"Risk Assessment & Hazard Management" (RH)

Occupational Health & Safety Report

Prepared and submitted by –

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- **Study Period**: (Oct-Dec 2016)

1.0 INTRODUCTION

1.1 Project Proponent: M/s MGL Pharma & Chemicals Ltd

1.2 Name of the Project:

Bulk Manufacturing Unit at Plot no. F-665 & 666, Upsidc Industrial Area, Phase-1, Tehsil & District- Hapur, Uttar Pradesh

by M/s MGL Pharma &Chemicals Pvt. Ltd. with Production Capacity 30 Tons/Month (Category B).

1.3 Location: **Village** - UPSIDC Industrial Area
District- Hapur, Uttar Pradesh

2.0 SCOPE OF WORK AS PER TERMS OF REFERENCE (ToR) LETTER

***T.o.R Point (3 ix*)**:

1. Hazard identification and details of proposed safety systems

***T.o.R Point (7 xiii*)**:

1. Onsite and Offsite Disaster (natural and Man-made) Preparedness and
2. Emergency Management Plan including Risk Assessment and damage control.
3. Disaster management plan should be linked with District Disaster Management Plan.

***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,

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 pre placement and periodical examinations give the details of the same. Details regarding last month analyzed data of abovementioned parameters as per age, sex, duration of exposure and department wise.

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

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

3.0 REPORT REFERENCE

1) https://en.wikipedia.org/wiki/Main_Page

2) http://hapur.nic.in/index.aspx

4.0 Project Proposal

M/s MGL Pharma & Chemicals Pvt. Ltd. has proposed to produce drugs (30 TPM) at Plot no. F-665 & 666 UPSIDC, Industrial Area, Phase 1 Hapur Uttar Pradesh. The proposed project site is Drug Manufacturing Unit located in the notified industrial estate and falls in Category 5(f)-B (Project is in Notified Industrial Area (Hapur Industrial Area Phase I) of Environment Impact Assessment Notification 14th September 2006 and its subsequent amendments. M/s MGL Pharma & Chemicals Pvt. Ltd. has proposed to produce drugs (30 TPM) at Plot no. F- 665 & 666 UPSIDC, Industrial Area, Phase 1 Hapur, Uttar Pradesh. The proposed project site is Drug Manufacturing Unit located in the notified industrial estate and falls in Category 5(f)-B (Project is in Notified Industrial Area (Hapur Industrial Area Phase I) of Environment Impact Assessment Notification 14th September 2006 and its subsequent amendments.The capacity of proposed project activity has been tabulated below **Table 1.1**:

Table 1.1
Proposed Project Activity

S. No.	Product	Capacity (Metric Ton/Month)
1.	Diclofenace	**5**
2.	Aceclofenace	**10**
3.	3- Nitro Acetophenone	**15**
4.	Mono Methyl Chloro Acetate	**-**
	Total	**30**

Table 1.2
Raw Material requirement

Name of Raw Materials	Source
Dichlofenace	
2-6 Dichlorophenole	Near by Market
Sodium methoxide (30%)	Near by Market
Mono Methyle Chloro Acetate	Near by Market

Chloro Acetyl Chloride	Near by Market
Methanol	Near by Market
Sodium Hydroxide	Near by Market
Acetofenance	
Dichlofenace	Near by Market
Tertiary Butyle Chloro Acetate	Near by Market
Tetra Butyle Ammonium Bromide	Near by Market
Formic Acid	Near by Market
3- Nitroacetophenone	
Acetofenance	Near by Market
Nitric Acid	Near by Market
Sulphuric acid	Near by Market
Methanol	Near by Market

Table 1.3

Raw Material requirement

S. No.	Energy requirement	Source of energy	Fuel used	Quantity
1.	60 KW	UPPL	-	-
2.	DG Set (100 KVA) Standby	DG Set	HSD	6 Ltr/Hr.
3.	Steam Boiler (1Tonnes)	New	Biomass	100Kg/Hr

