1.1 Risk and Hazard

Risk is a probability that damage to life, health and / or the environment. Risk will occur as a result of the 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 amended 2000, Government of India.
- Primary Hazard Analysis.

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

A) Natural Hazards:

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

B) Activity Hazards:

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

<u>Instruments & Equipment Handling:</u>

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.

(C) Chemical Hazards:

As 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 follow.

Safety Measures for Chemical Hazards:

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

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.

1.1.1 Fire Hazards:

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

Safety Measures for Fire Hazards*:*

- 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 consent authority.
- Being a CETP project, in case of fire treated water reservoir will be use for emergency operation.

1.1.2 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

Safety Measures 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.

1.1.3 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, & Falls at Work:

The risk associated with slip and trip hazards can be reduced by avoid spillages in work place, 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 follow.

- Safety railing / grills, and safety stairs should be provided.
- Safety operating procedure should be followed for tank cleaning, pipeline maintenance work at depth or height, chemical handling, and doing regular maintenance work.

1.1.4 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 eating facilities to avoid food poisoning.

• Effective arrangement for monitoring health of staff.

1.2 Fire Fighting System

• According to BOCW (Building & Other Construction Workers) ACT, NBC-2005, relevant BIS standard like BIS-14489 and other related sets out the law on Construction site general fire safety.

• The Statutory requires that a 'responsible person' must carry out, and keep up to date, a risk assessment and implement appropriate measures to minimize the risk to life and property from fire. The responsible person will usually be the main or principal contractor in control of the site.

• You should identify sources of fuel and ignition and establish general fire precautions including, means of escape, warning and fighting fire, based on your fire risk assessment.

• In occupied buildings such as offices, make sure the work does not interfere with existing escape routes from the building, or any fire separation, alarms, dry risers, or sprinkler systems.

Key Issues are:

- Risk assessment
- Means of escape
- Means of giving warning
- Means of fighting fire
- Construction of timber frame will require significant additional measures

1.3 Risk and Hazard Assessment

In most cases, conducting a risk assessment will be a relatively straightforward and simple task that may be carried out by the responsible person, or a person they nominate, such as a consultant.

There are five steps in carrying out a fire risk assessment:

1. Identify hazards: consider how a fire could start and what could burn;

2. People at risk: employees, contractors, visitors and anyone who is vulnerable e.g. disabled;

3. Evaluation and action: consider the hazards and people identified in 1 and 2 and act to remove and reduce risk to protect people and premises;

4. Record, plan and train: keep a record of the risks and action taken. Make a clear plan for fire safety and ensure that people understand what they need to do in the event of a fire; and

5. Review: your assessment regularly and check it takes account of any changes on site.

Means of escape

Key aspects to providing safe means of escape on construction sites include:

- **Routes:** your risk assessment should determine the escape routes required, which must be kept available and unobstructed;

- **Alternatives**: well-separated alternative ways to ground level should be provided where possible;

- **Protection:** routes can be protected by installing permanent fire separation and fire doors as soon as possible;

- **Assembly:** make sure escape routes give access to a safe place where people can assemble and be accounted for. On a small site the pavement outside may be adequate; and

- **Signs:** will be needed if people are not familiar with the escape routes. Lighting should be provided for enclosed escape routes and emergency lighting may be required.

Means of giving warning

Set up a system to alert people on site. This may be temporary or permanent mains operated fire alarm (tested regularly), a klaxon, an air horn or a whistle, depending on the size and complexity of the site.

The warning needs to be distinctive, audible above other noise and recognizable by everyone.

Means of fighting fire

Fire extinguishers should be located at identified fire points around the site. The extinguishers should be appropriate to the nature of the potential fire:

- Wood, paper and cloth – water extinguisher;
- Flammable liquids – dry powder or foam extinguisher;
- Electrical – carbon dioxide ($C0_2$) extinguisher.

Nominated people should be trained in how to use extinguishers.

Process fire risks

The Regulatory Reform (Fire Safety) and National Building Code sets out the law on construction site general fire safety, including means of escape.

