

Southern Water Industrial Emissions Directive (IED)

Goddard's Green Sludge Waste Acceptance Procedures

Waste pre-acceptance, Characterisation, Acceptance, Rejection & Quarantine, Inventory & Tracking

Version 01

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1. Introduction

Industrial Emissions Directive (IED) Best Available Techniques (BAT) conclusion 'BAT 2' requires waste characterisation, pre-acceptance procedures and acceptance procedures. This procedure covers the requirements for inter-site transfers of sludge from other Southern Water (SW) operated dewatering sites (source sites) to sludge treatment centres (STC) where the sludge will be digested.

This procedure outlines the existing procedure and includes measures identified for incorporation for alignment to the revised permit once it has been determined and provided.

The implementation of the measures identified to meet BAT will progress ahead of the permit determination, but full implementation remains subject to further discussion with the Environment Agency in line with the improvement conditions (IC) process outlined in correspondence and the undertaking of an appropriate characterisation period to inform the risk assessment basis for waste acceptance.

Measures in relation to the new permit seek to meet the requirements of Appropriate Measures (and other related referenced materials). The term 'appropriate measures' is used to cover the requirements of best available techniques (BAT) for waste installations and necessary measures for waste operations in line with the Appropriate Measures 'Non-hazardous and inert waste: appropriate measures for permitted facilities' and 'Biological waste treatment: appropriate measures for permitted facilities' guidance text.

This includes the requirements with respect to:

- **Waste pre-acceptance:** a process to review, prior to agreement for receipt, the risk presented by the waste in terms of process safety, occupational safety and environmental impact.
- **Waste Characterisation:** to determine the composition of the waste that will be received.
- **Waste acceptance:** relates to the receipt of waste from a given source site for a given load/tanker.
- **Rejection & Quarantine:** regarding non-conformances within the established process
- **Inventory & Tracking:** with respect to appropriate data collation and controls regarding the waste streams.

The process considers the requirements in relation to persons, techniques, assets and operations associated to the acceptance of inter-site sludge transfers.

2. Site Transfers

As well as indigenous primary and secondary sludge from the adjacent Water treatment Works (WtW), the STC receives sludge and cake produced at other SW sites.

Liquid sludge transfers are by way of a fleet of road tankers and the transfers are under the management of the SW Bioresources Team. This role includes monitoring of sludge volumes across the network to manage supply and demand to ensure overall capacity, this is through the 'master sludge schedule'.

Each Wastewater Treatment Works (WTW) has an established collection schedule set in agreement with the site manager and process scientist. This ensures sludge is moved at regular intervals dependent on the needs of the site.

Imports to STCs are carefully managed with the site managers agreeing specific import volumes that are not to be exceeded. This includes management of scenarios where capacity may be reduced by maintenance.

The treatment process at the STC is designed to treat the types of waste received, can manage the variability found in the sludges received and has related controls to optimise the process conditions and has sufficient capacity to treat the waste in line with the required retention times.

Southern Water's Environmental Management System (EMS) is ISO 14001:2015 certified.

The Bioresources Team work to the Biosolids Assurance Scheme (BAS).

The treatment process meets all the requirements of the Hazard Analysis and Critical Control Point (HACCP) standard and will produce a final product suitable to be sent to land.

The source sites are SW and as such internal reviews and operational coordination provides a basis for upstream auditing of the production process. Communication between sites is well established and company personnel have variously visited the source and STC sites. Process teams have oversight of sites, coordination of process activities and any planned changes in the processes undertaken.

Communication process for internal notification of identified issues is established through company systems and team structures.

The waste transfers are an existing activity, and the composition of wastes is generally consistent and the impact on the process known in terms of nutrient balance type of feedstock and moisture levels.

Additional measures in relation to other BAT requirements, particularly in relation to ensuring appropriate facilities for receipt and storage, these are not covered in detail herein but form part of the overall IED project scopes. Additionally, the existing systems for tracking and inventory will be reviewed and better integrated to improve the collation and control of data.

3. Waste pre-acceptance

Each Wastewater Treatment Works (WTW) has an established collection schedule set in agreement with the site manager and process scientist.

Further development of the management system to include a source-based (upstream) review of the wastes to be transferred. This requires completion of characterisation to determine the full composition of the waste.