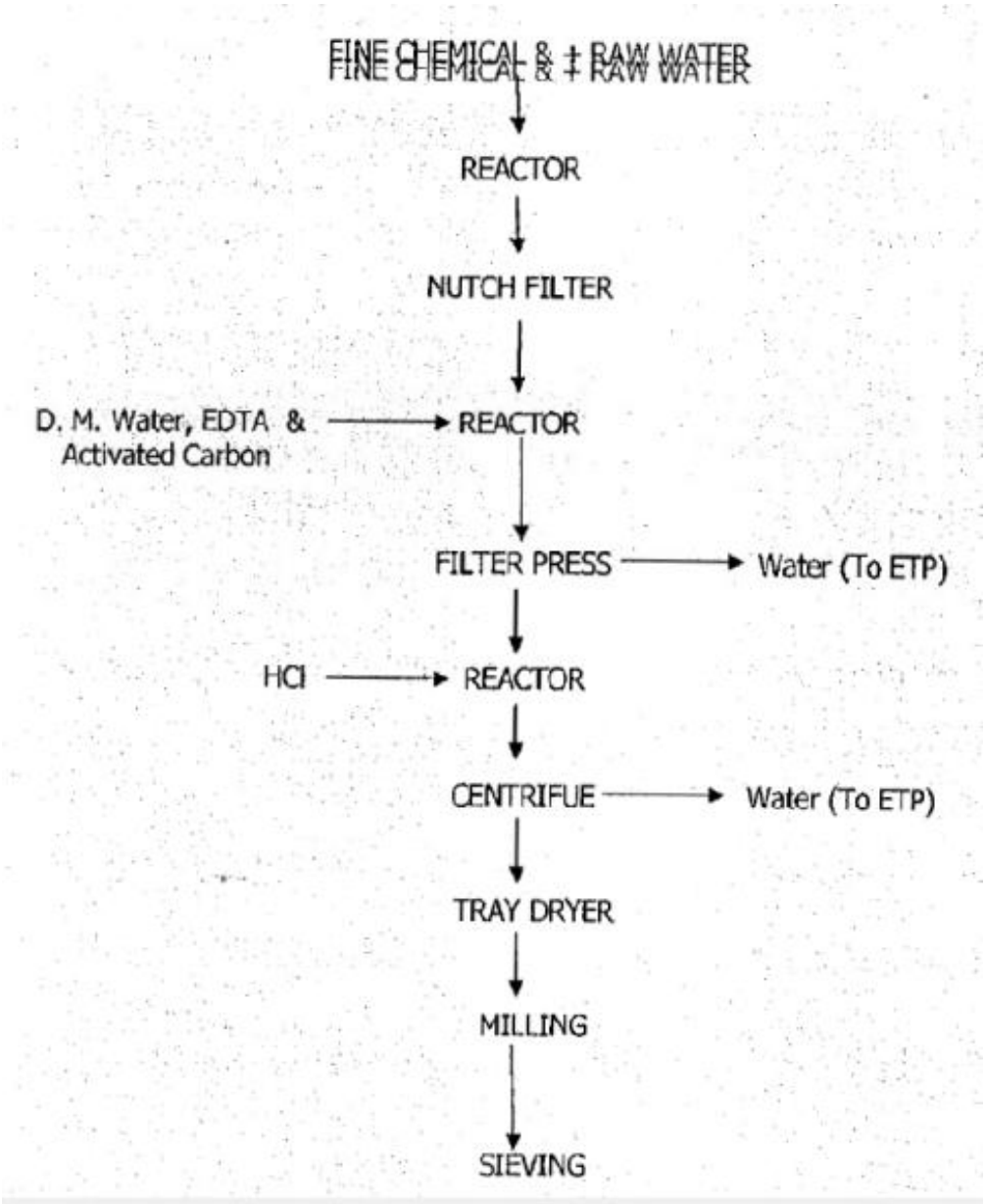

Fig No. 1.0 Process flow diagram

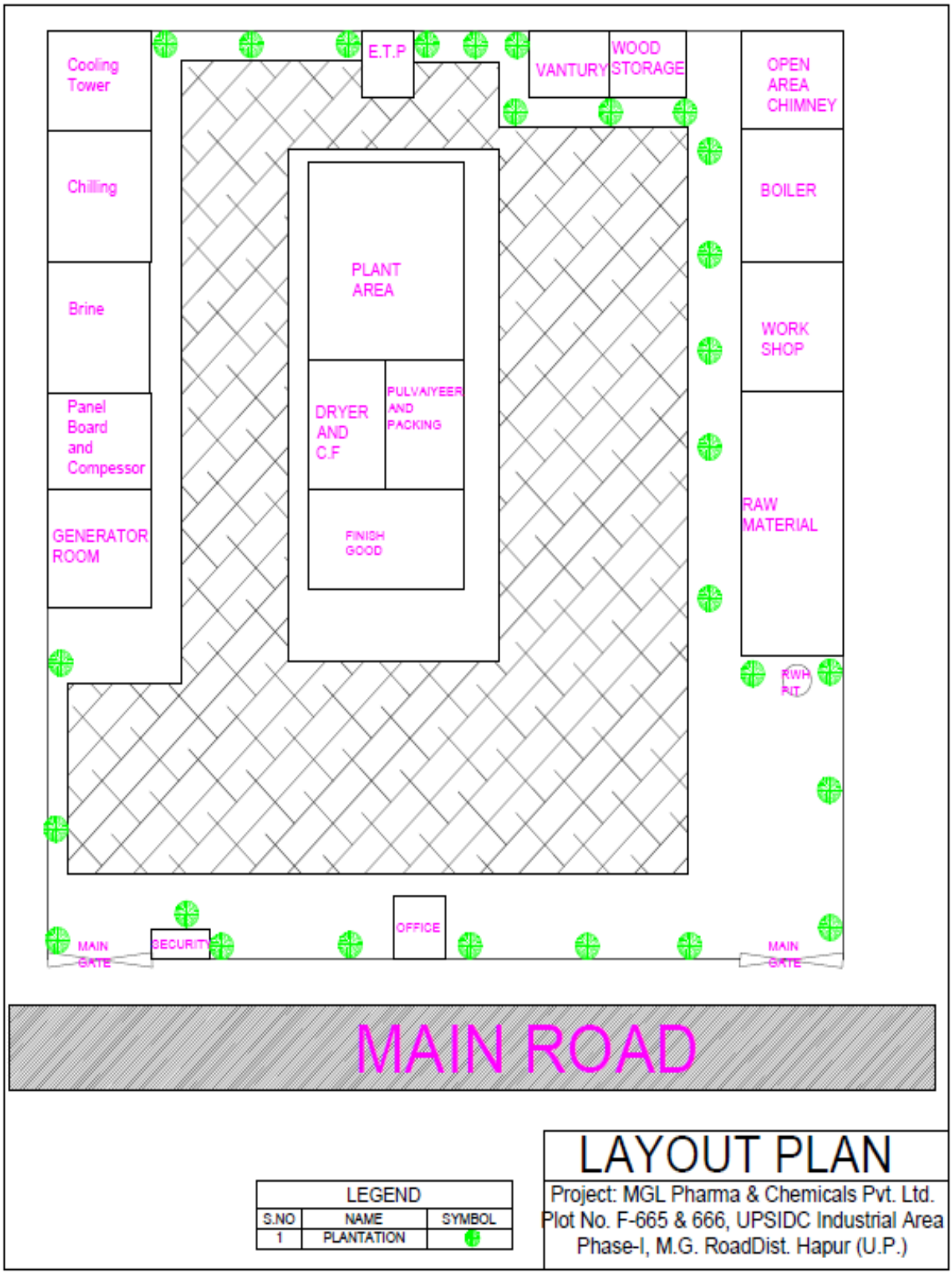

Fig1.2: Plant Layout

Fig1.3: Site Photograph

5.0 Risk Assessment

5.1 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.

