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| Facility type | **Faecal Sludge Treatment Plant (FSTP)** |
| Location | **Apac** |

**Document Description**

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| Number | **-** |
| Title | **Occupational Health and Safety Guidelines** |
| Targeted Staff | **Plant attendant, supervisor** |

**Scope and responsibilities**

| No. | Tasks | Plant Attendant | Supervi-sor | Frequency |
|---|---|---|---|---|
| C.1 | Pit emptier reception | X | | At FS delivery |
| C.2 | Prepare FS dumping | X | | At FS delivery |
| C.3 | Control and direct FS dumping | X | | At FS delivery |
| C.4 | Prepare and proceed to bed feeding | X | | At FS delivery |
| C.4 | Screening removal and disposal onsite | X | | < next dumping |
| C.5 | Screening disposal offsite | | X | ≥ Annually |

**Issue and Revision Record**

| No. | Date | Author(s) | Checker | Description |
|---|---|---|---|---|
| **1** | **__.__._20__** | | | **Initial version** |
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**Read by**

| No. | Name | Title | Signature | Date |
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# 1. What are the main hazards?

**a) Infection by pathogens via skin contact**

Pathogens can infect and then sometimes transmit diseases to humans. Main pathogen categories at the treatment plant are the following:

- Helminths eggs
- Bacteria and viruses

Impacts:

- Diseases from helminths can be particularly serious.
- Diseases from bacteria or virus infections can have little impact but in some cases also high impacts.

In the case of the targeted small treatment plants, the main infection route is the **skin contact** with:

- Raw faecal sludge: infection risk is the highest (highest pathogen doses).
- Biosolid (dewatered faecal sludge of planted drying beds): infection risk can negligible too high, depending on the length of the resting period as well as on the temperature and moisture of the biosolid during its resting period (doses are diminishing).
- Leachate: infection risk is low.

In addition, infections can occur via indirect contact with one of these pathogen carriers, if they have infected elements, with which the skin can get in contact: this can typically the case of the soil.

Other infection risks and routes (inhalation, etc.) are negligible for the targeted treatment plants.

Remarks on the pathogens categories and control measures:

- Helminth eggs are very resistant and can survive several months under mild and wet conditions. But they are well reduced through filtering or sedimentation treatment methods because of their large size. This is why they are mainly present in raw faecal sludge, they can disappear in the biosolids if the resting period and conditions are adequate and they are non-present in the leachate.
- Bacteria and viruses are usually dying within a few weeks.
- Hot and dry conditions are the best to reduce both types of pathogens (via die-off).

**b) Accidents followed by injuries**

There may be injuries by:

- Slips and falls on wet surfaces.
- Falls from/into high/deep works of the treatment plant.
- Tools (sharp, heavy, etc.).

These risks and their impacts vary depending on the treatment plant and their works.

**c) General assessment of hazards and impacts**

Considering the rather low operation activities related to these small treatment plants, the risks are low. **Risk control measures should not be unnecessarily overdesigned**.

## 2. What are the persons at risk?

Persons who are the most exposed to the previously described hazards are:

- Plant Attendant: high exposure
- FS emptiers: high exposure
- Supervisor and occasional treatment plant visitors: low exposure

## 3. Responsibilities

Utility in charge of the operation of the treatment plant (Employer):

- The employer shall appoint only competent personnel as supervisors, who shall be responsible for the safety of those under his or her supervision.
- The plant attendant shall require a supervisor to observe and enforce all safety rules.
- The employer shall provide adequate equipment, tools, and protective devices, and insist upon their proper use and maintenance.
- The employer, or designated representative, shall fully investigate all serious accidents and take remedial steps to prevent repetition of similar accidents wherever possible.
- The employer shall be responsible for safety records and shall be responsible for completing safety inspections and maintaining records to reflect findings and corrective actions taken.
- The employer shall require employees to use suitable tools and equipment in order that they may perform their work in a safe manner.
- The employer shall require employees to be instructed in safe methods of performing their work.

Supervisor:

- Supervisors are at all times responsible for the execution of the work in a safe manner and for the job performance of all personnel under their direction.
- Supervisors will be held accountable for all accidents and employee actions unless investigation indicates the actions were due to conditions beyond the supervisor's control.
- Supervisors shall instruct all new employees on the reporting of all accidents and the prompt receipt of first aid.
- Supervisors shall be responsible for the training and instruction of new employees and of employees transferred to their supervision.
- Supervisors shall fully understand and comply with the safety rules. They shall also ensure that safety rules are understood by the operators under their supervision.
- Supervisors shall insist on employees observing these safety rules of this document and shall use disciplinary measures, if necessary, to obtain compliance.
- Supervisors shall be responsible for the proper use of safety devices and equipment by the employees under their supervision.
- Supervisors shall be responsible for the regular inspection of all tools and equipment, including employees personal tools used while working under their supervision.
- Supervisors shall ensure no duties are assigned to an individual who is unqualified or incapable of completing those duties safely.
- Before leaving a job, the supervisor shall see that the site is left in as safe a condition as possible. The supervisor shall arrange adequate warning of any condition that might endanger other employees, the general public, or inspectors.

