

Procedure Title:	Sediment Minimisation Assessment and Review
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Approved by:	Ethan Tate/Gavin Clark
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Target audience:	All Employees
Associated Documents:	See reference documents section

Version History		
Version	Date	Description
01	27/03/2025	Initial procedure prepared to document measures

1.0 **Objective**

The objective of this procedure is to detail the measures in place for minimisation of sedimentation potential, for ongoing monitoring, assessment and review of actual sedimentation levels at the site, and for actions to be taken in the event of detection of potential for excessive accumulation at the Duranta Teesside site.

2.0 **Scope**

This procedure relates to the potential for sediment in all incoming feedstocks received at the site, and for sedimentation build up in F1, F2, the Post Digester, and final digestate storage tanks. The pasteurisation tanks are also included in scope.

3.0 **Responsibilities**

The **Operations Manager** is responsible for ensuring the requirements of this procedure are implemented.

All **Personnel** are responsible for carrying out monitoring tasks and reporting to the Operations Manager as required.

4.0 **Procedure**

4.1 Control of physical contaminants in incoming feedstocks will minimise the potential for sedimentation in the process tanks. All feedstocks received pre-assessed for suitability for acceptance at the site, and the potential for physical contaminants is considered as part of this process. Waste feedstocks accepted are liquid feedstocks and are to be offloaded by offload pump that pumps soup from the tanker through a stone trap and macerator.

4.2 Stone traps are to be cleared and monitored according to the plant PPM schedule so removing sediment and also monitoring for changes in characteristics. Any changes in characteristics of stone traps that might indicate an increase in physical contaminants in feedstocks are to be reported to the **Operations Manager**.

4.3 Weekly sieve tests for incoming feedstocks are to be undertaken for further ongoing monitoring for physical contaminants in accordance with PAS110 monitoring requirements and permitted physical contaminants thresholds. Any changes in characteristics of stone traps that might indicate an increase in physical contaminants in feedstocks are to be reported to the **Operations Manager**.

4.4 Silage inputs to the process are to be passed through a walking floor feeder and two stone traps prior to feeding into the fermenters.

4.5 Ongoing monitoring and assessment of sedimentation potential and impacts in the process are carried out as part of a range of regular checks

undertaken for surrogate process control parameters at the site during ongoing operations. These are as follows:

- Regular monitoring of the stone trap associated with the Post Fermenter mixing/re-circulation loop according to the site PPM.
- Daily visual assessment in digester windows for monitoring of substrate level/foaming
- Deployment of anti-foaming agent takes place automatically and is shown on SCADA. Use monitored by plant manager.
- Lab monitoring – daily FOS/TAC testing, and dry matter tests three times a week. Results are monitored for changes/trends. Also, samples go to external biological support services twice a week.
- Final digestate sampled in accordance with PAS110 – physical contaminants and dry matter content. Routine analysis results are monitored for trends and compliance within limits of the standard.
- Visual monitoring of final digestate store for evidence of sedimentation as levels in tank drop following final liquid digestate takeoff
- Routine PPM for mixers, and heating systems. Temperature trends on digesters monitored on SCADA and by plant manager.
- Pasteuriser tanks are regularly cleaned out to remove sedimentation c. every 3m, which provides a facility for ongoing monitoring of sedimentation potential in the process as amounts and nature of sediment removed is monitored.
- Pressure transducer in digesters used for monitoring substrate level subject to daily visual level check of visible tank contents compared to levels shown on the SCADA to check consistence and reliability of measurement.
- Hydraulic loading rate recorded daily.

- 4.6** Trends and changes in any of the above parameters when viewed in the context of overall plant performance will be indicative of any process control issues relating to sedimentation levels. Staff are to report any changes detected or trends to the **Operations Manager**.

5.0

- 5.1** **The Operations Manager** will collate daily plant performance data on 'Actual vs Theoretical Biogas Yield Spreadsheet' that is included in the plant EMS. A daily review of the data will be undertaken by the **Operations Manager**. Weekly and monthly reviews of the data will also be undertaken by the **Operations Manager**, to allow detection of any apparent trends in plant performance. This process will inform decision making for plant

management activities for a range of aspects, including evidence of sedimentation and the need for further action to be taken to address this.

5.2 Visual imaging monitoring of the sediment levels in the tanks will be undertaken at 6 monthly LDAR optical imaging surveys. LDAR surveys are undertaken using an Infra-Red (IR) imaging camera. A section of cladding is to be removed from the tanks that will expose a representative section of the tank to be surveyed. The site tanks are of a metal construction, and there will be a temperature difference in the area of the tank containing liquid, and the area of the tank where solid sediment material has accumulated, and so a visual image will be generated of the level of sediment in the tank. An imaging survey will be undertaken every six months, and this will provide data to allow monitoring for changes in the levels of sediment in the tanks over time. The **Operations Director** is to review the results of six-monthly imaging surveys to monitor tank levels.

5.3 A record has been retained of the levels of sedimentation that were present in the tanks at the last tank internal inspection/de-sedimentation exercise. The tanks had been in operation for 7 years when this exercise was undertaken, and the levels of sediment in the tank at the time had not had any impact on plant operations. These levels have been recorded and will be used as action levels for further investigation/assessment of sedimentation and consideration as to whether further action is needed if reached.

5.4 Sedimentation levels in the tanks during the last exercise are as shown in Table 1 below.

5.5 Table 1 – Sediment (Silt) Removed from Tanks During 2021/2022 Exercises

Tank	Tonnages Silt Removed	Tank Volume	Silt as % Total Tank Volume
F1	642t	5,800m ³	11%
F2	404t	5,800m ³	7%
PF	700t	4,750m ³	14.7%
FST's	1,999t	24,000m ³	8.3%

The Operations Manager will determine when IR survey data shows that sediment has reached the trigger levels shown in Table 1 and will then be responsible for undertaking further review of actions required.

6.0 **Records**

All records associated with this procedure must be retained for a period of six years.

7.0 **Associated Documents**

Daily Weekly Monthly PPM Schedule
Waste Pre-Acceptance Procedures
Actual vs Theoretical Biogas Yield Spreadsheet
PAS110 SOP