
OFF-SITE EMERGENCY

RESPONSE PLAN

KARNAL



(Prepared under Rule 14 of Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989.)

DISTRICT ADMINISTRATION, KARNAL

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1. INTRODUCTION

Industrialization has brought within its wake several problems. One such is the industrial disaster. With the rapid advances in industrial processes newer types of danger to life and environment are being introduced. There has been an increase in the number of disasters over the past years. The leakage of deadly gas Methyl Iso Cyanate (MIC) in Bhopal Disaster in Dec 2/3/1984 can never be forgotten. The killer clouds of gas that leaked abruptly and in an uncontrolled manner brought death to some 3000 people, babies and children, fathers and mothers, siblings and grandparents. It was to be the worst ever industrial accident in history. Disaster can have a devastating effect on the economy. They can cause huge human and economic losses which directly affect the development efforts of a region or a state. Unlike emergencies caused due to natural disasters which are difficult to prevent, chemical accidents can be prevented and their impacts minimized by better planning, preparedness and response. The emergency is more severe in case of chemical industries where potentially hazardous conditions are always prevailing. Therefore emergency planning becomes a necessary element of mitigation of the effect of emergency. Keeping in view the nature of hazards, Off-site Emergency plan is prepared to assess, minimize and eliminate risk to the possible extent. It is imperative that the legislation alone cannot fulfill the objectives but needs complete cooperation and involvement of Industries, District Administration and the Public. It is equally important that Contingency Plan coordinating the resources is prepared and kept ready in full preparedness to handle any eventualities. It is in this context that the Karnal district Administration has taken initiatives in preparing a comprehensive off site emergency plan for Karnal district to manage the eventualities from the Hazardous industries located in the district.

2. PREAMBLE

An offsite emergency arising out due to chemical is one, which has the potential to cause serious damage or loss of life beyond the plant boundary. In addition, accidents during transportation of hazardous chemicals by road, rail, pipeline, etc. can also cause offsite emergencies. Emergency services such as police, fire, medical etc. need to be prepared to handle such situations effectively. The snowballing of a small incident into a major chemical disaster and the subsequent effects on the life and property can be mitigated if there is a readily implement able emergency preparedness plan available with the concerned district authorities. In order to be in a state of preparedness to respond to the accidents and minimize their adverse impacts on the offsite population, Rule 14 of the MSIHC Rules, 1989 (Amended in 2000), under EPA, 1986, requires an offsite emergency plan to be prepared by the District Collector for every district or industrial area, as applicable.

Objectives, Extent & Scope of the Plan

The main objectives of the Off Site Emergency Plan are:

- To Provide resources and methods for effective control of emergencies arising out the leakage ,explosion and fire due to hazardous materials ;
- To prevent emergency turning into disaster;
- Synchronized action from all the coordinating agencies with least possible delay.
- To minimize damage to the property, people and the environment
- Effective rescue operation and treatment of the casualties;
- To train the people and the concerned to act efficiently and with confidence in an emergency;
- To bring back normal situation in the least possible time;
- To provide authoritative information to the news media and government agencies;
- No panic among the general public .No exploitation or exaggeration of the situation by any agency.

