Risk Assessment and Disaster Management Plan

Expansion of Viscose Staple Fibre
in existing plant premises
At
Plot No. 1, GIDC Industrial Area, Vilayat, Taluka: Vagra, District: Bharuch (Gujarat)

M/s. Grasim Industries Ltd.
(Grasim Cellulosic Division)

Risk Assessment Report

1.0 RISK ASSESSMENT AND DISASTER MANAGEMENT PLAN

1.1 Risk Assessment and Damage Control

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

Accidental risk involves the occurrence or potential occurrence of some accident consisting of an event or sequence of events resulting into fire, explosion or toxic hazards to human health and environment.

1.2 Hazard Identification & Preventive Measures

Identification of hazards is an important step in Risk Assessment as it leads to the generation of accidental scenarios. The merits of including the hazard for further investigation are subsequently determined by its significance, normally using a cut-off or threshold quantity. Following hazards may occur:

- Fire
- Explosion
- Accidental Spillage or Leak of Hazardous (Flammable, Toxic) Chemicals & Gases
- Contact with Flammable Toxic Chemicals and Gases
- Loading/ Unloading /Packaging Operations failures
- Electrocution/ Electrical Hazards.

Table - 1

Possible Hazardous Locations Onsite

S. No.	Hazardous Area	Likely Accident
1.	CS_2 storage area	Toxic & Flammable
2.	Caustic Storage Area	Toxic
3.	Sulfuric Acid Storage area	Toxic /Reactive
4.	Coal/ fuel storage area	Fire and spillage
5.	Boiler Area	Explosion
6.	Electrical rooms	Fire and electrocution
7.	Turbine room	Explosion
8.	Transformer area	Fire and electrocution
9.	Cable tunnel	Fire and electrocution
10.	Storage yard	Sliding/fall of material
11.	Crushing and grinding of Coal	Fatal accident
12.	Chimney/Stacks	Air pollution

1.2.1 SO_2 Emission from Stack Gases

Location: ACID Plant / Genosorb Plants

Causes:

1. Leakage from pipeline / equipments.
2. Conversion Failure during start up (Process disturbance)

Emergency Planning:

a) Stop the acid plant immediately as per the set emergency procedure.
b) Remove the affected persons immediately to fresh air.
c) SO_2 scrubbing system is to be commissioned before restarting the plant.
d) Alkali solution of scrubber should be maintained at pH > 9.0.
e) Continuous water makeup should be maintained in circulation tank.
f) Person approaching the area should use gas mask, breathing apparatus if required. Use of wet cloth may also help.
g) Plant is to be restarted with low sulphur feed and less air pressure (volume).

Method of control:

a) Process temperatures are recorded hourly.
b) Visual inspection of proper sulfur burning inside furnace.
c) Sulfur metering is installed for feeding metered quantity of sulphur.
d) Alkali scrubber pH monitoring more than 9.

1.2.2 SO_2 Emission due to Fire in Sulphur Pit

Location: CS2 /Acid plant

Cause:

1. High steam pressure.
2. Combustible materials (as plastic / polythene bags) in sulphur being fed.

Emergency Planning:

a) Area is to be evacuated by shift engineer / Incident controller seeing the wind direction.
b) Inform Safety & Fire fighting department.
c) In the mean time water to be sprayed using nearby water taps.
d) Stop steam supply to sulphur pit.
e) Fire fighting personnel to start fire fighting seeing the wind direction.
f) Remove the affected persons to fresh air & provide first aid if required.

Method of control:

a) Temperature indicators are provided.
b) Water taps are provided nearby.
c) Fire Hydrant System is installed

1.2.2.1 H_2S Gas leakage from service lines.

Location: CS_2 Plant

Causes:

1. Pipeline leakage due to corrosion

Emergency Planning

a) Stop Natural gas & sulphur feed to reactor.
b) Leaking lines to be isolated & flushed with water.
c) Area to be evacuated & persons approaching the area should use gas masks / Breathing Apparatus.
d) Persons affected should be given artificial respiration and first aid if required.
e) Damaged pipeline to be replaced immediately.

Method of control

a) All H_2S pipelines are of SS material
b) Pipelines are welded to safeguard leakage from flanges (minimum flanges are used)

1.2.2.2 Acid / Caustic leakage from storage tank & Pipeline:

Location: Acid Plant, Viscose, Auxiliary and WTP / ETP, Pipe racks.

Causes:

1. Damage to tank body / supply pipeline.

Emergency Planning:

a) Area is to be evacuated immediately and cordoned off.
b) Any person approaching the area should use safety apron, gumboot, and safety goggles.
c) Chemical should be transferred to another tank kept empty for emergency.
d) Dyke should be emptied out with the help of recovery / sump pump.
e) First Aid should be given to affected persons.

Method of control:

a) Dyke of adequate capacity has been provided.
b) One tank is always kept empty for transfer.

1.2.2.3 Acid leakage from acid circulation tanks

Location: Acid Plant

Emergency Planning:

a) Stop the acid plant immediately and transfer acid from circulation tank to storage tank up to minimum possible level.
b) Area is to be cordoned off.
c) Area is to be washed with water.

d) Injured persons affected area should be bathed with plenty of water and then should be sent to hospital.

1.2.2.4 CS_2 leakage from CS_2 Storage tanks

Location: CS2 Plant

Causes:

1. Corrosion in storage tanks.

Emergency Planning:

a) Fire fighting personnel shall be called immediately.
b) CS_2 tank, which has developed leak, is to be immediately depressurized and isolated from incoming and outgoing lines.
c) Water to be sprayed continuously over the tank using nearby water monitors.
d) Area is to be cordoned off.
e) CS_2 in the leaking tank is to be transferred to an empty tank kept for such emergency.
f) Persons approaching the area should use safety gears as Safety goggles, hand gloves, and gumboot.