Plant Attendant:

- It is the definite responsibility of the Plant Attendant to so perform assigned duties while at work to assure:
  - Safety for self;
  - Safety for fellow employees;
  - Protection for the other persons onsite;
  - Protection for company property.
- It is the responsibility of the Plant Attendant to report to the Supervisor in charge all unsafe conditions or acts witnessed on the job.
- When the Plant Attendant is requested to perform duties under unsafe conditions, the Plant Attendant should not perform those duties without first notifying the Supervisor in charge of the unsafe conditions.
- It is the responsibility of management to verify that the Plant Attendant is acquainted with the principles of first aid as soon as possible.
- It is the responsibility of the Plant Attendant to attend all safety meetings possible and to take an active part in safety work.
- It is the responsibility of the Plant Attendant to know and understand the safety rules of this document, which will apply to the work being performed.

## 4. Location of this Document

These Guidelines must be printed out and be located at the treatment plant and filed into a binder, in order to be accessible at any time to any employee at the treatment plant.

These Guidelines must be read and fully understood by the Supervisor and the Plant Attendant.

## 5. Exposure control measures

### a) Vaccination

The Employer should ensure that the Plant attendant and the supervisor are vaccinated for:

- Diphteria, Tetanus, Polio
- Hepatitis A

### b) Deworming (Preventive chemotherapy)

- Deworming can be done once a year but is not mandatory (usually with mebendazole or albendazole pills).
- It is rather recommended to pay attention to possible symptoms and if any doubt arises, then seek immediately a physician. Possible symptoms:
  - Abnormal fatigue (anaemia)
  - Stomach ache (intestinal pains inflammation and damages)
  - Etc.

**c) Define and ensure separation of clean and dirty surfaces / objects**

- Dirty surfaces / objects are carrying high pathogen numbers, which might infect you and the infection might cause you a disease.
- It is very important to define surfaces / objects, which are and shall remain "dirty" (this is unavoidable and normal), as well as surfaces / objects, which are and shall remain "clean". For example, eat in designated areas, which you are sure that they are really clean.
- Furthermore, it is important to avoid that dirty objects (e.g. tools in frequent direct contact with sludge) contaminate clean surfaces / objects. Therefore ensure areas for storage of clean and contaminated equipment and personal effects are segregated (separate from eating facilities, and other clean areas).

**d) Handwashing***: minimize exposure time and risks*

Hand washing does not prevent the skin contact but it is essential to ***minimize the exposure time*** and it also <u>minimizes the spreading of pathogens</u> with your dirty hands touching surfaces / objects which should remain clean.

- **Wash hands thoroughly with soap and water**
  - <u>Before</u>:
    - Eating and drinking.
    - Before and after using the bathroom.
    - Getting in contact with "clean surfaces" (incl. shaking hands).
  - <u>After contact</u> with:
    - Raw sludge
    - Biosolids
    - Leachate
    - "Dirty" surfaces".

