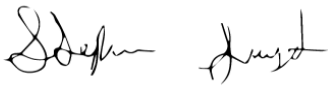
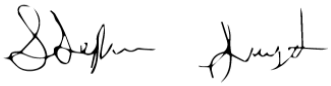
EVERGREEN FIELDS
TRANSPORT & AGRI SERVICES

Working with Sewage Sludge & Biosolids

Standard Operating Procedure

QEHS P 031 (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
21-06-2022	2	Cover page changed and ISO logos added. Some changes to wording and format	BG

P 031 Working with Sewage Sludges & Biosolids SOP

Quality, Environment, Health & Safety

Contents

1.0 Introduction/Purpose

This procedure describes the hazards, risks, environmental aspects, and impacts relating to the operations of Evergreen Fields Ltd with respect to the handling of Sewage Sludge and Biosolids. The procedure presents the control measures implemented to eliminate or reduce the risks and/or impacts. Particular reference is made to **S.I No. 572 of 2013 Safety, Health and Welfare at Work (Biological Agents) Regulations 2013** which defines the classification and minimum containment measures required.

2.0 Scope/Application.

This procedure applies to all operations and activities dealing directly with Sludge, Sewage Sludge and/or Biosolids including sludge collections, sludge deliveries, sludge storage, sludge treatment, testing and land spreading of biosolids.

3.0 Reference Documentation

Reference	Document Title	version
P 016	Accident/Incident Reporting Procedure	2
P 001	Non-Conformance Corrective Action Procedure	2

Management System Tracker Register of Environmental Aspects

Management System Tracker Register of OHS Risk Assessments

Management System Tracker Register of Legal and Other Requirements

S.I No. 572 of 2013 Safety, Health and Welfare at Work (Biological Agents) Regulations 2013

2013 Code of Practice for the Safety, Health and Welfare at Work (Biological Agents) Regulations 2013 (HSA)

Guidelines to the Safety, Health and Welfare at Work (Biological Agents) Regulations 2013 (HSA)

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.

5.1 Management Representative

A management representative shall identify the OH&S Hazards & Environmental Aspects of activities, products, and services of Evergreen Fields Ltd and its suppliers and contractors in working with Sewage Sludge and Biosolids and shall evaluate the significance of these. Where necessary, input will be sought from senior management, employees, subcontractors, or other persons/entities as deemed necessary. The management representative shall prepare, maintain, and implement specific control measures in this procedure to be applied when working with Sewage Sludge and Biosolids. The management representative will monitor the implementation of this procedure as deemed necessary

5.2 Senior Management

The senior management of Evergreen fields shall review and approve this procedure and will provide the necessary resources for its successful implementation.

5.3 Employees & Contractors

All employees and contractors working for/on behalf of Evergreen fields who will be operating in close proximity/contact with Sewage Sludge and/or Biosolids must follow the control procedures highlighted in this procedure. Failure to do so may result in disciplinary actions. Employees and contractors are actively encouraged to report any non-conformances/deficiencies in the control measures to the Management Representative/ Evergreen fields Management.

6.0 Process

6.1 Biological Agents Regulations

S.I No. 572 of 2013 Safety, Health and Welfare at Work (Biological Agents) Regulations 2013 (and associated Codes of Practice) outlines the approved list of biological agents, their classification, the minimum containment measures required and the legal requirements of the employer with regard to protecting employees working with Biological Agents.

Biological Agents are defined in the Regulations as micro-organisms including those that have been genetically modified, cell cultures and human endo-parasites which may provoke any infection, allergy or toxicity. They are also defined in the Regulations as microbiological entities, cellular or non-cellular, capable of replication or of transferring genetic material.

Biological Agents are classified into 4 risk groups in the Regulations being:

- A "**group 1 biological agent**" means one that is unlikely to cause human disease to employees.
- A "**group 2 biological agent**" means one that can cause human disease and might be a hazard to employees, although it is unlikely to spread to the community and in respect of which there is usually effective prophylaxis or treatment available.
- A "**group 3 biological agent**" means one that can cause severe human disease and presents a serious hazard to employees, and which may present a risk of spreading to the community, though there is usually effective prophylaxis or treatment available.
- A "**group 4 biological agent**" means one that can cause severe human disease and is a serious hazard to employees, and which may present a risk of spreading to the community, and in respect of which there is usually no effective prophylaxis or treatment available.