Method of control:

a) Sump dyke is always kept full of water.
b) One CS2 tank is always kept empty for such emergency.
c) Corrosion resistant paint is used.
d) No welding / cutting work permitted within 20 m radius of the tank farm.
e) Regular testing of tanks is carried out by NDT and records maintained.

1.2.2.5 Eventuality in Xanthation Section

Location: Viscose Department

A) Splashing of CS2 on the floor:

Causes:

1. Leakage from any Pipelines or dislocation of level tube of measuring vessel.

Emergency Plan:

a) Operate the emergency tripping switch to cut off CS2 supply from Cs2 department.
b) Inform to Safety & fire fighting department.
c) Wash the floor with a water jet liberally.
d) Suspend welding / gas cutting work in complete viscose department.

B) Fire or Explosion

Emergency Plan:

a) Stop the work in the section.
b) Move to a safer place as directed by Incident Controller.

c) Operator the emergency tripping switches available in HOD's office to cut off supply of CS2 from CS2 department.

d) Inform to Fire fighting department immediately.

Method of control:

a) Emergency CS2 tripping switch made available in HOD's office.

b) All electrical fittings installed in xanthator section are flame proof.

c) Sprinkler system provided.

d) Rupture disc provided.

e) Additional CS2 overflow tank provided with double safety alarm.

1.2.2.6 H_2S/CS2 Gas leakage:

Location: Auxiliary dept. (Spin Bath area), Spinning dept. (Machine area)

Causes:

1. Power Failure
2. Circulation pumps tripping.
3. Exhaust Fan Tripping.

Emergency Planning

a) Area to be evacuated & persons approaching the area should use Breathing Apparatus.

b) Persons affected should be given artificial respiration and first aid if required.

c) Use Breathing Apparatus Set for emergency operation like closing Valve, Provide Damper in exhaust line and start up stand by exhaust fan/pumps.

d) Close the Top tank feed line valve, MSFE return line valve, spin bath filter feed valve.

e) All hot job activity in section should be stopped for prevention of fire.

f) Use PPE's like rubber hand gloves, goggles and gumshoes for avoiding body contact of spin bath.

Method of control

a) Close the Top tank feed line valve, MSFE return valve, spin bath filter feed valve with the use of BA set.

b) Spin bath overflow tank should be kept empty in idle condition.

c) Provide damper in exhaust line for isolated from other M/C exhaust gas.

1.2.2.7 Fire:

Location: Anywhere in plant area (A, B, C & D type)

Emergency Planning

a) Area to be evacuated immediately & persons approaching the area should use Breathing Apparatus.

b) Inform Fire control Centre with complete details, e.g. location, type of fire, fuel.

c) Use portable fire extinguisher for emergency control based on type of fire (A, B, C & D). Close Valves and isolate equipment to avoid its further spread.

d) All hot job activity in section should be stopped for prevention of fire.

e) Use PPE's like hand gloves, goggles and dust / gas masks to avoid any injury during fire fighting.

Method of control

a) Isolate the equipment properly to stop supply of fuel.

b) Start fire fighting immediately and inform fire control center.

1.2.2.8 Storage Hazard & Control

Sr. No.	Name of the hazardous substance	Place of Storage	Type of hazards possible	Control measures
A	**Raw Materials**			
	Pulp	Pulp Godown	Fire	Fire Hydrant System, FFE's.
	Caustic	Mild Steel tank with dyke	Spills	Dyke provided, one tank kept empty to attend any spills, also spill kit.
	Sulphur	Covered shed	Fire	Hydrant System & Extinguishers, PPE's.
	Coal	Coal yard	Fire	Hydrant & Sprinklers System, Extinguishers, PPE's.
B	**Finished Products**			
	Viscose Staple Fibre	Fibre Godown	Fire	Hydrant & Sprinkler System, Detection System, PPE's.
	Sulphuric Acid 98%	Mild Steel tank with dyke	Spills	Dyke provided, one tank kept empty to attend any spills, FFE's.
	Carbon Di Sulphide	Mild Steel tank with dyke	Fire	Dyke provided, one tank kept empty to attend any spills, Hydrant & Sprinkler installation, foam tenders, SS trolley, Fire Alarm & Detection System.
C	**By Products**			
	Anhydrous Sodium Sulphate	Salt Godown	No Hazards	PPE's.

1.2.2.9 Preventive Measures for Electrical Hazard

a) All electrical equipments are provided with proper earthing. Earthed electrode are calibrated, periodically tested and maintained.

b) Emergency lighting are available at all critical locations including the operator's room to carry out safe shut down of the plant, ready identification of fire fighting facilities such as fire water pumps and fire alarm stations.

c) All electrical equipments are free from carbon dust, oil deposits, and grease.

d) Use of approved insulated tools, rubber mats, shockproof gloves and boots, tester, fuse tongs, discharge rod, safety belt, hand lamp, wooden or insulated ladder and not wearing metal ring and chain is insured.

e) Flame and shock detectors and central fire annunciation system for fire safety are provided.

f) Temperature sensitive alarm and protective relays to make alert and disconnect equipment before overheating are provided.

g) Dangers from excess current due to overload or short circuit are prevented by providing fuses, circuit breakers, thermal protection.

h) Carbon dioxide or dry chemical fire extinguishers are for electrical fires.

1.2.2.10 Emergency due to Natural calamities

Following types of risk are possible:

A. Earthquake:

As per the latest Seismic Zoning done by the Bureau of Indian Standards (BSI) which is the official agency for publishing seismic hazard maps and codes in India, in the year 2000, the District Bharuch including Vilayat is lying in the Zone III i.e. moderate risk zone. So, low risk to the plant installations. However, all the Plant Structures, the Building Structures, Storage tanks foundations are of sound strength & good design practices & are approved by Team of Expert Engineers.

During such emergency, employees are to gather at assembly points. Senior members are to be watchful for any hazardous material overflow & to take appropriate measures neutralize hazardous material.

B. Lightening:

To avoid this type of natural risk, the lighting arresters are placed on the top of high buildings.