5.2 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.

5.2.1 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

5.2.2 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

6.0 Hazard Identification & Risk Assessment (HAZID-HIRA)

The Ferro alloy manufacturing industry is intensive and uses large scale and potentially hazardous manufacturing processes. Some examples of such hazards likely to occur in proposed

Project activity includes *Induction Furnace, Uncontrolled reaction in the reaction vessel, at M/s MGL Pharma & Chemicals Pvt Ltd are given below.*

These mainly impact on those working within the industry, although health hazards can also impact on local communities.

- ✓ Fire & Explosion
- ✓ Physical Hazards due conveyor system, material handling
- ✓ Fugitive Dust of Raw Material Handling at charging bay, storage yard,
- ✓ Collapse of Structures/Fall of Material, stacking failure
- ✓ Loading/ Unloading failures
- ✓ Electrocution/ Electrical Hazards
- ✓ Accidental Spillage of hot molten metal
- ✓ Metal dust & fumes exposure

6.1 Thermal radiation

Table 1.3 Enlists damage consequences due to different Heat Loads are given below:

Table 1.3
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% lethality in 10 sec
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.*			

6.2 Physical Hazards onsite

- ✓ Accident due to Conveyor feeding system
- ✓ Slip/Trip/ Fall due to improper stacking of material

- ✓ Contact with Hot molten metal

6.3 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

6.4 D.G Set area

- ✓ Fire in Oil HSD storage yard
- ✓ Contact with
- ✓ Equipment resulting
- ✓ burns or electric shock
- ✓ Leaking fuel causing
- ✓ fire or slipping hazard
- ✓ Burns from contact with hot engine
- ✓ Air Pollution

6.5 Reaction vessel area

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

6.6 Chemical Exposure

Standard System for the Identification of the Hazards of Materials for Emergency Response" is 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 1.4

NFPA 704: Hazaradous Material Classification

Sl. No.	Material Handled	NFPA Classification
Product Material		
1.	Diclofenace	**Health: 3** **Flammability: 1** **Reactivity: 0**
2.	Aceclofenace	**Health: 1** **Flammability: 2** **Reactivity: 0**
3.	3-Nitro Acetophenone	**Health: 0** **Flammability: 0** **Reactivity: 0**
Other Chemicals		
4.	Sulfuric Acid	**Health: 3** **Flammability: 0** **Reactivity: 2**
5.	Nitric Acid	**Health: 4** **Flammability: 0** **Reactivity: 0**
6.	Toluene	**Health: 2** **Flammability: 3** **Reactivity: 0**
7.	Methanol	**Health: 1** **Flammability: 3** **Reactivity: 0**
8.	Acetophenone	**Health: 1** **Flammability: 2** **Reactivity: 0**

9.	2,6 Dichloro phenol	**Health: 3** **Flammability: 0** **Reactivity: 0**
10.	Pottasium Carbonate	**Health: 2** **Flammability: 0** **Reactivity: 0**
11.	Aniline	**Health: 3** **Flammability: 2** **Reactivity: 0**
12.	Alluminium Chloride	**Health: 3** **Flammability: 0** **Reactivity: 0**
13.	Hydro chloric Acid	**Health: 3** **Flammability: 0** **Reactivity: 1**
14.	Caustic Potash	**Health: 1** **Flammability: 0** **Reactivity: 0**
15.	EDTA	**Health: 1** **Flammability: 1** **Reactivity: 0**
16.	N-Dimethyl Amine	**Health: 3** **Flammability: 4** **Reactivity: 0**
17.	Tert Butyl Alcohol	**Health: 1** **Flammability: 3** **Reactivity: 0**
18.	Chloro Acetyl Chloride	**Health: 3** **Flammability: 0**

		Reactivity: 1
19.	Formic acid	**Health: 3** **Flammability: 2** **Reactivity: 0**

6.7 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)

Earthquake

The Hapur District of Uttar Pradesh area falls under the seismic zone-IV, This zone is called the High Damage Risk Zone and covers areas liable to MSK VIII. The IS code assigns zone factor of 0.24 for Zone 4. may trigger into a technological disaster, includes collapse of structures, buildings leading to fire and explosion. Earthquake cannot usually be forecasted and therefore precautions immediately prior to such event are not usually possible. Earthquake zonation map is given below in **Fig No: 1.3.**

Major Earth Quake History in near by area

A. 10th October 1956; Bulandshar District (Uttar Pradesh), 6.2 (IMD).

   No fatalities were reported. The shock was also strongly felt at Delhi, where there was some minor damage.

B. 15 July 1720;

   The last major earthquake in the New Delhi region. Heavy damage in the city.

C. 10 Oct 1956; Bulandshar District (Uttar Pradesh),6.2 (IMD)

   One of the most powerful earthquakes in Uttar Pradesh struck the districts of western Uttar Pradesh at 21:01 IST. The massive shock was centred near jehangirpur in Bulandshar District. No fatalities were reported. The shock was also strongly felt at Delhi, where there was minor damage.