Biological Agents are found virtually everywhere in the natural environment. However, certain biological agents can cause harm – either by causing disease (i.e., are pathogenic), by causing allergy or by producing toxins which are harmful. There are two modes of exposure at work to biological agents:

- Intentionally worked with (e.g., in a microbiological laboratory).
- Incidental exposure may occur as a result of the kind of work done (e.g., exposure through close proximity during transport activities).

The operations of Evergreen fields Ltd may lead to incidental exposure of personnel to Biological Agents. The nature of sewage, and hence its sludge, is such that it may contain enteric pathogens (i.e., those which are excreted with faecal material). The levels and diversity of pathogens in sewage will be dependent upon local conditions, including the incidence of disease in the contributing (i.e., source of sewage) community at that time. Examples of pathogenic microorganisms that may be found in sludge derived from faecal material are shown on the following page. The list is by no means exhaustive.

From this list, the risk group (as defined in the Code of Practice) can be identified. Leading from this, the minimum containment measures recommended for control can be determined as detailed in Schedule 2 or 3 of the Code of Practice. These are outlined in Section 6 of this procedure detailing the specific containment measures implemented by Evergreen fields Ltd.

A full risk assessment is also required to identify the hazards and associated risks and putting in place appropriate measures to protect employees' health and safety. This risk assessment is shown in Section 8 of this procedure. All employees are consulted with and have input into the risk assessment and development of control measures.

Table 1 List of pathogenic Microorganisms found in Sewage & their Risk Group Classification

Biological Agent	Risk Group Classification	Biological Agent	Risk Group Classification
Bacteria		**Fungi**	
Salmonella spp.	2 (S.typhi – 3)	Aspergillus spp.	2
Escherichia coli (enteropathogenic strains)	2	Trichophyton spp.	2
Pseudomonas aeruginosa	2	Epidermophyton spp.	2
Clostridium perfringens	2		
Clostridium botulinum	2		
Mycobacterium spp.	2 & 3		
Leptospira spp.	2		
Campylobacter spp.	2		
Viruses			
Hepatitis A-virus	2		
Influenza virus	2		
Protozoa			
Giardia lambia			
Toxoplasma gondii	2		
Helminths			
Toxocara canis	2		
Toxocara cati	2		
Trichuris trichiura	2		
Yeast			
Candida albicans	2		
Candida krusei	2		
Cryptococcus neoformans	2		

6.2 Code of Practice

The following containment measures are detailed in the Code of Practice:

NOTE: No Risk Group Level 4 Biological Agents are identified/expected to be present in sewage sludge or biosolids. The highest Risk Group Level identified is **Level 3**. Containment requirements may be selected from different categories below on the basis of risk assessments related to any particular process, as allowed for in the Code of Practice

Table 2 Code of Practice

Containment Measures	Containment Levels	
	2	3
1. The workplace is to be separated from any other activities in the same building.	No	Recommended
2. Input air and extract air to the workplace are to be filtered using HEPA filter or likewise.	No	Yes, on extract air
3. Access is to be restricted to nominated employees only.	Recommended	Yes
4. The workplace is to be sealable to permit disinfection.	No	Recommended
5. Specified disinfection procedures.	Yes	Yes
6. The workplace is to be maintained at an air pressure negative to atmosphere.	No	Recommended
7. Effective vector control (eg rodents and insects)	Recommended	Yes
8. Surfaces impervious to water and easy to clean.	Yes, for bench	Yes, for bench & floor
9. Surfaces resistant to acids, alkalis, solvents, disinfectants.	Recommended	Yes
10. Safe storage of Biological Agent.	Yes	Yes
11. An observation window, or alternative, is to be present, so that occupants can be seen.	Recommended	Recommended
12. A laboratory is to contain own equipment.	No	Recommended
13. Infected material including any animal is to be handled in a safety cabinet or isolator or other suitable containment.	Where appropriate	Yes, where infection is by airborne route
14. Incinerator for disposal of animal carcases.	Recommended	Yes (available)

6.4 Evergreen Fields Containment Measures

The workplace is to be separated from any other activities in the same building.