After than taking preventive actions, if lightening happens it may result in firing of hydrogen system or hydrocarbons storage inside the factory. The action will be taken as Fire emergency control plan.

C. Major Flood:

The Major flood may result due to heavy rain or water flow back from the Bhuki Nallah, which is present at the back side of factory.

The plant has storm water drainage system. In case of major Flood following actions to be taken.

- Declaration of emergency
- To ensure that there is no blockage of drain at any where
- Safe assemble of plant employees and vehicles available inside the plant
- Head counting of all employees.

- Continuous cleaning at water out lets
- Shifting of legal and important documents at other safe places.
- Shut down of computers and shifting at heighted place or other dry place.
- JCB and other heavy machinery to be kept ready to break any blockages of water flow.
- Ensure availability of diesel engine Pump in sufficient qty. to clear out accumulated water in diff. area.
- Safe shutdown of plant
- Power back up from DG for emergency equipments operation.
- Maintain enough stock of diesel , emergency lights , foods and PPEs
- Extraction of chlorine gas from system in hypo plant.
- Chlorine filling in tonners from bullets
- Degassing of chorine bullets and make pressure minimum in bullets.
- Isolation of pipe lines from manual valves.
- To make diesel operated pumps ready to pump the accumulated water
- To update the situation time to time to Site Main Controller.
- The plant people will ensure that there will be no over flow of any material from storage tanks.

Post flood activities:

- Dewatering of accumulated water from blocked area, pits, dyke wall of storage tanks, underground cable tranches.
- Cleaning of roads, plant buildings and offices.
- Checking of electrical equipments and instruments
- Maintenance or repairing of damage equipments
- Startup of plant as per Safe operating procedure

D. Hurricane / Cyclone:

No authentic data is presently available on Cyclone Zoning in India. No Hurricane / Cyclone has been faced in the past history. However, all the Plant Structures, the Building Structures, Storage tanks foundations are of sound strength & good design practices & are approved . Stability certificates are issued by charter engineer.

1.3 DISASTER MANAGEMENT PLAN

"Disaster Management Plan" (DMP) means a well coordinated, comprehensive response plan to contain loss of life, property, environment and provide speedy and effective recovery by making the most effective use of available resources in case of a disaster. The purpose of

DMP is to give an approach to detail organizational responsibilities, actions, reporting requirements and support resources available to ensure effective and timely management of emergencies associated to production and operations in the site.

Onsite and offsite emergency plans have been defined, documented and implemented in the industry. Onsite Emergency plan of Grasim Industries is duly approved by Deputy–Director (Industrial Safety and Health) Government of Gujarat. They follow these emergency preparedness plans and carryout periodic mock-drills and onsite mock drill every month & off site Mock drills every year.

The overall objectives of DMP are to:

1. Ensure safety of people, protect the environment and safeguard commercial considerations.
2. Immediate response to emergency scene with effective communication network and organized procedures.
3. Obtain early warning of emergency conditions so as to prevent impact on personnel, assets and environment.
4. Safeguard personnel to prevent injuries or loss of life by protecting personnel from the hazard and evacuating personnel from an installation when necessary
5. Minimize the impact of the event on the installation and the environment, by:
    - Minimizing the hazard as far as possible
    - Minimizing the potential for escalation containing any release

1.3.1 Key Elements

Following are the key elements of Disaster Management Plan:

1. Basis of the plan
2. Pre-Emergency Planning
3. Accident/emergency response planning procedures
4. On-site Disaster Management Plan
5. Off-site Disaster Management Plan

1.3.2 Basis of the Plan

Identification and assessment of hazards is crucial for on-site emergency planning and it is therefore necessary to identify what emergencies could arise in production of various products and their storage. Hazard analysis or consequence analysis gives the following results.

1. Hazards from spread of fire or release of flammable and toxic chemicals from storage and production units.
2. Hazards due to formation of pressure waves due to vapour cloud explosion of flammable gases and oil spill hazards.

1.3.3 Emergency Planning and Response Procedures

Emergency rarely occur, therefore activities during emergencies require coordination of higher order than for planned activities carried out according to fixed time schedule or on a routine day-to-day basis. To effectively coordinate emergency response activities, an organizational approach to planning is required. The emergency planning includes anticipatory action for emergency, maintenance and streamlining of emergency preparedness and ability for sudden mobilization of all forces to meet any calamity.

1.3.4 Onsite Disaster Management Plan

Identification of hazards constitutes the first step in the task of hazard analysis, which in turn produces a basis for risk assessment. Probability or frequency of such hazards will give risks and analysis, how they could occur and estimation to the extent, magnitude and likelihood of any harmful effects or consequences will give risk analysis. Onsite Emergency/disaster is an unpleasant event of such magnitude which may cause extensive damage to life and property due to plant emergencies resulting from deficiencies in Operation, Maintenance, Design and Human error, Natural Calamities like Flood, Cyclone and Earthquake; and deliberate and other acts of man like Sabotage, Riot and War etc. An Onsite Disaster may occur all of a sudden or proceeded by a Major Fire.

The Onsite Emergency Management Plan is a master plan which contains the emergency organization structure, responsibilities of key members, communications means and emergency response strategies to control a range of major incidents.

