7.3RISK ASSESSMENT

7.3.1 Proposed product with their common side effects

Penicillin API

Penicillin antibiotics were among the first medications to be effective against many bacterial infections caused by staphylococci and streptococci. They are still widely used today, though many types of bacteria have developed resistance following extensive use.
Common side effects include diarrhoea, hypersensitivity, nausea, rash, neurotoxicity, urticaria, and superinfection (including candidiasis). Infrequent adverse effects (0.1–1% of people) include fever, vomiting, erythema, dermatitis, angioedema, seizures (especially in people with epilepsy), nausea, stomach pain, headache, swollen, Thrush (white patches or inside your mouth or throat) and pseudomembranous colitis. Penicillin can also induce serum sickness or a serum sickness-like reaction in some individuals.

Cephalosporin API

The cephalosporins are a class of β-lactam antibiotics originally derived from the fungus Acremonium, which was previously known as "Cephalosporium". Together with cephamycins, they constitute a subgroup of β-lactam antibiotics called cephems.
Common adverse drug reactions (ADRs) (≥ 1% of patients) associated with the cephalosporin therapy include: diarrhea, nausea, rash, electrolyte disturbances, and pain and inflammation at injection site. Infrequent ADRs (0.1–1% of patients) include vomiting, headache, dizziness, oral and vaginal candidiasis, pseudomembranous colitis, superinfection, eosinophilia, nephrotoxicity, neutropenia, thrombocytopenia, and fever.

Oncology API

Oncology is a branch of medicine that deals with the prevention, diagnosis, and treatment of cancer. A medical professional who practices oncology is an oncologist. The three components which have improved survival in cancer are:

Prevention – by reduction of risk factors like tobacco and alcohol consumption

Early diagnosis – screening of common cancers and comprehensive diagnosis and staging

Treatment – multimodality management by discussion in tumor board and treatment in a comprehensive cancer centre.

Common side effects are the same as those seen with standard chemo drugs, and include:

High blood pressure, Bleeding or blood clotting problems, Slow wound healing, Heart damage, Autoimmune reactions, Swelling and other side effects are reported such as Nausea and vomiting, Diarrhea or constipation, Mouth sores. Shortness of breath or trouble breathing, Cough, Feeling tired all the time (fatigue) Headache, Hair loss.

Penems API

A penem is a type of unsaturated β-lactam. An example is faropenem. Penems are similar in structure to carbapenems. However, where penems have a sulfur, carbapenems have another carbon. The drug only treat bacterial infections, not viral infections.

Some side effects of Penem Injection are headache, dizziness, nausea, pain, vomiting, sore throat or mouth or problems with sleep. Some serious side effects are hives, diarrhea, seizures, rashes, pale skin, breathing problems and swelling. If these serious side effects occur get in touch with your doctor immediately.

Macrolide

One in a class of antibiotics that includes Biaxin (Clarithromycin), Zithromax (Azithromycin), Dificid (Fidoximycin), and Erythromycin. The macrolides inhibit the growth of bacteria and are often prescribed to treat rather common bacterial infections.

Minor side effects of macrolides include nausea, vomiting, diarrhea, and ringing or buzzing in the ears (tinnitus).

Hormones

A hormone is any member of a class of signaling molecules produced by glands in multicellular organisms that are transported by the circulatory system to target distant organs to regulate physiology and behaviour.

Some effects vary from drug to drug, stimulation or inhibition of growth, wake-sleep cycle and other circadian rhythms, mood swings, induction or suppression of apoptosis (programmed cell death), activation or inhibition of the immune system, regulation of metabolism, preparation of the body for mating, fighting, fleeing, and other activity, preparation of the body for a new phase of life, such as puberty, parenting, and menopause, control of the reproductive cycle, hunger cravings, Tiredness, Digestive system problems. Menopausal symptoms, Hair thinning, Muscle and bone changes, Weight gain, Headaches and Memory problems.

Generals

General anesthetics bring about a reversible loss of consciousness and analgesia in order for surgeons to operate on a patient. Their use is commonplace, but how they produce their effect is still not fully understood. General anesthesia is, essentially, a medically induced coma, not sleep. Drugs render a patient unresponsive and unconscious. They are normally administered intravenously (IV) or inhaled. Under general anesthesia, the patient is unable to feel pain and may also have amnesia. The drugs will be administered by an anesthesiologist or nurse anesthetist, a specially trained doctor or nurse who will also monitor a patient's vital signs and rate of breathing during the procedure.

Side effects of generals include: temporary confusion and memory loss, although this is more common in the elderly, dizziness, difficulty passing urine, bruising or soreness from the IV drip, nausea and vomiting, shivering and feeling cold, sore throat, due to the breathing tube.

7.4 Risk Assessment

7.4.1 Risk Assessment & Damage Control

Risk assessment is the determination of quantitative and qualitative value of risk related to a concrete situation and a recognized threat. Activities requiring assessment of risk due

to occurrence of most probable instances of hazard and accident are both onsite and off-site.

7.4.2 Maximum Credible Accident Analysis (MCA)

Increasing fatal accidents that have occurred during transportation, Handling, operation, Process have to be taken into consideration and, therefore have prompted the Ministry of Environment and Forests & Climate Change (MoEF&CC), Government of India, to make Risk Assessment a mandatory requirement for all Industry sector.

MCA stands for Maximum Credible Accident or in other words, an accident with maximum damage distance, which is believed to be probable. MCA analysis does not include quantification of the probability of occurrence of an accident. In practice the selection of accident scenarios for MCA analysis is carried out on the basis of engineering judgment and expertise in the field of risk analysis especially in accident analysis.

7.4.2.1 Methodology of MCA Analysis

The MCA analysis involves ordering and ranking of various sections in terms of potential vulnerability. The data requirements for MCA analysis are:

- Operating manual
- Flow diagram and P&Id diagrams
- Detailed design parameters
- Physical and chemical properties of all the chemicals
- Detailed plant layout
- Detailed area layout
- Past accident data Analysis

7.4.2.2 Following steps are involved in the MCA analysis:

Identification of potential hazardous sections and representative failure cases

Visualization of release scenarios considering type and the quantity of the hazardous material

Damage distance computations for the released cases at different wind velocities and atmospheric stability classes for heat radiations and pressure waves

7.5 Hazard Identification & Risk Assessment (HAZID-HIRA)

Main impacts on those working within the industry are Identified Using HIRA method. Health hazards has impact on local communities.

- Fire & Explosion
- Physical Hazards due to material handling, slip, trip & fall
- Fugitive Dust of Raw Material Handling at charging bay, storage yard,
- Collapse of Structures/Fall of Material, stacking failure durng Construction Stage
- Loading/ Unloading failures
- Electrocution/ Electrical Hazards
- Boiler Explosion
- Accidental Spillage of Chemical
- Dust & fumes exposure

7.5.1 Impact due to Thermal radiation

Enlists damage consequences due to different Heat Loads are given below:

Table 7.1 List of Damages Envisaged at Various Heat Loads

Sr. No.	Heat loads (kW/m^2)	Type of Damage Intensity	
		Damage to Equipment	**Damage to People**
1	37.5	Damage to process equipment	100% lethality in 1 min. 1%
2	25.0	Minimum energy required to ignite wood	50% Lethality in 1 min. Significant injury in 10 sec
3	19.0	Maximum thermal radiation intensity allowed on thermally unprotected equipment	--
4	12.5	Minimum energy required to melt plastic tubing	1% lethality in 1 min
5	4.0	--	First degree burns, causes pain for exposure longer than 10 sec
6	1.6	--	Causes no discomfort on long exposures
***Source**: World Bank (1988). Technical Report No. 55: Techniques for Assessing Industrial Hazards. , Washington, D.C: The World Bank.*			

7.5.2 Impact due to Loading/Unloading operation/ Storage Area

- Approach of heavy good vehicles for unloading material
- Cleaning of overflows
- Unauthorized passages , travelling over transportation system
- Unclean platforms causing staggering and falls

7.5.3 Impact due to Reaction vessel operation

- Uncontrolled Reaction/Exothermic Runaway reaction
- Thermal Run away reaction may occur
- Explosion due to high Temperature & Reaction

7.5.4 Impact due to Boiler Operation

Table 7.2 HIRA Boiler Operations

Operating Hazard	Cause	Effect	Prevention
Steam Explosion			
Defective safety valves.	Obstruction between boiler and valve. Valve damaged or corroded (internal).	Will not lift to release excess pressure. Impose excess pressure on the boiler. Rupture	Replace or repair safety valve.
			Remove obstructions. Periodically test valve

Operating Hazard	Cause	Effect	Prevention
	Lever tied down. Obstruction on valve outlet.	the boiler. Cause loss of life and/or injury to personnel. Cause property damage.	per ASME code.
Defective steam pressure gauges.	Broken gauge. Gauge is not in calibration. Blockage in line from boiler to gauge. Gauge cock is closed. Multiple gauges not in agreement.	Gauge is not showing the correct pressure. Boiler may be under excessive pressure. Prevents operator from being aware of true operating conditions.	Calibrate gauge regularly. Replace defective gauges. Inspect gauge connection and piping to boiler for blockage and/or closed cock.
Low water level.	Defective low water cutoff. Low water cutoff bypassed. Improper water column blowdown procedure. Equalizing lines restricted or plugged. Tampering with low water control. Defective boiler water feed system. Operator error. Defective or inoperative gauge glass.	Overheated boiler surfaces. Ruptured boiler. Loss of life and/or injury to personnel. Property damage.	Verify operation of boiler water feed system periodically. Prove low water cutoff operation periodically. Use proper water column blow down procedures. Train boiler operators. Do not tamper with low water controls. Replace defective low water controls. Inspect equalizing line (especially the lower line).
Scaled or corroded boiler internal surfaces.	Poor maintenance procedures. Inadequate inspection. Improper chemical cleaning.	Ruptured boiler. Loss of life and/or injury to personnel. Property damage. Boiler overheating.	Proper maintenance. Regular inspections by competent inspector. Keep inspection log. Proper boiler water treatment.
	Contaminated boiler water. Poor feedwater control. Improper water treatment.		
Bypassed controls.	Defective electrical wiring. Tampering with controls and	Controls will not function. Boiler may rupture. May cause	Verify proper operation of controls periodically. Correct electrical wiring

Operating Hazard	Cause	Effect	Prevention
	electrical wiring.	furnace explosion. Loss of life. Property damage.	defects immediately. Do not tamper with controls.
Tampering with Controls	Deliberate action by personnel. Lack of knowledge on the part of the personnel. Inadequate training.	Improper operation of boiler. Boiler may rupture. May cause furnace explosion. Loss of life. Property damage.	Read and follow manufacturer's instructions. Prevent access by unauthorized personnel by locking equipment cabinet. Properly train operators.
Poor maintenance.	No definite maintenance policy and procedure. Lack of interest of the boiler owner. Poorly or inadequately trained personnel. No one assigned the maintenance responsibility.	Danger to personnel and property. Low operating efficiency. Eventually high repair and replacement costs. Poor operation.	Establish a definite maintenance policy and procedure. Assign maintenance responsibility. Insist on performance of maintenance functions. Keep maintenance log.
Condensate tank explosion.	Improperly vented tank. Vent too small. Vent is trapped. Frozen condensate in trapped vent.	Tank pressure may exceed design pressure. Tank may explode. Loss of life. Property damage.	Eliminate traps in vent line. Eliminate restrictions in vent line. Vent to be full size (no valves). Vent to be run vertically from tank.
Furnace/Boiler Explosion			
Inadequate pilot/igniter.	Low gas pressure. Low fuel pressure. Improperly positioned. Too small nozzle. Plugged orifice. Improper light-off damper setting.	May not ignite the main flame. Delayed ignition. Fireside explosion. Fire. Boiler damage. Loss of life and/or personal injury. Property damage.	Periodic pilot maintenance. Properly position pilot, periodic pilot verification test. Use procedures of NFPA 85 series.
Delayed ignition.	Inadequate pilot/igniter. Low fuel pressure. Insufficient fuel rate. Excessive air rate. Low oil temperature.	Fireside explosion. Fire. Boiler damage. Loss of life and/or injury to personnel. Property damage.	Provide adequate pilot. Correct light-off fuel/air ration setting. Avoid excessive restart attempts. Review and follow manufacturer's instructions. Conduct

Operating Hazard	Cause	Effect	Prevention
	Water in fuel.		pilot turndown test.
Insufficient combustion air.	Lack of or insufficient boiler room air openings. Dirty combustion air blower. Combustion air blower running too slow or slipping. Incorrect fuel/air ration setting. Blower inlet blockage. Outlet damper blockage. Plugged boiler gas passage.	Poor combustion. Delayed ignition. Fireside explosion. Loss of life and/or injury to personnel. Property damage. Fire. Boiler damage. Increased emissions.	Provide adequate air to boiler room. Keep combustion air fans clean and run at proper speed. Periodically observe dampers, air inlets and outlets, combustion controls boiler gas passages, hot flue gas passages, hot flue gas temperature.
Tampering with combustion safety control.	Deliberate action by personnel. Lack of knowledge on the part of personnel. Inadequate operator training.	fireside explosion. Fire. Loss of life and/or injury to personnel. Boiler damage. Property damage.	Review and follow manufacturer's instructions. Prevent access by unauthorized personnel by locking equipment cabinets. Train operators in proper maintenance procedure.
Manual operation of combustion safety controls.	Deliberate action by personnel.	May cause ignition of main flame at the wrong time. Fireside explosion. Loss of life or injury to personnel. Boiler damage. Property damage. Fire.	Do not operate combustion safety control manually. Review and follow manufacturer's instructions. Provide adequate training for operators. Prevent access of unauthorized personnel by locking equipment cabinets.
Leaking fuel safety shutoff valves.	Defective valve. Foreign matter under valve seat.	Fuel flows to the boiler. Uncontrolled ignition of fuel. Fireside explosion. Loss of life and/or injury to personnel. Boiler damage. Property damage.	Monitor valves for proper operation periodically. Replace defective valves. Leak test and verify proper operation of valves periodically.

Operating Hazard	Cause	Effect	Prevention
		Fire.	
Implosions			
Excessive negative pressure.	Flame out. Induced draft fan runaway.	Equipment damage resulting in personnel injury.	Maintain proper operation of control equipment. Do not bypass control equipment. Use procedures of NFPA 85G.
Maintenance			
Equipment being serviced or repaired. Unexpected starting of remotely controlled equipment. Movement of equipment. Release of electrical energy. Release of fluid pressure.	Equipment not locked out, not tagged out, not placed in zero mechanical state, or not placed in zero energy state.	Physical injury or death.	Place the equipment if zero energy state or zero mechanical state. Establish and comply with lockout and tagout procedures. Train and alert personnel. Warning signs. Use blocking devices or ties to prevent movement of equipment.
Activities related to cleaning.	Failure to observe safety procedures applicable to maintenance cleaning.	Potential injury or death to personnel.	Observe operating and maintenance instructions for maintenance cleaning. Observe all safety regulations and normal safety precautions. Provide a safe means of access for maintenance cleaning. Provide personnel with protective clothing and equipment. Establish a routine procedure to clean and remove residue (ash, soot, slag) frequently to prevent excessive accumulation. Report all unsafe conditions and/or

Operating Hazard	Cause	Effect	Prevention
			unsafe practices.
Entering a confined or enclosed space (includes but not limited to furnace, drums, shell, gas passes, ducts, flues, bunkers, hoppers, tanks).	Extremely hazardous environment I.e. toxic or inflammable oxygen deficient atmosphere, hot material, darkness. Temporary internal access provisions.	Potential danger to life and health.	Observe all safety regulations and normal safety precautions. Provide sufficient ventilation to assure fresh air quality and quantity to maintain the health and safety of personnel. Test for oxygen deficiency with field type oxygen analyzers or other suitable devices. Develop stand- by emergency plans and procedures. Report all unsafe conditions and/or unsafe practices. Work with a partner. Test for toxic or flammable gas. Provide lights before entering a confined space.
Oxygen deficiency	Confined or enclosed spaces	Potential danger to life or health.	Provide sufficient ventilation to assure fresh air quality and quantity to maintain the health and safety of personnel. Wear approved respiratory protective equipment. Test for oxygen deficiency with field type oxygen analyzers or other suitable devices. Observe all safety regulations and normal precautions. Report all unsafe conditions and/or unsafe practices.

