

# ***Risk Assessment***

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## **6.1 Introduction**

M/s. Sikaria Mega Foodpark Private Limited intends to establish a common effluent treatment plant (CETP) at Plot No. 7957, Tulakona & Uttar Champamura Mouza, Sadar Subdivision, District: West Tripura, Tripura – 799008.

The CETP is meant to serve food based industrial units & to handle about 1 MLD of raw effluent. Being project for CETP, use of chemicals will be restricted for preparation of solutions for physio-chemical and biological treatment. It's handling will not cause any major toxic and explosive hazards.

## **6.2 Activities at CETP**

### **6.2.1 Activities to Be Performed :**

Activities to be carried out in CETP for treatment of effluent includes following :

- Operation of treatment plant.
- Handling of treatment chemicals.
- ETP sludge handling.
- Control of flow and processing of wastewater.
- Monitoring of control panel.
- Adjustments of valves and gates through SCADA or manually.
- Observation of variations in operating conditions.
- Starting and stopping of pumps and other equipment.
- Maintenance work of CETP units.
- To carry out sampling and testing of effluent samples in in-house laboratory.

### **6.2.2 Instruments & Equipment Handling :**

The workforce of Treatment plant is anticipated to handle following instruments / equipment:

- Laboratory equipment.
- Measuring and metering devices.

- Mechanized lifting and disposal equipment.
- Portable mechanical working tools.
- Pumps and blowers.

### **6.3 Types of Hazards In CETP:**

Risk is a probability that damages life, health and / or the environment. Risk will occur as a result of hazard. Hazard is an inherent property of a substance, agent and source of energy or situation having potential of causing undesirable consequences.

The following two methods of hazard identification have been employed in the study:

- Identification of major hazards based on Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 Government of India, as amended till date.
- Primary Hazard Analysis.

The following are the various hazards considered during different phases of the project i.e. construction and operation phase.

#### **6.3.1 Natural Hazards:**

Several natural hazards like flooding, earthquake, lightening, etc. may be possible and may cause danger to surrounding environment.

##### **6.3.1.1 Safety from Floods:**

The elevation of proposed location of CETP is much higher than high flood level (HFL) of this area and will not have any threat related to flooding. However, to avoid any catchment runoff, the plant will have high plinth level and internal storm water drain to avoid flooding within the premises.

#### **6.3.1.2 Safety from Earthquake:**

Earthquake may cause extensive damage to CETP and may result in fatal injuries to workers. Some of the possible preventive measures to be taken before, during and after earthquake are listed as below:

##### **Before an Earthquake:**

- All the structural design work of treatment units will be carried out considering the safety factor based on seismicity of the area.
- There will be an Earthquake Operation Plan (EOP) including evacuation map, emergency telephone list and Emergency Assembly Point (EAP).
- Store laboratory chemicals on lipped shelves to prevent falling.
- Inspect work areas periodically to maintain awareness and to identify situations that may need correction.
- Keep large and heavy objects stored on low levels of shelves and cabinets.
- Hold periodic earthquake drills.
- Prepare for earthquake by taking basic first aid training.
- Keep earthquake survival kit and first aid kit handy.
- Bolt down gas and chemical appliances of the laboratory properly.
- Conduct calm discussions with co-workers about earthquakes and other possible disasters.
- Teach co-workers how to turn off water, chemicals, gas, and electricity and main switch valves.

##### **During an Earthquake:**

- Everybody should stay calm and think through consequences before taking any action.
- Stay away from windows, and mirrors.

- Move to an open space area, away from the possible hazards and immediately after ensuring the closure of hazard causing operation.

**After an Earthquake:**

- If uncertain about any potential hazard in building / work space, do not enter there. Raise alarm, seek help of co-workers.
- Review fire hazards, structural damage, and water leakages.
- Shut off electrical power at the control box if there is any damage to wiring and piping.
- Do not use lighters, candles, or electrical equipment.