In order to handle disaster / emergency situations, an organizational chart entrusting responsibility to various personnel of the Company showing their specific roles are available as shown below:

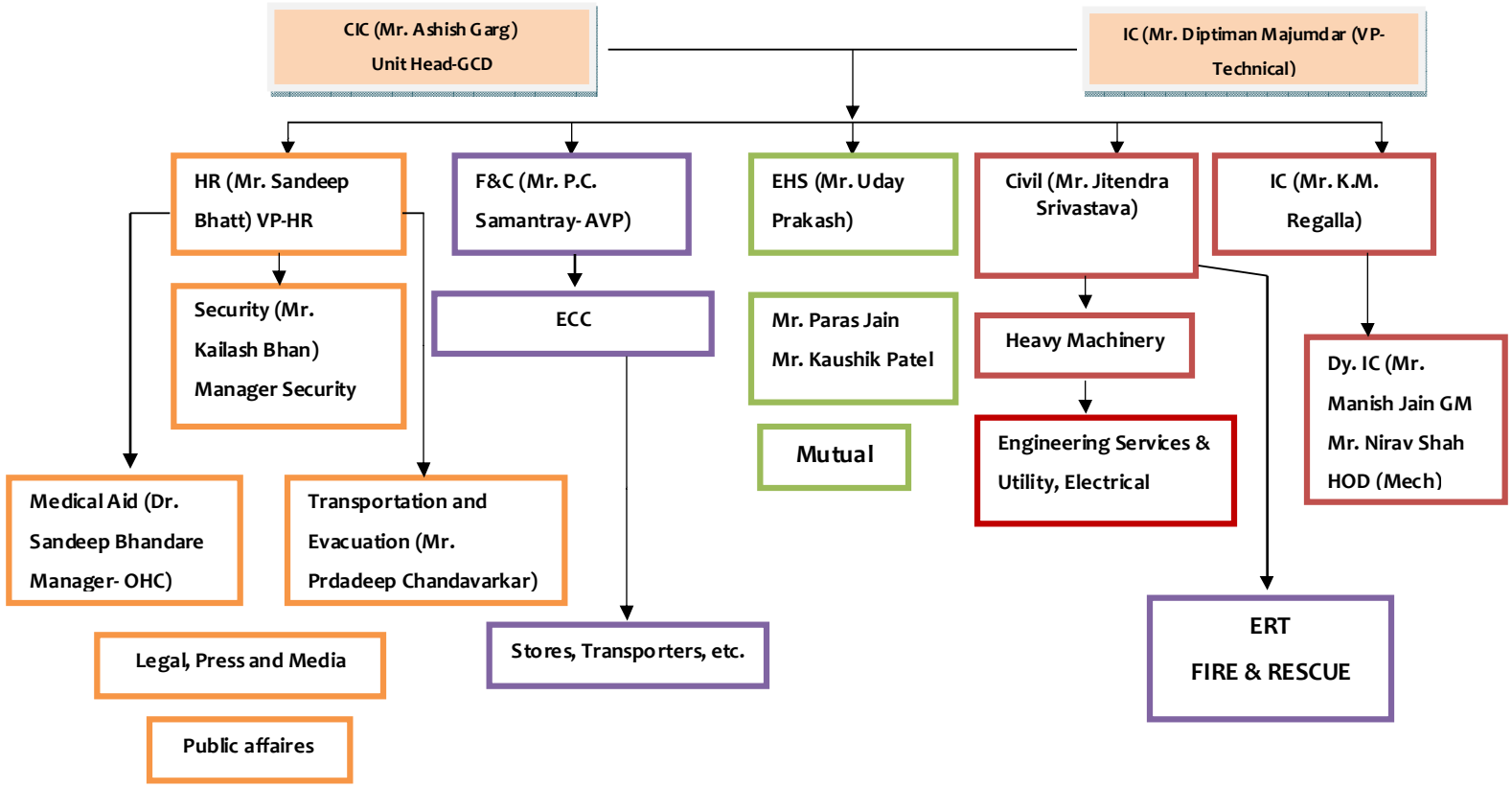

Figure 1: Flow Diagram for Onsite Disaster Management Plan

Roles & responsibilities of the key personnel are as follows:

A. Chief Incident Controller

CIC is the head authority of the Emergency Organization. Unit head holds the responsibility of the Chief Incident Controller. He is having overall responsibility for directing operation and calling for outside help from Emergency Control Centre.

On being informed about the emergency CIC will-

1. To rush to the ECC
2. To relieve the incident controller from responsibilities for overall main control. On consultation with I.C. and Key Personnel decide about the type of emergency and activate on site / off site Emergency Plan if not activated.
3. To ensure that key personnel are called in.
4. After declaring the major emergency,

a) To activate the off site plan (if required).

b) To ensure about the outside emergency services and mutual aid helps are called.

c) To ensure about intimation to neighboring factories by telephone or by sending runner and surrounding population through loud speakers.

5. To continuously review and assess possible developments to determine the most probable course of events.
6. To direct the safe shut down and evacuate the plant in consultation with the incident controller and key person. If necessary, arrange to evacuate the neighboring population.
7. To ensure that the casualties are receiving adequate attention -

a) To arrange for hospitalization of victims.

8. In case of Off Site Emergency to inform and liaison with Local Crisis Group (SDM-LCC), District Crisis Group (collector-DCR), Dy. Director (Industrial safety & Health) and experts of health and safety.
9. To ensure that assembly point managing team reached on the company assembly point to take charge.
10. To ensure the accounting of personnel and rescue of missing persons.
11. To ensure proper control of traffic movement inside factory.
12. To ensure canteen facilities, if the emergency is prolonged.
13. To facilitate issuance of authentic statement to the news media.
14. To ensure preservation of evidence make arrangement for photographs etc.
15. To control rehabilitation of affected areas and victims on cessation of emergency.
16. To instruct the Security office/ control room to raise "All Clear Siren" after ensures that the emergency is controlled and over.

17. To ensure that the plant is not start unless inspected / investigated by Joint Director (Industrial safety & Health) or Government Authorities/insurance surveyor.
18. To inform ABG Corporate designated person about status from time to time and seek support (if required).

Note: For major emergency, in the absence of the CIC of Cellulosic Division an alternate person, i.e. CIC of Chemical or Epoxy Division will be the active CIC for Cellulosic Division.