The CDM Regulations 2015 also impose duties including the requirement to prevent risk from fire. The fire risk from site activities must be assessed and precautions taken to control:

- **Combustible material** – The quantity of combustible materials on site should be kept to the minimum and all such materials safely stored and used.
- **Ignition sources** – action is needed to eliminate, reduce and control ignition sources on site.
- Construction of timber frame buildings will require significant additional measures to those outlined here. You should refer to the specific guidance listed in Resources, below.

A) Combustible Material

Many solids, liquids and gases can catch fire and burn. It only takes a source of ignition, which may be a small flame or an electrical spark, together with air. Preventive actions that can be taken include:

- **Quantity:** fire risk can be reduced by controlling the amount of combustible material in the work area until it is needed;
- **Flammability:** it may be possible to specify materials that are less combustible. Remember that when worked on, materials may become more easily ignited e.g. solids turned to dust or crumb;
- **Storage**: combustible materials should ideally be stored outside buildings under construction, especially volatile materials e.g. LPG. Internal storage must be planned and located where it will not put workers at risk;

- **Rubbish:** good housekeeping and site tidiness are important to prevent fire and to ensure that emergency routes do not become obstructed;
- **Volatile flammable materials**: extra precautions are needed for flammable liquids, gases and oxygen cylinders especially when internally stored;
- Coverings and sheeting: protective coverings and scaffold sheeting may add to fire risk. This can be reduced by use of flame retardant materials;
- Tanks and services: demolition projects can involve an increased risk of fire and explosion. Dismantling of tank structures may cause ignition of flammable residues or disruption and ignition of buried gas services.
- Ignition sources
- It is important that you take action to control ignition sources including:
- Hot work: all hot work generating heat, sparks or flame can cause a fire.

Precautions include:

- Clearing the area of combustible materials;
- Suitable fire extinguishers; and
- maintaining a careful watch throughout the work.
- A permit to work (PTW) system can help manage the risk on larger projects.
- Plant and equipment: select electrical and engine driven plant of suitable capacity to prevent overheating. Fasten lamps to a solid backing and, if mounted on tripods, make sure the tripod is stable. Electrical equipment in flammable atmospheres must be suitable for the nature and extent of the flammable atmosphere;
- Smoking: bring the rules on smoking to the attention of all workers and visitors to the site and enforce them;
- Electrical installations: should be of sufficient capacity for the intended use and designed, installed, inspected and maintained by competent people;

A) Event Classification and Modes of Failure

Component failures are the initiating events for the failure scenarios, which can escalate to consequences like fires, explosions and equipment damage. Eventual failures could be in the form of small gasket leaks in a flange joint or guillotine failure of a pipeline or even rupture / catastrophic failure of equipment. Major failure modes identified in this project are:

- Pipeline - small/large leaks;
- Storage tank - small/large leaks

B) Power Failure / Load Shedding

Operational difficulties may be experienced at CETP plant when there will be power failure. Since, there is a provision made for DG sets for running plant during power failure, there will not be significant effect on the treatment efficiency of the CETP.

Standby generator of total capacity of 2x1010 KVA will be provided during power failure or load shedding period, which would reduce the chances of inadequate treatment of the effluent.

Training programme for plant operation and maintenance activities have been included as part of the project's technical assistance programme.

1.4 Health & Safety Measures

During the operation of CETP and during handling chemicals, a practice of preventive and protective maintenance will be adopted to take care of employee's health. The various safety equipments like breathing apparatus, gum boots, goggles and helmet will be provided to the workers/operators. Besides, all the first aid, firefighting devices will also be inspected, tested and maintained all the time in ready to use condition.

Health of all the employees in plant area will be regularly monitored by the physician. If any abnormality is found, necessary treatment will be given from time to time. Necessary history cards, records will be maintained which will be up-dated from time to time. Some of the safety measures proposed to be carried out to ensure prevention of occupational hazards is delineated below.

- Safety equipments and fittings for handling of chemicals.
- Housekeeping of the plant as per prescribed norms. Floors, platforms, staircases, passages will be kept free of any obstruction.
- All operations will be explained to the workers. They will be periodically trained on the processes.
- Should impart safety training to the employees engaged.
- Only authorized persons will be allowed inside the plant.
- All instruments and safety devices will be checked and calibrated during installation and at frequent intervals.
- All electrical equipments will be installed as per prescribed standards.