Operating Hazard	Cause	Effect	Prevention
Airborne contaminants I.e. gases, vapors, fumes, dust, and mist.	Leakage. Inadequate ventilation or exhaust.	Potential danger to life and health.	Operate ventilation and exhaust systems. Wear approved respiratory protective equipment. Wear protective clothing. Observe all safety regulations and normal safety precautions. Report all unsafe conditions and/or unsafe practices.
Unexpected Starting of Remotely Controlled Equipment			
Expose moving equipment	Guards not installed.	Bodily injury. Dismemberment.	Reinstall guards. Avoid loose clothes. Confine long hair.
Exposed fan blades.	Guards not in place.	Bodily injury. Dismemberment.	Reinstall guards.
Exposed moving parts of sootblowers.	Guards not in place.	Injured or lost fingers. Bodily harm.	Reinstall guards. Avoid loose clothing. Confine long hair.
Obstructed areas.	Poor housekeeping.	Potential injury to personnel.	Provide a safe means of access to all equipment and working places. Maintain all access ways in a clean safe condition.
Lack of access to equipment.	Access not provided.	Potential injury to personnel.	Provide a safe means of access to all equipment and working places.
Accidental opening of the access door.	Failure to bolt or lock closed door.	Potential injury to personnel.	Bolt or lock all access doors.
Electrical			
Exposed energized electrical wiring.	Damaged insulation or protective covering.	Electrical shock resulting in death, injury, or burns.	Use care to prevent damaging insulation. Repair damaged insulation.
Open electrical boxes.	Failure to cover boxes.	Electrical shock resulting in death, injury or burns.	Cover boxes. Instruct personnel to keep boxes covered.

Operating Hazard	Cause	Effect	Prevention
Opening switch box without turning off power.	Damaged safety catch permitting opening without shutting off switch.	Electrical shock resulting in death, injury or burns.	Repair safety catch. Turn off switch before opening box. Don't tamper with interlocks.
Working on energized electrical equipment.	Second party closing switch which energizes equipment.	Electrical shock resulting in death, injury or burns.	Follow lockout and tagout procedures.
Improper use of tools and lights.	Lack of grounding. Cut off group prong. Using two wire extension cords. Not grounding "cheater" plug (adapter plug). Body contact with wet surface.	Electrical shock resulting in death, injury or burns.	Don't cut off ground prong. Use only 3-wire heavy-duty extension cords properly grounded.
	Damaged insulation. Using lights without guards.		Ground "cheater" plug if used. Use double insulated portable tools. Use low voltage trouble lights or battery operated lights. Make sue guard is installed on light.
Combustible dust entering the electrical equipment.	Not keeping dust proof equipment closed. Poor housekeeping.	Death, injury or burns. Equipment damage. Explosion and/or fire.	Keep dust proof equipment closed. Practice good housekeeping procedures. Insure proper operation of purge equipment.
Fire			
Fire.	Explosion. Electrical or mechanical failure. Improper operation of equipment. Poor housekeeping.	Potential injury or death to personnel. Potential equipment or property damage.	Operate equipment in accordance with manufacturers' recommended operating procedures. Conduct routine equipment maintenance. Practice good housekeeping. Report all unsafe conditions and/or

Operating Hazard	Cause	Effect	Prevention
			practices. Train and drill operators in emergency fire fighting and extinguishing procedures. Use fire protection systems.
Storage yard fire (Wood Briquette)	Spontaneous combustion due to fire	Potential injury or death to personnel. Potential equipment or property damage.	Operate in accordance with the manufacturers recommended operating procedures. Practice good housekeeping. Report all unsafe conditions and/or unsafe practices. Train and drill operators in emergency fire fighting control and extinguishing procedures. Use fire protection and/or inserting systems.
Fire at burner deck, fuel stations, or other areas adjacent to the boiler.	Electrical or mechanical component failure. Fuel leaks.	Potential injury or death to personnel. Potential equipment or property damage.	Operate equipment in accordance with manufacturers recommended procedures. Locate fuel, combustible materials, and controls away from boiler surfaces. Report all unsafe conditions and/or practices. Train and drill operators in emergency fire fighting and extinguishing procedures, Use fire protection systems. Repair leaks promptly.
Wet steam during atomizing.	Steam wet from source. Steam line not insulated. Steam traps not working. Explosion.	Poor atomization. Dirty or smoky fires. Sparkles in flame. Discharge of unburned oil in furnace. Fireside explosion or puff. Fire. Boiler damage.	Insulate all steam lines. Check proper trap operation periodically. Follow manufacturer's instructions.

Operating Hazard	Cause	Effect	Prevention
		Property damage. Loss of life and/or injury to personnel.	
Worn or damaged atomizer. (sprayer plate.)	Abrasive material in oil. Normal wear. Leaving out of service burner tip in hot furnace. Tip abuse. Explosion.	Fire. Incomplete or smoky combustion. Flare back.	Check tips regularly. Use copper tools to clean tips. Follow manufacturer's instructions. Replace gaskets when cleaning or replacing tips. Do not use copper tools for cleaning stainless steel parts.
Hot Fly Ash			
Hot fly ash accumulations in boiler flues and plenums. Fly ash accumulating in flues and plenums. Personnel stepping in fly ash while still hot. Fly ash	Severe burns to legs and other parts of the body coming into contact with the hot ash. Overloading support systems causing failure.	Warnings to all personnel concerning this danger. Allow sufficient cooling time before walking on fly ash. Remove the hot fly ash with caution and suitable equipment. Do not spray water on hot fly ash.	
may retain heat for a number of weeks. No visible difference between hot and cold fly ash. "Quicksand" action of fly ash when stepped on. Explosive effect of water on hot fly ash.		Probe temperature of fly ash before walking on it.	

7.5.5 Impact due to Chemical Exposure

Standard System for the Identification of the Hazards of Materials for Emergency Response" sis a standard maintained by the U.S.-based National Fire Protection Association. "**fire diamond"** used by emergency personnel to quickly and easily identify the risks posed by hazardous materials. The four divisions are typically color-coded with **red indicating**

flammability, **blue indicating level of health hazard**, **yellow for chemical reactivity**, and **white containing codes for special hazards**. Each of health, flammability and reactivity is rated on a scale from 0 (no hazard) to 4 (severe risk).

The numeric values in the first column are designated in the standard by **"Degree of Hazard"** using Arabic numerals (0, 1, 2, 3, 4).

Table 7.3 Hazardous Material Identified

Sl. No.	Material Handled
As per MSHIC Rule to be used in Proposed activity	
1.	Acetic acid
2.	Isopropyl alcohol
3.	Sodium hydroxide
4.	Ethylene Dichloride
5.	Ammonia
6.	Ethylene di chloride
7.	Cyanamide
8.	Sulphuric acid
9.	Ethyl Benzene
10.	Triethylamine
11.	Formic acid
12.	Hydrogen bromide
13.	Hydrogen Fluoride
14.	Nitric acid
15.	Dimethylamine
16.	Morpholine
17.	Methyl hydrazine
18.	Bromine
19.	Benzoyl peroxide
20.	Thionyl Chloride
Other Hazardous Solvents & Chemicals used in the proposed activity	
21.	Acetone
22.	Ethyl acetate
23.	Methanol
24.	Acetonitrile
25.	Triethyl amine
26.	Diethyl amine
27.	Butanol
28.	Ethanol
29.	Iso propyl Alchol
30.	Methyl acetate
31.	MDC
32.	Tetrahydofuran
33.	MIBK
34.	2EHA
35.	Pyridine
36.	Ethylene glycol

37.	N,N-Dimethylformamide

7.6 Natural and Manmade Calamities which can lead to Emergency

Disaster refers to a serious disruption of the functioning of a society, causing widespread human, material, or environmental loss, which exceeds the ability of the affected society to cope using its own resources. To put it in other words, it is the occurrence of a sudden mishap/calamity/grave occurrence that disrupts the basic fabric and normal functioning of a society (or community)

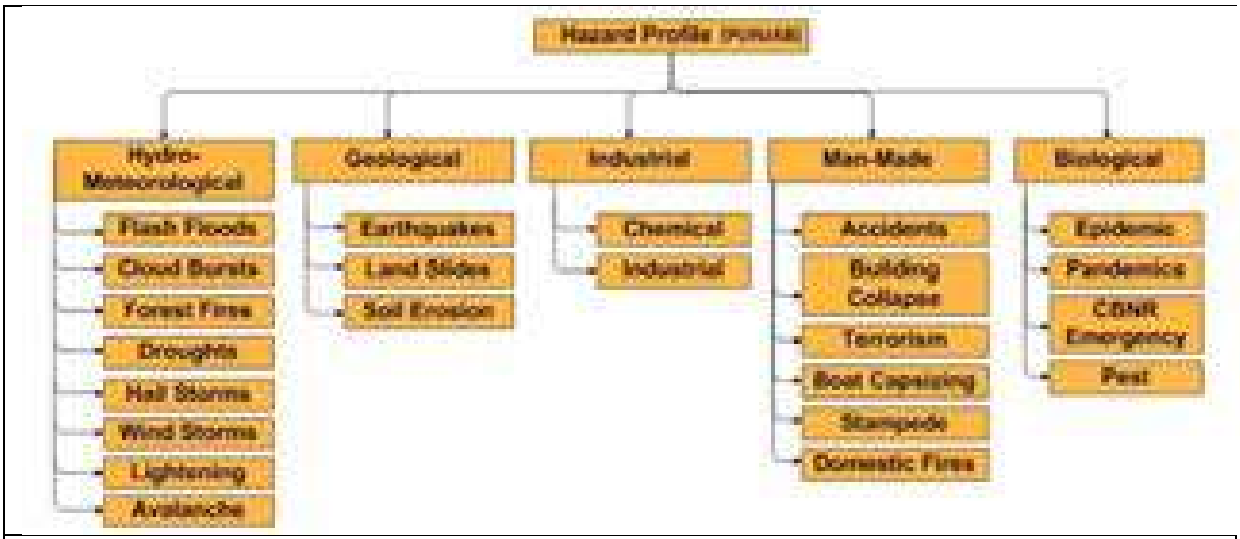

Figure7.1 - Hazard profile (Punjab)

A). Earthquake

Many parts of the Indian subcontinent have historically high seismicity. Seven catastrophic earthquakes of magnitude greater than 8 (Richter scale) have occurred in the western, northern and eastern parts of India and adjacent countries in the past 100 years. Approx. 59 % of the land area of India is liable to seismic hazard damage. In India, seismic zones are divided into four zones i.e. V, IV, III and II.

Punjab is broadly divided in to three Earth quake Risk Zones- High Damage Risk Zone-IV, Moderate Damage Risk Zone III and Low Damage Risk Zone II. However, northern boundary of Punjab State with Himachal Pradesh is in close proximity to Zone V. District SAS NAGAR lies in the Moderate Damage Risk Zone III to High Damage Risk Zone IV.

Major Earth Quake History in nearby area

Punjab lies in a fore-deep, a downwarp of the Himalayan foreland, of variable depth, converted into flat plains by long-vigorous sedimentation. This is known as a geosyncline. This has shown considerable amounts of flexure and dislocation at the northern end and is bounded on the north by the Himalayan Frontal Thrust. The floor of the trough (if see without all the sediments) is not an even plain, but shows corrugated inequalities and buried ridges (shelf faults). Much of Punjab lies in the Punjab Shelf, bounded on the east by the Delhi-Haridwar Ridge and on the south by the Delhi-Lahore Ridge. Most earthquakes in

this region are shallow though a few earthquake of intermediate depth have been recorded in Punjab. However, it must be stated that proximity to faults does not necessarily translate into a higher hazard as compared to areas located further away, as damage from earthquakes depends on numerous factors such as subsurface geology as well as adherence to the building codes.

Major Earthquake in the Punjab & nearby areas reported as –

Largest Instrumented Earthquake in Punjab

14 October 1970 - North of Firozpur (Indo-Pakistan Border region), 5.2 Mb (USCGS) 00:36:34.0 UTC, 31.26N, 74.50E, 44 kms depth

Largest Instrumented Earthquake in Punjab

4 April 1905 - Kangra (Himachal Pradesh), Mw 7.833.00 N, 76.00 E, OT=00:50 UTC. At least 28,000 people were killed in the Kangra-Dharamsala region of Himachal Pradesh. Damage and casualties also occurred in adjoining parts of Punjab including in the cities of Amritsar, Lahore, Jalandhar, Ludhiana and Sialkot.

14 October 1970 -North of Firozpur (Indo-Pakistan Border region), 5.2 Mb (USCGS) 31.26 N,74.50 E, D=044.0 kms,OT=00:36:34UTC,

21 October 1991 -Near Pilang (Uttarkashi), Uttaranchal, Mw 6.8 30.78 N, 78.77 E, OT=21:23:14 UTC Between 750 to 2000 people killed in the Gharwal region. It was also felt very strongly in Uttar Pradesh, Chandigarh, Delhi, Haryana and Punjab. Some minor damage was reported in Chandigarh and New Delhi.

17 October 1997 - North of Jalandhar, Gurdaspur District (Punjab), 5.1 Ms (EIDC) 31.616 N,75.774 E, D=38kms,OT=17:36:31UTC

29 March 1999 - Near Gopeshwar (Chamoli), Uttaranchal Mw 6.5 (HRV) 30.492 N,79.288 E,OT=19:05:11UTC 115 people killed in the Gharwal region. The quake was felt very strongly in Uttar Pradesh, Chandigarh, Delhi and Haryana. In Haryana, one person was killed in the city of Ambala and 2 at Nakodar in the neighbouring state of Punjab. Minor damage to buildings in New Delhi, most significantly in Patparganj. Minor damage also reported from Chandigarh.

8 October 2005 - Kashmir-Kohistan, Pakistan-India border, Mw 7.6 34.432 N, 73.537 E, D=020.0 kms, OT=03:50:40 UTC. A major earthquake struck the India-Pakistan border on the morning of 8 October 2005. It had a magnitude of Mw=7.6 and was felt strongly in much of Pakistan, northern India and eastern Afghanistan. The earthquake resulted in more than 80,000 deaths in northern Pakistan and adjoining parts of Jammu & Kashmir, India and is by far one of the deadliest in the sub-continent. At least 10 people also died in other parts of north India (including 2 in Punjab) and 4 in Afghanistan due to this earthquake. Tremors from the earthquake were felt more than a thousand kilometres away in the Indian states of Gujarat, Madhya Pradesh and Uttar Pradesh.

14 March 2010 - Near Hiranagar, Punjab, Mb=4.5 32.134 N, 75.759 E, D=58.3 kms OT=06:53:29 UTC. A light earthquake occurred in northern Punjab along the Punjab-Himachal Pradesh border on 14 March 2010 at 12:23 PM local time in India. It had a magnitude of Mb=4.5 and was felt over a wide area due to its depth.

Fig No: 7.2. Earth Quake Zonation Map

Emergency recovery plan has been considered by the emergency management team as per the situation and site conditions as follows in **Table No 7.4.** Earthquakes usually give no warning at all. Consider following in Pre & Post Disaster Phases

Before the earthquake:

- Always keep the following in a designated place: bottled drinking water, non perishable food, and first-aid kit, torch-light and battery-operated radio with extra batteries.
- Teach family members how to turn off electricity, gas, etc.
- Identify places in the house that can provide cover during an earthquake.
- It may be easier to make long distance calls during an earthquake.
- Identify an out-of town relative or friend as your family's emergency contact. If the family members get separated after the earthquake and are not able to contact each other, they should contact the designated relative/friend. The address and phone number of the contact person/relative should be with all the family members.
- Safeguard your house
- Consider retrofitting your house with earthquake-safety measures\Reinforcing the foundation and frame could make your house quake resistant. You may consult a reputable contractor and follow building codes.
- Kutcha buildings can also be retrofitted and strengthened.

During Earthquake:

- Earthquakes give no warning at all. Sometimes, a loud rumbling sound might signal

- Its arrival a few seconds ahead of time. Those few seconds could give you a chance to move to a safer location. Here are some tips for keeping safe during a quake.
- Take cover. Go under a table or other sturdy furniture; kneel, sit, or stay close to the floor. Hold on to furniture legs for balance. Be prepared to move if your cover moves.
- If no sturdy cover is nearby, kneel or sit close to the floor next to a structurally sound interior wall. Place your hands on the floor for balance.
- Do not stand in doorways. Violent motion could cause doors to slam and cause serious injuries. You may also be hit be flying objects.
- Move away from windows, mirrors, bookcases and other unsecured heavy objects.
- If you are in bed, stay there and cover yourself with pillows and blankets
- Do not run outside if you are inside. Never use the lift.
- If you are living in a kutcha house, the best thing to do is to move to an open area where there are no trees, electric or telephone wires.

If outdoors:

- Move into the open, away from buildings, streetlights, and utility wires. Once in the open, stay there until the shaking stops.
- If your home is badly damaged, you will have to leave. Collect water, food, medicine, other essential items and important documents before leaving.
- Avoid places where there are loose electrical wires and do not touch metal objects that are in touch with the loose wires.
- Do not re-enter damaged buildings and stay away from badly damaged structures.

If in a moving vehicle:

- Move to a clear area away from buildings, trees, overpasses, or utility wires, stop, and stay in the vehicle. Once the shaking has stopped, proceed with caution.
- Avoid bridges or ramps that might have been damaged by the quake.