B. Incident Controller

VP (Technical)/VP (Power Plant)

In charge/Supervisor of the Plant (Site) & Department, holds the responsibility of the Incident Controller, if the incident is in respective plant/area. On being informed of the emergency and its location IC will rush to the site and IC will, (In case of off hours the shift incharge will act as incident controller till the seniors reach to the site and take over all charge, after arrival of IC, shift in charge will assist IC

1. Assess the scale of emergency, if the emergency is minor, try to prevent by using internal resources like fire extinguishers in case of fire, and cover the spillage by sand in case of liquid spillage, attain leakage of toxic gas by emergency kit.
2. Assess the scale of emergency, if the emergency is major / unable to prevent by using internal resources, he will start to activate on-site plan by raising the siren.
3. If fire emergency is there and fire is major /unable to prevent by using internal resources, the incident controller (IC) will inform to local fire brigade by telephone through (ECC) office.
4. Incident controller and in his absence, deputy incident controller shall also have to take responsibilities of Chief Incident Controller (CIC), till Chief Incident Controller take the charge of emergency control centre (ECC).

a) They should remain at the plant assembly point with their personnel if safe to do so unless instructed by CIC/IC.
b) Partial shutdown of plant should be executed by trained essential person of the plant/area.
c) To ensure carry out head count at plant/area assembly point.
d) As per the emergency, to send the essential person team member fully equipped with PPEs at incident place.

5. Incident controller in consultation with CIC shall seek support from one or two Area Incharge of other plant/area.
6. To send telephonic message to Chief Incident Controller and key personnel or send messenger/runner to inform them about incident.

7. As per the incident, direct the respective team of essential personnel to attend the emergency by

a) Using extinguishers in case of fire,

b) Covering the liquid spillage by sand or soil in case of liquid spillage or by adequate equipment, etc.

8. To ensure about the key personnel arrived and distribute their duties.
9. To ensure that Fire fighting, First aid & rescue and Engineering service trained team member reported at the site.
10. Establish a control point at a safe distance nearest to the incident place.
11. To set up a communication point and establish contact with the emergency control centre.
12. To ensure availability of the outside services like mutual aid, fire brigade through emergency control centre.
13. Direct the safe shut down of the plant or part of the plant and evacuate the plant or area to the safe company assembly point.
14. Direct all operations within the affected areas with the following priorities.

a) Secure the safety of personnel.

b) Minimum damage to plant, property and environment.

c) Minimize loss of material.

15. To search for casualties.
16. To give advice and as asked by the head of fire brigade and emergency services.
17. To brief Chief Incident Controller (CIC) and keep informed of development of situation.
18. To Inform the Chief Incident Controller/Telephone operator after controlling the emergency to raise all clear siren.
19. To preserve evidences that will be necessary for subsequent inquiry into the cause of the emergency and concluding preventive measures.
20. In case of emergency arise in surrounding industries or plant; he will assess the plant safe shut down and evacuation activities from his area. He will provide support to incidental place as per requirement coming from ECC.
21. To ensure protection of water pollution by blockage of drain to avoid contaminated water goes outside of premises.

C. Dy. Incident Controller

Concerned General Manager (GM)/Concerned HOD's in General Shifts & Shift In-charge in Shifts.

On being informed of the emergency DIC will rush to the incident site and will report to incident controller or Chief Incident Controller at E.C.C.

Till the Incident controller reach to the incident side, he will act as Incident controller and after arrival of Incident controller, he will hand over the charge to incident controller.

The roll of Production in charge act as Dy. Incident controller is as below.

1. To keep in touch with IC & CIC in assessing/controlling the emergency.
2. To guide essential personnel team, Fire fighting team and ERT.
3. To guide personnel for safe close down of the plant.
4. To guide transport for safe shifting of materials from one place to other.
5. To guide mutual aids services and the teams.
6. To keep informed the Chief Incident Controller about developments.
7. To make arrangement like emergency light, water and other utilities.
8. To assess the emergency & evacuate the neighboring factory workers and neighboring population through CIC.
9. To inform the effect of emergency and steps to be taken to avoid the effects of radiation and toxic gas.
10. To guide Pollution control team for toxic gas concentration monitoring, blockage of drains to avoid water pollutions and neutralization activity during spillage of toxic chemicals.

D. Environmental Health and Safety Coordinator (EHS)

As soon as he receives the information of emergency, he will rush to site and contact Incident Controller.

1. To assist Chief Incident Controller & incident controller in controlling emergency
2. To help Chief Incident Controller in communication.
3. To provide necessary equipments like FFE, PPE & RPE.
4. To guide transport for safe shifting of materials from one place to other.
5. To guide mutual aids services and the teams.
6. To keep informed the Chief Incident Controller about developments.

a) To maintain and keep ready all Self Contained Breathing Apparatuses and Spare Air Cylinders at all time.

b) To supply Extra Personal Protective Appliances, if required for controlling emergency.

c) Prepare / Review and Up-date On-Site Emergency & Disaster Control Plan periodically, generally once in two years.

d. Look- after & upkeep of the "**Emergency Control Centre**".

To prepare & keep maintained necessary documents in the "Emergency Control Centre".

E. Rescue and Medical Coordinator (Under HR)

On hearing Emergency Siren / receipt of information, the Rescue Team will report to Chief Incident Controller (CIC) & take - up following activities.

1. To help in removing the entrapped persons from affected or likely to be affected areas and send them to Assembly Point in Safe Zone, as per the prevailing Wind direction.
2. To help to send the affected persons to First Aid Room.
3. To look-after Medical Aid arrangements, Local as well as Hospitals for the affected/injured persons. Team will ensure that injured persons are given adequate attention.
4. If required, this team will also ensure that all the employees have evacuated the section / plant and none of the employee is missing, by tally physically with attendance record of the individual department as well as of Time Office.
5. To work as a messenger if required.
6. To assist in arranging Transport, Announcement, information & Evacuation. To ensure & maintain Company's First-Aid Room well equipped with necessary medicines & facilities.
7. To maintain ready in hand following First Aid Items to take immediately at incident site.

a) First Aid Box
b) Eye Wash Bottle
c) 05lts Plastic Cane filled with fresh water.
d) Soda water bottles
e) Medicines for Chlorine gas effect.