हरियाणा सरकार

पर्यावरण विभाग

अधिसूचना

दिनांक 4 मई, 2001

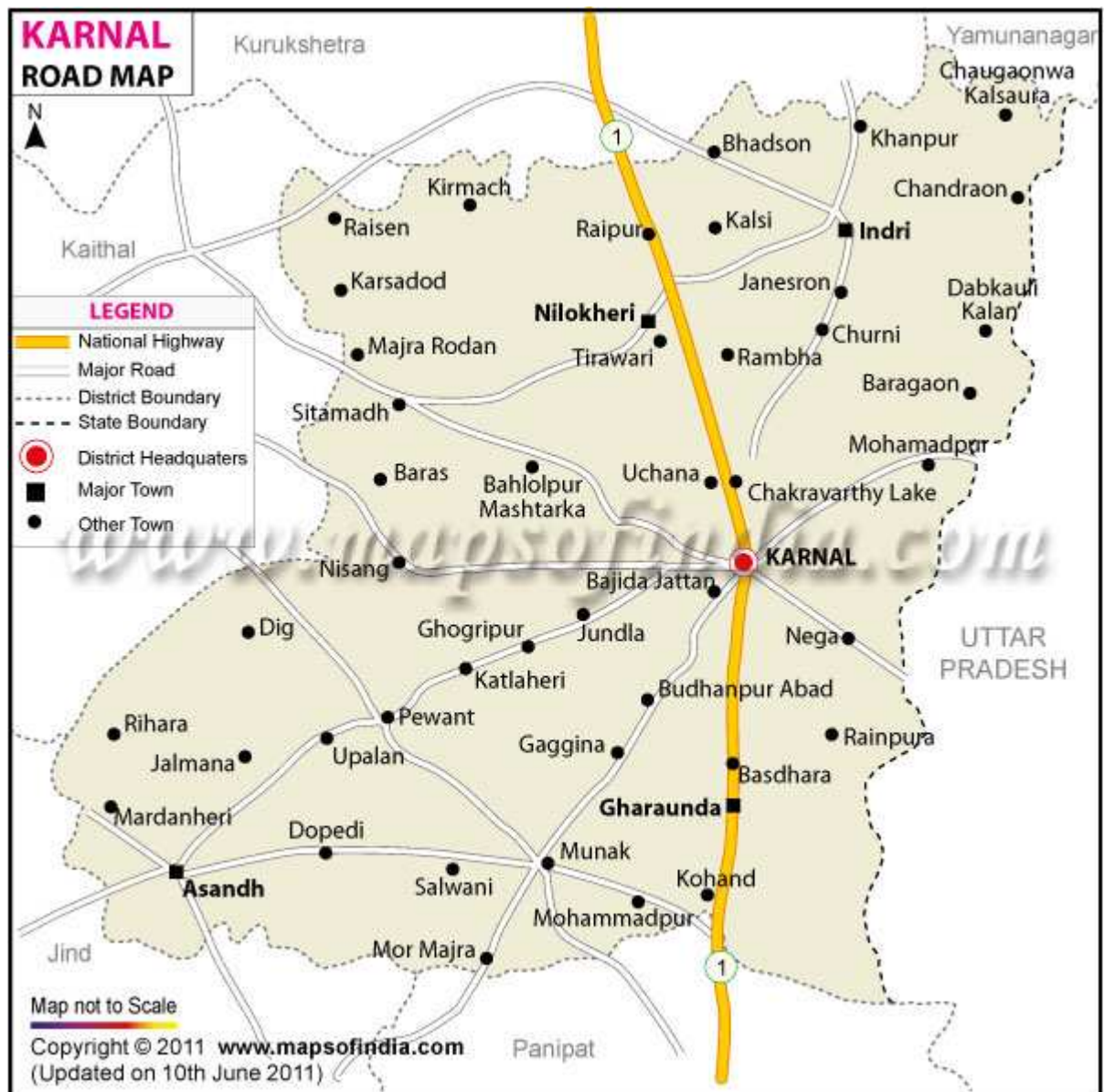
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संख्या का० आ० 58/र० दु० (आ० यो० तै० और अ०) नि० 1996/नि० 8/2001.— रसायन दुर्घटना (आपात योजना, तैयारी और अनुक्रिया) नियम, 1996 के नियम 8 के उप नियम (2) के साथ प्रवृत्त उप नियम (1) द्वारा प्रदान की गई शक्तियों का प्रयोग करते हुए, हरियाणा के राज्यपाल, इसके द्वारा, मुख्य रसायन दुर्घटनाओं के बारे में कार्यवाही करने और रसायन दुर्घटनाओं का निपटान करने के लिए उच्च स्तरीय (एक्सपर्ट) मार्गदर्शन प्रदान करने हेतु करनाल जिला में अग्रक (एपेक्स) निकाय के रूप में जिला संकटकालीन ग्रुप गठित करते हैं। जिला संकटकालीन ग्रुप में निम्नलिखित होंगे :—