All Evergreen fields facilities are agricultural type sheds used specifically for sludge treatment and storage and do not have any other activity present. All sludge is collected in dedicated skips, Ro-Ros or trailers/tankers. These are filled in dedicated sludge processing areas in individual treatment plants. All containers are covered/sealed when in transport.

Input air and extract air to the workplace are to be filtered using HEPA filter or likewise.

It is not practicable to install Input/Extract air systems to Evergreen fields sludge facilities.

Access is to be restricted to nominated employees only.

Yes. Security gates are installed at all sites. Safety signage is in place.

The workplace is to be sealable to permit disinfection.

It is not practicable to fully seal Evergreen Fields facilities for disinfection. Partial sealing is possible (i.e., facilities have high concrete walls and dedicated drainage). Partial sealing of collection containers (e.g., skips) is possible (i.e., all containers are watertight).

Specified disinfection procedures.

Yes. Refer to ***Preventive Measures.***

The workplace is to be maintained at an air pressure negative to atmosphere.

It is not practicable to install Input/Extract air systems to Evergreen fields sludge facilities or to maintain negative air pressures.

Effective vector control (eg rodents and insects).

Yes. Refer to ***Preventive Measures.***

Surfaces impervious to water and easy to clean.

Yes. Walls and floors constructed of concrete.

Surfaces resistant to acids, alkalis, solvents, disinfectants.

Yes. Walls and floors constructed of concrete.

Safe storage of Biological Agent.

Yes. All Evergreen Fields Ltd. facilities are licenced to store sewage sludge and biosolids. All facilities are fit for purpose, maintained, and monitored. All facilities have dedicated liquid runoff.

All containers are fit for purpose, maintained, and monitored.

An observation window, or alternative, is to be present, so that occupants can be seen.

Not applicable.

A laboratory is to contain own equipment.

Not applicable.

Infected material including any animal is to be handled in a safety cabinet or isolator or other suitable containment.

Not applicable.

Incinerator for disposal of animal carcases.

Not applicable.

6.5 OHS Risks

Working in proximity to Sludge/ sewage sludge, sewer systems, wastewater treatment plants and biosolids may expose personnel Occupational Health & Safety Risks such as viruses, bacteria, fungi, parasites and numerous other micro-organisms.

The **Transmission Chain** of the above is outlined in the HSA guidelines as follows:

- **Reservoir:** the source of the infectious agent; any contaminated part of a human being, animal, soil, water or object.
- **Portal of Exit:** for contamination to happen, the biological agent must get out of the reservoir or has to be accessible.
- **Mode of Transmission:** direct (inhalation or contact), semi-direct (transmitted on dirty hands), or indirect (by carrier, insect etc.)
- **Portal of Entry:** respiratory tract, digestive tract, intact or damaged skin, previous injury or via a contaminated instrument or mucus.
- **Potential Host:** the employee/personnel at the workplace.

This can lead to any of the following conditions:

- Leptospirosis (Weils Disease)

  Rat's urine or infected water encountering breaks in the skin can lead to this potentially fatal bacterium. Flu-like symptoms, fever, headaches, and vomiting can lead to meningitis and kidney failure.

- Hepatitis A, B, C

  Bodily fluids that may be contaminated with blood encountering broken skin can lead to the above conditions as can splashes to the eyes, nose and mouth and hand-to-mouth contact.

- Tetanus (Lock Jaw)

  Again, spores that encounter broken skin can lead to uncontrolled muscle spasms or lock jaw.

- Toxicara Canus

  This parasite is a roundworm that in its worst case can lead to blindness.

- Infection/transmission of any of the Pathogenic Microorganisms listed in Table 1 of this procedure.