F. Key Person Welfare coordinator (HR);

1. Immediately contact Chief Incident Controller/Incident Controller on hearing emergency siren, or getting the information
2. To arrange for information on telephone to alert the neighboring Factories, Schools and Hospitals in the vicinity of the Factory if needed.
3. Mobilize his team for financial help as required by rescue, evacuation & medical co-coordinator.
4. To keep in touch with Global Hospital (Bharuch), Public Health Centre (Vagra), Factory Medical Officer for preparedness of suitable treatment of victims as case may arise.
5. To arrange necessary medicines, if required by hospitals officials.
6. To keep in touch with GCD for continuous water supply.
7. To arrange the transportation for victims inside the factory as well as outside the factory.
8. To arrange/ to provide transportation with the help of marketing department, if required, for evacuation of the public from the areas likely to be affected.
9. Arrange vehicles to evacuate persons/casualties from assembly points/plants to the hospitals/outside shelter etc.

10. In addition to own vehicles, if necessary, use hired vehicles & arrange additional drivers to operate vehicles with Public Address System to instruct surrounding community regarding actions to be taken.
11. Assist Medical Department in co-ordination outside help by contacting Local Authority, District emergency services, civil hospital etc.
12. Prepare record of affected personnel and arrange for information to their relatives.
13. Make arrangements for providing hot drinks, food etc., per the requirements.

G. Key Person: Incident Recorder/Communication:

1. To record all incoming and outgoing information related to the incident.
2. To arrange for communication facilities like fax, photography/videographer, telegram, mail etc.
3. To prepare the reports as directed by the Site main controller.
4. To ensure preservation of site condition/evidence.
5. To keep contact with the Site Main Controller for further actions.
6. In case situation goes out of control inform the local authorities from whom help is required, clearly specifying the place, and requirement.
7. To act as liaison between different Key Emergency Persons.
8. To inform the security controller about arrival of any external help, outside personnel/ VIP/Consultants etc. for assisting in the emergency, if prior information is received.
9. To attend the local calls and suitably reply regarding safety of employees, who are inside the unit.

H. Emergency Response Team

To rush to the site of incident immediately after receiving information or hearing emergency siren and take charge and guide the Emergency Squad to combat /control the emergency situation / chlorine leakage and work as an Emergency Squad Leader.

1. Leader should have information about the pressure and quantity of Chemical Contents (example liquid chlorine & CS_2 tanks) in the leaky tank or vessel.
2. To decide how and what action should be taken to combat / control the emergency situation / chlorine leakage.
3. To ensure that proper protective appliances are used by the persons working in the contaminated atmosphere and ascertain whether they are adequate and sufficient for handling the situation.
4. To ensure that the Dyke Walls around the leaky tank are intact & there is no opening in the Dyke walls & no possibility of leaked liquid to go out of the dyked area.
5. To ensure that the leaked chemical is neutralized effectively / completely.

6. To check that Emergency Suction Blower is running and suction hood is kept as close as to the source of Chlorine leak.
7. To ensure that the members, in the contaminated area, have come out safely after attending the job partly or fully.

In case of fire and spillage of chemical

1. To decide line of action in consultation with incident controller & Key personnel and take appropriate measures to extinguish the fire & to control spillage.
2. To fight fire till fire brigade takes the charge.
3. To help/guide fire brigade and mutual aid teams.
4. To control leakage with emergency kit or spillage control with sand or neutralizing material.
5. To Rescue the injured person.
6. To provide first aid to the affected persons and if necessary, send them to hospitals for treatment.

I. Essential workers:

1. Try to control and contain the emergency at incipient stage.
2. Use appropriate safety gadgets while tackling emergency in consultation with shift manager/ section manager.
3. Inform to the shift manager / section manager.
4. Act according to the instruction of shift manager / section manager or incidence controller/ site main controller.
5. Gather at one place and wait for further instruction.
6. Do not take any decision of your own.
7. Do not leave the place of incidence without permission.

J. Emergency Control Centre (ECC)

During an emergency, the Emergency Management Staff, including the main controller will gather in the ECC. Following locations are identified as Emergency Control Centre.

Sr.	ECC	Category of Emergency
1.	Safe Zone in the Area	1
2.	Plant DCS Room	2, 3, 5
3.	Alternative ECC	Epoxy Control room
4.	ECC, Grasim Cellulosic Division	Fire Pump House near south side of reservoir
5.	ECC of SFD & ECC of Bharuch District	4

EHS department will keep ready ECC with following item

1. Emergency telephone facility
2. Area Map
3. Site Map with roads , plants, utility facilities , Location of Fire Extinguishers & safety equipments and assemble pints
4. Internal , External importance telephone numbers
5. A list of key personnel, with addresses, telephone numbers, etc.
6. A copy of MSDS of all the materials used in Plant site
7. A copy of Emergency Plan
8. A Copy of off Site plan of Bharuch district.
9. Atmospheric condition record
10. Communication record sheet
11. List of Antidotes
12. List of dispensaries and registered medical practitioners around factory
13. Contact No. list of Government agencies, neighboring Industries , Mutual Aid agencies , Local crisis group , Sarpanch of Villages , PHC etc.

1.3.5 Offsite Disaster Management Plan

Emergency is a sudden unexpected event, which can cause serious damage to personnel life, property and environment outside the boundary wall of the industry as a whole, which necessitate evolving Off-site Emergency Plan to combat any such eventuality. In Offsite disaster management plan, many agencies like Revenue, Public Health, Fire Services, Police, Civil Defence, Home Guards, Medical Services and other Voluntary organization are involved. Thus, handling of such emergencies requires an organized multidisciplinary approach.

Evacuation of people, if required, can be done in orderly way. The different agencies involved in evacuation of people are Civil Administration (both state and central), non-Govt. organizations, factory Inspectorate and Police authorities.