After the Earthquake:

- Here are a few things to keep in mind after an earthquake. The caution you display in the aftermath can be essential for your personal safety.
- Wear shoes/chappals to protect your feet from debris
- After the first tremor, be prepared for aftershocks. Though less intense, aftershocks cause additional damages and may bring down weakened structures. Aftershocks can occur in the first hours, days, weeks, or even months after the quake.
- Check for fire hazards and use torchlight's instead of candles or lanterns.
- If the building you live in is in a good shape after the earthquake, stay inside and listen for radio advises. If you are not certain about the damage to your building, evacuate carefully. Do not touch downed power line.
- Help injured or trapped persons. Give first aid where appropriate. Do not move seriously injured persons unless they are in immediate danger of further injury. In such cases, call for help.
- Remember to help your neighbours who may require special assistance-infants, the elderly, and people with disabilities.
- Listen to a battery-operated radio for the latest emergency information.
- Stay out of damaged buildings.
- Return home only when authorities say it is safe. Clean up spilled medicines, bleaches or gasoline or other flammable liquids immediately. Leave the area if you

smell gas or fumes from other chemicals. Open closet and cupboard doors cautiously.

- if you smell gas or hear hissing noise, open windows and quickly leave the building.
- Turn off the switch on the top of the gas cylinder.
- Look for electrical system damages - if you see sparks, broken wires, or if you smell burning of amber, turn off electricity at the main fuse box. If you have to step in water to get to the fuse box, call an electrician first for advice.
- Check for sewage and water lines damage. If you suspect sewage lines are damaged, avoid using the toilets. If water pipes are damaged, avoid using water from the tap.
- Use the telephone only for emergency calls.
- In case family members are separated from one another during an earthquake (a real possibility during the day when adults are at work and children are at school), develop a plan for reuniting after the disaster. Ask an out of state / district relative or friend to serve as the "family contact". Make sure everyone in the family knows the name, address, and phone number(s) of the contact person (s).

Table No 7.4: Emergency Preparedness for Earthquake

Step	Activity	Action By
Preparedness	• Constitute Emergency Response Team • Identify ECC, if the identified ones are damaged • Control centers to be equipped with • Alarming • Communication facilities • Emergency vehicles/equipment • List of emergency contacts & suppliers • Medical facilities	Plant Key Person
Action during effective period	• Do not panic. Raise alarm • Avoid standing near to windows, external walls • Stand near the columns or duck under sturdy furniture. • Assemble at emergency assembly point as there may be aftershocks	Individual(s)
Action after effective Period (Establish Emergency Control Center. Site Main Controller to direct all activities)	• Assess situation and initiate shut down of plants (if required) • Initiate search & rescue (if required) • Evacuation of people. • Recovery/ Rehabilitation Work • Medical care for the injured. • Supply of food and drinking water. • Temporary shelters like tents, metal sheds etc. • Repairing lines of communication and information.	Main Controller, Incident Controller, Site Incident Controller, , Coordinators – Fire & Security, Safety, Material and Medical

Step	Activity	Action By
	• Restoring transport routes • Take head count • Activate emergency plan as situation demands • Assess damage	

B). Storm

The contingency actions during storm shall be based on the weather forecasts obtained from meteorological stations and the local meteorological department. Some of the important actions to be carried out are as follows:

Prior to Storm

- Communication with the local meteorological department.
- Maintain distances from storm in order to execute preparatory actions in a shorter time.
- Considering the consequences about the emergency might have on operations and personnel.
- Review all operations carefully to ensure that systems in jeopardy are taken care of or shut down.
- Ensure the readiness of first aiders, emergency vehicles, medical centre, medicines etc.
- Metallic sheets, loose materials, empty drums and other light objects shall be properly secured.
- Flush the drainage systems.

During Storm

- Remain calm.
- Avoid going outdoors.
- Do not seal the office completely as the suction created by the difference in atmospheric pressure inside and outside can rip open a window or door by breaking window glass panes.

After the Storm

- Do not touch electric lines.
- Stay away from the disaster area.
- Take special precautions in driving vehicles since the under-pavement could cave in due to the weight of automobile.

C). Flood

There is no major scenario of Flood in India. Zonation Map of India are given below **in Fig .7.3.**

As per the "Vulnerability Atlas - 2nd Addition; Peer Group, MoH and UPA; based on digitized data of SOI, GOI; Flood Atlas, Task Force Report, C.W.C., GOI" the project site does not fall under "area liable to flood". Flood Hazard Zonation Map showing the plant site is given in Figure below:-

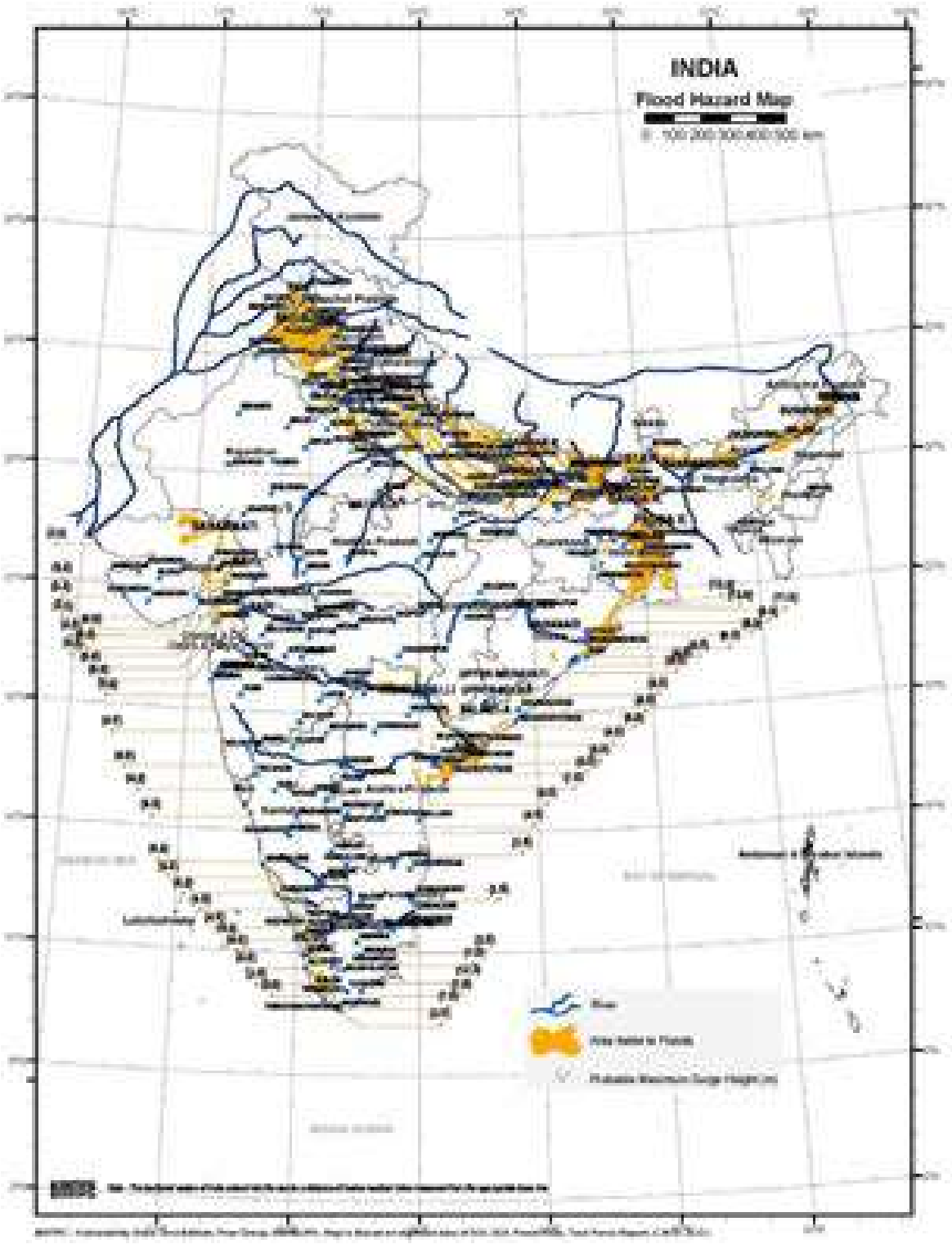

Fig No: 7.3. Flood Zonation Map

Presently, there is no surface water drainage system present within most parts of the Greater Mohali Region. Surface water surface runoff flows freely with the terrain to be discharged into the numerous non-perennial rivers crossing. The only existing surface water drainage system is found in SAS Nagar, which has been designed to discharge into the non-perennial rivers of Patiala Ki Rao, Lakhnour Choe and Natural Choe. There are also some roadside drains serving the National Highways in Zirakpur, built by the National Highways Authority of India.

Ghaggar Flood Plain:

The chief stream which traverses this district is the Ghaggar. It rises in Sirmaur district of Himachal Pradesh and is known by the name of Kaushalaya in the upper reaches. After flowing through Himachal territory and Ambala district of Haryana it enters plains near Dera Bassi(Mubarikpur). Thereafter it is called Ghaggar. It flows in the south – westerly direction and is joined by streams like Tangri, Patiala Rao, etc. Later outside the district boundaries it is joined bycombined waters of Saraswati and Tangri stream (emanating in Haryana). Its bed is narrow and illdefined in Banur and Rajpura areas but near Ghannaur its banks are low and the stream floodseasily. Further south the river flow provides some excellent soil. In summer only small quantity of water is available in its upper reaches, but during the rainy season the quantity of water isconsiderable which cause floods and damage to crops and property. An inundation canal called 'Banur Canal' has been taken out near Banur, which besides provide irrigation helps in controlling the floods. The Ghaggar after flowing through Patiala and Sangrur district traverses through Haryana State and disappears in the 'Thar Desert' near Hanumangarh in Rajasthan.

Existing Floods

Flooding have been recorded at several locations as shown below

Table-7.5: Floodable Locations in Greater Mohali Region

Flood Location	Flood Area* (ha)	Flood Depth* (m)	Frequency of Flood*	Time for Flood to Subside* (hrs)
north of Banur Town (along Naulakhiwala Choe)	352	1.0 – 1.2	a few days per year	24
south of Lalru town (confluence point of Ghaggar river and Sarsani Nala river)	730	2.0	a few days per year	24
head of Banur Canal (near Chatt Bir Zoo)	55	1.0	a few days per year	24
in Zirakpur (near Baltana Choe)	49	0.6 – 1.0	a few days per year	24

Source: GIS plots of Punjab Engineering College and Discussions with Punjab Irrigation Board
Note: approximate figure

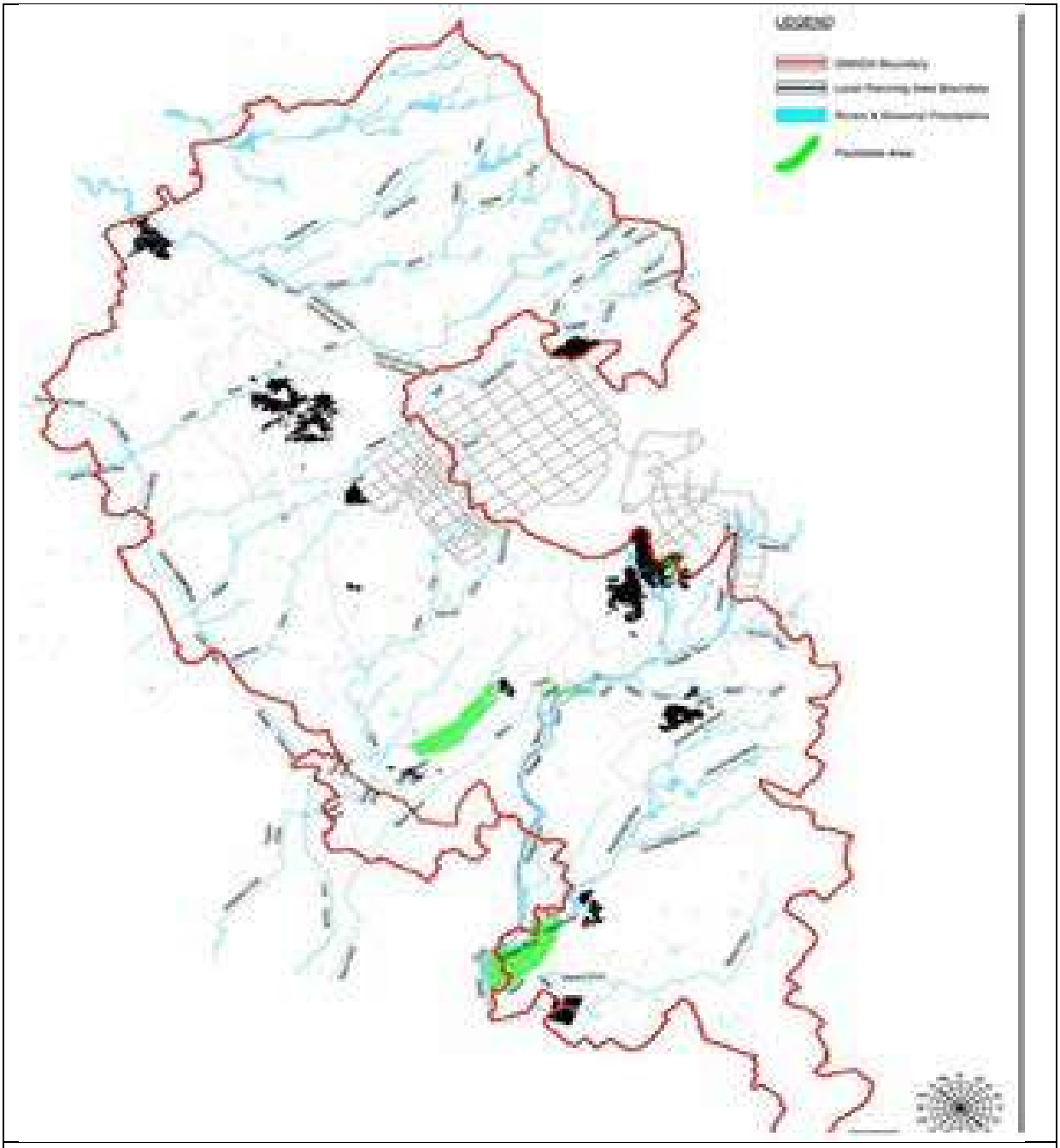

Figure -7.4: Existing Rivers (District- SAS Nagar)

Source-http://www.puda.gov.in/img/approved_masterplan_files/Regional_rpt_2011.pdf

Drainage Map of study area (10km area) is attached under figure the major rivers in the study area are mentioned below:-

Sukhna Choa – 6.5 KM (NNW), Mankan Nadi – 7 KM (NNE), Medkhali Nadi – 7.29 km (NNE) , Mattanwali Nadi – 7.45 km (NE), Toka Nala – 10 km (NE), Dhudgarh Ki Nadi – 5 km (E), , Dangri Nadi –7.7 km (E), Jharmal Nadi – 0.7 km (S), , Dhabi Nala – 3.25(NNW) km, , Chao Nala – 4.5 Km (E), Ghagghar River 6 km (NW).

D). Drought

Punjab State Action Plan on Climate Change has brought out some alarming facts about the water situation in the state. According to the report, the state has the highest probability of drought occurrence in the country. It also falls within areas having greatest climate sensitivity, maximum vulnerability and lowest adaptive capacity.

The Sutlej basin with spatial variation in precipitation is shown in Figure 3.8. It is clear that towards the lower end of the basin, the precipitation is <400 mm, compared to the Shivalik region where it is greater than 950mm. There is an indication that droughts in the southwest of Punjab or at the lower end of the basin may be becoming more extreme (Source: ADB, 2011). The variation in the changes in rain fall can be derived from the observations made in Ludhiana which lies at the centre of the Basin in the Punjab region and Amritsar which lies partially within the basin at the North West end.