- All the equipments of the plant will be periodically tested as per standard and results will be documented. All equipments will undergo preventive maintenance schedule.
- Number of fire extinguishers will be installed at different locations within premises.
- Adequate ventilation arrangement will be provided for safe and better working in the plant as per the standard.
- Sufficient access for firefighting will be provided in the plant.
- Protection against lightning will be taken care in the plant.

1.5 Disaster Management Plan

An accident is an unplanned event which has a probability of causing personal injury or property damage or both. It may result in physical harm (injury of disease) to personnel and also damage to property, loss to the company, a new miss or combination of these effects.

1.5.1 Major accident

It will be a sudden, unexpected, unplanned event, resulting from uncontrolled developments during an industrial activity, which causes, or has the potential to cause;

- Serious adverse effect immediately or delayed (death, injuries, poisoning or hospitalization) to number of people inside the installation and/or to persons outside the establishments or,
- Significant damage to crops, plant or animals, or significant contamination of land, water or air or,
- An emergency intervention outside the establishment (ex. Evacuation of local population, stopping of local traffic) or,
- Significant changes in the process operating conditions, such as stoppage or suspension or normal work in the concerned plan for a significant period of time, or
- Any combination of above effects.

1.5.2 Emergency

It could be defined as any situation which presents a threat of safety of persons or/and property. It may require outside help also. Emergency due to operating conditions (small fire, spill, failure of power, water, air etc.) and which can be locally handled by plant personnel alone (without outside help) will be considered as emergency.

Objectives of the On-Site Emergency Plan

1. To define & assess emergencies, including risk & environment impact assessment.

2. To control & contain incidents.

3. To safeguard employees, visitors & other people in the vicinity.

4. To minimize damage to property &/or the environment.

5. To inform employees, the general public and the authorities about the hazards/ risk assessed safeguard provided residual risk if any and the role to be played by them in the vent of emergency.

6. To be ready for the mutual aid if need rises to help the neighboring unit. Normal jurisdiction of an OEP (on-site emergency plan) will the own premises only but looking to the time factor in the arriving the external help of off-side plan agency, the jurisdiction must be extended outside to the extent possible in case of emergency occurring outside.

7. To inform authorities and mutual aid centers to come for help.

8. To affect rescue and treatment of causalities to count injured.

9. To identify and list any dead.

10. To inform and help relatives.

11. To secure the safe rehabilitation of affected area and to restore normalcy.

12. To provide authoritative information to the news media.

13. To preserve records, equipments, etc., and to organize investigation into the cause of the emergency and preventive measure to stop its recurrence.

14. To ensure safely of the works before personnel re-enter and resume work.

15. To work out a plan with all provisions to handle emergencies and to provide for emergency

preparedness and the periodical rehearsal of the plan.

In order to meet the above objectives, detailed procedure for handling On Site Emergency has been prepared, which will intended to cover all foreseeable eventualities even those leading to the evacuation of the site.

a) Major Emergency

Major Emergency could be defined as any situation which may affect several departments within and/ or may cause serious injuries, loss of life, extensive damage to property of serious disruption outside the work. It will require the use of outside resources to handle it effectively.

Usually the result of a malfunction of the normal operating procedure, it may also be participated by the intervention of an outside agency, such as severs electrical storm, flooding, crashed aircraft or deliberate acts of arson or sabotage.

b) Disaster

It will a catastrophic situation in which the day to day patterns of life are, in many instances, suddenly disrupted and people are plugged into helplessness, suffering and as a result need protection, clothing, shelter, medical & social care and other necessities of life such as:

Disaster resulting from natural phenomena like earthquakes, volcanic eruptions, storm, surges, cyclones, tropical storms, floods, landsides, forest fires and massive infect infestation. Also, in this group, violent drought which will cause a creeping disaster leading to famine disease and death must be included.

