Bioresources - Tankered Trade Waste			
Document Title	SOP 01 TTW Waste Pre-Acceptance		
Document Owner Role	Process Manager	**Version Number**	3.0
Date of Last Review	21/10 /21	**Date of next Review**	21/10/22

Identified Risks

- HS&W risks associated with unsuitable / volatile / hazardous waste streams.
- Excessive solids could damage the pipework infrastructure
- Activated Sludge Process lanes collapse: from Overloading of nutrients
  - Inhibition of the microbial activity through the introduction of too many inhibitory compounds such as metals or cyanide or pH concentrations are too extreme
- Digestors inhibits Methane (CH_4) generation due to:
  - excessive volume of heavy metals such as Chromium (Cr III) and Cadmium (Cd)
  - They can poison the active bacteria and inhibit the methanogenic bacteria
  - This leads the presence of organic acids
- Combined Heat Power process impacted by:
  - High concentrations of Hydrogen Sulphide (H_2S) can damage engines
  - High concentrations of Siloxanes (Si) pas through the biogas and result in silica deposits.
  - These damage the engine valves, oil life etc leading to greater downtime and more equipment to be replaced
- Compliance risks:
  - Loss of waste permits if waste not listed on them permitted or waste does not have the appropriate EWC.
  - Final effluent discharge consents missed due to high solids or heavy metals or Phosphorus (P)
  - BAS Compliance for Biosolids non-conforming if too high metal content
  - Wider environmental damage from failures of the treatment processes due to unsuitable waste streams being accepted.

If this is a printed version please ensure that it is still within the current review period, if not 'DO NOT USE' and contact your line manager for a new version

Remember – If you can't do the job safely, don't do it.

'DO NOT CARRY OUT THE PROCEDURE' And seek advice from your line manager

Introduction

The pre-acceptance procedure determines the suitability of a waste stream treatment at a wastewater site, prior to on-site compliance checks.

Key Roles and Responsibilities	
Tankered Trade Waste Manager (TWM):	○ Ensure that the approval process is be followed ○ Ensure that the operating procedures are followed ○ Ensure that the Tankered Trade Waste Technicians (TTWT) have undergone appropriate training ○ Can make approval decisions if they have been deemed as technically competent ○ Investigate HSW & Environmental concerns from the TTWT
Tankered Process Team (TPT):	○ Reviewing and updating the approval process as required ○ Reviewing and deciding on Low and Medium Risk Waste-streams within a timely manner ○ Reviewing WAF details to ensure they are completed in line with our requirements (e.g. correct EWC, SIC, details on origin of waste) ○ Notifying the commercial team once a decision has been made regarding a rejection/acceptance. ○ Setting discharge conditions for Low and Medium risk waste-streams ○ Establish site limits on testing parameters such as potentially toxic elements (PTEs) and review in-line with Biosolids and Effluent results
Tankered Trade Waste Technicians (TTWT)/Technical Competent Persons(TCP):	○ Preparing and sending samples for analysis at UKAS approved lab ○ Approval of low-risk waste streams ○ Escalating concerns to TWM or TPT where H&S, regulatory compliance or processes are at risk ○ Setting the discharge conditions for low-risk waste-streams
Commercial Team:	○ Setting the price for the waste stream and informing the customer of the discharge conditions set by the technicians or process specialist. ○ Providing customers with WAF to complete and setting up sales opportunity on CWID. ○ Notifying the customer of the outcome of the Approval Assessment.
Treatment Quality Team:	○ Review high-risk waste streams with the process team ○ Determine whether high-risk waste streams reviewed will be accepted by the site.

Required Training	
Tankered Trade Waste Technicians (TTWT)	• In date EMS training • At least 6 months experience in the waste industry (if they are approving low risk wastes) HNC Chemistry, University Degree in a Scientific Area or similar experience • Experience undertaking sampling and lab testing

	• How to use CWID
Tankered Process Team (TPT)	The requirements for the TTWT in addition to: • Tankered Waste experience or 12 months experience in the waste industry • CIWM Hazardous Waste Classification course • Cranfield University Biological Processes/Activated Sludge Treatment course • University degree or similar level of experience and knowledge in a Scientific Area
Tankered Trade Waste Manager (TWM):	• In date EMS training • Experience of working in the Waste Industry • Understanding of Health, Safety, Wellbeing and Environmental Compliance

Documentation & Resources
• Standard Operating Procedures (SOP) • CWID (Commercial Waste Information Database) • LCW Risk calculator • QUIS (For Lab results) • Waste Acceptance Form (WAF)

Procedure:

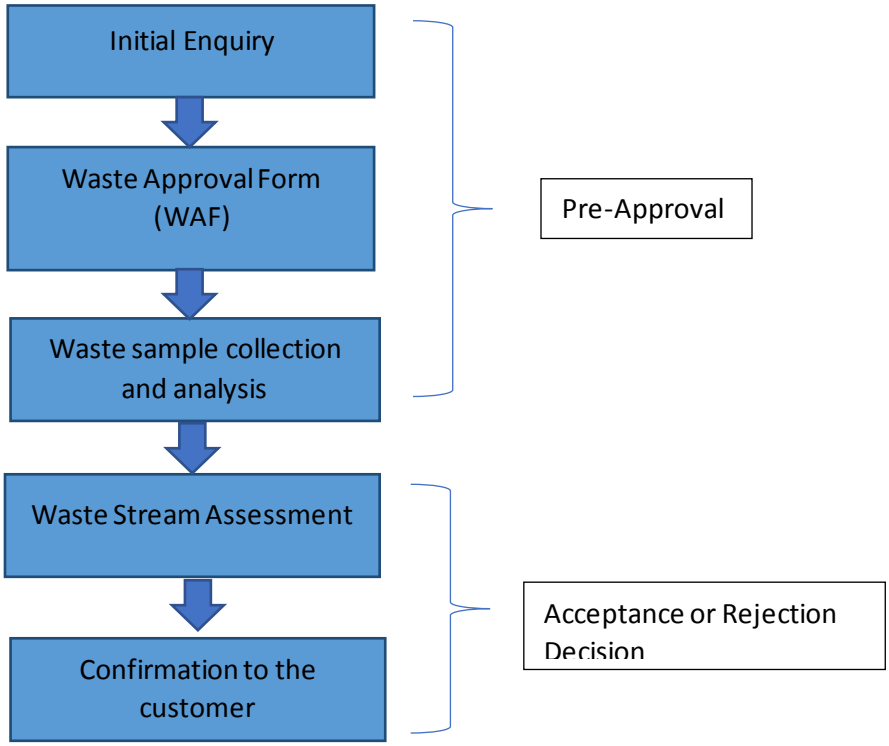

Figure 1: Waste Pre-Approval Process

Initial Enquiry

As outlined in Figure 1, the first step is having the initial enquiry from a customer. The commercial team liaise with the customer and supply them with a Waste Approval Form (WAF). The enquirer fills out a WAF with aim to collect information to support waste characterisation.

This includes:

- the name, location and contact details of the waste producer
- relevant details of the process giving rise to the waste
- an appropriate description of the waste including its physical form
- the estimated quantity expected to be delivered to the operator per load and in a year
- information on the nature and variability of the waste production process(es); EWC code (to be checked against requested site's IED permits and appears suitable for the waste in question – ultimately, the producer is responsible for assignment of the EWC code)
- SIC Code (to be checked is reasonable based on Government/companies house website)
- Process generating the waste
- Nature of the producer business
- Haulier of Waste (if known at time of completion)
- Preferred disposal sites (final approval may be restricted to different sites)
- Approximate yearly tonnage & frequency of delivery
- Other relevant information i.e., COD, Suspended Solids, Ammonia, metal analysis, (sample will be used for this, if not present), List I, List II and Red List substances if present etc.
- Miscible in water declaration (Must be "Yes", if "No", the waste must be rejected, as it will not be treatable via the inlet route)
- Biodegradable declaration (Must be "Yes", if "No", the waste must be rejected. Waste must be treatable aerobically via activated sludge. "Waste which is not biodegradable shall not be accepted" is stated on all IED permits)
- Flash point declaration (Must be >60C, as we currently do not have EX rated discharge equipment/safety apparatus in place for flammable wastes)

As part of the WAF the waste producer identifies whether the waste contains any hazardous properties prior to approval samples being sent off. There are only selected sites which are permitted to take in hazardous waste and of those the hazardous waste streams are assessed on whether they match the waste codes outlined in the permit. There will never be any radioactive waste streams pursued, nor those which may have a risk to contain or be contaminated with radioactive properties.

Sampling:

A representative sample of waste is obtained and analysed to determine the chemical composition of the waste. It is sent off to certified labs for analysis. Sample analysis is required to ensure that there is sufficient information to aid characterisation of the waste. Regular samples tested for are outlined in Table 1 whilst Samples for sewage sludge and cake tests are outlined in Table 2.