D. 15 September 1966; South of Moradabad, (Moradabad-Rampur Districts), 5.8

E. 29th March 1999; Near Gopeshwar (Chamoli District), Mw 6.5 (HRV) at 19:05, 115

   people killed in the Gharwal region. The quake was felt very strongly in UttarPradesh, Chandigarh, Delhi and Haryana. In Haryana, one person was killed in the city of Ambala and 2 at Nakodar in the neighboring state of Punjab. Minor damage to buildings in New Delhi, most significantly in Patparganj. Minor damage also reported from Chandigarh.

F. 18 October 2007; Gautambudhnagar, Uttar Pradesh, M 3.6 at 11:24 AM, A mild earthquake struck the district of Gautambudhnagar in western Uttar Pradesh. Caused minor damage in the epicentral region.

Fig No: 1.3. 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 1.5.** 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, nonperishable food, 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 getseparated 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 contactperson/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.
- ✓ Kutchha buildings can also be retrofitted and strengthened.

During quake:

- ✓ 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 causeserious 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 quake:

- ✓ 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 doorscautiously.
- ✓ 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), developa plan for reuniting after the disaster. Ask an out of state / district relative or friend toserve 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 1.5

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. • Restoring transport routes • Take head count • Activate emergency plan as situation demands • Assess damage	Main Controller, Incident Controller, Site Incident Controller, , Coordinators – Fire & Security, Safety, Material and Medical

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.

Flood

Of the various natural disasters floods are the most commonly occurring in Uttar Pradesh, affecting almost every year some part of the state or the other. Important rivers, which create floods in the State, are the Ganga the Yamuna, the Ramganga, the Gomti, the Sharda, the Ghaghra, the Rapti and the Gandak. The Ganga River basin of U.P. experiences normal rainfall in the region .from 60 cm to 190 cm of which more than 80% occur during the southwest monsoon. The rainfall increases from west to east and from south to north .Similar is the pattern of floods, the problem increases from west to east and south to north. Out of the 240.93 lakh hectares geographical area of the State about 73.06 lakh hectares is flood prone. As per the Irrigation Department's estimate, only 58.72 lakh can actually be protected. Up to March 2004, Only 16.01 lakh hectares has been protected.Flood Zonation Map of Uttar Pradesh are given below **in Fig No.1.4.**

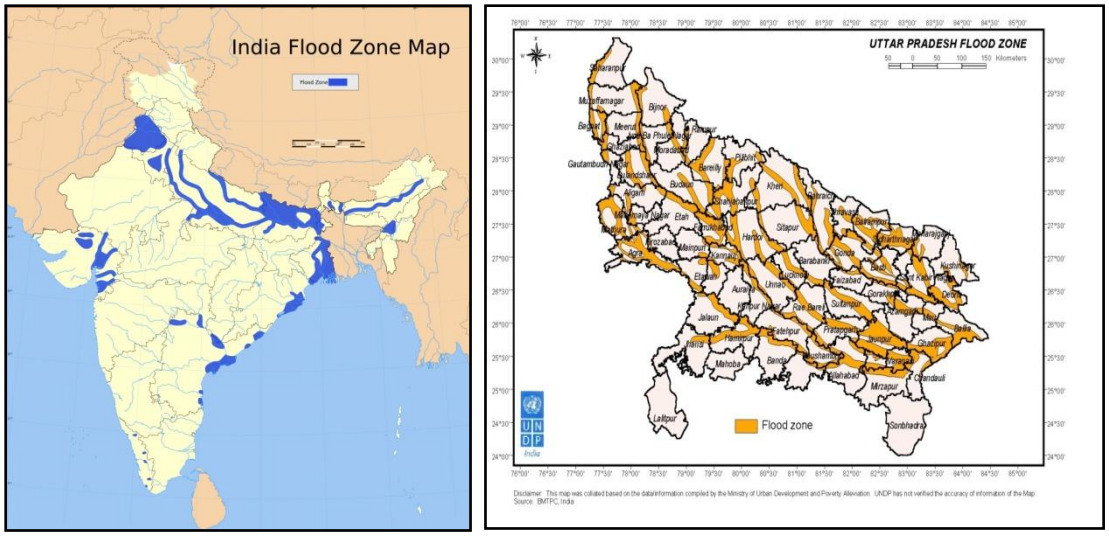

Fig No: 1.4. Earth Quake Zonation Map

Drought

Drought is another major disaster affecting the State of Uttar Pradesh. The State produces about 21 percent of all food grains of the country, and hence is agriculturally an important State. The total sown area is 25.30 million ha out of which, 17.69 million ha. is irrigated area.(66% is irrigated). Of the irrigated area, canals contribute about 25%, tube wells about 67% and ponds, lakes etc. the remaining. Thus one third of the irrigated area and the entire extent of rain fed area in the State is dependent on monsoon rains. The recharge of groundwater through rains accounts about 80 % of total recharge. The monsoon rain accounts 70-80% of the total rainfall in a year in our region. The State of U.P. has been divided into two meteorological sub-divisions, viz. U.P. East, and U.P. West. The recurrence period of highly deficient rainfall in East U.P. has been calculated to be 6 to 8 years whereas in West U.P. it is 10 years. The annual loss due to drought in the State varies depending on the severity of the drought. In the recent years, the year 2002, & 2004 were severe in terms of drought, with loss to crop, livestock and property assessed at Rs.7540 crores and Rs. 7292 crores respectively.

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.

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 takes place on the roads which goes from Balaghat to Gondia , Seoni, Baiher and the state highways and other roads. So, to cope with such disasters in the future some safety measures must be followed**.**

Naxalism

It is one of the organizations of aggressive communists. Naxalites enter Balaghat from Rajnandgaon border in M.P. and from Bhandara border in Maharastra. In Balaghat and Rajnandgaon district there are mainly tribal villages and villagers are of 'Gond' & 'Baiga' tribe. The villages covered by naxalites are located in dense forest area where the communication and transportation facilities are very poor. The District has a thick forest area and a tough terrain. (*source :Balaghat District Disaster Management Plan*)

7.0 General Recommendations for M/s. MGL Pharma & Chemicals Pvt Ltd

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.