6.6 Environmental Aspects

Incorrect handling and storage of sewage sludge may lead to odour emissions and/or contamination of land and/or water bodies.

Incorrect testing of sewage sludge and/or biosolids may lead to contamination of land and/or water bodies.

Incorrect development and implementation of Nutrient Management Plans may lead to contamination of land and/or water bodies.

Preventive measures in relation to Environmental Aspects are established through QEHS Objectives, Targets & Programs.

Additional control and preventive measures include:

- **Evergreen Fields Ltd Safety Statement**
- **Evergreen Fields Ltd Driver Handbook**
- **QEHS P 010 Emergency & Evacuation Response Plan**
- **QEHS P 032 Sludge Operations Odour Management Plan**
- **QEHS P 030 Monitoring of Sites**

6.7 Preventive Measures

All personnel, while working in proximity to sewage sludge, sewage infrastructure and biosolids are required to implement the following preventive measures

6.7.1 PPE

PPE is used as a last defense in the control hierarchy of biological agents' exposure. Where Evergreen fields have determined that exposure cannot be avoided, the company provides suitable PPE for employees at risk. The measures below must be followed at all times by employees working with sludge and biosolids:

Before commencing work in the sludge/biosolids area, the following PPE must be worn:

- Hi-visibility vest/jacket
- Gloves
- Safety boots
- Safety glasses

- The PPE provided is for personal use and should not be shared.
- PPE must be stored in a clean, dry and separate area away from clean clothing/stationary etc. to avoid cross contamination.
- Any damage/defects to PPE must be reported to Evergreen Fields Management immediately.

6.7.2 Personal Hygiene

Hygiene measures aim to prevent or reduce the accidental transfer or release of biological agents from the workplace. The measures below must be always followed by employees working with sludge and biosolids:

- Eating, smoking and drinking is forbidden at all treatment plants, sludge facilities and during transport activities. Rest breaks/meal breaks must be taken away from sludge/biosolids work areas.
- Hands (and forearms potentially) must be washed before eating, drinking, smoking, using the telephone, inserting contact lenses, physical contact with other persons, re-entering vehicles.
- Wash hands/forearms using soap and water following the best practice below:
  - Wet hands thoroughly under running water.
  - Apply soap to heel of hands.
  - Rub palms together 5 times. Rub palms together 5 times with fingers interlaced. Rub palm of hand over back of other hand 5 times.
  - Rinse hands thoroughly under running water to remove all traces of soap.
  - Turn off tap.
  - Dry hands completely using paper towels/air-dryer.
  - Discard paper towel in waste bin (avoid touching bin with hands if possible).
  - Where running water/soap not available:
    - Apply provided disinfectant to heel of hands.
    - Follow hand wash process above to apply disinfectant to all parts of hands/forearms.

- Any existing cuts/grazes on hands/forearms must be covered with waterproof dressings provided in First Aid kits (in each Evergreen fields vehicle and Sludge Facility) before commencing work with sludge/biosolids. If y cuts/grazes occur during work, these should be washed immediately.
- Avoid hand-to-mouth, hand-to-nose, or hand-to-eye contact. Care should be taken with pens and all stationary, that these are not inserted into the mouth.
- Remove any PPE and contaminated clothing when leaving the work area and do not enter clean areas wearing contaminated PPE/clothing. Do not store PPE/contaminated clothing with clean clothing.

6.7.3 Vaccination

Evergreen Fields employees are advised that the company will provide vaccinations where the employee opts to do so considering the information contained within this procedure in relation to the hazards and risks posed by sludge and biosolids.

Employees wishing to avail of the vaccination option should contact Evergreen Fields Management who will organize an appointment with a suitable Medical Practitioner. It should be noted that vaccinations are not available for some of the Biological Agents present.

6.7.4 Emergency Response

Emergency Procedures are in place at all Evergreen Fields Ltd. sites. All staff are trained in emergency procedures and in use of firefighting equipment. The relevant Emergency Procedures are:

- **QEHS Site specific Emergency & Evacuation Response Plan**
- **QEHS P 011 Head Office Emergency & Evacuation Response Plan**

All emergency situations on site must be reported Evergreen Fields Management and the relevant Authority.