**6.3.1.3 Safety from Lightning:**

Following measures need to be taken:

- Make sure that building is grounded.
- Every conductive path such as water, gas, sewer, structural steel, electrical etc., that enters the building shall be bonded at the perimeter to the ground system.
- Provision of an isolation protection through insulating barrier to electrical conduction.

**6.3.2 Activity Hazards:**

The following activity hazards along with proposed safeguard measures were studied for construction and operation phase of the project.

**6.3.2.1 Chemical Hazards:**

At CETP, there is no such chemical used except alum, poly-electrolyte, activated carbon, and the quantity required is very less, so there are no any hazards associated with handling of chemicals. However, for further reduction in the chemical hazards, following measures should be followed:

- Development of safe working procedures.
- Reduction of number of workers exposed to hazards & duration and frequency of exposure.
- Use of personnel protective equipment.
- Regular environmental and medical monitoring.

#### **6.3.2.2 Accident Hazards:**

Different accident hazards associated with CETP construction and operation activities are as follows:

- Fire hazards,
- Electrical hazards,
- Slips, Trips, and Falls at work, and
- Biological hazards.

##### **A) Fire Hazards:**

Accidental fires due to electrical short circuit represent minor hazards. Special precautions must be taken for electrical fitting and appliances used. Sources of ignition for fire hazards are direct flames, Heat radiation, and Electric spark.

**To avoid fire hazard following will be ensured:**

- Automatic fire detection system and control system should be provided.
- Emergency back-up power like D.G. Sets should be provided for the automatic systems.
- Matches, cigarettes, etc., should be prohibited.
- Soldering, welding or cutting torches should be used after taking hot work permit from the concerned authority.

##### **B) Electrical Hazards:**

Poor electrical installations and faulty electrical appliances can lead to fires which may also cause death or injury to workers.

Hazards involved with electrical network are:

- Contact with live parts causing shock and burns
- Faults which could cause fires

**Following will be the safety measures ensure for electrical hazards:**

- Ensure safety of electrical installation and its maintenance.
- Provision of safe and suitable equipment.
- Provision of safety device.
- Carry out preventive maintenance.
- Get approved Cabling from concerned authority.

**C) Slips, Trips, & Falls at Work:**

Slips and trips are the most common cause of fatal injuries as well as non-fatal major injuries. The hazards related to slip and trips at work can be reduced through good housekeeping as well as health and safety arrangements.

**Safety Measures for Slips, Trips, & fall at Work:**

The risk associated with slip and trip hazards can be reduced by avoiding spillages in workplace, especially on uneven floors, and trailing cables and by maintaining good housekeeping. However, for further reduction in the slips and trips, following measures should be followed:

- Safety railing / grills, and safety stairs should be provided.

- Safe operating procedure should be followed for tank cleaning, pipeline maintenance work at depth or height, chemical handling, and doing regular maintenance work.

**D) Biological Hazards:**

The workers working in the CETP are prone to following biological hazards:

- Diseases caused by infectious agents present in raw effluent.
- Diseases caused by insects or rodents proliferating in the sludge drying beds.

**Safety Measures for Biological Hazards (infection & illness):**

- Employees shall understand the risks through proper instruction, training and supervision, there will be no any direct contact with chemicals.
- Provisions and use of suitable personal protective measures.
- Provision of adequate welfare and sanitation facilities as well as first-aid measures considering the heavy contamination.
- Provision of separate canteen facilities to avoid food poisoning.
- Effective arrangement for monitoring health of staff.

**6.4 General Preventive Measures:**

**6.4.1 Personnel Protective Equipment:**

The workers shall be provided with necessary personal protective equipment depending upon the type and nature of work they are handling. They should provide secure and clean place to store the Personal Protective Equipment (PPE) given to them.