- | | |
|--|------------|
| 1. उपायुक्त, करनाल | अध्यक्ष |
| 2. सहायक निदेशक, औद्योगिक सुरक्षा, करनाल | सदस्य सचिव |
| 3. महा प्रबन्धक, जिला उद्योग केन्द्र, करनाल | सदस्य |
| 4. अग्निशमन अधिकारी, नगर परिषद, करनाल | सदस्य |
| 5. जिला लोक सम्पर्क अधिकारी, करनाल | सदस्य |
| 6. उपायुक्त करनाल द्वारा मनोनीत किये जाने वाले व्यवसाय संघों का एक प्रतिनिधि | सदस्य |
| 7. वरिष्ठ पुलिस अधीक्षक, करनाल | सदस्य |
| 8. सिविल सर्जन, करनाल | सदस्य |
| 9. कार्यकारी अधिकारी, नगर परिषद, करनाल | सदस्य |
| 10. कार्यकारी अभियन्ता, लोक निर्माण विभाग (जन स्वास्थ्य), करनाल | सदस्य |
| 11. क्षेत्रीय अधिकारी, हरियाणा राज्य प्रदूषण नियन्त्रण बोर्ड, यमुनानगर | सदस्य |
| 12. उप निदेशक, कृषि, करनाल | सदस्य |
| 13. (i) वरिष्ठ सहायक निदेशक, औद्योगिक सुरक्षा एवं स्वास्थ्य, गुड़गांव | सदस्य |
| (ii) सहायक निदेशक, औद्योगिक सुरक्षा एवं स्वास्थ्य, हिसार | सदस्य |
| 14. महा प्रबन्धक, हरियाणा परिवहन, करनाल | सदस्य |
| 15. उपायुक्त द्वारा मनोनीत किया जाने वाला उद्योगों का एक प्रतिनिधि | सदस्य |

4. GENERAL PROFILE OF THE DISTRICT KARNAL::

Karnal district falls in the north-east part of the Haryana State and is bounded by North latitudes 29°05' and 29°20' and East longitudes 76°40' and 77°08'. It falls in parts of Survey of India Toposheets nos. 53C and 53G covering an area of 2520 sq.km. The district covers 5.69% area of the state. The district is bordered by the river Yamuna in the east, Panipat district in the south, Kaithal district in the west and Kurukshetra district in the north. The district is well connected by roads and railways. The SherShah Sri Marg (NH No.1) runs through the entire length of the district. A broad gauge railway line connecting Delhi with Ambala runs almost parallel to the NH No.1. Karnal is the district headquarters. The main townships are Karnal, Indri, Assandh, Nissang, Nilokheri and Gharaunda. The towns are well connected by roads. It has five tahsils, three sub-tehsils and six blocks. The tehsils are Karnal, Assandh, Nilokheri, Indri and Gharaunda and sub-tehsils are Nissing, Ballah and Nigdhu. The blocks are Gharaunda, Indri, Karnal, Nilokheri, Nissang and Assandh. The district is one of the most densely populated districts of the state. Total Population of Karnal district in 2011 census was 12,74,843. The district falls in the Upper Yamuna Basin. There are approx. 500 industries covered under The Factories Act, 1948 in the district providing employment to about 23600 persons and producing various types of goods such as agricultural implements, Electronic Motors, Submersible Pumps, Welding Electrodes, Card Board/Mill Board, Paints, Edible and non-Edible Oils, Leather and Non-Leather Footwear, Rubber Hawaii Chapels, Pressure Cookers, Finished Leather, Life Saving Medicines, Wheat Products, Wooden & Steel Furniture, Rice, Milk Products, Wire Netting, Washing Soap etc.etc. Karnal is also famous for manufacture of agricultural implements and its spares as more than 40% of country agricultural implements and spares are manufactured here. There are approx. 30-35 small industries in working which are using/storing/manufacturing/processing/handling chemicals like fire crackers manufacturing units, paint manufacturing units, solvent plants, Ice factories, Cold Storages, pesticides and an oil pipeline also passes across the district which can say partially hazardous installation where chemical accident likely to be happen.