Table 1:Llist of sampling suites used for regular samples

Description	Units

pH	pH_unit
Suspended Solids [SS]	mg/l
Biological Oxygen Demand [BOD] (2mg/l ATU) 5 day suppressed	mg/l
Ammoniacal Nitrogen [N]	mg/l
Nitrite as [N]	mg/l
Nitrate as [N]	mg/l
Iron [Fe] (total)	mg/l
Aluminium [Al] (total)	mg/l
Cadmium (total) as Cd	mg/l
Chromium (total) as Cr (mg/l)	mg/l
Copper (total) as Cu (mg/l)	mg/l
Lead (Total) as Pb (mg/l)	mg/l
Nickel (total) as Ni (mg/l)	mg/l
Zinc (total) as Zn (mg/l)	mg/l
Phenols monohydric (mg/l)	mg/l
Sulphide as S (mg/l)	mg/l
Fluoride as F (mg/l)	mg/l
COD (total)	mg/l
Phosphorous total as P	mg/l
Arsenic total as As (mg/l)	mg/l
Mercury Total as Hg	mg/l
Selenium (total) as Se (mg/l)	mg Se/l
Tin (total) as Sn (mg/l)	mg Sn/l
Bromide as Br	mg/l
Cyanide excluding Iron Cyanide (mg/l)	mg/l
Antimony (total) as Sb (mg/l)	mg Sb/l
Molybdenum total mg/l	mg/l
COD 1h settled	mg/l
Sulphate as SO4	mg SO4/l
Chloride	mg Cl/l
AMTOX nitrification inhibition test 25% dilution	%
AMTOX nitrification inhibition test 10%	%
AMTOX nitrification inhibition test 1%	%
AMTOX nitrification inhibition test 0.5%	%
AMTOX nitrification inhibition test 0.1%	%
AMTOX nitrification inhibition test 5%	%
AMTOX nitrification inhibition test 50%	%
Phenols monohydric (mg/l) HPLC	mg/l
Biomethane Potential Test	CH_4/Kg

Table 2: For sewage sludge (>3% thickness) and sewage cake samples

Description	Units
Mercury [Hg] (total) as Hg dry weight	mg/kg
Arsenic [As] (total) as As dry weight	mg/kg
Selenium [Se] (total) as Se dry weight	mg/kg
pH sludges and soils	pH_unit
Nitrogen as N % Dry weight	% DW
Phosphate as P % Dry weight	% DW
Potassium as K % Dry weight	% DW
Molybdenum (total) as Mo dry weight	mg/kg
Solids Total at 105c	%
Loss on Ignition dried solids	%
Cadmium (total) as Cd dry weight	mg/kg
Chromium (total) as Cr dry weight	mg/kg
Copper (total) as Cu dry weight	mg/kg
Lead (total) as Pb dry weight	mg/kg
Nickel (total) as Ni dry weight	mg/kg
Zinc (total) as Zn dry weight	mg/kg
Sulphur as SO3 % Dry weight	% DW
Sulphur as S % Dry weight	% DW
Magnesium as MgO % Dry weight	% DW
Magnesium as Mg % Dry weight	% DW
Potassium as K2O % Dry weight	% DW
Phosphate as P2O5, % dry weight	% DW
Available Fluoride as F (mg/kg)	mg/kg

Individual waste streams may require additional analysis with consideration to the ecological risk. Furthermore, if the WAF indicates that other contaminates are present these will be investigated with additional analysis undertaken. For example, Siloxane testing is undertaken for wastes with chemical,

cosmetic, or pharmaceutical origins. At the moment, some waste streams are tested for Biomethane Potential (BMP) by an externally accredited Lab. Assessment of the data is then completed by a competent member of the team discharge terms determined.

Waste Stream Risk

Waste stream risk is determined using a calculator assesses only the eco-toxicological risk to the treatment process and biosolids cake quality. Waste streams will be classified as either:

- **Low risk**
- **Medium risk**
- **High risk**

This is determined by the number of risk thresholds which have been breached. Each breach will be assessed to understand the risk and determine any measures which need implemented to mitigate the risk (e.g. Splitting discharge, use of holding tank, restricting the number of loads or sites). If more than 3 determinants breach the predetermined thresholds, the waste will be classed as high risk, and must either be rejected or discussed with the Treatment Quality team.

Regardless of the risk profile, regular communication with the site team ensures that we are alerted to any issues with the processes, final effluent or biosolids. This allows the Process Team to modify thresholds or change the feeding patterns e.g. all at inlet or 'drip feed' to inlet via tanks to support the sites functionality.

If any single determinant is considered too high, and additional measures will not mitigate the risk sufficiently, the waste will be rejected. The final decision lies with the Treatment Quality team on high-risk wastes.

