
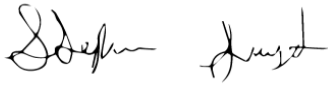
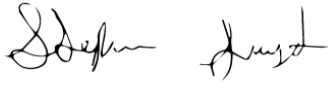




**Alkaline Stabilization of Sludges &
Testing
Standard Operating Procedure
QEHS P 029 (V2)**

The signatures below certify that this Quality Manual has been reviewed and accepted and demonstrates that the signatories are aware of all the requirements contained herein and are committed to ensuring their provision.

	Signature	Position	Date
Prepared by		EHS Manager	08/06/2022
Reviewed by		Director	21/06/2022
Approved by		Director	21/06/2022

COMPANY PROPRIETARY INFORMATION

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Date	Version	Context	Initial
24-05-2021	1	Procedure implemented into Management System	KR
13-06-2022	2	Cover page changed and ISO logos added. Some changes to wording and format. Renumbered. Risks expanded on and lime risk assessment completed	BG

P 029 Alkaline Stabilisation of WWTP Sludges & Testing SOP

Quality, Environment, Health & Safety

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1.0 Introduction/Purpose

This procedure describes how Evergreen Fields Ltd. manages the alkaline stabilisation of WWTP sludges.

2.0 Scope/Application

This procedure applies to alkaline stabilisation of WWTP sludges at the Evergreen Fields Ltd. operated specified shed facility.

- The site receives deliveries of wastewater sludge from various wastewater treatment plants for treatment and storage.
- Lime treatment (Alkaline stabilisation) is used at this facility to reduce the microbiological parameters. Quicklime is mixed with the sludge cake with an appropriate dose (0.3kg CaO /kg DM) to raise the pH (>12)
- Sludge and lime are mixed in a Keenan Mixer.

3.0 Reference Documentation

Reference	Document Title	version
	Code of good practice for the use of biosolids in agriculture	

4.0 Terms and Definitions

Term	Definition
Document	Information & supporting medium
Procedure	Specified way to carry out an activity or process
Quality manual	Document specifying the QEHS management system
Record	Document stating results or data relating to activities performed
Specification	Document stating requirements

5.0 Responsibility

The management representative will establish and review this procedure. Evergreen Fields Ltd. senior management will work with the management representative to implement it. All personnel working for/on behalf of Evergreen Fields Ltd. at the facility must familiarise themselves with the contents of the relevant Site Folder and follow all safety procedures and instructions issued by Evergreen Fields Ltd.

6.0 Process

6.1 Training and Induction

The following training records are to be checked by the relevant manager prior to works commencing. Copies of training records to be kept on QEHS smart sheets.

- Required training for operatives:
 - Safe Pass
 - Teleporter tickets.
 - Manual handling

The following inductions are to be completed by the relevant manager prior to works commencing. Copies of induction records to be kept on QEHS smart sheets.

- Required inductions for operatives on site:
 - SOP induction (minimum SOP's required):
 - Emergency & Evacuation
 - Accident Incident reporting
 - Working with sludge & biosolids
 - Alkaline stabilization

6.2 Equipment and Substances Details

Only authorized and trained/experienced Personnel are allowed to operate the equipment.

- **PPE:** Hi-Vis, Safety Boots, Gloves, 3m 6000 mask with 3m 5000 organic filters and Gas Detector.
- **Sludge Delivery:** Sludge reception area is where incoming sludges are tipped prior to Alkaline stabilization. Refer to site specific plan and signage.
- **Lime:** The required lime must have a CaO content of >74%.
- **Lime storage:** Lime is delivered to the site on the morning of process and will be kept dry.
- **Sludge and lime Loading:** Sludge and lime are loaded into the Keenan mixer with the Teleporter. Only authorized and suitably trained/experienced personnel are allowed to operate.
- **Sludge mixing:** The necessary amount of lime is added to mixing chamber and is mixed to an even mixture of sludge and lime.
- **Biosolids discharge:** The biosolids are discharged to the holding area.
- **Equipment maintenance:** All equipment must be checked and maintained prior to use.