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.

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 1.9

General Recommendation for Fire Fighting Facilities onsite

Sl 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 water reactive)

Personal Protective Equipment (PPE)

Personal Protective equipments kept onsite are made readily available to plant personnel. **Table1 .10** shows the lists of recommended Personal Protective equipments (PPE) onsite.

Table 1.10

Summary of Recommended Personal Protective Equipment According to Hazard

	Workplace Hazards	Suggested PPE

	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 cords	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	➢ Facemasks with appropriate filters for dust removal and air purification (chemical, mists, vapors and gases). ➢ Single or multi-gas personal monitors, if available
	Oxygen deficiency	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

8.0 Occupational Health & Safety at M/s. MGL Pharma & Chemicals Pvt Ltd

***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 1.11
Summary of Material Handled, Firefighting & Personal Protective Equipment According to Type of Hazard

Sl. No	Material Handled	Type of Hazard	Fire fighting	Personal Protection equipments and Precautions
Product Material				
i.	**Diclofenac**	**Potential Acute Health Effects:** Very hazardous in case of skin	**May be combustible at**	**Personal Protection:** Splash goggles. Lab coat.

Sl. No	**Material Handled**	**Type of Hazard**	**Fire fighting**	**Personal Protection equipments and Precautions**
		contact (irritant), of ingestion. Hazardous in case of eye contact (irritant), of inhalation. Slightly hazardous in case of skin contact (sensitizer, permeator). Severe over-exposure can result in death. **Potential Chronic Health Effects:** toxic material may produce general deterioration of health by an accumulation in one or many human organs**.**	**high temperature** **SMALL FIRE:** Use DRY chemical powder**.** **LARGE FIRE:** Use water spray, fog or foam. Do not use water jet.	Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. **Personal Protection in Case of a Large Spill:** Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.
ii.	**Acelofenace** *Store away from direct sunlight. When heated to decomposition it emits acrid smoke and fumes***.**	**Potential Acute Health Effects:** Very hazardous in case of eye contact (irritant). Hazardous in case of skin contact (irritant). Slightly hazardous in case of ingestion, of inhalation. Inflammation of the eye is characterized by redness, watering, and itching. **Potential Chronic Health Effects:** Very hazardous in case of eye contact (irritant). Hazardous in case of skin contact (irritant). Slightly hazardous in case of	**Combustible.** **SMALL FIRE: Use** DRY chemical powder. **LARGE FIRE:** Use water spray, fog or foam. Do not use water jet.	Splash goggles. Full suit. Boots. Gloves. Protective clothing .

Sl. No	**Material Handled**	**Type of Hazard**	**Fire fighting**	**Personal Protection equipments and Precautions**
		ingestion, of inhalation.		
iii.	**3-Nitro Acetophenone**	**This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies**	Water spray. Carbon dioxide (CO2). Dry chemical. chemical foam	As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear
Other Chemicals				
iv.	**Sulfuric Acid** *Hygroscopic. Strong oxidizer. Reacts violently with water and alcohol especially when water is added to the product*	**Potential Acute Health Effects:** Very hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (irritant, corrosive), of ingestion, of inhalation. Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening,or, occasionally, blistering. **Potential Chronic Health Effects:** **CARCINOGENIC EFFECTS:**	**Non-flammable** **Not applicable**	Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product.

Sl. No	Material Handled	Type of Hazard	Fire fighting	Personal Protection equipments and Precautions
		Classified 1 (Proven for human.) by IARC, + (Proven.) by OSHA. Classified A2 (Suspected for human.) by ACGIH.		
v.	**Nitric Acid**	**Potential Acute Health Effects:** Very hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (irritant, corrosive), of ingestion, . Slightly hazardous in case of inhalation (lung sensitizer). Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Prolonged exposure may result in skin burns and ulcerations. Over-exposure by inhalation may cause respiratory irritation. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering. **Potential Chronic Health Effects:** The substance may be toxic to	**Non-flammable.**	**Personal Protection:** Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots. **Personal Protection in Case of a Large Spill:** Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product.

Sl. No	Material Handled	Type of Hazard	Fire fighting	Personal Protection equipments and Precautions
		lungs, mucous membranes, upper respiratory		
vi.	Toluene	**Potential Acute Health Effects:** Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator). **Potential Chronic Health Effects:** The substance may be toxic to blood, kidneys, the nervous system, liver, brain, central nervous system (CNS).Repeated or prolonged exposure to the substance can produce target organs damage	**Flammable** Flammable liquid, insoluble in water. **SMALL FIRE:** Use DRY chemical powder. **LARGE FIRE:** Use water spray or fog	**Personal Protection:** Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. **Personal Protection in Case of a Large Spill:** Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product.
vii.	Metahnol	**Potential Acute Health Effects:** Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator). Severe over-exposure can result in death. **Potential Chronic Health Effects:** Slightly hazardous in case of skin contact (sensitizer). The substance is toxic to eyes. The substance may be toxic to blood, kidneys, liver, brain, peripheral nervous system, upper respiratory tract, skin, central nervous system (CNS),	**Flammable** **Flammable liquid, soluble or dispersed in water.** **SMALL FIRE:** Use DRY chemical powder. **LARGE FIRE:** Use alcohol foam, water spray or fog	**Personal Protection:** Splash goggles. Lab coat. Vapor respirator. **Personal Protection in Case of a Large Spill:** Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product.