A list of personal protective equipment for safety purpose includes:



- Face shields, Goggles and Safety Glasses
- Gloves
- Rubber / Gum boots
- Protective clothing / apron
- Respirators
- Dust masks
- Helmets

#### **6.4.2 Training:**

The workers shall be informed /trained regarding hazards associated with activity and precautionary measures and control measures, appropriate use of personal protective equipment provided to them. They should also be trained for when to use which kind of PPE and the right method to use it. The workers shall be informed periodically about health risks they are facing in work place and safety measures to be taken at work place and counseling for use of PPEs. First-Aid and Fire – fighting training should be provided to workers and ensure at least one trained person available in each shift. Training on Emergency Preparedness should be given to each worker.

#### **6.4.3 First Aid during Emergencies:**

General principles to be employed during designing of first-aid programme for a workplace are as under:

- There should be at least one worker in every shift, who has received approved first-aid training. He will be offered follow up and refresher courses periodically to update his knowledge.
- All workers should have knowledge of technique of Cardiopulmonary resuscitation (CPR) and appropriate use of it.
- Emergency showers and eye-baths will be situated close to the site of any potentially hazardous work processes.

- First-aid boxes will be provided in all work areas and workers trained in emergency first-aid procedures for any accident or chemical exposure.
- Telephone number in case for medical assistance and ambulances will be prominently displayed in the work place and a telephone must be available for use in case of emergency.
- There will be an Emergency Response Plan (ERP) in which individuals are assigned to perform certain tasks.

#### **6.4.4 Health Surveillance:**

Health surveillance or medical monitoring consists of periodic health examination of a worker by a doctor, nurse, or health worker in order to detect any health effects of a chemical. Medical monitoring is useful for assessing the effectiveness of measures implemented to control chemical exposure.

#### **6.4.5 Safety Signages :**

To ensure the health and safety of workers and visitor, there will be provision of safety signs and signals in and around plant premises.

The use of illuminated signals, hand and acoustic signals and marking of pipelines indifferent colors will be implemented.

Dos and Don'ts, Speed Limit, Danger, Restricted Entry, Use of PPEs, Wet area, Fire Extinguisher, First-Aid Box, Fire Exit, Storage area, empty barrel area, etc. marking should be done.

#### **6.4.6 Alarm System:**

An effective alarm system will direct the operator's attention towards the plant conditions requiring timely assessment or action. Alarm system will do:

- Alert, inform and guide the operators, allowing them to diagnose problems and keep the process within its safe envelope.

- Prevent unnecessary emergency shutdown.
- Only present the operator with useful and relevant alarms.
- Allow enough time for the operator to respond.
- Use prioritization to highlight the critical alarms.

#### **6.4.7 Permit-to-Work System:**

A permit-to-work system is a formal written system used to control certain types of work that are potentially hazardous. A permit-to-work is a document which specifies the work to be done and the precautions to be taken. It forms an essential part of safe systems of work for many maintenance activities. It allows working to start only after safe procedures have been defined and provides a clear record that all foreseeable hazards have been considered, and necessary precautionary measures ensured.

It is needed when maintenance work can only be carried out if normal safeguards are dropped or when new hazards are introduced by the work. e.g. entry to the underground tank. The system should have included the following points:

- Clear identification of person authorized for particular type of jobs.
- Clear identification of responsibility of person specifying necessary precautions.
- Clarity about its design to allow for use in unusual circumstances.
- Does the person issuing permit have sufficient knowledge concerning the hazards and precautions associated with the work?
- Does the permit clearly identify the work to be done and hazards associated with it?
- Is there a detailed work method statement for complicated tasks?.
- Does the system require the removal of hazards and, where this is not reasonably practicable, effective control?
- Does the permit contain clear rules about how the job should be controlled or abandoned in the case of an emergency.

The permit-to-work will help communication between everyone involved in the particular task / job. Separate permit forms must be designed for different tasks, so that sufficient emphasis can be given to the particular hazards present and required precautionary measures.