Various organizations involved during emergencies are shown below

Sr. No.	Authority	Name Of Current Office Holder	Address (O, R)	Telephone (O, R, M)
1.	District Collector (or DEA)	Smt. Avantika Singh Aulakh	(O) District Collector Office, Bharuch (R) Civil Lines Edgah Road, Bharuch	(O) 02642 240500, 240600 (R) 02642- 223701,223703 (M) 09978406205
2.	Alternate Additional Collector	Mr. R.S. Ninama	Bharuch	(O) 02642-222332 (R) 99784 51077

Sr. No.	Authority	Name Of Current Office Holder	Address (O, R)	Telephone (O, R, M)
3.	Superintendent of Police	Mr. Gautam Parmar Ips	Civil Lions, Kali Talavadi, BambaKhana Road, Bharuch	(O) (02642) 223633 (M) 99784 05066
4.	Alternate DySp	Mr. G. M Patel	Civil Lions, Kali Talavadi, BambaKhana Road, Bharuch	(O) 02642 – 223433 (M) 94268 76606
5.	District Development Officer, Bharuch	Ms. Ardra Agrawal - I. A. S.	District Development Office, District Panchayat, Bharuch	(O) 02642 - 240603
6.	Fire Department Chief-Ankleshwar	Mr. Manoj Kotadiya	DPMC, Ankleshwar	(O) (02642) 220229 (M) 94268 89616
7.	Alternate- Fire Department Chief-Ankleshwar	Mr. Pritesh Patel	DPMC, Ankleshwar	(O) (02642) 220229
8.	Fire Department Chief-Bharuch _ Nagarpalika	Fire Officer	Bharuch _ Nagarpalika	(O) (02642) 220151,220143,101,102, 108
9.	Dist. Health Officer	Dr.V.S.Tripathi	Maktampur, Bharuch	(O) 02642243660 (R) 02642243660 (M) 9727702155
10.	Civil Surgeon	Civil Surgeon	Civil Hospital, Station Road, Bharuch.	(O) 02642- 243515, 241759 (R) 02642- 246200
11.	Inspector Of Factories Dy. D I S H, Bharuch	Mr. Vijay J. Patel	JillaSevaSadan – 2, Nr. Court Bldg. Bharuch	(O) 02646 -240421 (M) 94265-37152
12.	Pollution Control Board (Regional Officer)	Mr. Rathod	Shed no. C-1, 119/3, GIDC Estate Bharuch – 392 001	02642-246333
13.				
	a) Technical Experts	Mr. P. A. Patel	Gujarat Alkalies And Chemicals Limited, P.O.Dahej,Ta.Vagra,Dist-Bharuch,Dahej-392 130,Gujarat,India	(M) 99090 29643
	b) Technical Experts	Mr. Paresh Ardhavaue	United Phosphorus Limited Unit-5, Plot No-746&750, GIDC Estate, Jhagadia. Dist -Bharuch.Gujarat. Pin-393110.	(M) 99099 94534
	c) Technical Experts	Mr. Sandip Mandot	P I Industries Ltd 237, GIDC Estate Panoli -394 116 Dist. Bharuch, Gujarat State	(O) 02646-655471/72/73/74 (M) 92275 62340
	d) Technical Experts	Mr. V. C. Bhatt	GNFC Ltd. Po.-Narmadanagar , Bharuch-392015	(M) 98980 63460
14.	NGO			

Sr. No.	Authority	Name Of Current Office Holder	Address (O, R)	Telephone (O, R, M)
	Red Cross Blood Bank	Dr. J. K. Khilwani	Panchbatti, Bharuch	(O) (02642)243603 (R) (02642) 240232 (M) 9377410614
	Indian Medical Association	Dr. Amin Surani	RajpiplaChokdi, Ankleshwar	(O) (02646) 223117 (M)9228168461
15.	Regional Transport Officer	Mr. K.L. Hadiya	RTO Office, Bholav, Bharuch	(O) (02642) 240653 (M) 94284 73322
16.	Petroleum And Explosive Safety Organisation	Dr. Mrs. S. Sharma Dy. Director-Peso Vadodara	(O) 8 Th Floor, YashkamalBil. Vadodara	(O)(0265)2361035,2225159
17.	Mutual Aid Group			
	Disaster Prevention & Management Centre, Ankleshwar	Mr. Vijay Aashar	Fire Station, Notified Area, GIDC, Ankleshwar	(O) (02646) 220229
	Disaster Prevention & Management Centre, Dahej	Mr. Hitesh Shah Mr. Jaydeep Patel	Dahej Eco Friendly Society – Dahej	(M) 98244-75576
18.	Railways Superintendent	Mr. P.G.Barot	Railway Station, Bharuch	(O) 02642-240969 (R) 02642-240969 (M) 97240 98417
19.	District Information Officer	Officer	Bahumanli Building – Bharuch	(O) 02642-240603
20.	Chairman-Local Crisis Group, And SDM& Dy. Collector Bharuch	Shri. D. D. Pandya	District Collector Office, Bharuch	(O) (02642) 241400, 241980 (R) (02642) 240162, (M) 9427305256
21.	Chairman-Local Crisis Group, And SDM& Dy. Collector Dahej (Vagra)	Shri. D. D. Pandya	District Collector Office, Bharuch	(O) (02642) 241400, 241980 (R) (02642) 240162, (M) 9427305256
22.	Chairman-Local Crisis Group, And SDM& Dy. Collector Ankleshwar	Sri. B. M. Patel	SDM& Dy. Collector Office Ankleshwar	(O) (02646) 242648 (M) 9978405356
23.	Chairman-Local Crisis Group, And SDM& Dy. Collector Jhagadia	Sri. B. M. Patel	SDM& Dy. Collector Office Ankleshwar	(O) (02646) 242648 (M) 9978405356
24.	Secretary-Local Crisis Group-Bharuch	Mr. V J Patel Asst Dir. Ish	2nd Floor, Multi Story Bldg., Opp. Gayatri Nagar, Bharuch	(O) 02646 -240421 (M) 94265-37152
25.	Secretary-Local Crisis Group Dahej (Vagra)	Mr. V J Patel Asst Dir. Ish	2nd Floor, Multi Story Bldg., Opp. Gayatri Nagar, Bharuch	(O) 02646 -240421 (M) 94265-37152