Second group includes disastrous events occasioned by man or by man's impact upon the environment, such as armed conflict, industrial accidents, fires, explosions and escape of toxic gases or chemical substances, rivers, pollution, mining / deep excavations or other structural collapse, air, sea, rail and road transport accident, aircraft crashes, collisions of carrying inflammable liquids, oil spills at sea and dam failures.

c) Risk

The likelihood of an undesired event (i.e. accident, injury or death) occurring within a specified period or under specified circumstances. It may be either a frequency or a probability depending on the circumstances.

d) Hazard

Hazard is a physical situation which may cause human injury, damage to property or the environmental or combination of these criteria.

1.5.3 Emergency Organization

No plan will succeed without effective emergency organization. Key personnel to combat emergency should be nominated with specific responsibilities according to the set procedures and making the best use of the resources available with different department and to avoid confusion. Respective department's key personnel are important part to combat emergency as part of organization. Such key personnel include Incident controller, Site main controller, Communication officer, messenger, Essential workers etc. Assembly point for non-essential workmen, occupational health center, emergency control room, firefighting arrangement, first aid arrangement and other arrangement and persons to manage them and also important part of emergency organization. Other key personnel will be required to provide advice to and implement the decisions made by the Site Main Controller (SMC) in the light of information

received on the developing situation at the emergency. Such key personnel (i.e. Fire fighters, First-Aider, Emergency rescue, Communication officer, messenger, security people, P&A officer etc.) will included from various department. All key personnel will responded on instruction given by Site Main Controller / Incident Controller. Their roles and responsibilities will mention bellow;

Incident Controller (IC)

Responsibility of Incident Controller

- Rush to accident site, ask field person to close the required valves.
- Inform control room from field to take required action.
- Take charge at the scene of incident and assess the scale of emergency.
- Decide for continuing the operation of the plant.
- Decide the need of external help.
- Ensure that outside emergency services have been called in.
- Ensure that SMC and Key personnel have been called in.
- Direct firefighting operations to internal as well as external agencies

1.6 Hazard during Construction & Operation

Increased urban development and requirements for strict control of the quality of effluents discharged into streams, rivers, estuaries and coastal water has led to the need to set up individual wastewater/effluent treatment plant and common effluent treatment plants.

The wastewater treatment ranks of industrial occupations where on-the-job injuries are frequent. The wastewater treatment plant operators are exposed to a variety of hazardous chemical agents contained within the effluent and the reagents used in the water processing or generated during the wastewater treatment which may cause poisoning and a number of ailments in the operators.

The operators are also exposed to hazards related to work in confined spaces, which include electric shocks, explosions, entanglement in moving machinery, etc.

Against natural calamities like floods, earthquakes, lightening, possible accidental hazards Fire & explosion hazards − Electricity − Slips, trips and falls at work, chemical hazards, biological hazards and ergonomic, psychological and organization factors and the preventive measures required in common effluent treatment plants.

Risk and Hazard during Construction:

Excavation: Any person-made cut, cavity, trench depression in an earth surface, formed by earth Trench:

A narrow excavation with its depth greater than width, but the width at the bottom is not greater than top.

Competent Person: One who is capable of identifying existing and predictable hazards in the surrounding working conditions that are unsanitary, hazardous and dangerous Hazards.

- Excavation cave-ins
- Underground and overhead utilities
- Materials falling into excavations
- Hazardous atmosphere of work.
- Vehicle movement and equipment operation
- Water accumulation.
- No protective system
- Ladder is not angled working height (vertical)
- Poor housekeeping
- The excavated soil is close to the edge and not retained to prevent from falling into the trench/excavated area.
- Overnight rain can make excavated area unsafe.

Hazards of Mechanized Excavators

- Struck by vehicle
- Blind spot
- Toppling of the equipment
- Contact with power transmission

Basic Safety Requirements

- Sloping or benching for excavations deeper shall be designed.

- Means of access/egress (ladder) required if it is 4 feet deep or more.
- Spoil dirt must remain at least 1 meter from of the trench/excavation.
- Trench/ Excavations are to be identified and barricaded.
- Personnel are not permitted to work in trench excavations where water is accumulating.
- Fall Protection is required for walkways over deeper than 2 feet.
- Identification, isolation, protection of underground utilities and structures nearby to be taken care.