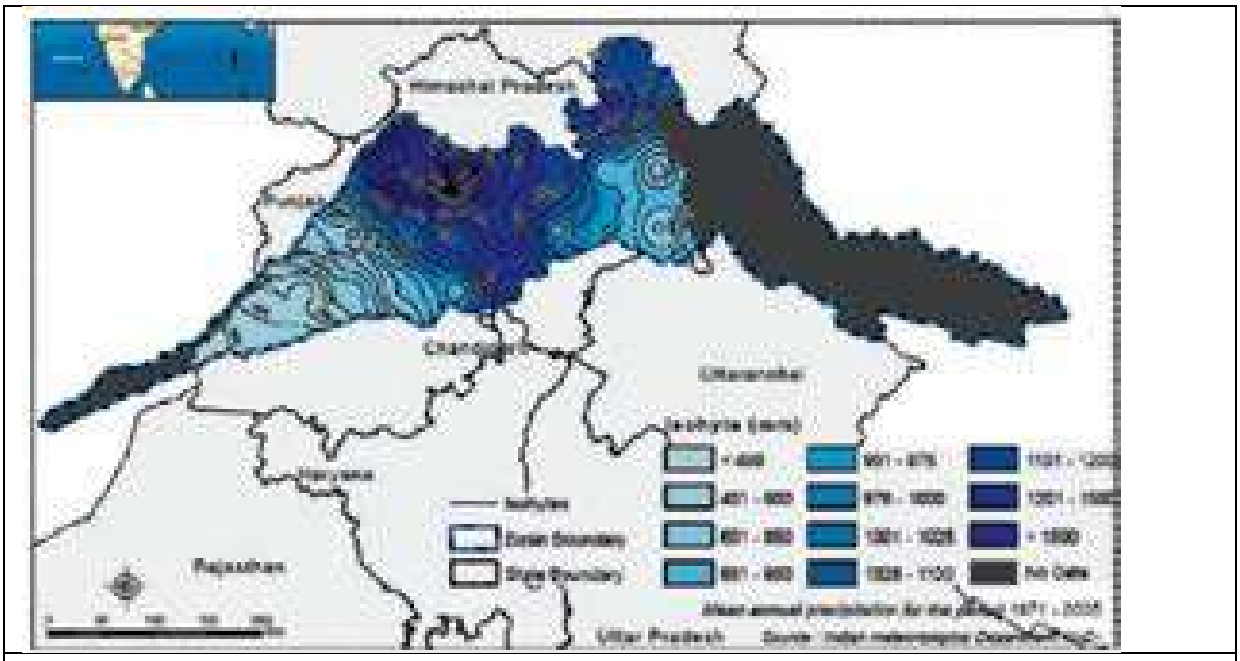

Figure 7.5 : The Sutlej basin and spatial variation of rainfall within

Source: http://www.moef.nic.in/sites/default/files/sapcc/Punjab.pdf

Punjab experienced droughts in 1987, 2002 2004, 2007, 2014 and 2015. The intensity of drought was the highest in 2002 – all districts were declared as drought affected. Occasionally, Punjab experiences hailstorms, which cause damages to standing crops.

Apart from natural calamities, the state faces severe depletion of ground water. The agricultural sector accounts for 85 per cent of the water consumption in state. Due to increase in the demand for water and reduction in canal capacity, the area irrigated by tube wells has been increasing. As a result, ground water is being over exploited for irrigation purposes. The present ground water development in the state is 172 per cent and ground water is over exploited in 80 per cent of blocks (CGWB, 2016). While the northern and central districts of the state suffer from severe ground water depletion, the south western districts face the problem of water logging and soil salinity. The affected districts include Muktsar, Fazilka, Bathinda and Faridkot. According to the GoI Report of the High level Expert Group on Water Logging in Punjab,

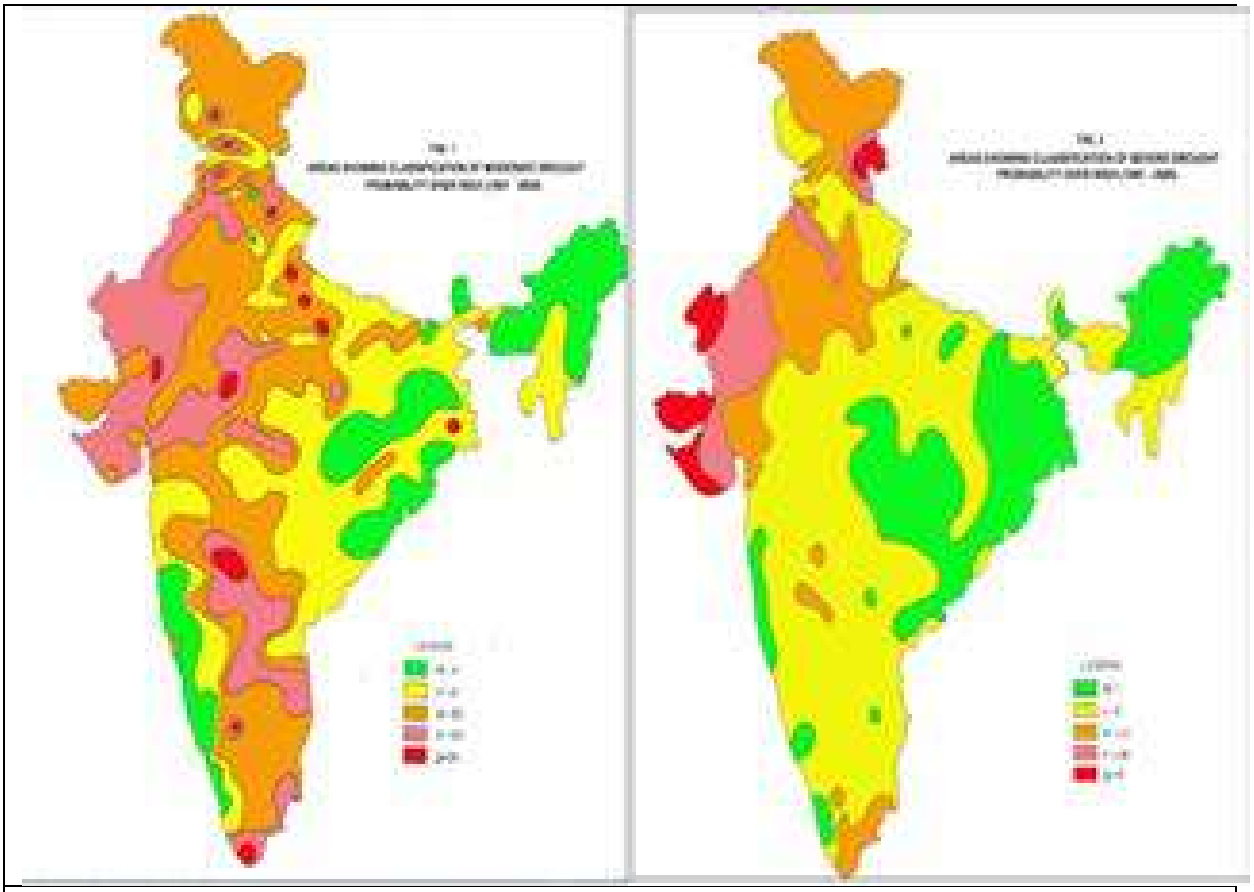

Figure 7.6 : Drought Prone area

The Climate Change Agenda for Punjab (CCAP) listed a set of priorities for policy and action with respect to adaptation and mitigation for 2010-2014. Keeping that in view, a steering committee has been formed, headed by the chief secretary and principal secretaries of various key departments as members to monitor the implementation of various actions proposed under the Punjab Environment Mission. None of the towns in the state, except Jaipur, have sewage collection, treatment and disposal system. Hence, a lot needs to be done after the Central Pollution Control Board (CPCB) has identified highly polluting industries in the state which includes textiles, sugar, distilleries, fertilizers and pharmaceuticals etc.

E). Fires

Annually, fires destroy thousands of houses especially in summer, in the rural areas of the State. Also fire accidents are a common occurrence in the urban areas. Hence Appropriate actions will be taken to combat fire emergency situation.

F). Road and Rail Accidents

There is a no good network of road in the district. The information from the police reveals that road accidents take place on road, which are related to truck, car, buses and motorcycle. Roads are affected by these accidents; there were road jams in some cases. The accidents take place on the roads and the state highways and other roads. So to cope with such disasters in the future some safety measures must be followed. Traffic Near the plant will be monitored.

7.7 General Recommendations

Risk Mitigation measures for the new Installation activities require adoption of best safety practice at the respective construction zones as well as operational phase within the works boundary. In addition, the design and engineering of the proposed facilities will take into consideration of the proposed protection measures for air and water environmental as outlined in earlier Chapter.

Wood briquette Storage Area

- Wood briquette storage area to be considered at the isolated area
- Adequate dust suppression measures are provided to prevent fugitive emission and also risk of fire. Similar measures are also adopted for loading/unloading operations.
- Boiler ash is transported in tankers are to be covered and closed and there is no chance of spillage during transportation.
- Fire fighting measures are provided to avoid any fire case
- Measures are taken to control the air pollution during loading/handling

Precautionary Measures for Falling material

- Safety helmets to be used to protect workers below against falling Material
- Barriers like a toe boards or mesh guards is to be provided to prevent items from slipping or being knocked off the edge of a structure
- An exclusion zone is to be created beneath areas where work is taking place.
- Danger areas are to be clearly marked with suitable safety signs indicating that access is restricted to essential personnel wearing hard hats while the work is in progress.

Mitigation Measures for Control Rooms at plants

- Control rooms shall be blast proof and shock proof
- The building shall be located upwind of the process storage and handling facilities. The building shall not be at a lower level than the tank farm.
- Adequate number of doors shall be provided in the control room for safe exit
- Smoke detectors system shall be provided for control rooms at suitable locations
- One hydrant (minimum) for every 45m per wall of the building shall be positioned all around the building.

Mitigation measure for Chemical spillage

- Any accumulation of water will be prevented in such vulnerable areas.
- In case of minor leakages, the flow of chemical will be controlled.
- If there is major breakout, the area would be cut off and cordoned.
- Vital connections e.g. water, gas, compressed air, oxygen etc., would be cut off or regulated as per requirement.

Precautions for storage in drums or bags;

- Separately stored with proper enclosures and marked, within premises in closed shed
- Proper ventilation will be provided
- Sufficient fire extinguishers and PPE will be provided
- Flame proof fittings will be provided
- Smoking will be prohibited

Electrical safety at Plant

- Adequately rated and quick response circuit breakers, aided by reliable and selective digital or microprocessor based electromagnetic protective relays would be incorporated in the electrical system design for the proposed activities.
- The metering and instruments would be of proper accuracy class and scale dimensions.

Electrical Hazard due to Dust

- Electrical equipment such as motors, circuit breakers, transformers, and switchgear can produce sparks and ignite dust clouds and hybrid dust/air mixtures in the vicinity. Reference is taken from CCPS Guidelines for safe handling of Bulk solids.
- Ingress of dust into enclosures with subsequent ignition causes smoldering or burning (fires)
- Dust that enters an enclosure will settle out as layers on internal surfaces and become heated
- Electrically conductive dusts causes short-circuiting when deposited on exposed electrical components and circuits
- Abrasive and/or corrosive dusts damages components of electrical equipment
- Electric shock

General Recommendation for Fire Fighting Facilities

- All the fire extinguisher system will be controlled by the Security Department. Safety department will consist of qualified safety manager, safety officer and supporting staff.
- Portable fire extinguishers
- Fire Buckets

Table no 7.6: General Recommendation for Fire Fighting Facilities onsite

S.No.	Name of site	Type of Extinguisher
1	Cable galleries	CO_2 Type
2	High voltage panel	CO_2 & Foam type, Dry chemical powder
3	Control rooms	CO_2 & Foam type, Dry chemical powder
4	MCC rooms	CO_2 & Foam type, Dry chemical powder
5	Pump Houses	CO_2 & Foam type, Dry chemical powder
6	Guest houses and offices	Dry chemical powder, foam type
7	Godowns, Lubrication rooms,	Foam type
8	Bunkers, Silo, enclosed dust collector	CO_2 type, N_2 type, automatic sprinkler, fixed spray nozzle(unless

7.8 Personal Protective Equipment (PPE)

Personal Protective equipment's kept onsite are made readily available to plant personnel.

Table 7.7 Summary of Recommended Personal Protective Equipment According to Hazard

	Workplace Hazards	Suggested PPE
Eye and face protection	Flying particles, molten metal, gases or vapors, light radiation	Safety glasses with side-shields, protective shades, etc.
Head protection	Falling objects, inadequate height clearance, and overhead power	Plastic helmets for top and side impact protection
Hearing protection	Noise	Hearing protectors (ear plugs or ear muffs)
Foot protection	Failing or rolling objects, points objects. Corrosive or hot liquids	Safety shoes and boots for protection against moving and failing objects, liquids and chemicals
Hand protection	Hazardous materials, cuts or lacerations, vibrations, extreme temperatures	Gloves made of rubber or synthetic material (Neoprene), leather, steel, insulation materials, etc.
Respiratory protection	Dust, fogs, fumes, mists, gases, smokes, vapors Oxygen deficiency	Facemasks with appropriate filters for dust removal and air purification (chemical, mists, vapors and gases). Single or multi-gas personal monitors, if available Portable or supplied air (fixed lines). Onsite rescue equipment
Body / leg protection	Extreme temperatures, hazardous materials, biological agents, cutting and laceration	Insulating clothing, body suits, aprons etc. of appropriate materials

7.9 Occupational Health & Safety

***Occupational Health & Safety Onsite as per T.o.R Point (8i-iv*)**:

I. **Details of existing Occupational & Safety Hazards. What are the exposure levels of above mentioned hazards and whether they are within Permissible Exposure level (PEL). If these are not within PEL, what measures the company has adopted to keep them within PEL so that health of the workers can be preserved**,

Table 7.8 Summary of Material Handled, Fire fighting & Personal Protective Equipment According to Type of Hazard

S.No.	Material Handled	Type of Hazard	Fire fighting	Protection equipment's and Precautions
Product Material				
1	**Pencilline API**	**Acute Toxicity: Oral, Category-2**	**EXTINGUISHING MEDIA**	Avoid raising and breathing dust, and provide

S.No.	Material Handled	Type of Hazard	Fire fighting	Protection equipment's and Precautions
				adequate ventilation.
		Highly allergenic nature if prolonged used/taken This type of acute reaction usually occurs minutes after exposure Symptoms are tightness in the chest, asthmatic breathing, dizziness, swelling of the lips, tongue, or face, edema of the lungs, heart failure and in some cases, death. Other reactions are hives, "black hairy tongue," fungus infection, and rectal itch. To the best of our knowledge, the toxicological properties have not been thoroughly investigated.	· Foam. · Dry chemical powder **FIRE FIGHTING** · Alert Emergency Responders and tell them location and nature of hazard. ·Wear breathing apparatus plus protective gloves. **GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS** Combustible solid which burns but propagates flame with difficulty.	As conditions warrant, wear a NIOSH approved self-contained breathing apparatus, or respirator, and appropriate personal protection (rubber boots, and safety goggles/ face shields). When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher is recommended Avoid reaction with oxidizing agents

S.No.	Material Handled	Type of Hazard	Fire fighting	Protection equipment's and Precautions
			Avoid generating dust, particularly clouds of dust in a confined or unventilated space as dusts may form an explosive mixture with air, and any source of ignition,	
2	**Cephalosporin API**	**Acute Toxicity:Rat Oral LD50 > 10 g/kg** Rat Subcutaneous LD50 > 5g/kg **Carcinogen Status:** Not listed as a carcinogen by IARC, NTP or US OSHA.	**EXTINGUISHING MEDIA** Use carbon dioxide, dry chemical, or water spray **FIRE FIGHTING** Wear approved positive pressure, self-contained breathing apparatus and full protective turn out gear	Avoid raising and breathing dust, and provide adequate ventilation. As conditions warrant, wear a NIOSH approved self-contained breathing apparatus, or respirator, and appropriate personal protection (rubber boots, safety gloves and safety goggles/ face shields). Hypersensitivity reactions, including cross reactions (with penicillins) and anaphylaxis,

S.No.	Material Handled	Type of Hazard	Fire fighting	Protection equipment's and Precautions
		To the best of our knowledge, the toxicological properties have not been thoroughly investigated.	**GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS** Fine particles (such as dust and mists) may fuel fires/explosions Emits toxic fumes of carbon monoxide, carbon dioxide, nitrogen oxides, sulfur oxides and other sulfur-containing compounds	are common among the cephalosporins May cause allergic skin reaction. May cause allergic or asthmatic symptoms or breathing difficulties if inhaled.
3	**Oncology API**	**Acute Toxicity: Oral, Category 4**	**EXTINGUISHING MEDIA** Use alcohol-resistant foam, carbon dioxide, water, or dry chemical spray. **FIRE FIGHTING**	Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.

S.No.	Material Handled	Type of Hazard	Fire fighting	Protection equipment's and Precautions
		Carcinogen Status:Category-2 The toxicological effects of this product have not been thoroughly studied.	wear self-contained breathing apparatus pressure-demand (NIOSH approved or equivalent), and full protective gear to prevent contact with skin and eyes. **GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS** Fine particles (such as dust and mists) may fuel fires/explosions Use water spray to cool fire-exposed containers	As conditions warrant, wear a NIOSH approved self-contained breathing apparatus, or respirator, and appropriate personal protection (rubber boots, safety gloves and safety goggles/ face shields). May cause allergic skin reaction. May cause allergic or asthmatic symptoms or breathing difficulties if inhaled.
4	**Macrolide**	**Health Hazard- Category-3**	**EXTINGUISHING MEDIA**	Avoid raising and breathing dust, and provide adequate ventilation.

