stage Euro Environment John Cockerill LRV1600 packed acid scrubber which is designed to remove ammonia. The system comprises a single tower which contains the reagent sump at the bottom, packed media and spray bars in the midsection and a droplet eliminator just prior to the 7m stack. OCU 2 has design flow of 1,080m³/h.

When it was in use acid (H₂SO₄) was dosed from a separate acid tank into the reagent sump and then recirculated through the media by spray bars. The system is fitted with duty and standby extract fans which draw air from the sludge belt press building and push it through the scrubber. Duty and standby acid dosing pumps and recalculation pumps are provided. Make up water is supplied by final effluent. Bypass provision is provided to enable process maintenance.

Improvements will be implemented in line with the recommendations in the odour impact assessment.

Boiler wastewater

Boiler blowdown contains concentrated hardness which would be damaging to the internal of a boiler but not at all significant in relation to Urban Wastewater Treatment. Volumes are in the order of less than 1m³/day. They are returned to the head of the works.

Site surface rain run-off

There are surface water drains in the sludge treatment area of Afan STC 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 Afan STC. Final effluent from the wash water system will be adequately diluted.

Storm bypass

The stormwater drainage of potentially contaminated areas from within the Site boundary will be routed back to the head of the works. Digestate and effluent from the STC are returned to the process downstream of storm separation. Returns come in downstream overflow and flow cannot physically escape down the storm route. The digestate and effluent must pass through treatment before going out to the environment.

Sample locations

We propose to sample the wastewater streams described above as set out below in Table 1 which lists the location identified as a provisional sampling point and waste waters present. It is proposed that, as the centrate, filtrate and condensate only all converge into the liquor return well that one single sample point will be provided.

Table 1: Sample points

Sample Point	Grid Reference
M1 – All process liquors	SS 76163 87347

Composite Sampling

The returns from thickening/dewatering equipment identified above combine as from the sludge thickeners and centrifuge into point S1 and flow into the liquor sump to pass to the Head of Works.

DCWW will sample the location shown in Table 1 in accordance with NRW 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 wastewater treated emissions and uncontaminated rainwater run off identified in this document enter the inlet before the storm overflow and, therefore, these emissions could bypass the WwTW treatment or be emitted as a direct discharge to water.