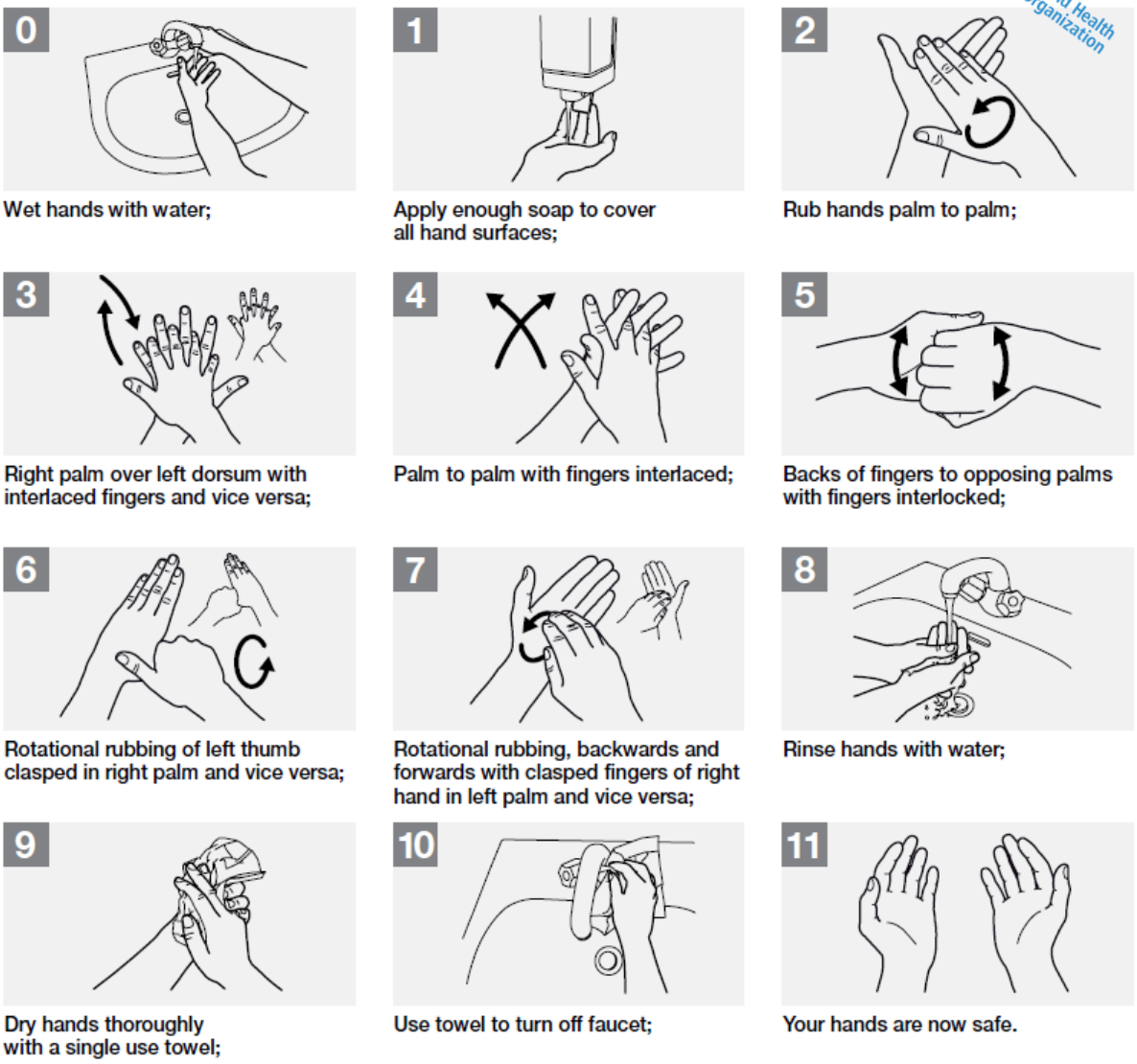
*Bear in mind that the raw sludge has the highest concentration of pathogens and can represents high doses.*

- **Hand washing or hand rubbing?**
  - In any case, hand washing is adequate and soap is usually the most accessible product.
  - Hand rubbing with an antiseptic can provide more efficiency, but if you have soiled hands, then hand rubbing is not sufficient, because the visible dirt has to be removed with water before the hand rubbing.

- **How to wash hands with soap?** Soap and its alternatives to hand washing: solid (left) and liquid/foamy (middle) soap and liquid detergent (right).


**Duration of the entire procedure:** 40-60 seconds

World Health Organization




*Note that it is recommended to close the tap using the towel in order to avoid a recontamination (because you have previously opened it with your unwashed hands). If you don't have a towel, then use some other clean object/surface, which might not expose you.*

- **How to hand rub?** Usual hand rubbing products are antiseptic liquids or alternatively ash.


**e) Personal Protective Equipment (PPE)**: minimize skin contact (exposure risks)

Use barriers between your skin and the sludge / biosolids in case of potential contact:

- Hands:
  - Wear **liquid repellent gloves**.
  - Keep short nails to improve the impact of the handwashing.
- Feet:
  - Wear gumboots if you have to step into sludge, biosolids or leachate.
  - Wear of sandals or open toe shoes is prohibited in order to minimize the exposure risk via foots.
- Eyes:
  - Considering the low exposure risks and impact, goggles are not mandatory. Instead, following alternative preventive measures are recommended.
  - When dumping sludge or opening the flow with a gate valve, particularly at the start of the flow:
    - Do not approach too much

        - Don’t direct your eyes to the expected splashing point or hide your eyes.
- Rest of the body:
    - Wear work clothes.
    - The use of overalls or overcoats is not mandatory. It is the cleanliness of the clothes, which is important. The Plant Attendant must have at least 2 sets of work clothes, which have to be used alternatively and only for work at the treatment plant.