Electrical safety in construction

The law says you must take precautions against the risk of death or injury from electricity. Electrical equipment must be safe, and properly maintained. Only in exceptional circumstances should work be carried out on live systems, and then only by a competent authorized person.

- Electrical systems in buildings - Refurbishment work in buildings presents the greatest risk and must be planned, managed and monitored to ensure that workers are not exposed to risk from electricity.
- Overhead power lines - Any work near electric overhead power lines must be carefully planned and carried out to avoid danger from accidental contact or close proximity to the lines.
- Underground cables - Damage to underground electrical cables can cause fatal or severe injury you must take precautions to avoid danger. These precautions include a safe system of work based on planning, use of plans, cable locating devices and safe digging practices.

Personal Protective Equipment (PPE)

Always wear the proper gloves when working with acids. Neoprene and rubber gloves are effective against most acids and bases. Polyvinyl chloride (PVC) is also effective for most acids. A rubber coated apron and goggles should also be worn. If splashing is likely to occur, wear a face shield over the goggles. Always use corrosives in a chemical fume hood.

Checklist for PPE

- All workers should wear PPE to protect head, eye, hand and feet.
- Helmet, hand gloves, safety shoe and goggles Safety belt/safety harness for working at height.
- First aid kit with medicine to be available at site.

1.7 Conclusion

Risk assessment should be carried out in order to identify the needs in handling these hazards. Risk assessment shall include: Identifying the possible hazards˙ The Receptors who would be harmed because of the hazards˙ Adequacy of the existing precautionary measures˙ Reviewing and revising the assessment from time to time˙ Identifying the greater risk of damage˙ based on Recognize, Evaluate and Control. In evaluation we have to adopt both Qualitative and Quantitative Analysis.

To adopt Japanese PDCA model this insists us to

- PLAN
- DO
- CORRECT
- ACT

Testing the electrical appliances regularly. After completion of risk assessment, following findings can be used for reducing the risks.

Safe installation of electrical appliances as per standards.

• Use of safe and suitable equipments for the working environment

• Provision for safety devices for detecting faults

• Preventive maintenance by testing the equipments and visual inspection˙

• Safe working conditions˙ considering underground power cables˙overhead power lines

These are the most common causes of non-fatal injuries at work but may cost workers heavily. Slip and trip hazards can be reduced through good health and safety arrangements of the workers/employers.

There should be adequate information on appropriate use of the safety equipments provided. A good management system for health and safety shall include:˙ planning for minimizing or removing risks by identifying the risk areas˙ organization setup with responsibilities to ensure safe working conditions˙ control on working practices and processes by record keeping and maintenance to ensure good health and safety˙ monitoring and reviewing the reports regularly based on experience and improving the existing conditions.˙ good working practices by choosing suitable floor surfaces, lighting levels, provision for footwear, removing obstructions, warn signs, etc.

Chemical hazards Sources of chemical hazards can be exposure to chemicals and toxic effects of chemicals. Exposure to chemicals. The heaviest exposure to some chemicals often occurs during industrial activities. The four main exposure routes where chemicals enter the body

are through inhalation (breathing), absorption (skin or eye), ingestion (swallowing, eating) and Accidental.

Most of the chemicals in the workplace have the potential to be dispersed into the air as dust, droplets or as gas or vapor or inhalation. The most important routes of exposure in the workplace leading to systemic effects are inhalation and skin absorption. Also, ingestion is a potential source through contaminated food or drink in the workplace. Toxic effects of chemicals. The toxicity in chemicals may poison the body of the person exposed. The toxic chemical exposure may lead to acute, chronic, reversible, irreversible, local, systematic and synergism effect. The toxicity of chemicals can be classified as corrosive, irritant, sensitizer, asphyxiant, carcinogen, mutagen, teratogen and fetotoxicant. To avoid these toxic risk assessments should be carried out which involves identification of hazard based on chemicals of concern, adverse effects, target populations, risk characterization, assessing, exposure and estimating the risk.