Sr. No.	Authority	Name Of Current Office Holder	Address (O, R)	Telephone (O, R, M)
26.	Secretary-Local Crisis Group –Ankleshwar	Mr. M G Baria Asst Dir. Ish	2nd Floor, Multi Story Bldg., Opp. Gayatri Nagar, Bharuch	(O) 02646 -240421 (M) 94261-22924
27.	Secretary-Local Crisis Group –Jhagadia	Mr. M G Baria Asst Dir. Ish	2nd Floor, Multi Story Bldg., Opp. Gayatri Nagar, Bharuch	(O) 02646 -240421 (M) 94261-22924
28.	Coast Guard – Daman	Commanding Officer	Daman	(O) 0260 – 2260665

1.3.5.1 Off Site Emergency

A. <u>In case of CS2 / NG leakage information received from VSF:</u>

Following instructions will be followed

- Sectional Head or Functional head in day time and the plant incharge / shift incharge after office hours, will assess the situation depending on wind direction and quantity of release. Following actions will be undertaken:
  - Announcement of Emergency by PA system or raising the alarm if required.
  - Plant safe shutdown
  - Stoppage of all running activities i.e. Hot work , height work , excavation, vehicle movement, project work , construction activities , material loading and un loading activity.
  - Evacuation of employees working in their area
  - Ensure use of Necessary PPEs by the employees involving in the shut down procedure
- Leave the affected plant or area and reach to Safe Assembly Point by identifying the Air direction and/ or do as directed by the Department /Section In-charge.
- Observe instruction of Plant Incharge
- Remain calm and do not become panicky.
- Cover nose and mouth with wet handkerchief / cloth while going to Assembly Point / safe area.
- Wait for "All Clear Siren". Only after All Clear Siren go to work place

B. <u>In case of Fire/Explosion or Gas Release in Power Plant (GCD, Vilayat):</u>

1. Observer:

- Observer will assess the situation & inform to Incident Controller & in meantime he will inform to SHE representative.
- He shall act by means of all available sources to prevent / Control the situation.

- Incident controller will reach at spot & assess the situation & decide to activate the onsite emergency plan.
- He will inform to site main controller (Mr. Bharath Kumar) about the situation.
- Ensure essential services (Safety, Fire & Rescue team, First Aid team, Security etc.) called in.
- Direct for safe isolation & evacuation of non-essential workers to safe assembly point.
- Direct fire & rescue team.
- Brief the site main controller & keep informed the development.
- Assess the situation in consultation with incident controller & try to tackle the emergency with available resources.
- Decide to declare major emergency & activate disaster management plan if required.
- Ensure all essential services called in & perform effectively.
- Do not start the operation unless it is ensure that it is safe to start & cleared by respective concerned.

2. HR / Admin:

- Inform to security Manager / Supervisor about emergency situation.
- Ensure head count at assembly point.
- Co-ordination with nearby industries for necessary mutual aid if required.
- Arrange communication facilities telephones, fax, mail, photography, videographer etc...
- Handle govt. agency, and media.
- Arrange a vehicle for emergency evacuation for safe place.

3. Security:

- Control the traffic & man movement.
- Cordon of the emergency spot area.
- Restrict the unauthorized entry of visitor, vendors, NGO, suppliers etc.
- Assist fire & rescue team to control emergency situation.

1.3.5.2 Role of Grasim(GIL) in case OffSite Emergency

The Incident controller will assess the magnitude of the accident and will declare the 'Emergency'. He will apprise Site Main Controller (SMC), about the severity of the situation. If the situation is of such that it likely to affect the general public living in the

vicinity also or cannot be controlled by the resources available at the site , in such case, role of Grasim Chemical division will be as follow:.

- Site Main Controller(SMC) will instruct the Security Gate to raise the Main Gate Siren frequently with a wailing sound to warn the public in the vicinity. The Site Main Controller of will instruct to call outside help if necessary and will arrange to inform about the emergency to Crisis Control Room, SDM Chairman of Local Crisis Group, District Emergency Authority, Directorate Industrial Health & Safety and other Government Authorities about off site Emergency. He will co-ordinate with local crisis group and District crisis group site main controller team. After controlling of Emergency and as instruction given by district authority he will declare All clear and instruct to security about all clear siren and also ensure that all clear information reach to the nearby villages, Hospitals , school , neighboring industries etc. Who had informed about the emergency.
- The Incident site teams will continue their role and responsibilities as prescribed in On Site emergency Plan and act as per instructions received from SMC of GIL, Vilayat or SMC of Off Site controller. The IC of GIL will help to Incident Control team, Fire & Rescue Control team, the emergency services and technical expert teams of District crisis group to control the emergency.
- HR will co-ordinate and help to Health / Medical Control team, Evacuation, Traffic control, Public Warning, Security, Law and Order and Cordon of area team, Communication team, Public Relation & Mass Media Communication team, Rehabilitation & Voluntary Organizations team.
- Finance and Marketing team of GIL will act as per the requirement of District Crisis group Transportation team.
- Pollution control team of GIL will work together with Pollution control team of DCG or LCG and Civil department of GIL will help to Demolition & Reconstruction team of LCG or DCG.

1.4 CONCLUSION

It is concluded that there will be no major risk involved due to proposed expansion project. Proper precautionary measures are being/ will be taken to minimize risks. Personal Protective Equipments (PPEs) will help to minimize the health hazards and accidental casualties. So it is safe to say that there is being/ will be no major risk involved due to the proposed expansion project.