CWID Upload

Details of a waste enquiry must be entered onto CWID by the Commercial team as soon as is practicable in the process. Waste stream approvals are only valid in CWID and waste bookings will not be permitted unless the waste stream is approved within CWID and all relevant information is saved on the system.

As a minimum this will include all the details from a fully completed WAF and a copy of the WAF saved on the system. Once an enquiry is entered onto CWID, it is allocated a specific reference number which must be utilised during all future stages of waste stream approval & acceptance. All waste bookings must be recorded in CWID.

System Failure:

In the event of a system failure / power failure – deliveries may be accepted and recorded using hard copy "Tankered Waste Tickets" and the information uploaded to CWID as soon as practicable. However, if any member of the Trade Waste team has any queries regarding the booking / approval of delivery; the delivery MUST NOT be accepted until the query can be resolved.

Risk & Documentation Review

Once a completed WAF is received it is uploaded to CWID. Then a full review of the information is undertaken including a review of the risk calculation:

- Risk Calculator – Risk level for sites, paying close attention to the destination sites.

- Suitability for Biological Treatment:
  - Inhibition values
  - Biodegradability through BOD/COD results
  - Current performance of the treatment process
  - Other site variables such as weather, maintenance work, projects
- Site Loadings/Chemical Limits – in particular Ammonia and COD concentrations need to be considered for discharge conditions
- Biosolids/BAS (Biosolids Assurance Scheme) compliance - in particular, metal concentrations are considered in line with current cake PTE (potentially toxic elements) concentrations
- Review WAF:
  - Confirmation all require information is present
  - Ensure SIC code is correct
- Review EWC code & compare with site permit codes

- A check must be completed to ensure a customer account is in place.

- BAS compliance – particular focus on metal concentrations to ensure that the PTE (potentially toxic elements) match the limits in the biosolids

- A check must be completed to ensure the requested discharge sites have the appropriate EWC code and that the description for the waste stream is specified on the permit.

Depending on the level of risk, either a technician, Tankered trade waste manager or a member of the process team are permitted to review and determine approval. If acceptable, individual site approvals can be added on the waste stream CWID page under the "Approvals" tab. Extra measures should be added in the "special requirements" tab. The commercial team can provide information if required but do not decide on approvals. Queries and updates relating to specific parts of the WAF may be appended to the notes section of the waste stream in place of completing the WAF again. Digital and printed signatures are acceptable on WAFs.

Note: If specific information is not present on the WAF, the review of analysis may continue but the waste stream MUST NOT be approved until a fully completed and signed WAF is received and saved in CWID. If not, there must be suitable updates made against the waste stream notes section to include the required details.

Approval Timescales

The approval process' highest priority is to protect the environment and to maintain the highest standards in these areas, there is no pre-determined timescale by which an approval must be completed.

However, in consideration of providing a high quality to our customers, the team will endeavour to complete the process (approval on CWID) within the following timescales from receipt of a sample to the approval on CWID:

- Low Risk: 12 working days
- Medium Risk: 14 working days
- High Risk: 14 working days

The Process team will liaise with the commercial team to ensure that customers can be kept updated as to the progress of an approval especially where the above timescales will not be possible. For example, waste streams that might require additional tests may need longer.

Confirmation to Customer:

Once a decision on the waste stream has been made, the commercial team will be informed. They will then notify the customer. All records are kept in the computerised process control system and the system will be updated to reflect the decision.

Acceptance:

The Commercial Team will then issue conditions of disposal to the customer and the waste stream may be booked in according to those requirements. The waste stream is valid for 12 months from the point of the last booking. Re-approval may be granted providing that there is no notable change to the waste stream and all WAF conditions remain the same. Any additional changes identified will result in more sampling and another review of the documentation.

Rejections:

When the enquiry does not lead to the waste being received that opportunity is deactivated. An explanation of why the waste stream was rejected such as contamination, unable to biodegrade or high in Potential Toxic Elements (PTEs). This is included in the CWID update and relayed to the Commercial Team to accurately inform the customer.

Criteria Limits for non-conformance/rejection:

The limits for non-conformances are set based on regular reviews with the site effluent and Biosolids results. These are used to determine thresholds which are bespoke to each site. The waste samples are used as part of the assessment to determine if the waste is unsuitable for treatment.

References:

- SOP 02 TTW Waste Acceptance
- SOP 03 TTW Non-conformance
- WM3 Framework

Version Control			
Version	Date	Details	Published By
1.0	07/04/2020	Initial Waste Pre-approval process.	E. Ruswa
2.0	07/04/2021	Merged into a big document.	E.Ruswa
3.0	21/10/2021	Waste pre-approval process updated.	O.Boertje