Develop material safety data sheets (MSDS) for all the chemicals used in the workplace – Ensure whether chemical products clearly indicate their harmful effects and provide guidance on how to use the products as safely as possible – Instruct workers on labels and MSDS – Workers should have the right to refuse to work with chemicals which does not have safety information about the chemical· To prevent, control or eliminate the risk – all the workers are required to implement effective safety procedures for protection against chemical hazards agreed jointly by employer and workers through – Regular inspections with standard checklists for particular chemicals and chemical processes.

Substitution

The most effective way is to remove the chemical entirely and replace it with less hazardous chemical, wherever possible. Similarly, dangerous processes can also be substituted to avoid the production of toxic intermediates.

Engineering controls

In case, the chemical hazard cannot be removed from the workplace by substitution then the best solution is to physically enclose the hazard to prevent it from coming into contact with either workers or the environment. Dilute or local exhaust ventilation systems can be used to remove contaminated air from the workplace.

Biological hazards: Exposure to wastewater may result in number of illnesses when entered into the body. Some of these illnesses are: Gastroenteritis – Cramping stomach pain, diarrhea and vomiting.

As the micro-organisms are inherent in wastewater they cannot be removed or eliminated. However, exposure to wastewater can be minimized to avoid these biological hazards. The

following measures can be taken to reduce risk of infection and illness: Awareness on risks through instructions, training and supervision use of personal protective equipment such as water proof gloves, footwear, eye and respiratory protection, face visors, etc. workers should be of 20 to 50 years age group and must not have asthma and tuberculosis provide the workers with adequate welfare facilities such as clean water, soaps, disposable paper towels, showers, etc. Inspection and maintenance of safety equipments provision for adequate first aid facilities effective arrangements for monitoring health and safety.

Ergonomic and psychological hazards: These hazards can be raised due to stress during work. Some of the problems which may lead to stress are: Boring job repetitive job too little or too much work to do too little time too little or too much training for the job selecting right person to fit into the task poor relationship with others bullying, racial or sexual harassment inflexible work schedules poor physical working conditions lack of communication and consultation lack of support for individuals to develop their skills lack of control over work activities negative work culture. These hazards can be minimized by following measures: clarity in defined objectives and responsibilities of an individual linked to business objectives selection of appropriate person for the assigned tasks prioritizing the jobs, training the individuals based on interpersonal skills and increasing the scope of work for the trained˙ increase the variety of tasks rearrange people between the jobs in order not to get bored with the single task working in group to improve the performance setting up of an effective system to prevent and stop harassments working in shifts to ensure flexible working hours provision for regular health checkups provision for adequate control measures opportunity to contribute individual ideas in planning and organizing the jobs introducing clear business objectives, good communications and employee involvement particularly during period of change any individual should be honest and respect others support the individuals to develop their skills.

Hazardous air pollution Solvents in huge quantities are used in pharmaceutical, chemical, dyes & dye intermediate units. The recovery and reuse of these solvents in such units is very poor because of the indigenous technology, equipment adds to pollution load in CETP.

Especially in connection with high levels of fine particulates, noxious gases like methane, CO_2, SO_2 and NOx can lead to respiratory diseases. The duration of exposure is decisive. Injurious heavy metals (e.g., lead, mercury and cadmium) can enter the food chain and, hence, the human organism by way of drinking water and vegetable and animal products. Climatic changes such as warming and acidification of surface waters, forest depletion, etc., can occur due to acid rain and/or the greenhouse effect of methane and CO_2 and other trace gases can have long-term detrimental effects on human health. Similarly, important are the effects of climatic changes on agriculture and forestry (and thus on people's standard of living), e.g., large-scale shifts of cultivation to other regions and/or deterioration of crop yields due to climate change impacts.

In view of the above we have to have to avoid/mitigate the Risk and hazard both during construction phase and operational phase of common Effluent treatment plant we have to adopt 3E system which is basically

- Engineering Control- for sound engineering
- Education and training- To improve awareness
- Enforcement- to follow statute and also maintain discipline.