Sl. No	Material Handled	Type of Hazard	Fire fighting	Personal Protection equipments and Precautions
		optic nerve. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs		
viii.	**Acetophenone**	**Potential Acute Health Effects:** Very hazardous in case of eye contact (irritant). Hazardous in case of skin contact (irritant). Slightly hazardous in case of ingestion, of inhalation. Inflammation of the eye is characterized by redness, watering, and itching. **Potential Chronic Health Effects:** Very hazardous in case of eye contact (irritant). Hazardous in case of skin contact (irritant). Slightly hazardous in case of ingestion, of inhalation.	**Combustible** **SMALL FIRE**: Use DRY chemical powder. **LARGE FIRE**: Use water spray, fog or foam. Do not use water jet	Splash goggles. Lab coat. Gloves. **Personal Protection in Case of a Large Spill:** Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.
ix.	**2,6 Dicholoro Phenol**	Causes burns by all exposure routes. Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation	Water spray. Carbon dioxide (CO2). Dry chemical. chemical foam	Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Sl. No	Material Handled	Type of Hazard	Fire fighting	Personal Protection equipments and Precautions
				Wear appropriate protective gloves and clothing to prevent skin exposure
x.	**Potassium Carbonate**	**Potential Acute Health Effects:** Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of eye contact (corrosive). **Potential Chronic Health Effects:** The substance is toxic to mucous membranes. The substance may be toxic to skin, eyes. Repeated or prolonged exposure to the substance can produce target organs damage	**Non-flammable**	**Personal Protection:** Splash goggles. Lab coat. Dust respirator. **Personal Protection in Case of a Large Spill:** Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product.
xi.	**Aniline**	**Potential Acute Health Effects:** Hazardous in case of skin contact (irritant, permeator), of eye contact (irritant), of ingestion, of inhalation. Severe overexposure can result in death**.** **Potential Chronic Health Effects:** Slightly hazardous in case of skin contact (sensitizer). CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH. 3.Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast.	**Combustible** **SMALL FIRE:** Use DRY chemical powder. **LARGE FIRE:** Use water spray, fog or foam. Do not use water jet	**Personal Protection**: Splash goggles. Lab coat. Vapor respirator. **Personal Protection in Case of a Large Spill:** Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product.

Sl. No	**Material Handled**	**Type of Hazard**	**Fire fighting**	**Personal Protection equipments and Precautions**
		The substance may be toxic to blood, kidneys, liver, bladder, spleen, cardiovascular system, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.		
xii.	**Aluminium Chloride**	**Potential Acute Health Effects:** Very hazardous in case of skin contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive), of eye contact (irritant). The amount of tissue damage depends on length of contact. Eye contact can result in corneal damage or blindness. Skin contact can produce inflammation and blistering. Inhalation of dust will produce irritation to gastro-intestinal or respiratory tract, characterized by burning, sneezing and coughing. Severe over-exposure can produce lung damage, choking, unconsciousness or death. **Potential Chronic Health Effects:** The substance is toxic to lungs, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure of the eyes to a low level of dust can produce eye irritation.	**Non-flammable**	**Personal Protection**: Splash goggles. Synthetic apron. Vapor and dust respirator. **Personal Protection in Case of a Large Spill:** Splash goggles. Full suit. Vapor and dust respirator. Boots. Gloves. A self contained breathing apparatus.

Sl. No	Material Handled	Type of Hazard	Fire fighting	Personal Protection equipments and Precautions
		Repeated skin exposure can produce local skin destruction, or dermatitis. Repeated inhalation of dust can produce varying degree of respiratory irritation or lung damage. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs		
xiii.	**HCL**	**Potential Acute Health Effects:** Very hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (irritant, corrosive), of ingestion, . Slightly hazardous in case of inhalation (lung sensitizer). Non-corrosive for lungs. Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing**,** choking, or shortness of breath. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally,	**Non-flammable**	**Personal Protection:** Face shield. Full suit. Vapor respirator. **Personal Protection in Case of a Large Spill:** Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product.

Sl. No	Material Handled	Type of Hazard	Fire fighting	Personal Protection equipments and Precautions
		blistering. **Potential Chronic Health Effects:** Slightly hazardous in case of skin contact (sensitizer). CARCINOGENIC EFFECTS: Classified 3 . The substance may be toxic to kidneys, liver, mucous membranes, upper respiratory tract, skin, eyes, Circulatory System, teeth.		
xiv.	**Caustic potash**	**Potential Acute Health Effects:** Very hazardous in case of skin contact (corrosive, irritant), of eye contact (irritant, corrosive), of ingestion, of inhalation. The amount of tissue damage depends on length of contact. Eye contact can result in corneal damage or blindness. Skin contact can produce inflammation and blistering. **Potential Chronic Health Effects:** The substance may be toxic to upper respiratory tract, skin, eyes. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure of the eyes to a low level of dust can produce eye irritation. Repeated skin exposure can produce local skin destruction, or dermatitis. Repeated inhalation	**Non-flammable.**	**Personal Protection:** Splash goggles. Synthetic apron. Vapor and dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. **Personal Protection in Case of a Large Spill:** Splash goggles. Full suit. Vapor and dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product.

Sl. No	Material Handled	Type of Hazard	Fire fighting	Personal Protection equipments and Precautions
		of dust can produce varying degree of respiratory irritation or lung damage		
xv.	**EDTA**	**Potential Acute Health Effects:** Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. **Potential Chronic Health Effects:** The substance may be toxic to upper respiratory tract, skin, eyes. Repeated or prolonged exposure to the substance can produce target organs damage	**May be combustible at high temperature** **SMALL FIRE:** Use DRY chemical powder. **LARGE FIRE:** Use water spray, fog or foam. Do not use water jet.	**Personal Protection** Safety glasses. Lab coat. Dust respirator. **Personal Protection in Case of a Large Spill:** Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product.
xvi.	**N-Dimetyl Amine**	**Potential Acute Health Effects:** Very hazardous in case of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (irritant). **Potential Chronic Health Effects:** Very hazardous in case of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (irritant). Non-sensitizer for skin.	**Flammable** Flammable liquid, soluble or dispersed in water. **SMALL FIRE:** Use DRY chemical powder. **LARGE FIRE:** Use alcohol foam, water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion	**Personal Protection**: Splash goggles. Lab coat. Vapor respirator. **Personal Protection in Case of a Large Spill:** Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product.