S.No.	Material Handled	Type of Hazard	Fire fighting	Protection equipment's and Precautions
		ORAL LD50 (RAT) > 5000mg/kg **Carcinogen Status:** Not listed as a carcinogen by IARC, NTP or US OSHA. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)	water spray, dry chemical, or alchol resistance foam **FIRE FIGHTING** In case of fire and/or explosion do not breathe fumes. Use standard firefighting procedures and consider the hazards of other involved materials. Move containers from fire area if you can do so without risk. Water runoff can cause environmental damage. Ventilate closed spaces before entering them. Keep run-off water out of sewers and water sources. Dike for water control.	As conditions warrant, wear a NIOSH approved self-contained breathing apparatus, or respirator, and appropriate personal protection (rubber boots, safety gloves and safety goggles/ face shields). Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA. Structural firefighters protective clothing will only provide limited protection. Wear self-contained

S.No.	Material Handled	Type of Hazard	Fire fighting	Protection equipment's and Precautions
				breathing apparatus with a full face piece operated in the positive pressure demand mode when fighting fires.
		To the best of our knowledge, the toxicological properties have not been thoroughly investigated. Causes mild skin irritation. May cause an allergic skin reaction.	**GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS** Fire may produce irritating, corrosive and/or toxic gases.	
5	**Penem API**	**Health Hazard- Acute** It is difficult to define the minimal dose below which allergic responses are unlikely to occur in humans	**EXTINGUISHING MEDIA** Water spray, dry chemical, carbon dioxide or foam as appropriate for surrounding fire and materials. **FIRE FIGHTING**	SRP: Local exhaust ventilation should be applied wherever there is an incidence of point source emissions or dispersion of regulated contaminants in the work area. Ventilation control of the contaminant as close to its point of

S.No.	Material Handled	Type of Hazard	Fire fighting	Protection equipment's and Precautions
				generation is both the most economical and safest method to minimize personnel exposure to airborne contaminants. Ensure that the local ventilation moves the contaminant away from the worker.
		Carcinogen Status: Not listed as a carcinogen by IARC, NTP or US OSHA. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)	This material is assumed to be combustible. As with all fires, evacuate personnel to a safe area. Firefighters should use self-contained breathing equipment and protective clothing.	As with all dry powders it is advisable to ground mechanical equipment in contact with dry material to dissipate the potential buildup of static electricity
		The threshold dose at which allergenic response could occur is extremely low and difficult to detect with current analytical methods	**GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS**	Engineering controls such as exhaust ventilation are recommended.
		To the best of our knowledge, the toxicological properties have not been thoroughly investigated.	Fire may produce irritating, corrosive and/or toxic gases.	Use a NIOSH approved respirator, if it is determined to be

S.No.	Material Handled	Type of Hazard	Fire fighting	Protection equipment's and Precautions
		Serum aminotransferase elevations have been reported in 1% to 6% of recipients of intravenous meropenem wh en given for up to 14 days		necessary by an industrial hygiene survey involving air monitoring. In the event that a respirator is not required, an approved dust mask should be used. Gloves: Chemically compatible. Eye Protection: Safety Glasses. Protective Clothing: Protect exposed skin.
6	**Harmones**	**Health Hazard- Category-1** May cause eye & skin irritation **Carcinogen Status:** Not Available	**EXTINGUISHING MEDIA** Use carbon dioxide, dry chemical, or water spray. **FIRE FIGHTING** During all fire fighting activities, wear appropriate protective equipment, including selfcontained breathing apparatus.	Impervious protective clothing is recommended if skin contact with drug product is possible and for bulk processing operations. If the applicable Occupational Exposure Limit (OEL) is exceeded, wear an appropriate respirator

S.No.	Material Handled	Type of Hazard	Fire fighting	Protection equipment's and Precautions
				with a protection factor sufficient to control exposures to below the OEL. Engineering controls such as exhaust ventilation are recommended. Use a NIOSH approved respirator, Splash goggles. Full suit. Boots. Dust respirator. Gloves. Gloves: Chemically compatible. Eye Protection: Safety Glasses. Protective Clothing: Protect exposed skin.
			GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS Fine particles (such as dust and mists) may fuel fires/explosions. Formation of toxic gases is possible during heating or fire.	
7	**Generals**	**Health Hazard- Accute** Fluoride-ion toxicity from methoxyflurane – Metabolized in liver = release of Fluoride ions Depression of respiratory drive – Decreased CO2 drive	**EXTINGUISHING MEDIA** Use carbon dioxide, dry chemical, or water spray.	Use a NIOSH approved respirator, Splash goggles. Full suit. Boots. Dust respirator.

S.No.	Material Handled	Type of Hazard	Fire fighting	Protection equipment's and Precautions
		Malignant hyperthermia **Carcinogen Status:** Not Available pharmaceutical industry to develop occupational exposure limits (OELs) of less than 10 µg/m3	**FIRE FIGHTING** During all fire fighting activities, wear appropriate protective equipment, including selfcontained breathing apparatus. **GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS** Formation of toxic gases is possible during heating or fire.	Gloves. Gloves: Chemically compatible. Eye Protection: Safety Glasses. Protective Clothing: Protect exposed skin. If the applicable Occupational Exposure Limit (OEL) is exceeded, wear an appropriate respirator with a protection factor sufficient to control exposures to below the OEL. Engineering controls such as exhaust ventilation are recommended.

M/s. United Biotech Pvt Ltd. will adopt suitable measures for the proper occupational health safety of workers complying with OSHA standards.

- Check of the effectiveness of preventive and control measures on regular basis.

- Adequate supplies of potable drinking water is to be provided .Water supplied to areas of Plant food preparation or for the purpose of personal hygiene (washing or bathing) are according to drinking water quality standards
- Where there is potential for exposure to harmful dusts by ingestion arrangements are to be made for clean eating areas, where workers are not exposed to the hazardous or noxious substances
- Periodic medical hearing checks are to be performed on workers exposed to high noise levels
- Provisions are to be made to provide OHS orientation training to all new employees to ensure they are apprised of the basic site rules of work at / on the site and of personal protection and preventing injury to fellow employees
- Contractors that have the technical capability to manage the occupational health and safety issues of their employees are to be hired, extending the application of the hazard management activities through formal procurement agreements
- Ambulances and First aid treatment facilities are made available for any emergency situation

Table 7.9 PEL level Summary of Hazardous chemicals handled

SL No.	Chemical Name	OSHA PEL	Cal/OSHA	NIOSH REL	ACGIH
		Mg/m3	8-hour TWA (ST) STEL (C)	Up to 10-hour TWA (ST) STEL (C)	TLV
1	Acetic acid	10 ppm	10 ppm (ST)	10 ppm (ST) 15ppm	10 ppm (ST) 15ppm
2	Acetone	1000 ppm	500 ppm	250 ppm	250 ppm
3	Acetonitrile	40 ppm	40 ppm	20 ppm	20 ppm
4	Ammonia	50 ppm	25 ppm	25 ppm	25 ppm
5	Butanol				
6	Dimethylamine	25 ppm	5 ppm	10ppm	5 ppm
7	Ethanol				
8	Ethyl acetate	400 ppm	400 ppm	400 ppm	400 ppm
9	Ethyl Benzene	100 ppm	5 ppm	100 ppm	20 ppm
10	Ethylene di chloride	See Annotated			
11	Ethylene glycol				
12	Formic acid	5 ppm	5 ppm	5 ppm	5 ppm
13	Hydrogen bromide	3 ppm	3 ppm	3 ppm	2 ppm
14	Isopropyl alcohol	400 ppm	400 ppm	400 ppm	200 ppm
15	MDC				
16	Methanol		200 ppm	250ppm	250ppm
17	Methyl acetate	200 ppm	200 ppm	200 ppm	200 ppm
18	Methyl hydrazine	(C) 0.2 ppm	0.01 ppm	Ca (C) 0.04 ppm	0.01 ppm
19	MIBK	100 ppm	50 ppm	50 ppm	20 ppm
20	Morpholine	20 ppm	20 ppm	20 ppm	20 ppm
21	N,N-Dimethylformamide	10 ppm	10 ppm	10 ppm	5 ppm

22	Nitric acid	2 ppm	2 ppm	2 ppm	2 ppm
23	Pyridine	5 ppm	5 ppm	5 ppm	1 ppm
24	Sodium hydroxide	2 mg/m3	(C) 2	(C) 2 mg/m3	(C) 2 mg/m3
25	Sulphuric acid		1		3 (mg/m3)
26	Tetrahydofuran	200 ppm	200 ppm	200 ppm	50 ppm
27	Triethyl amine	25 ppm	(C) 1 ppm		0.5 ppm
Reference- OSHA/PEL exposure limit Guide					

ii. Details of exposure specific health status evaluation of worker. If the workers' health is being evaluated by pre designed format, chest x rays, Audiometry, Spirometrv. Vision testing (Far & near vision. color vision and any other ocular defect) ECG, during preplacement and periodical examinations give the details of the same. Details regarding last month analyzed data of above mentioned parameters as per age, sex, duration of exposure and department wise.

Workers' health shall be evaluated by pre designed format, given below for chest x rays, Audiometry, Spirometrv, Vision testing (Far & Near vision. color vision and any other ocular defect) ECG, during pre-placement and periodical examinations that will give the details of the same.

Table 7.10 Specific Health status 9Periodicl Examination Format)

Physical Examination Tests								
YEAR	***Total Manpower***	***Pulse***	***ECG***	***BP***	***Right Eye***	***Left Eye***	***Color Blindness***	***Squint***
Spirometry Tests								
Year	***Total Manpower***	***FVC (litres)***	***FEV 1***	***FEV 1/ FVC %***	***PEFR***	***Conclusion***		
Investigations Tests								
YEAR	***Total Manpower***	***Blood (CBC)***	***Blood Sugar (F& PP)***		***Lipid profile***	***URINE (R&M)***		
Audiometry Tests								
YEAR	***Total Manpower***	***Audiometry done***	***Normal***		***Abnormal***	***Conclusion***		

iii. Annual report of health status of workers with special reference to Occupational Health and Safety.

Annual report of health will be reviewed for M/s. United Biotech Pvt Ltd, manpower once the facility the proposed activity is operational as per above given formats.

iv. Plan and fund allocation to ensure the occupational health & safety of all contract and casual workers.

Necessary required budgetary allocation will be kept for to ensure safety of all Employees including contract & casual workers.

7.10 CHEMICALS AND THEIR ANTIDOTES

Sl. No.	Chemicals	Antidotes
As per MSHIC Rule to be used in Proposed activity		
1.	Acetic acid	Milk of Magnesia
2.	Isopropyl alcohol	Novasine Eye Drops
3.	Sodium hydroxide	No Antidote Available
4.	Ethylene Dichloride	-
5.	Ammonia	Skin: Wash with Lactic Acid, Apply Soframycin Eye: Benoxynate (Novacin? 0.4% con.) Throat: Smelling Ethanol or Ether
6.	Ethylene di chloride	No Antidote Available
7.	Cyanamide	No direct Antidote Available
8.	Sulphuric acid	Milk of Magnesia Fresh air, milk, water
9.	Ethyl Benzene	No Antidote Available
10.	Tri ethyl amine	No Antidote Available
11.	Formic acid	No Antidote Available
12.	Hydrogen bromide	No Antidote Available
13.	Hydrogen Fluoride	No Antidote Available
14.	Nitric acid	Milk of Magnesia
15.	Di methylamine	Methylene Blue
16.	Morpholine	No Antidote Available
17.	Methyl hydrazine	No Antidote Available
18.	Bromine	Wash the skin plenty of water. Apply sodium bi carbonate and again wash the skin plenty of water. If gone in eye, wash plenty of water through spray up to 15 min. Put three drops of pontocane or benoxinate 0.4%. If problem in respiration, given milk, butter milk or lemon juice and drench with Ethanol and put it near victim's nose to smell. If go in the intestine give milk, Milk butter and Milk of Magnesia.
19.	Benzoyl peroxide	No Antidote Available
20.	Thionyl Chloride	Milk of Magnesia, Soda Water, Caster Oil, Soframycine
Other Hazardous Solvents & Chemicals		
21.	Acetone	No Antidote Available

22.	Ethyl acetate	Novesine, Eye Drops
23.	Methanol	Oxygen, Baking soda in a glass of Water, Ethanol, Novesine Eye Drops
24.	Acetonitrile	Cobalt EDTA (calocyonor), nitrile/Thiosulphate
25.	Triethyl amine	No Antidote Available
26.	Diethyl amine	No Antidote Available
27.	Butanol	No Antidote Available
28.	Ethanol	2 gm sodium bi carbonate in 250 ml water. Diezipam 10 mg through injection. Injury in eye or skin wash plenty of water
29.	Iso propyl Alchol	No Antidote Available
30.	Methyl acetate	No Antidote Available
31.	MDC	No Antidote Available
32.	Tetrahydofuran	No Antidote Available
33.	MIBK	No Antidote Available
34.	2EHA	No Antidote Available
35.	Pyridine	No Antidote Available
36.	Ethylene glycol	Ethanol, Calcium gluconate
37.	N,N-Dimethylformamide	No Antidote Available

7.11 DISASTER MANAGEMENT PLAN

7.11.1 INTRODUCTION TO THE TERM "DISASTER"

The term "Disaster" refer to extensive damage of property and serious disruption both inside, outside the work system and its surrounding that can be natural or human interfered. Emergency may be caused by a number of different factors, e.g. plant failure it will normally manifest itself in three basic forms viz fire, explosion or toxic release and requires the assistance of emergency control services to handle mass devastation effectively.

7.11.2 NEED OF DISASTER MANAGEMENT

The aim of Disaster management plan is concerned with preventing accidents through following guidelines of good design practice, operation, maintenance and inspection, by which it is possible to reduce the risk of an accident. Since it is known to all it is not possible to eliminate entire risk since, absolute safety is not achievable.

After Assessing and quantifying the possible scenarios, consequence analysis approach to emergency preparedness and emergency planning delineates Disaster Management Plan for both on-site and off-site. These plans are needed to be implemented in the event of a disaster.

Table 7.11 Identified Disaster Scenarios

	Name of possible Hazard and	Source and Reasons	Effect on Persons and Environment	Place of Effect	Control Measures Provided
1.	Fire	Transformer Transfer oil short circuit etc.	Electrical power failure Production hindrance Loss of transformer	Transformer near power control centre	* Fire Fighting Equipment's * Graved bed for oil spillage or soaking isolated fenced area * Lightening arrestor nearby * DG set for emergency power
2.	Fire & Toxic chemical spillage	Natural Disaster, Earthquakes, Lightening, war.	Production hindrance Trapping under debris, death Chemical burn Toxic chemical spillage	Whole factory & population nearby	* Hydrant system * First aid available * Smoking prohibited inside the factory * Security at all the time guarding important locations
3.	Fire, Explosion & smoke	Fire in boiler	Burns Storage tank catching fire Production Hindrance	Tank area	*Adequate earthing Tanker unloading permit * Unauthorized person not allowed to enter * Breathing Apparatus for rescue operations *Alarm system for indicating unusual incidence

7.11.3 OBJECTIVE OF DISASTER MANAGEMENT PLAN

The objective of Disaster Management plan is to give a broad framed layout to tackle emergency situation that may lead to a hazardous situation. It defines detail organizational responsibilities, actions, reporting requirements, broad and specific key roles and responsibilities of personal with Organ grams and organisation charts. The overall objectives of the emergency plan will be:

- Ensure safety of people, protect the environment
- To ensure localization of risk
- To minimize and reduce the effects of the accident on people and property.
- Immediate response to emergency scene with effective communication network and organized procedures
- To obtain and mitigate early warning of emergency conditions so as to prevent impact on personnel, assets and environment

- To prevent injuries by following proper onsite, offsite emergency plans that can protect personnel from the hazard

National Level: The Act calls for the establishment of National Disaster Management Authority (NDMA), with the Prime Minister of India as Chairperson. The NDMA has 9 members including a vice chairperson. The tenure of NDMA members is 5 years.

State Level: All state governments are mandated under Section 14 of the Act to establish a State Disaster Management Authority (SDMA).The SDMA consists of the Chief Minister of the State, who is the Chairperson, and no more than eight members are appointed by Chief Minister

District Level: The Chairperson of District Disaster Management Authority(DDMA) will be the Collector or District Magistrate or Deputy Commissioner of the district. The elected representative of the area is member of the DDMA as an ex officio Chairperson

7.11.4 PHASES OF DISASTER

There are various phases of Disaster including pre and Post Management of Hazardous Event that may or has occurred.