Adequately segregate your PPE from clean areas and clean it frequently in order to avoid contamination of clean surfaces/objects:

- The Plant Attendant must have:
    - Specific footwear and clothes for the work, and which can get dirty
    - Other footwear and clothes off the work.
- The Plant Attendant must remove contaminated PPE (gloves, footwear and clothes) after completion of a job
- The Plant Attendant must clean the PPE as soon as it becomes dirty and change it or them for clean PPE.
- The Plant Attendant must wash at work before changing into clean clothes and footwear.

**f) Biosolid handling**

- At the treatment plant site, biosolids can only be handled without protection equipment if the analysis of a representative sample shows that it is safe.
- In all other cases:
    - Use gumboots, gloves and adequate clothes to avoid any contact with the biosolids

**g) Accident and injury prevention**

- Wear a safety vest if a FS emptier delivers sludge very late and it has become dark. In other cases, the very low risks do not justify the use of a safety vest.
- Risks of falling objects are very low or inexistent. Therefore, it is basically not necessary to wear a safety helmet and safety shoes, which might rather hinder the Plant attendant and increase accident risks.
- Before commencing any work that may be hazardous, care should be taken to establish a safe procedure. Where more than one worker is engaged in the same job, all of them shall be concerned and understand the procedures to be followed to prevent endangerment to self or other personnel on the job. Under no circumstances shall safety be sacrificed for speed.
- Worker(s) shall always place themselves in a safe and secure position. The care exercised by others shall not be relied upon for one’s own protection.
- No guard shall be removed from any machine or piece of equipment except to perform required maintenance.
- Housekeeping:
    - Materials and supplies used at a plant site should be stored in a neat and orderly manner at the site to prevent them from falling off of shelves or else.
    - Junk parts removed from a piece of equipment should be disposed of in a proper manner.

    - Spare parts used in the operation of a treatment plant should be kept in a neat and orderly manner with the item labelled to indicate on what piece of equipment the spare part is used.
    - The treatment plant premises shall be sufficiently maintained to maintain a safe access to any part of the treatment plant as required for its O&M.
- Reporting hazardous conditions:
    - When an employee observes a hazardous condition that may cause injury or property damage, the employee shall report it promptly to a proper authority and when necessary, guard it.
    - An employee who receives a report of a hazardous condition, either from the general public or another employee, shall immediately refer this information to the person or utility responsible for such matters.

## 6. First Aid

### a) Skin contact

- In case of skin contact with faecal sludge or biosolids:
    - Thoroughly cleanse all exposed surfaces with soap and water.
    - Use antiseptic to disinfect.
- In case biosolids contact eyes, flush eyes thoroughly, but gently.
- In case of massive skin contact (not simple splashes), wound contact or of eye contact, immediately seek medication attention.

### b) Accident and small injury

- In case of small wounds:
    - cleanse thoroughly with water and disinfect with antiseptic,
    - install a bandage (hands must have been previously washed),
    - Seek medication attention immediately.
    - Inform your Supervisor.
- In case of small contusion, sprain, etc., which is hindering you:
    - Seek medication attention immediately.
    - Inform your Supervisor.
    - If you can't move and should be transported, don't try to move by your own means but call/request transportation assistance.

### c) Accident and serious injuries

As already indicated, risks are low, but in case of serious injuries, knowing what not to do in an emergency is just as important as knowing what to do. The original injury may be magnified by the wrong kind of treatment or mishandling.

If a victim must be transported, ensure that methods described in a standard first aid text are used. With neck or back injuries, particularly, serious damage may occur by improperly transporting the victim. If possible, the victim should remain at the site where the injury occurred until a physician arrives, rather than risk an increase to the injury through mishandling.

1. Keep the victim lying down.
2. Examine the victim - look for serious bleeding, lack of breathing, and poisoning.
3. Keep the victim warm.
4. Call a physician or ambulance (or send someone to)
5. Remain calm. Do not be rushed into moving the victim unless absolutely necessary.
6. Never give an unconscious victim anything to eat or drink.
7. Keep the crowd away from the victim.
8. Ensure the victim is comfortable and cheerful.
9. Don’t allow the victim see his injury.

## 7. Health Impact Reporting and Monitoring

### a) Reporting

Report in detail to your Supervisor in all following cases:

- Serious skin contacts (wound contact or of eye contact)
- Disease symptoms:
    - cramping stomach pains, diarrhoea, vomiting
    - yellowing of the skin
    - symptoms of breathlessness, chest tightness and wheezing
    - redness and pain of the eyes
    - skin rash and/or pain
    - etc. (any unusual symptom identified by the employee)
- Injuries resulting from accidents
- Medical diagnostics
- Medical leave periods

### b) Monitoring

The Supervisor shall digitally compile and analyse all the reported facts and events, in order to be able to:

- provide an annual brief on the topic,
- improve the OHS guidelines as required.