Sl. No	Material Handled	Type of Hazard	Fire fighting	Personal Protection equipments and Precautions
xvii.	**Tert Butanol**	**Potential Acute Health Effects:** Hazardous in case of skin contact (irritant, permeator), of eye contact (irritant), of ingestion, of inhalation. **Potential Chronic Health Effects:** prolonged exposure is not known to aggravate medical condition	**Flammable** Flammable liquid, soluble or dispersed in water. **SMALL FIRE:** Use DRY chemical powder. **LARGE FIRE:** Use alcohol foam, water spray or fog	**Personal Protection**: Splash goggles. Lab coat. Vapor respirator. **Personal Protection in Case of a Large Spill:** Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product.
xviii.	**Chloro Acetyl Chloride**	**Potential Acute Health Effects:** Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation (lung irritant). Corrosive to skin and eyes on contact. Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. **Potential Chronic Health Effects:** The substance may be toxic to eyes, central nervous system (CNS), ears, nose/sinuses, throat. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray	**May be combustible at high temperature**	**Personal Protection**: Splash goggles. Lab coat. Vapor respirator. **Personal Protection in Case of a Large Spill:** Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product.

Sl. No	Material Handled	Type of Hazard	Fire fighting	Personal Protection equipments and Precautions
		mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection		
xix.	**Formic Acid**	**Potential Acute Health Effects:** Very hazardous in case of skin contact (irritant), of eye contact (irritant, corrosive), of ingestion, . Hazardous in case of skin contact (corrosive, permeator). Slightly hazardous in case of inhalation (lung sensitizer). Non-corrosive for lungs. Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath**.** Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.	**Combustible** **SMALL FIRE:** Use DRY chemical powder. **LARGE FIRE**: Use water spray, fog or foam. Do not use water jet.	**Personal Protection**: Splash goggles. Lab coat. Vapor respirator. **Personal Protection in Case of a Large Spill:** Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product.

M/s. MGL Pharma & Chemicals Pvt Ltd. will adopt suitable measures for the proper occupational health safety of workers complying to OSHA standards. Permissible Exposure Level (PEL) of various Materials Handled onsite are listed below in **Table No 1.12**

- 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 1.12
PEL level Summary of Hazardous chemicals handled At M/s. MGL Pharma & Chemicals Pvt Ltd

SL No.	Chemical Name	OSHA PEL	Cal/OSHA PEL	NIOSH REL	ACGIH
		Mg/m3	8-hour TWA (ST) STEL (C) Ceiling Mg/m3	Up to 10-hour TWA (ST) STEL (C) Ceiling Mg/m3	TLV
1.	Sulfuric Acid		1 (mg/m3)		3 (mg/m3)
2.	Nitric Acid	2ppm	4ppm		4 (ppm)
3.	Toleuene		300ppm	560ppm	50 ppm
4.	Methanol		200 ppm	250ppm	250ppm
5.	Aniline	19mg/m3	5 mg/m3		7.6 mg/m3
6.	HCL		5 (ppm)	5ppm	
7.	Di methyl Amine				10ppm
8.	Ter Butanol		300 mg/m3	450 mg/m3	300 mg/m3
9.	Choro Acetyl chloride			0.05ppm	0.5 ppm

SL No.	Chemical Name	OSHA PEL	Cal/OSHA PEL	NIOSH REL	ACGIH
		Mg/m3	8-hour TWA (ST) STEL (C) Ceiling Mg/m3	Up to 10-hour TWA (ST) STEL (C) Ceiling Mg/m3	TLV
10.	Formic Acid		5 ppm	5ppm	10ppm
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 pre placement 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 1.13

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 heath status of workers with special reference to Occupational Health and Safety.

Annual report of health will be reviewed for M/s. MGL Pharma & Chemicals 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.

9.0 DISASTER MANAGEMENT PLAN

9.1 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.

9.2 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 1.14
Identified Disaster Scenario at MGL Pharma & Chemicals Pvt Ltd

#	Name of possible Hazard and Emergency	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

3.	Fire & smoke	Fire in storage tank	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

9.3 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 Organograms 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

9.4 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.3

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.

9.5 KEY ELEMENTS

9.5.1 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

9.5.2 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)

9.5.3 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.