A review will be completed following characterisation to ensure receiving STCs are appropriate for the source site sludges. Normal operation has been demonstrated to be appropriate and this will relate to contingency plans for alternative STC receipt in the event of maintenance etc. This may identify constraints on sludge transfers which is controlled through the master sludge matrix.

Documentation is required to provide an appropriate basis on which to record the establishment or change in any new sites. This is anticipated to be an electronic system.

Where changes are implemented at a source site (typically improvement works), or a new site is to be received, a characterisation period will be completed on the sludge to ensure it remains appropriate to receive that sludge.

Prior to receipt at the STC the source will be required to provide in writing:

- the waste producer (always SW but requires site name address and contact details)
- the source and nature of the waste, at the point of production (the process that gives rise to the waste)
- a description of the waste including its physical form
- the full characteristics of the waste including the variability and reactivity (if relevant) of each waste (see characterisation)
- a description of any
- the odour potential
- the type of packaging and risks of contamination
- an estimate of the quantity you expect to receive in each load and in a year (managed through master sludge matrix)
- the age of the waste

The pre-acceptance documentation will be retained for at least 3 years following receipt of a waste stream.

An annual review will be completed yearly or with cause (change in process, feedstock, non-conformance) to ensure controls remain appropriate.

The potential odour and emissions impact (description and intensity) will be considered prior to agreement for receipt and assurance that suitable handling and storage measures are in place for the proposed waste.

A review will be completed on site throughput and storage capacity to ensure it can be accommodated.

A basis for receipt of a given tanker load will be established and agreed internally (i.e. waste acceptance criteria).

On completion of characterisation a technical assessment of the waste's suitability for treatment and storage will be completed to ensure alignment to permit conditions, regulatory requirements and the site's treatment capabilities and capacities.

The receipt of a new waste stream will remain subject to review by an appropriate technical specialist (typically Process team member).

4. Waste Characterisation

A period of initial evaluation of 12 months will be completed to understand the composition of wastes and then be completed *with cause* (see Rejection & Quarantine).

The detail regarding characterisation is in development and remains subject to agreement with the Environment Agency, detailed evaluation of the supply chain, confirmation of required lab capacity (and the required test certification) and operator training to ensure the results meet the required criteria and include tests for the required determinands.

The characterisation period will include samples from all source sites within the network to establish a basis for an update to the master sludge matrix for acceptable receipt of sludges. Samples are anticipated to be completed at STC sites but referenced to the source site. Sludge testing and testing frequency will reflect the nature of the material, how it arises and any potential variation within it (eg. taking account of seasonal variations). This is anticipated to be best understood from initial findings in the characterisation phase which will help inform pre-acceptance requirements.

This will include the identification of potential risks to process safety, occupational safety and the environment and the potential for self-heating, self-reactivity or reactivity to moisture or air.

Waste characterisation is required to obtain representative test data to fully characterise the waste and identify the chemical composition.

This requires a representative sample and subsequent analysis at an approved and certified facility to verify the suitability for the with respect to its effect on the biological treatment process.

This will include:

- particle size distribution and physical contaminants
- total solids and volatile solids
- biogas potential
- total organic carbon (TOC)

- chemical oxygen demand (COD)
- nutrient analysis
- fibre content
- pH and alkalinity
- volatile fatty acids (VFA)
- ammonia and total nitrogen content – carbon to nitrogen (C to N) ratio
- heavy metals and potentially toxic elements (PTEs)
- carbohydrates and lipids

5. Waste Acceptance

The volume and source of imports to the site is recorded by swipe and loggers which ensure that only appropriately authorised drivers can discharge.

This requires the entering of the source site, the waste being received (in line with WM3 technical guidance for EWC codes) and records offload information including the time, duration, volume, and dry solids.

The sites supplying sludge to the STC have been reviewed to ensure that the typical sludge they produce is stable, consistent, capable of, and safe for, anaerobic digestion.

All waste, to, from and between sites, is subject to duty of care requirements.

Checks are made on waste carriers [registrations/licences](#) and permits of sites receiving waste generated by Southern Water's operations. Only SW approved and appointed waste carriers (companies) may be used.

Waste characterisation and subsequent spot checks will be undertaken as outlined above, measures to implement this are progressing to improve alignment to Appropriate Measures guidance.