6.7.5 Accident Incident Reporting

All accidents/incidents (near misses), whether serious or not, must be reported immediately to the Safety (Management) Representative/ Evergreen Fields Management. Accident reporting shall be conducted in line **with QEHS P016 Accident Incident Reporting Procedure** and the accompanying **QEHS F 016a Accident Incident Report Form**. The procedure and form must be followed/completed by the staff member involved as soon as practically possible following the accident/incident. Failure to do so may result in the implementation of the disciplinary procedure.

In the event of a serious incident/accident the safety (management) representative together with Evergreen Fields Ltd. management will carry out an investigation into the root cause of the accident/ incident and will make recommendations on any corrective action/s required. A prompt investigation is to be carried out after every accident/incident to determine the immediate cause and to prevent similar accidents/incidents occurring. Corrective action will be taken where necessary and recorded. The co-operation and assistance by all members of staff in accident/ incident investigations is expected. Any non-conformance(s), corrective action(s) and/or preventive action(s) arising from an accident/incident investigation shall be raised/logged/implemented as per **QEHS P 001 NCCA Procedure** and the accompanying **HSQE F 001 NCCA Report Form**.

6.7.6 First Aid

First Aid facilities are provided at all Evergreen Fields Ltd. facilities and vehicles. During the induction process staff will be advised as to the location of the nearest first aid box to their workstation. Employees must report any shortages or missing equipment to the Safety Representative as soon as practical.

6.7.7 Disinfection Procedure

Disinfection of Evergreen Fields equipment/facilities/an area will be conducted when there is a risk (real or perceived) of contamination/infection. The method of disinfection will depend on the circumstances, but the following recommended disinfection procedures shall be attempted first:

NOTE: Prior to any disinfection activity, the Safety/Management Representative/ Evergreen Fields Ltd. management must be contacted. A specific risk assessment and safe working method will need to be completed before any disinfection activity will be authorised.

Disinfection Circumstance	Disinfection Method
Facility Shed Contamination	- All sludge/biosolids in affected area to be segregated and lime treated. - Segregated material to be tested for pathogens prior to release. - Shed walls/floors to be power washed with disinfectant.
Spillage in public area	- All sludge/biosolids in affected area to be removed using suitable equipment. - Affected area to be covered in lime. - Road sweeper to be used as final clean-up.
Equipment Contamination	- All excess sludge/biosolids on affected equipment to be removed, segregated and lime treated. - Equipment to be power washed with disinfectant.

6.7.8 Vector Control

The aim of the rodent and insect control programme at the Company is to make ‘food’ sources inaccessible and living conditions as unattractive as possible. The following procedures are in place:

- Maintenance of good housekeeping standards on an ongoing daily basis.
- Efficient management of on-site wastes.
- Staff training and awareness.
- Contracted rodent control program, where necessary.

6.8 Risk Assessment

RA No	Hazard	Risk(s)
RA 029	**Group 2 & 3 Biological Agents (non-exhaustive list shown in Section 5 of procedure)**	**Incidental exposure to Biological Agents causing infection/disease**
Risk Rating		
Likelihood	**Consequence(s)**	**Risk Rating**
Possible	**Severe**	**Very High**
Control Measures		
- Housekeeping procedures in place - Containment measures as required by Biological Agents Regulations & Code of Practice in place		
Additional Control Measures		
- Staff trained on risks of working with Biosolids and preventive measures – QEHS P 031 **Working with Sewage Sludge & Biosolids Procedure**. Preventive Measures as highlighted in procedure: o Staff informed & trained on working with Biological Agents o Personal hygiene guidelines & facilities/equipment provided o PPE provided o First Aid facilities provided o Safety signage in place o Vaccinations offered to all employees o Emergency procedures in place		
Final Risk Rating		
Likelihood	**Consequence(s)**	**Final Risk Rating**
Rare	**Severe**	**Medium**

7.0 Review

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