9.6 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

9.6.1 Disaster control Management system at M/s. MGL Pharma and Chemicals Pvt Ltd

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

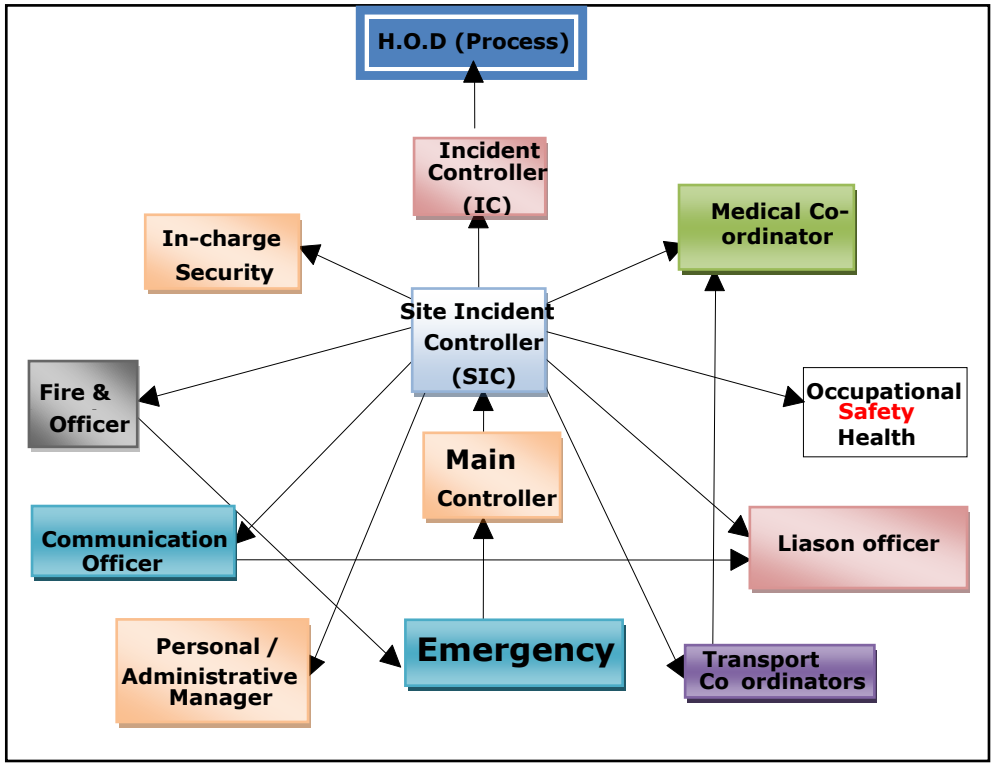

Fig.1.5: Onsite DMP - Disaster Control / Management System

9.6.2 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

9.6.3 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
- Incharge (Security)
- Incharge (Medical)
- Shift Incharge (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.

Incharge (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

Incharge - Security

- ✓ The Incharge (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.

9.6.7 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.

9.6.8 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.

9.6.9 Fire Station

The following equipment will be provided in the fire posts.

- ✓ Water tender
- ✓ Foam tender
- ✓ Portable pump
- ✓ Wireless set

- ✓ Hoses
- ✓ Hot line telephone

9.6.10 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.

9.6.11 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.

9.6.12 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.

9.6.13 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.

9.6.14 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

9.7 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.1.6.**

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.

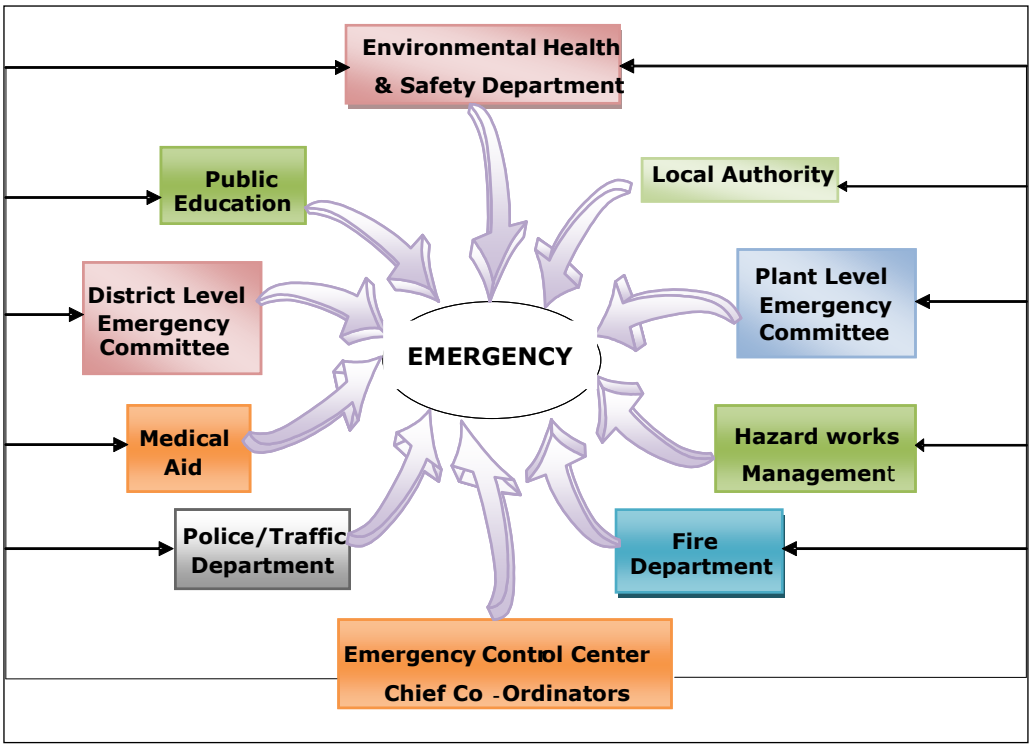

Fig. 1.6: Various Organizations Involved During Emergency

9.7.1 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.

9.7.2 Communications

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

9.7.3 Special Emergency Equipment

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

9.7.4 Voluntary Organizations

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

9.7.5 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

9.7.6 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.

9.7.7 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.

9.7.8 Humanitarian Arrangements

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

9.7.9 Public Information

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

9.7.10 Assessment

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

9.7.11 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.

9.7.12 Role of police

The police is 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 ECC

9.7.13 Role of Fire Brigade

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

9.7.14 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

9.7.15 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 equipments
- ✓ Securing assistance of medical and paramedical personnel from nearby hospitals/institutions
- ✓ Temporary mortuary and identification of dead bodies

10.0 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.MGL Pharma & Chemicals Pvt Ltd, Dist-Hapur, Uttar Pradesh 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.