Warning Phase

Emergencies /disasters are generally preceded by warnings during which preventive measures may be initiated. For example uncontrollable build-up of pressure in process equipment, weather forecast give warning about formation of vapour cloud, equipment failure etc.

Period of Impact Phase

This is the phase when emergency /disaster actually strike and preventive measures may hardly be taken. However, control measures to minimise the effects may be taken through a well - planned and ready-to-act disaster management plan already prepared by organization. The duration may be from seconds to days.

Rescue Phase

This is the phase when impact is almost over and efforts are concentrated on rescue and relief measures.

Relief Phase

In this phase, apart from organization and relief measures internally, depending on severity of the disaster, external help are also to be summoned to provide relief measures (like evacuations to a safe place and providing medical help, food clothing etc.). This phase will continue till normalcy is restored.

Rehabilitation Phase

This is the final and longest phase. During which measures required to put the situation back to normal as far as possible are taken. Checking the systems, estimating the damages, repair of equipments and putting them again into service are taken up. Help from

revenue/insurance authorities need to be obtained to assess the damage, quantum of compensation to be paid etc.

7.12 KEY ELEMENTS

7.12.1 Basis of Plan

Hazard Identification necessitates preparation and planning the prevention and methods by which accidental failure can be tackled without much damage to life. HAZID-HIRA and consequence analysis combines and requires planning for the following:

- Hazards from spread of fire or release of flammable from storage and process units
- Hazards due to formation of pressure waves due to vapour cloud explosion of flammable gases

7.12.2 Emergency planning and Response procedure

The Emergency Response Plan is plan for dealing with emergencies are implemented immediately whenever there is a fire, explosion, or release of a hazardous substance that threatens human health or the environment. The emergency response plan is reviewed and immediately amended whenever:

- The plan fails in an emergency
- The list of emergency contacts change
- The list of emergency equipment changes
- The facility changes in its design, construction, operation, maintenance, or other circumstances in a way that increases the potential for fire, explosions, or release of a hazardous substance

Incident Response Plan

It is the Frame work of addressing the emergency situation arose due to failure scenario.

- Incident Response Plan(IRP) and Emergency Preparedness Plan
- Incident Response Team (IRT)
- Emergency Response Team (ERT)
- Crisis Management Team (CMT)

7.12.3 Onsite Disaster Management Plan

Disaster management plan are prepared with an aim of taking precautionary step to control the hazard propagation, avert disaster, take action after the disaster which limits the damage to the minimum and follow the on-site emergency planning.

7.12.4 Onsite Emergency Plans

The onsite emergency is an unpleasant situation that causes extensive damage to plant personnel and surrounding area and its environment due to in operation, maintenance, design and human error. Onsite plan will be applied in case of new Project acivity. Following point are taken into consideration:

- To identify, assess, foresee and work out various kinds of possible hazards, their places, potential and damaging capacity and area in case of above happenings.

- Review, revise, redesign, replace or reconstruct the process, plant, vessels and control measures if so assessed.
- Measures to protect persons and property of processing equipments in case of all kinds of accidents, emergencies and disasters
- To inform people and surroundings about emergency if it is likely to adversely affect them

7.12.5 Disaster control Management system

Disaster Management group plays an important role in combating emergency in a systematic manner. Schematic representation Emergency Control Management system for M/s. United Biotech Pvt Ltd and Chemicals is shown in **Fig.1.5.**

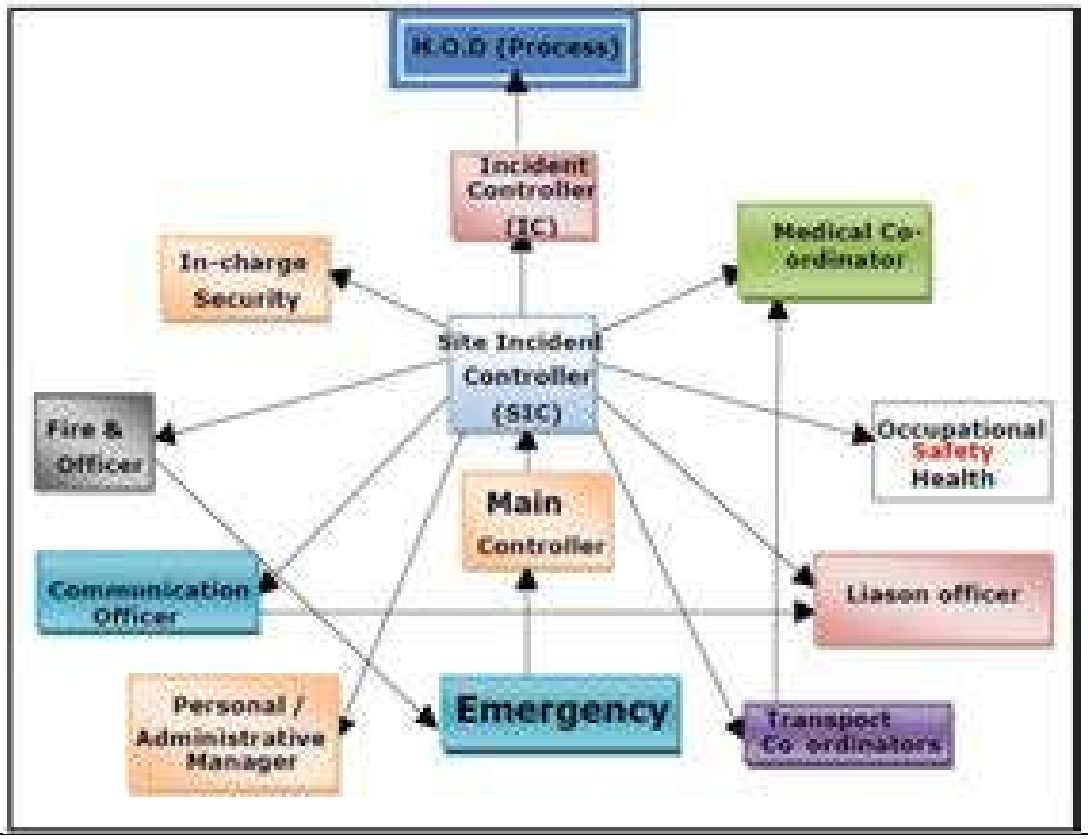

Fig.7.7: Onsite DMP - Disaster Control / Management System

7.12.6 Emergency Control Centre (ECC)

An Emergency Control Centre (ECC) is established from which emergency operations are directed and co-ordinated. Centre will be activated as soon as on-site emergency is declared. The ECC will consist of one room, located in an area that offers minimal risk being directly exposed to possible accidents. During an emergency, the Emergency Management Staff, including the main controller will gather in the ECC. Therefore, the ECC will be equipped with adequate communication systems in the form of telephones and other equipments to allow unhampered organization and other nearby facility personnel.

The ECC will provide shelter to its occupants against the most common accidents; in addition, the ECC's communication systems will be protected from possible shutdown. The ECC will have its own emergency lighting arrangement and electric communication systems operation. The ECC will always be ready for operation and provided with the equipment and supplies necessary during the emergency such as:

- Hazard identification chart, All Emergency response plans
- Population around factory
- Internal telephone connections and External telephone connections
- A list of key personnel, with addresses, telephone numbers, etc.
- Hotline connection to district collector, police control room, fire brigade, Hospital etc.
- Public address system (PAS)
- MSDS of all the materials used in Plant site
- List of dispensaries and registered medical practitioners around factory
- Area map of surrounding villages
- Note pads and ball pens to record message received and instructions
- The blown up copy of Layout plan showing areas where accident has Occurred
- Undated copies of the On-site Disaster Management Plan
- Emergency telephone numbers
- The names, phone number, and address of external agencies, response organizations and neighbouring facilities
- The adequate number of telephone
- Emergency lights
- List of fire extinguishers with their type no. and location, capacity, etc
- Personal protective equipment(PPE)
- Safety helmets
- Clock
- Material safety data sheets for chemicals handled at the facility
- Several maps of the facility including drainage system for surrounding area showing:
- Areas where hazardous materials are stored
- Plant layout
- Plot plans of storage tanks, routes of pipelines, all water permanent lines etc.
- The locations where personal protective equipment are stored
- The position of pumping stations and other water sources
- Roads and plant entrances
- Assembly areas
- Lay out of Hydrant lines

7.12.7 Roles and Responsibility

A team of following Essential persons shall be taking necessary action in case of emergency. The roles and responsibilities of these personnel are defined subsequently:

- Main Controller
- Site Incident Controller (SIC)
- Incident Controller (IC)
- Liaison Officer

- Communication Officer
- Observer
- In charge (Security)
- In charge (Medical)
- Shift In charge (Security)

Main Controller

The Primary Controller is the employee who gives the first information about the incident/accident. He will be responsible for:

- To inform the Security office (Main Gate), & Engineers/Sr. Engineers / Shift In-Charges/HOD of Section of the aforesaid Department/Section from the nearest available telephone about the location and nature of incident.
- To assist rescue operation as well as clear obstruction, if any, in the same.
- To carry out all instructions from Incident Controller.

Site Incident controller (SIC)

The Unit Head shall have overall responsibility for the factory and its personnel. In absence of Unit Head, Chairman OHS Committee shall assume the responsibility of Site Controller. His duties during emergency shall be:

- To assess the magnitude of the situation and decide if employees need to be evacuated from assembly points.
- To give necessary instructions to Liaison Officer, HOD(HR&A) regarding the help to be obtained from outside agencies like Fire Brigade, Police and Medical
- To advise Liaison Officer to pass on necessary information about the incident to News Media and ensure that the evidences are preserved for enquiry to be conducted by statutory authorities.

Incident Controller(IC)

The HOD of affected department shall have overall responsibility for controlling the incident and directing the personnel. Section In charge of the affected department shall assume the responsibility of Incident Controller(IC) in the absence of HOD of affected department. His duties during emergency shall be:

- To inform Communication Officer about the emergency, Control Center & Assembly point.
- To direct all operations` within the affected area with priorities for safety of personnel, to minimize damage to the Plant and environment and to minimize loss of material.
- To act as Site Controller till the later arrives.
- To advise and provide information to Fire Squad, Security Officer and Local Fire Services when they arrive.
- To ensure that all non-essential persons are sent to the assembly point.

Liaison Officer

HOD (HR&A) shall be the Liaison officer. He shall be responsible for: -

- To contact Fire Brigade, Police, and Medical facilities on intimation from Site Controller & arrange for the rescue operation.
- To ensure that the casualties receive attention.
- To inform relatives of the affected employee at the earliest.
- To arrange for additional transport if required.
- To arrange for relief of personnel & organize refreshment/catering facility, in case the duration of emergency is prolonged.
- To issue authorized statements to news media and ensure that evidence is preserved for enquiry to be conducted.

In charge (Medical)

On receiving the information he will reach hospital immediately and take following actions :-

- He will keep necessary first aid medicines and artificial respiration equipment ready.
- Inform doctors at other places to be ready, for attending serious injury, burn cases and food poisoning

Observer

- During Mock Drill for Emergency Situations they shall be placed at different locations in plant to note down the movement and action taken by people and give feed back to the Site Controller.

Communication Officer

In-Charge (Safety) shall act as Communication officer. He shall work from Control Centre and maintain communication between relevant personnel. He shall be responsible for: -

- To apprise the site controller of the situation, based on the information received, suggest the evacuation of personnel from assembly points, if needed.
- To arrange for suitable persons to act as runners/messengers in case of failure of communication system.
- To carry out any other works as assigned by Site Controller/Incident Controller

In charge - Security

- The In charge (Security) shall guide the crew, according to the condition of emergency site, for the actions required to handle the emergency i.e. for fire fighting, removal of debris, arresting of dust, removal of oil soaked earth etc. He shall give instructions to Security Guards to cordon off areas as required by Incident Controller. He shall render all help to incident controller to handle the emergency and carry out the work as assigned to him.
- He shall be responsible for ensuring the discipline at control points and for preventing the entry of unauthorized persons inside the affected area as well as inside the factory during emergency.

Shift Incharge – Security

He shall be responsible for

- To arrange the necessary help as requested by Primary Controller.
- To inform Incharge (Security).
- To blow emergency siren, if instructed by the HOD (HR&A)/Incident Controller.
- To send Ambulance near accident area.
- To rush to the accident site with fire brigade along with available trained security persons.

7.12.8 Automatic Fire Detection System

Unattended vulnerable premises like electrical control rooms, cable tunnels, MCC, oil cellars, etc. will be provided with automatic fire detection and alarm systems.

7.12.9 Manual Call Point Systems

All major units and welfare/administrative building will be provide with manual call points for summoning the fire fighting crew from the fire station for necessary assistance.

7.12.10 Fire Station

The following equipment will be provided in the fire posts.

- Water tender
- Foam tender
- Portable pump
- Wireless set
- Hoses
- Hot line telephone

7.12.11 Alarm System

A hooter installed at the Security Office shall be blown alternately with high and low pitch for 2 minutes to indicate major emergency in the plant. In such case, all non-essential employees are expected to gather at assembly point i.e. Company's Main Gate/Time Office. Signal for the clearance of emergency shall be given by blowing the hooter continuously for one minute.

7.12.12 First Aid

- Fully equipped Hospital with Ambulance Van is available. Doctors and nurse are available round the clock to handle any emergency in the plant. The Ambulance shall be periodically checked through preventive maintenance programme .To ensure that the system is strictly followed, In-charge (Safety) shall cross check randomly once in a fortnight the preparedness of Ambulance as per the check list and counter sign
- The injured shall be shifted to nearby hospital, as per the opinion of the Medical Officer.
- A list of First Aid boxes is available in every department as mentioned in ECC

- Medical Officer shall ensure that refilling is done on monthly basis and he shall maintain a record of refilling.
- The names & contact numbers of trained First Aiders are provided the same is displayed at all the prominent locations in the premises.
- In case of Injury caused due to Hazardous Chemicals, Material Safety Data Sheet (MSDS) available with the user department / Hospital shall be referred.

7.12.13 Mock Drill

For reviewing and assessing the level of preparedness, In-charge (Safety) shall conduct Mock trials twice in a year (one in each half) simulating the covered emergencies and will maintain records of the trials. The team of Prime & Deputy Responsible persons will review the records and events of the emergency preparedness trials along with the observations taken by the observer and report shall be put forward to the Site Controller. Corrective and Preventive measures, if suggested/directed, will be initiated and relevant records of the same are maintained. Fire drills will be exercised once in every six months under the leadership of Incharge (Security). The records of Fire drill will be recorded & maintained.

The findings of the mock drills shall be used for improvements in preparedness and response. All team leaders shall be responsible for implementing the suggestions based on mock drill findings within reasonable time frame.

7.12.14 Training

On a yearly basis class room training for fire fighting and mitigating measures to be adopted to reduce environmental impact & OHS risks, will be imparted covering at least 20% employee by the In-charge (Safety) and In-charge (Security). The records of the same are maintained.

7.12.15 Evacuation Plan

To establish method of systematic, safe and orderly evacuation of all the occupants in case of fire or any emergency, in the least possible time, to a safe assembly point through nearest safe means of escape. Additionally to use available fire appliances provided for controlling or extinguishing fire and safeguarding of human life.

- Facility staff will be notified of evacuation by one or more of the following method(s): Verbal, Intercom, Portable Radio, Alarm, Other
- Notification to emergency services to ECC
- Staff will follow predetermined evacuation routes and assemble at designated areas.
- Evacuation maps must be displayed throughout the facility.
- Individuals responsible for coordinating evacuations must confirm the process

7.13 Off-Site Emergency Planning

The off-site emergency plan is an integral part of any hazard control system. It is based on those accidents identified by the works management, which could affect people and the environment outside the works. Thus, the off-site plan follows logically from the analysis that took place to provide the basis for the on-site plan and the two plans therefore complement each other. The roles of the various parties that may be involved in the

implementation of an off-site plan are described below. The responsibility for the off-site plan will be likely to rest either with the works management or with the local authority. Schematic representation of various organisation involved during emergency is shown below in **Fig.7.8.**

Either way, the plan must identify an emergency coordinating officer who would take overall command of the off-site activities. Consideration of evacuation may include the following factors:

- In the case of a major fire but without explosion risk (e.g. an oil storage tank), only houses close to the fire are likely to need evacuation
- If fire is escalating very fast it is necessary to evacuate people nearby as soon as possible
- In acute emergency people are advised to stay indoors and shield themselves from the fire.