The characterisation period will help identify in greater detail the composition of the waste to inform the risk basis for the waste acceptance criteria and ongoing receipt, this will consider:

- the source and nature of the waste (SW and sludges)
- the variability of a waste (for example, liquid effluents) – see Waste Characterisation re. individual assessment and testing
- any hazardous properties the waste may have
- potential risks, process safety, occupational safety and the environment (for example from odour and other emissions)
- knowledge about the previous waste holder(s) and the age of the waste
- the waste's potential for self-heating, self-reactivity or reactivity to moisture or air

The practical process for undertaking waste acceptance sampling will be improved. A sample will be taken from the tanker to an appropriate receptacle prior to discharge, this will be compared against revised acceptance criteria (see below).

If the required criteria is met the operator can continue with discharge, if the criteria is not met this will be escalated to the appropriate authority (see 'Rejection and Quarantine').

The key points of the revised process include:

- retention of existing process regarding verification of source, volumes/weight,
- revision of the extent of checks completed on received sludge loads to ensure they are acceptable for receipt for the digestion process (e.g. visual, physical, pH, %DS) the criteria for rejection and the process for subsequent actions in the case of rejection (rejection, diversion etc).
- recording of non-conformances
- improvements in data management
- updated procedures and forms to reflect the changes required.
- operator training in relation to the new requirements inc. technical appraisal of suitability for receipt

6. Rejection and Quarantine

Sludge production problems are uncommon, operators and tanker drivers can identify contaminated sludges and this is most likely to happen at the source site (e.g. oil odour or visual discrepancy) and take appropriate action to prevent transfer to the digestion site.

The waste acceptance improvements outlined above will provide a means of ensuring all received waste is suitable for the facility.

If the acceptance criteria is not met the receipt will not progress and the findings will be escalated by the operator to a suitably qualified person who can advise on next steps.

This would typically be a facility performance manager (FPM) in the first instance and process technician for technical input depending on the nature of the issue.

This may include the relocation of the vehicle to another area on site to facilitate other vehicles to offload while the issue is investigated.

Depending on the findings by the suitably qualified persons the next steps may include:

- Further testing to determine if acceptance is possible
- Rejection of the load and diversion to an appropriately permitted facility that can receive and treat the waste
- A sample may be taken for further analysis and the vehicle remains quarantined pending results. This requires an additional level of control and further measures that are to be identified through further detailed review

The pre-acceptance and acceptance measures will look to appropriately manage the risk and are likely to identify issues, however given the planned periodic sampling and [lab] testing activities it may be possible for retrospective identified of non-compliant receipt. This would trigger an additional level of investigation that would require the advice of a wider team to understand the potential consequences for the digestion process, the downstream/output material, duty of care compliance and permit compliance. A revised process is required to establish the detail for this this.

The findings of which would be used to update the risk-assessment basis for waste acceptance as part of continuous improvement and risk reduction.

7. Inventory and Tracking

The volume and dry solids concentration of all sludge imports are recorded via the liquid import logging equipment. Note the dry solids device is not accurate enough to calculate total dry solids.

This is only calculated at the feed into the digesters where flow and solids concentration are measured (the latter by daily spot samples).

Imports of liquid sludge are tracked by a data logging system which records the source WtW, volume, date, time, EWC code and dry solids (DS) content (%). The record of each imported load is linked to the individual registered tanker details.

Vehicles contain a weigh cell, which can weigh and measure the wastes.

All data is stored on the logger software database.

All sludge waste imports are screened after being received, unwanted material (e.g. solid materials) will be removed through this process and disposed of appropriately.

Further development of the inventory system looks to provide greater connectivity between different computerised systems to be able to better track wastes through the site transfers/process.

This will collate the following information:

- pre-acceptance information
- acceptance basis
- non-conformance or rejection process/procedures
- storage arrangements
- treatment overview and means of removal off site
- the role of the facility in the designated disposal route

And record the following information for a given operation:

- the date the waste arrived on site
- the original producer's details
- a unique reference number
- acceptance analysis results
- the load type and size
- the nature and quantity of wastes held on site
- where the waste is physically received into on site
- staff (name and position) who are involved
- non-conformances and rejections
- With a broader reporting facility to provide:

- the total quantity of waste present on site at any one time and how that compares with the limits authorised by your permit
- the total quantity of end of waste product materials on site at any one time
- a breakdown of the waste quantities you are storing pending on-site treatment or waiting for onward transfer
- a breakdown of the waste quantities by hazardous property
- where a batch or load of waste is located based on the site plan
- the length of time a waste has been on site