6.3 Sequence of Operation.

- WWTP sludges are delivered to the facility by Trailer, Ro-Ro and/or Skips.
- Deliveries are unloaded in the designated unloading area.
- Lime is added to the sludge as a treatment (alkaline stabilization) to reduce the microbiological parameters and produce a biosolid as per the *Code of Good Practice for use of Biosolid in Agriculture*.
- Biosolids Manager to take 3 samples from different points from the stockpile of sludge and take them to the inhouse lab for dry matter testing.
- When the dry matter testing is completed, it can be calculated how much lime is added. The minimum acceptable lime dose for alkaline stabilization is 0.3kgCaO per kg dry matter
 - 12% dry matter - 36kg lime per ton of sludge.
 - 13% dry matter - 39kg lime per ton of sludge.
 - 14% dry matter - 42kg lime per ton of sludge.
 - 15% dry matter - 45kg lime per ton of sludge.
 - 16% dry matter - 48kg lime per ton of sludge.
 - 17% dry matter - 51kg lime per ton of sludge.
 - 18% dry matter - 54kg lime per ton of sludge.
 - 19% dry matter - 57kg lime per ton of sludge.
 - 20% dry matter - 60kg lime per ton of sludge.
- The information is then passed on to the Operative. Lime and sludge is to be mixed to ratios as in table above.
- Sludge is loaded into the Keenan mixer mixing chamber.
- Lime is added into the mixing chamber.
 - Ensure the correct lime dosage rate is applied.
 - Close mixing chambers door.
- The lime and sludge are mixed together in the mixing chamber.
 - Mix for 5 min and visually inspect to ensure it is evenly mixed.
 - If it is not evenly mixed repeat the process, continue mixing and visually inspect at 5 min intervals.
- The lime and sludge are discharged into the holding area.
- The Biosolids Manager then completes the Testing Process.
- The biosolids is transferred to the storage area with a teleporter.
- The biosolids remain in storage until approved NMP is in place.

- Biosolids loaded with teleporter/loading shovel into the tractor trailers/rear discharge muck spreaders or Trucks and transported to the farms for recovery. Depending on the location and situation it is decide what options are used.
- The Biosolids manager ensures the operator has the required paperwork (NMP Spread maps and rates) before land spreading.
- Biosolids land spread with a rear discharge spreader and ploughed in directly.

6.4 Process Treatment Verification

To verify the treatment process, independent certified laboratory analysis is required. The following procedure shall be followed:

- A sample of the Biosolid shall be taken and placed in the approved sample container.
- Reseal the container and label the sample with the following:
 - Date
 - Sample Name
 - Required Tests
- Fill out the **Microbiological Sample Log Form QEHS F 029** form with the details of the sample taken and log it into smartsheet.
- The sample must be delivered to IAS Laboratories, Bagnelstown, Co. Carlow for testing.
- On receipt of the test report from the laboratory, the results must be assessed to verify treatment following standards have been met.
 - faecal Coliform (Presumptive E-Coli) < 1,000 MPN/g DS
 - Salmonella sp. < 3 MN.4/g DS
- If standards have been met, the report must be scanned and filed in the designated folder.
- If standards have not been met, a Non-Conformance must be raised following Non-Conformance Corrective Action Procedure to investigate the root cause and to identify Corrective Actions.

6.5 Irish Water Biosolid Analysis Reporting Form

The Biosolid Analysis Reporting form must be submitted monthly with the Monthly Service Reports. In Lot 1 [Provision of Wastewater Treatment Sludge Management Services] the test data received from IAS Labs must be input onto the spreadsheet. The following fields must be completed according to the specified timelines:

Parameter	Units	Minimum Frequency of Analysis
Faecal Coliforms	MPN/g dry solids	Every Week
Salmonella sp.	MPN/g dry solids	Every Week
Dry Solids	%	Every 2 months
Organic Matter	TOC as % of dry solids	Every 2 months
pH	pH Units	Every 2 months
Total Nitrogen	% of dry solids	Every 2 months
Ammonium-nitrogen	% of dry solids	Every 2 months
Total Phosphorous	% of dry solids	Every 2 months
Potassium	% of dry solids	Every 2 months
Cadmium	Mg/kg dry solids	Every 6 months
Chromium	Mg/kg dry solids	Every 6 months
Copper	Mg/kg dry solids	Every 6 months
Lead	Mg/kg dry solids	Every 6 months
Mercury	Mg/kg dry solids	Every 6 months
Nickel	Mg/kg dry solids	Every 6 months
Zinc	Mg/kg dry solids	Every 6 months
Polychlorinated dibenzodioxins/dibenzo Furans [PCDD/F]	Mg/kg dry solids	Every 12 months
Polychlorinated biphenyle [PCB]	Ng TEQ/kg dry solids	Every 12 months
Nonylphenol	Mg/kg dry solids	Every 12 months

How to label samples.

e.g. B21-M-EGF 02 =

Biosolids sample, week number, -M = Microbial- EGF 02 = EGF Facility

M = Micro weekly

BM = By-Monthly every 2 months

BA = By-Annual every 6 months

A = Annual every 12 months

Attach testing parameters sheet with samples when sending to IAS labs

6.6 Health & Safety

- **Summary of hazards of lime:**

- Causes skin irritation.
- Causes serious eye damage.
- May cause respiratory irritation.

- **Precautionary statements Prevention:**

- Wear protective gloves/protective clothing/face protection /eye protection.
- Wash exposed skin thoroughly after handling.
- Use only outdoors or in a well-ventilated area.
- Do not handle until all safety precautions have been read and understood.
- Do not breathe dust. Do not eat, drink, or smoke when using this product.

6.6.1 Quicklime Response:

- **If on skin:**

- Wash exposed skin with plenty of water.
- If skin irritation occurs: Get medical attention.
- Take off contaminated clothing and wash it before reuse.

- **If in eyes:**

- Rinse cautiously with water for several minutes.
- Remove contact lenses, if present and easy to do. Continue rinsing.
- Seek medical attention immediately.

- **If inhaled:**

- Remove person to fresh air and keep comfortable for breathing.
- Seek medical attention if you feel unwell

- **If ingested:**

- Rinse mouth.
- Do NOT induce vomiting.
- If exposed or concerned:
- Get medical advice

6.6.2 Spills/Leaks

- Identify the liquid of the spill or leak.
- If spillage/leak is thought to be flammable, check for and remove ignition sources, **ONLY IF SAFE TO DO SO.**
- Locate the nearest available fire extinguishers.
- Locate the nearest spill kit.
- Locate the nearest first aid kit & eye wash.
- If liquid is free flowing from pipe, prevent further leakage by shutting off flow if safe to do so. Place container under leak to catch any residual flow.
- If spill or leak has the possibility of running into surface water drains, the drain cover must be covered to prevent contamination using sandbags.
- If spill or leak is over 1m³, utilize the loading shovel to clean up. If under 1m³ then using correct PPE, squeegee, buckets, and shovels clean up spill and put contents into dedicated sludge area.
- Any other liquid, clean up spillage using correct PPE and spill kit.
- Place all used spill pads, socks and any other absorbents used into disposal bags inside the spill kit and seal.
- Dispose of contaminated pads appropriately.
- **DO NOT** dilute any leaks/spills with water.

6.6.3 Emergency Procedure

- For all classifications of Emergency firstly, assess the situation.
- Only take appropriate actions if it is safe to do so.
- If the area is unsafe then all persons should evacuate to the nearest Emergency Assembly Point or a reasonably determined safe location.
- Initiate a Rollcall to ensure all persons are accounted for.
- If it is safe to take appropriate action, the area should be made safe as far as practically possible.
 - Don the appropriate level of PPE, as required – if material/risk is unknown then don the highest level of protection.
 - Cordon off the area.
 - Switch off/Isolate any machinery/electrical equipment/valves etc.
- As soon as practical after the area has been made safe and/or evacuated, the Emergency Services and Evergreen Fields Management should be contacted.

6.6.4 Emergency Contact Details

Emergency Services:	999 or 112
Relevant manager:	Kevin Regan (087) 9405836
Evergreen Fields Head Office:	(094 9646205

7.0 Review

This document is to be reviewed by management representative on an annual basis or as required by senior management.