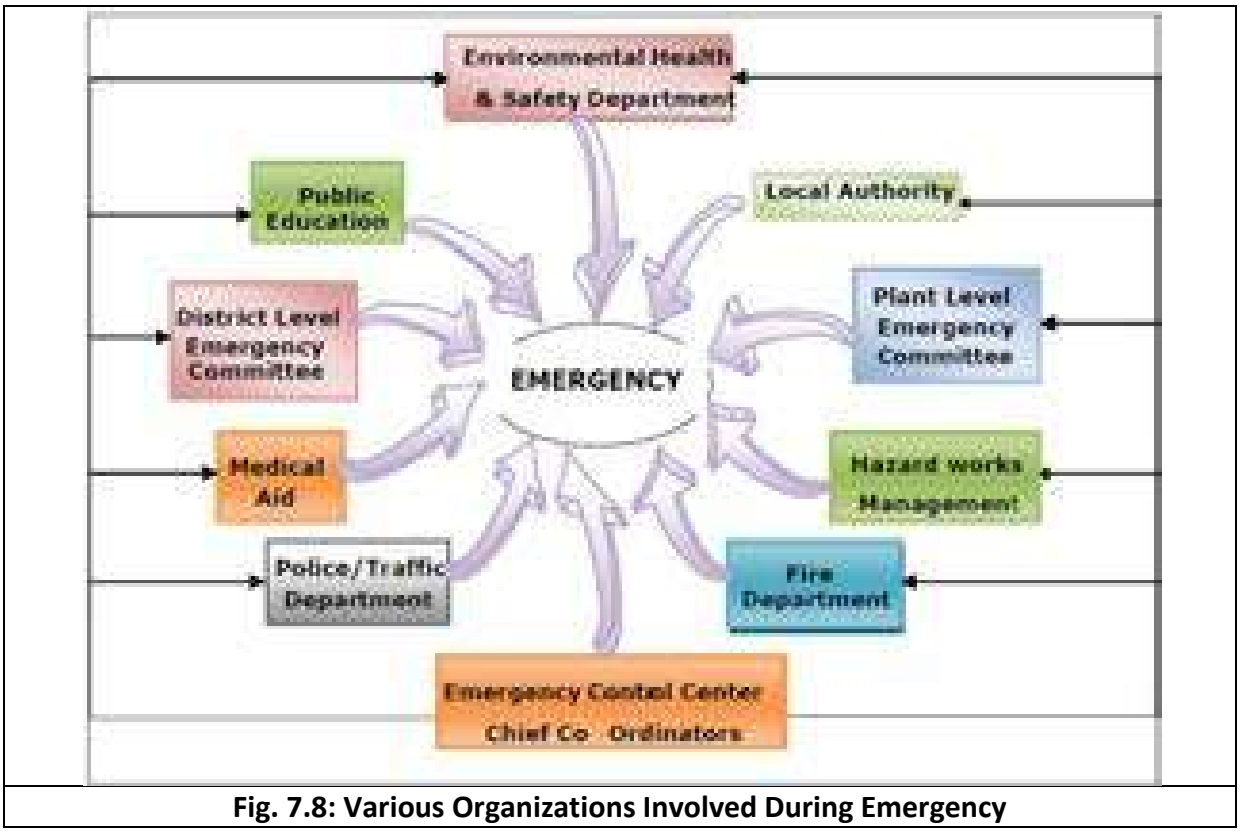

Fig. 7.8: Various Organizations Involved During Emergency

7.13.1 Organization

Organizational details of command structure, warning systems, implementation procedures, emergency control centres include name and appointments of incident controller, site main controller, their deputies and other key personnel involved during emergency.

7.13.2 Communications

Identification of personnel involved, communication centre, call signs, network, list of telephone numbers.

7.13.3 Special Emergency Equipment

Details of availability and location of heavy lifting gear, specified fire-fighting equipment, fireboats etc.

7.13.4 Voluntary Organizations

Details of Voluntary organizations, telephone numbers nearby of hospitals, Emergency helpline, resources etc are to be available with chief authorities.

7.13.5 Non-governmental Organizations (NGO)

NGO's could provide a valuable source of expertise and information to support emergency response efforts. Members of NGOs could assist response personnel by performing specified tasks, as planned during the emergency planning process.

- Evacuation of personnel from the affected area
- Arrangements at rallying posts and parking yards
- Rehabilitation of evacuated persons

7.13.6 Chemical information

Details of the hazardous substances (MSDS information) and a summary of the risks associated with them will be made available at respective site.

7.13.7 Meteorological information

There is to be arrangements for obtaining details of weather conditions prevailing at r before the time of accident and weather forecasts updates.

7.13.8 Humanitarian Arrangements

Transport, evacuation centres, emergency feeding, treatment of injured, first aid, ambulances, temporary mortuaries.

7.13.9 Public Information

- Dealing with the media-press office
- Informing relatives, etc.

7.13.10 Assessment

- Collecting information on the causes of the emergency
- Reviewing the efficiency and effectiveness of all aspects of the emergency plan.

7.13.11 Role of local authority

Local Authorities like Panchayat, Sabha, Samity, municipalities can help in combating emergency situation after assessing the impact scenario in rescue phase.

7.13.12 Role of police

- The police are to assist in controlling of the accident site, organizing evacuation and removing of any seriously injured people to hospitals.
- Co-ordination with the transport authorities, civil defence and home guards
- Co-ordination with army, navy, air force and state fire services
- Arrange for post mortem of dead bodies
- Establish communication centre with easy contact with EC

7.13.13 Role of Fire Brigade

The fire brigade shall be organized to put out fires and provide assistance as required during emergency.

7.13.14 Media

- The media is to have ready and continuous access to designated officials with relevant information, as well as to other sources in order to provide essential and accurate information to public throughout the emergency and to avoid commotion and confusion
- Efforts are made to check the clarity and reliability of information as it becomes available, and before it is communicated to public
- Public health authorities are consulted when issuing statements to the media concerning health aspects of chemical accidents
- Members of the media are to facilitate response efforts by providing means for informing the public with credible information about accidents involving hazardous substances

7.13.15 Role of health care authorities

- Hospitals and doctors shall be ready to treat all type of injuries to causalities during emergency.
- Co-ordinate the activities of Primary Health Centres and Municipal Dispensaries to ensure required quantities of drugs and equipment's
- Securing assistance of medical and paramedical personnel from nearby hospitals/institutions
- Temporary mortuary and identification of dead bodies

Table No. 7.12: Contact list of Police Officers

S. No	Name	Designation	Phone No	MOBILE NO	Email ID
1	Smt. V Neerja I.P.S	IGP/ Ropar Range	01881-220973	91154-00004	dig.rupnaqar@gmail.com
			221301 (O)		ranqe.rpr. police@puniab.qov.in
			220912		

S. No	Name	Designation	Phone No	MOBILE NO	Email ID
2	Sh.Kuldeep Singh I.P.S	S.S.P	0172-2219211	91155-16000	ssp.moh.police@punjab.gov.in
			0172-2219212		
			FAX-2219213	90412-80817	dpo.moh.police.@punjab.gov.in
			2270009(R)		ssp.sasnagar@yahoo.co.in
3	Sh.Gursewak Singh Brar PPS	S.P (HQ)	2219203	91155-16001	sphq.mohali@gmail.com
				98157-00101	
4	Sh. Harbir Singh Atwal PPS	S.P (Inv.)	2219204	91155-16003	spinvsasnagar@gmail.com
				95010-01501	
5	Sh.Tarun Rattan PPS	SP (Sec &Tfc)	2219206	91155-16004	sptsasnagar@gmail.com
				88720-00021	
6	Sh.Jagjit Singh PPS	SP (City)	2219305	91155-16002	spcitymohali@gmail.com
				98789-50009	
7	Dr.Akhil Chaudhary (IPS)	S.P (IND.SEC.)	2219825	91155-16005	spindsecmohali@gmail.com
				70874-22221	
8	Sh. Amroz Singh PPS	DSP(HQ)	2219284	91155-16007	dsphmohali@gmail.com
				95924-24675	
9	Sh. Kamalpreet Singh	DSP (Inv.)	--	91155-16009	dspinvsasnagar@gmail.com
				91183-26000	
10	Sh.Gurwinderpal Singh PPS	DSP (Tfc.)	2219340	91155-16010	trafficpolicesasnagar@gmail.com
				98155-09024	
11	Sh.AlamVijay Singh PPS	DSP CITY-1	2227003	91155-16006	dspcity1mohali@gmail.com
				98552-	

S. No	Name	Designation	Phone No	MOBILE NO	Email ID
				00001	
12	Sh.Ramandeep Singh PPS	DSP CITY- 2	--	91155-16008 99154-00790	dspcity2mohali@gmail.com
13	Sh.Deepkamal Singh PPS	DSP KHARAR	0160-2281414	91155-16012 85588-33110	dsp.kharar@gmail.com
14	Sh.Harmandeep Hans IPS	ASP (DERABASSI)	01762-280133	91155-16011 99140-00962	spoffice.derabassi@gmail.com
15	Sh.Digvijay Kapil PPS	DSP Control Room	--	91155-16013 98725-13324	--
16	Smt. Prabhjot Kaur PPS	DSP Crime against women	--	98149-00058	dspcawsasnagar@gmail.com
17	Sh.H.S Rakkar	D.D.A. Legal	--	98144-10778	--

Table No. 7.13: Contacts of SUB division-1

S.No	Name	Designation	Phone No	MOBILE NO	Email ID
1	SI Gurbant Singh	SHO PS PH-8	--	91155-16024 99150-12703	psoc.phase8mohali@gmail.com
2	Insp. Gurpreet Singh	SHO PS-11	--	91155-16026 96211-00001	shopsphase11mohali@gmail.com
3	Insp. Manjit Singh	SHO PS SOHANA	--	91155-16028 95929-16015	psoc.sohana19@gmail.com
4	ASI Paramjit Singh	I/C PP Saneta	--	98724-60006	--

Table No. 7.14: Contacts of SUB division-2

S.No	Name	Designation	Phone No	MOBILE NO	Email ID
1	Insp Rajan Parminder Singh	SHO PS PH-1	--	91155-16014 98722-00300	shops1mohali@gmail.com
2	ASI Bhupinder Kumar	I/C PP Civil Hospital (Phase-6)	 --	91155-16018 95929-16966	--
3	SI. Sumit Mor	I/C PP Ind. Area Mohali	--	91155-16016 70878-78717 95927-00541	ppindarea.3044@gmail.com
4	Insp Bagwant Singh	SHO PS NAYA NGAON	--	91155-16021 98155-55214	psocnayagaon@gmail.com
5	SI Rajeev Kumar	SHO PS Mataur	--	91155-16019 98786-33339 99150-12778	shopsmataur@gmail.com

Table No. 7.15: Contacts of Inspector & Sub Inspector

S.No	Name	Designation	Phone No	MOBILE NO	Email ID
1	Insp.Pawan Kumar	SHO PS ZIRAKPUR	--	91155-16053 97806-07000	shozkp26@gmail.com psoczirakpur26@gmail.com
2	SI.Satinder Singh	I/C PP Baltana (Zirkpur)	--	91155-16055 97800-01574	--

3	SI.Jagjit Singh	SHO Dhakoli (Zirakpur)	--	91155-16057 98154-00042	--
4	Insp. Mahinder Singh	SHO PS DERABASSI	--	91155-16048 98762-00343	psocderabassi@gmail.com
5	ASI.Bhinder Singh	I/C PP MUBARKPUR (Derabassi)	--	91155-16051 98888-22062	--
6	Insp.Harsimran Singh	SHO Airport Mohali	--	91155-16030 98765-16104	ceo@chial.org
7	Insp.Amarpreet Singh	SHO PS LALRU	--	91155-16059 99880-00455	psoclalru@gmail.com
8	SI.Phull Chand	I/C Nahar (Lallru)	--	91155-16062 98765-16578	--
9	SI.Gurdeep Singh	SHO HANDESRA (Lallru)	--	91155-16064 98887-80001	psochandesra@gmail.com

Table No. 7.16: Contact List of Hospitals

S.No	Hospital Name	Address	Contact person Name	Contact No
1	Amar Hospital & Heart Centre	Sector 70, Mohali 160071	Dr. Sameer Kaushal (CEO)	8284886910

2	Behgal Hospital	SCF 11-12, near PTL chowk Phase 5, Mohali 160059 Behgal's Institute of IT & Radiatoin	Dr. kuljinder Singh Behgal	9814109573
3	Chaudhary Hospital	Singhpura Road, Kurali, Kharar, Mohali - 140103	Pritpal Singh	7589007970, 9814125374
4	Kaushal Hospital	Near Rori Sahib Gurudwara, Arya College Road, Kharar, Mohali - 140301	Ankur	8146141990, 9855465
5	Rajeev Eye hospital	Sco-7, Jamuna Aprtment, NH-21, Kharar ropar road, Kharar, Dist. Mohali	Dr. Rajeev Jain	9814603063
6	Manjit Laser eye hospital	Super complex, morinda road, Kurali, Dist. Mohali	Gurshan Singh	9855680486
7	Shri Sukhmani Multispeciality hospital	Ambala road, Derabassi, Disst Mohali,	Mr. S.C. Sharma	9855534302, 9855623600
8	Shri Ram Hospital	Tehsil road, Near Telephone Exchange, SAS Nagar	Rajeev Gupta	9417303444
9	JP Eye hospital	# 35, phase 7, Mohali	Mrs. Shashi	9216066612
10	Kamboj Multispeciality hospital	Plot no 4929, sector 125, Chandigarh Kharar road, 100 foot road, greater mohali, Kharar	Dr. Jyoti Kamboj	9814601096
11	Grecian Susperspeciality hospital	Sector 69, Opp. Village Kumbra, Mohali	Dr. Deepak Dhiman	9041681152, 0172-
12	Chawla Nursing Home & Hospital	Kothi No. 1 and 2, Phase-7, SAS Nagar, Mohali.	Manjeet Bhalla	8284973197
13	J.P. Hospital	Ambala-Chandigarh road (NH21), Zirakpur,Distt. Mohali, Punjab-140603	Dr. Sandeep Singla	8728075349
14	Sanjivni Hospital	Baba G Hospital, LIC Market, Mundi Kharar,Mohali	Dr. Sanklap Kaushal	7087978233

15	Life Care Hospital	Opp. Hospital Tanveer, Chandigarh road , Kurali , Distt	Dr rakhi Goyal Bhalla	8054469141
16	Dhawan Nursing Home.	Near Gurudwara Akali daftar road, # 172/E, Mohali.	Gagan Dhawan	9216250525, 9317789159
17	Nimbus Eye Care	SCO-46, Phase-10 Mohali	Avnish Gupta	9888027179

Table No. 7.17: Contact List of SAS Nagar hospitals

S.No	Hospital Name	Address	Contact person Name
1	Civil Hospital Mohali	Phase 6, SAS Nagar	0172 226 3938
2	CHC Derabassi	PHC DERABASSI, SAS Nagar	
3	CHC Dhakoli	Near Railway Crossing ,CHC,Dhakoli, Distt Ajitgarh	
4	SOH Kharar	SOH KHARAR	
5	CHC Kurali	Near Bus Stand,Ropar Road Kurali	
6	CHC Banur	District SAS Nagar	
7	CHC Lalru	District SAS Nagar	

Table No. 7.18: Contacts of Officers/ Employees of Civil Surgeon Office, SAS Nagar

S.No.	Name	Designation	Complete Address	Office Telephone No.
1	Dr. Jagjeevan Bansal	Asstt. Civil Surgeon	O/o Civil Surgeon, SAS Nagar (Mohali)	0172-2226343
2	Dr. Rajiv Bhalla	SMO	Civil Hospital, Mohali	0172-2271295
3	Dr. Jaswant Singh	MO	Civil Hospital, Mohali	9417131004
4	Dr. Adesh Kang	SMO	Civil Hospital, Kharar	0160-2280797
5	Dr. Tarsem Singh	MO	Civil Hospital, Kharar	8146711655
6	Dr. Dalbir Kaur	SMO	PHC Boothgarh	0160-2644144
7	Dr. Rakesh Singla	MO	PHC Boothgarh	9814520013
8	Dr. Shashi Kant	SMO	PHC Gharuan	0160-2635631

S.No.	Name	Designation	Complete Address	Office Telephone No.
9	Dr. Ranjana	MO	PHC Gharuan	9815453179
10	Dr. Mohinder Singh	SMO	CHC Kurali	0160-221140
11	Dr. Dharminder Singh	MO	CHC Kurali	9888999426
12	Dr. Usha Rani	SMO	CHC Banur	1762251101
13	Dr. Bhupinder Singh	MO	CHC Banur	9855405452
14	Dr. Daler Singh Multani	SMO	CHC Lalru	1762294068
15	Dr. Sangeeta Jain	MO	CHC Lalru	9855059926
16	Dr. Sunita Sharma	SMO	CHC Zirakpur	1762270012
17	Dr. Dilbag Singh	MO	CHC Zirakpur	9815678401
18	Dr. S.K. Mittal	SMO	PHC Derabassi	1762281010
19	Dr. H.S. Cheema	MO	PHC Derabassi	9478005500

Sr. No.	Name of Employee	Designation	Officer Address	Office Phone No.
1	Dr. Vijay Kumar	A.C.S	C/o Office Civil	0172-2226343
2	Dr. Surinder Pal Suri	D.H.O	C/o Office Civil	0172-2226343
3	Dr. Arun Kumar Ha	D.F.W.O	C/o Office Civil	0172-2226343
4	Dr. Sunita Pal	Distt.	C/o Office Civil	0172-2226343
5	Dr. P.P. Bath	M.O	C.D Ph-9, Mohali	0172-2226343
6	Sh. Anil Kumar Aror	A.C. (F&A)	C/o Office Civil	9878530900
7	Dr. Rupinder Kaur	DDHO	C/o Office Civil	9780470958
8	Dr. Gurjot Kaur	M.O	C.D, Sec-39-D,	9815900869
9	Dr. Anu Chopra	M.O	C.D, Mini Sec.,	9464739769
10	Dr. Amandeep Chad	M.O	C.D, Mini Sec.,	9888886959
11	Dr. Rajbir Singh	M.O	C.D Ph-7, Mohali	9814854440
12	Dr. S.S. Malik	M.O	C.D Ph-11, Mohali	9915369469
13	Dr.Narinder Mohan	M.O	S.A.D. Mundi	9815591072
14	Dr. Sandeep Singh	M.O	C.D, Mini Sec.,	9780032965
15	Dr. Navneet Kanwar	M.O	C.D Ph-1, Mohali	9815951822
16	Ramandeep Kaur	Distt. Drug Insp,	C/o Office Civil	0172-2226343
17	Smt. Gurmail Kaur	Ch. Phm. Gr-I	C/o Office Civil	0172-2226343
18	Sh. Lakhwinder Sing	Pharmacist	S.A.D. Mundi	9814427625
19	Smt. Sushma Rani	Pharmacist	C.D Ph-1, Mohali	9815501754
20	Smt.Balwinder kaur	Pharmacist	C.D Ph-5, Mohali	9815756167
21	Smt. Anita	Pharmacist	C.D Ph-7, Mohali	9888833055
22	Smt. Amarjit Kaur	Pharmacist	C.D, Sec-39-D,	0172-2626688
23	Smt.Harwinder kaur	Pharmacist	C.D, Mini Sec.,	9814483444
24	Ankur Mahajan	Pharmacist	C.D, Mini Sec.,	9417150412
25	Smt. Kiran Prabha	Pharmacist	C.D Ph-11, Mohali	9417743124
26	Smt. Gita Malhotra	Pharmacist	C.D, Ph-9, Mohali	9872241507

7.14 CONCLUSION

As discussed in above sections, adequate risk Control measures for process needs to be considered for to say that the proposed new Project Activity is not likely to cause major significant risk to onsite, offsite & environment. Suitable Mitigation Measures will be taken by M/s. United Biotech Pvt. Ltd, Dist-SAS Nagar, Punjab to ensure complete workplace safety. In the event of disaster onsite, offsite and all the emergency planning procedures will be followed so as to minimise the impact on working personnel, plant surrounding and environment.

7.15 Social Impact Assessment

7.15.1 Introduction

The term "Social Impact" means all social and cultural consequences, including changes of people's lift, production, social relations and organization pattern, brought about by any private or public activity, as well as cultural impacts, including changes of people's behavior, the view of value and religion.

The objective of a Social Impact Assessment (SIA) is to assess the possible social impacts that may be brought about by a development project, to understand, manage and control changes, to formulate, implement mitigation measures to minimize adverse social impacts or prevent from extension. In the assessment, the most important key is to carry out social intervention to settle, mitigate and eliminate the adverse impacts and manage the social impacts rationally.

Social Impact Assessment is carried out, based on impacts to all the properties and assets identified along the project site. The socio-economic survey in the project area was carried out and the detailed relevant information.

7.15.2 Objectives of Social Impact Assessment Study

The main objective of conducting social survey is to provide inputs of social concerns and to avoid or minimize the adverse social impacts with the best possible solutions at minimum cost. The social reconnaissance exercise is intended to assess the negative impacts (direct, indirect or cumulative) and to suggest mitigating measures to avoid or at least minimize the adverse impacts on nearby communities and people. To minimize and or avoid the adverse impacts through suggested appropriate measures that can be adopted during the operation of the project.

The above objectives can be summarized as follows:

- To identify Socio economic status of the study area;
- To collect base line demographic and socio-economic characteristics of the study area
- To gather from the villagers information on the awareness and opinion about of the project
- To know the perceptions and expectations of the respondents from the project authority

- To suggest an appropriate action plan for improving/ restoring the living standards of people in the study area

7.16 Rehabilitation & Resettlement Plan

The proposed expansion project does not involve any displacement of persons and no rehabilitation or resettlement is necessary.

Reconnaissance Survey of the Project Area

The study team carried out extensive visits to collect social features within the study area. Other primary data has been collected by using structured and semi-structured questionnaires. Socio Economic survey was been carried out in all the directions within the 10 km radius of the study area to know their socio economic status that includes the basic amenities like education, health, communication and transportation, drinking water facility, sanitation facility and their views, expectation and perceptions about the project.

The consultations were carried out with both individuals and groups during the reconnaissance survey involving local people, directly and indirectly affected persons, public consultation involved information dissemination i.e. informing the people about the details of the project and to invite their suggestions and comments.

Analysis of Data and Reconnaissance Exercise

The data collected through the above steps were compiled to develop the social scenario of the project area and the sensitive components within that. The collected data was analyzed, tabulated, summarized and accordingly socio-economic features of the project area were assessed. The analysis will indicate the feasibility of the project and will help in suggesting various socially viable options and suggested mitigation measures to make the project socio-economically acceptable.

7.17 Details of Project Area

Study Area

The study area was defined as an area within 10 km radius around the proposed project site. Total 90 villages and urban area covers Daper(CT) and Lalru(CT) are coming within the 10 km radius of the study area. All the villages are from Dera Bassi, Majri, Kharar and RajpuraTehsil of Sahibzada Ajit Singh Nagar District of Punjab State and Shahzadpur and Naraingarh Tehsil of Ambala District of Haryana State.

7.18 Public Consultation

As part of the participatory approach, the project has been designed in due consultation with all the stakeholders. Public consultation is mandatory for any investment in infrastructural development program. The aim of the public consultation is to make the people aware about the developmental activities being undertaken in their locality and to incorporate their views for making sustainable plan during the design and to have successful completion of the project.

Public consultations were carried out at the villages within the study area. The participants included villagers, farmers, Panchayat representatives, Medical Representatives and other stakeholders.

7.18.1 Methods of Public Consultation

Informal and formal consultations in the project area were conducted which adopted the following methodology:

(i) Walk over survey and informal discussion with people

(ii) Individual interviews with villagers.

As per the data generated through the survey it is observed that the quality of life of the surveyed village is on an average with lack of basic amenities such as medical facility, sanitation condition is very poor which leads to the unhealthy environment and cause for various health problems. Drinking water facility is also very poor and unsatisfactory. Project proponent should work in certain area for improving the quality of the region.

Socio economic survey was conducted in 7 villages of the study area. The details of the amenities available in the villages are summarized below:

Daper is a town situated in Dera Bassi Block of Sahibzada Ajit Singh Nagar district in Punjab. Placed in urban area of Sahibzada Ajit Singh Nagar district of Punjab, it is one of the 5 towns of Dera Bassi Block of Sahibzada Ajit Singh Nagar district. Daper is a Census Town city in district of Mohali, Punjab. The Daper Census Town has population of 5,936 of which 3,296 are males while 2,640 are females as per report released by Census India 2011. Population of Children with age of 0-6 is 779 which is 13.12 % of total population of Daper (CT). In Daper Census Town, Female Sex Ratio is of 801 against state average of 895. Moreover Child Sex Ratio in Daper is around 779 compared to Punjab state average of 846. Literacy rate of Daper city is 85.98 % higher than state average of 75.84 %. In Daper, Male literacy is around 91.18 % while female literacy rate is 79.51 %. Daper Census Town has total administration over 1,309 houses to which it supplies basic amenities like water and sewerage. It is also authorize to build roads within Daper Census Town limits and impose taxes on properties coming under its jurisdiction.

Dera Bassi is a city and a municipal council in Mohali district in the state of Punjab, India. Zirakpur comes under tehsil Dera Bassi. Dera Bassi is located on the Chandigarh – Delhi National Highway, 20 km from Chandigarh. It is strategically located near the boundary of Haryana, Himanchal Pradesh and Union territory of Chandigarh. The nearby sub town Lalru was once a famous market for red chili powder.

Education: The city and nearby area has eight engineering colleges, B.ed, paramedical and management Institutes.The main engineering institute in Dera Bassi is the Sri Sukhmani Institute of Engineering & Technology (SSIET) founded in 1998. National Dental College and Hospital is a dental college at Gulabgarh, Derabassi.

Lalru Mandi is a Village in Dera Bassi Tehsil in S.a.s Nagar District of Punjab State, India. It is located 25 KM towards South from District head quarters Sahibzada Ajit Singh Nagar. 26 KM from State capital Chandigarh.

Colleges near Lalru Mandi - Punjab Group of Colleges, Mohali, Punjab

Schools in Lalru Mandi - Gian Jot Public School, Sarsini Rathi Public School

- Jaswindra High School
- Akash Public School
- Gsss Laru Mandi

Table 7.19: SUMMARISED DETAILS OF THE INFRASTRUCTURE FACILITY IN SAMPLING VILLAGES

Sr.No.	Name of the Villages	Education Facility	Health Facility	Drinking Water Facility	Sanitation Facility	Transportation Facility
1.	Bhagwanpur	Primary(1),Middle (1),secondary school(-) High school(-)	No Medical Facility	Untreated tap water, Hand pump Uncovered Well	Closed drainage system available in the village but unsatisfactory. No Garbage disposal system.	Private bus and jeeps are used for transportation by villagers
2.	Samgauli	Primary(1), No middle and High school facility, prefer to go to Salanpur village	Primary Health Centre and Dispensary working in the village	Tap water, Uncovered well, Hand Pump and Tube well	No Sewage and Drainage System	Private bus facility
3.	Jauli	Primary(3),Middle (1), High school(1) and Senior secondary school (1)	No Medical Facility	Hand Pump, Covered well and Tap water	Open drainage system, community toilet available	Private bus facility

				facility		
4.	Bhagwasi	Primary(1), Middle(--), High School (-)	No Medical Facility	Uncovered well and Tube Well	Open drainage system	Public and private bus service available in the village

Source: Socio Economic survey

It was observed during the survey that most of the villages have primary and middle school facility in the village but for further studies they have to travel to town for which transportation facility is poor in the villages. No medical facility is available in the sampling villages. Only Samgauli village is having primary health centre and dispensary working to provide medical care to the villagers. The drainage system in the villages is quite poor which may be the cause of various common diseases prevailing in the village. It can be inferred from the data that the quality of life of the villages is on an average.

FOLLOWING ACITVITIES CAN BE PROPOSED IN THE STUDY AREA

As per the socio economic survey in the study area it has been observed that as per the perceptions and expectations of the villages certain activities can be proposed in the surrounding areas of the site in consent of gram panchayat and by identifying the priorities needs of the villagers.

7.19 Corporate Environment Responsibility (CER)

As per the suggestions received from various Expert Committee in this regard which inter-alia states that Greenfield projects and Brownfield projects should be treated differently, so CER should be prescribed whereas there is no increase in air pollution load, R&R, etc

The cost of CER is to be in addition to the cost envisaged for the implementation of the EIA/EMP which includes the measures for the pollution control, environmental protection and conservation, R&.R, wildlife and forest conservation/protection measures including the NPV and Compensatory afforestation, required, if any, and any other activities, to be derived as part of the ETA process.

The fund allocation of the CER shall be planned in subject to the maximum percentage as prescribed below for the different cases:

S.No	**Capital Investment Additional Capital Investment (in Rs)**		**Greenfield Project — % of Capital Investment**	**Brownfield Project — % of Additional Capital Investment**
I		II	III	IV

1	≤100 crores	2.0%	1.0%
2.	100 crores to ≤ 500 crores	1.5%	0.75%
3.	> 500 crores to < 1000crores	1.0%	0.50%
4.	> From 1000 crores-10000 crores	0.5%	0.25%
5.	> 10000 crores	0.250/o	0.125%

The activities proposed under CER shall be worked out based on the issues raised during th public hearing, social need assessment, R&R plan, EMP, etc

M/s United Biotech Pvt Ltd is proposing to setup a new manufacturing unit which will be located in the same location as the existing plant for which the area is available. The project comes under the Greenfield Project and the total project cost is estimated to be 100 Crores (approx). Which include the proposed investment in plant and machinery, investment in Building construction, investment in site Development & Fixed Assets. So the percentage of Additional Capital Investment shall be about 2% of the total project cost i.e about 2 crores shall be invested in Corporate Environment Responsibility (CER).

The activities based on the need and priorities of the villagers identified during the assessment study. The list of activities may include:

1. **Drinking Water Facility-** Installation of Hand Pumps in Bhagwanpur, Jauli, Samgauli, Kuranwala Villages. Rain Water Harvesting System and Construction of Ponds in villages
2. **Health Care**
   - Organizing Health Check-up Camps quarterly in adjacent villages of project site by hiring Doctor, Nurse and Assistant
   - Providing the 24x7 Ambulance facility in Bhagwanpur village
   - Up gradation of local PHC(Samgauli and Tohffapur PHC) with equipments and infrastructure
3. **Education Development**
   Provision of school infrastructures also helps in the enrolment & retention of children in the schools
   - Construction of Toilets in Primary schools for maintaining health and Hygiene of students
   - Scholarship to the students in villages
   - Sponsoring Computers in Schools of the villages
   - Installation of Water coolers in Schools
4. **Infrastructure Development**
   - Construction of approach road in Bhagwanpur village in adjacent to the Project area and Installation of Street Lights in villages.
5. **Employment Opportunity**

Vocational Training Center for Educated youth of villages, Short term courses for skill up gradation for villagers, Training centre for Ladies (stitching, Embroidery, tailoring etc.)

6. **Sanitation and Hygiene**
   Construction of Nallas in villages, Distribution of house to house Dustbins/Community Garbage System

7. **Community Development**

Plantation of trees adjacent to the project site and neighboring village and Distribution of Seeds and saplings to the villagers promote agricultural activity

The details of activities to be undertaken and the budget allocated is given in Table below-

Table 7.20: PROPOSED ENTERPRISE SOCIAL COMMITMENT ACTIVITIES (BASED ON PUBLIC HEARING &NEED BASED ASSESSMENT) & BUDGET

Sr.No.	Area of Concern	Name of the Village Represented in Public Hearing/Public Consultation	Action Plan	Additional Capital Investment(in Rs) as per CER Notification 2018 For ≤100 crores-2% of Additional Capital Investment (Budget in Lacs)	Time Frame for Implementation
1.	Drinking Water	Bhagwanpur Jauli Samgauli Kuranwala	Installation of Hand Pumps Cost of Installation of HandPump- No.of 4 hand Pumps in each Village 50,000x4 villages=Rs.15 lacs Rain Water Harvesting System in villages-5 lacs Construction of Ponds in village - Estimated Cost-Rs.20 lacs	35	1 Year
2.	Health Care	Samgauli Bhagwanpur Tohffapur	Health Care facility through Medical Health camps quarterly by hiring (Doctor+Nurse+Assistant)= Ambulance 24x7 made available in villages Tie ups with various diagnostic labs to provide poor patients free diagnostic checkups. Up gradation of local PHC(Samgauli PHC) with equipments and infrastructure-	40	3-6 months

3.	Educational Development	Samgauli Bhagwanpur Tohffapur Jauli Bhagwasi	Construction of Toilets in Primary School Sponsoring Computers in Schools Scholarship to students Installation of Water coolers in Schools Infrastructure equipments/educational aids in School such as providing material support (uniforms, bags, notebooks, shoes and socks)	25	1-1.5 months
4.	Infrastructure Facility	Bhagwanpur	Construction of road from Project site Village Cost of Road construction= Rs.15 lacs Installation of Street Lights in all villages- Cost of Streetlight/20,000x5x6 villages+Rs. 6 lacs+ Miscellaneous- Rs 50,000	30	1-2 years
5.	Employment Opportunity	Bhagwanpur	Vocational Training Center for Educated youth of villages Short term courses for skill up gradation for villagers Training centres for Ladies (stitching, Embroidery, tailoring etc.)	30	1-2 year
6.	Sanitation and Hygiene	Bhagwanpur	Construction of Nallas for proper drainage system Distribution of house to house Dustbins/Community Garbage System	20	1 Year
7.	Community Development	Bhagwanpur	Distribution of Seeds and saplings to the villagers promote agricultural activity Plantation of trees adjacent to the project site and neighbouring village	20	1 year
Total				**200**	