(ROAD MAP OF DISTRICT KARNAL)

5. HAZARD IDENTIFICATION:

5.1 PAST HISTORY OF DISASTER/ INCIDENTS:

- 1) An LPG fire occurred in the year 2005 in Indane Bottling Plant, Gudha and three persons were injured in this fire. There were no casualties in this fire. LPG filling hose snapped at the carousal filling machine and it struck with pressure against a metallic part which caused fire and injuries to the workmen. The fire was locally controlled by the staff of the bottling plant.
- 2) Recently a fire incident occurred in M/s Shree Ram Fire Works, Kunjpura, Karnal which was engaged in manufacturing of fire crackers. The workers were working in and around A.C.C. sheet shed by laying temporary electric wiring with three poorly maintained joints, which generated the spark. Workers were also said to follow the practice of collecting the dried fire crackers outside the shed in the plastic sheet (Tirpal) and place the same in the shed by dragging. Both of these practices of dragging semi finished dibbis and dried crackers along with plastic sheet containing mixture particles could have generated a spark due to friction with the brick floor, without completely laid rubber mats and result in fire, explosion and accident, resulting in death of 9 workers and burn injuries to 11 workers.

5.2 IDENTIFICATION OF DISASTER AND DISASTER PRONE AREAS:

In the Karnal district, the nature of emergencies /Disaster could be any of the following:

- a) In plant Emergencies due to deficiencies in:
 - *Operation
 - *Maintenance
 - *Design & Equipment failure.
- b) Natural calamities like:
 - *Flood
 - *Earthquake
- c) Deliberate act of Man
 - *Sabotage
 - *Riots
 - *War
- d) * Emergencies during transportation of Chemicals.

5.3 CONSEQUENCES:-

- Fire & Explosion
- Release of toxic gas
- Oil Spill.
- Chemical and heat Burns to human and livestock
- Overpressure shocks to human and livestock
- Damage to private and public property

5.4 DISASTER SCENARIOS IN KARNAL DISTRICT .

There is one Major Accident Hazardous (MAH) Installation namely Indane Bottling Plant in Karnal district which may cause of serious disruption inside or outside the plant resulting serious injuries, loss of life, extensive damage to property or environment. Moreover there are some chemical units which have fire hazards and cause of loss of life and damage to environment.

5.5 LOCATIONS AND SURROUNDINGS OF MAJOR ACCIDENT HAZARD (MAH) UNITS

The 88,000MTPA LPG bottling plant of IOCL, commissioned in 1988, is located at Gudha village in Karnal district, Haryana. The plant site is about 4km off the national highway NH-1 (Delhi – Amritsar) on Kohand–Assandh road and is about 16km and 28km from Panipat & Karnal, respectively. The plot area is approximately 103acres. LPG is received through a 6.2km long from IOCL's refinery at Panipat or by road through tank trucks from other locations during refinery shutdown. The received LPG is stored in six Horton spheres and is filled into LPG cylinders, which after filling, are despatched in trucks by road. The plant is located in an uninhabited area and is largely surrounded by fields with the nearest villages viz., Gudha and Begampur are at distances of 2km and 3.5km, respectively. A Central Government Institute for conducting soil tests is located across the road in front of the plant gate; however, there are no inhabitants on this plot as well.

5.51 PLANT DESCRIPTION

The plant is equipped with six Horton spheres for storing LPG. Each of the spheres has a diameter of 17m and a nominal storage capacity of 1200 MT each. Normally, LPG is received into these Horton spheres through a 6.2km long buried pipeline (10" diameter) from the IOCL's refinery at Panipat. The normal supply rate through the pipeline is about 200MT/hr at an average of about 10,000MT per month at a pressure of 7.5 – 8.0kg/cm². LPG is also received at the bottling plant through road tankers for a period of about one month (30days) when Panipat refinery is under annual shutdown. These tankers are unloaded at the Tank Lorries Decanting (TLD) bay and LPG is stored in the Horton spheres under pressure. This LPG is then transferred/ pumped to the Filling shed, where it is be filled in cylinders of different capacities (14.2 & 19.0kg for use as domestic as well as commercial fuel, respectively) with the aid of two carousel filling machines. Each of the carousels is provided with 24 filling points. LPG is filled at a pressure of 16.9 kg/cm² in cylinders.

The plant is equipped with eight bays for unloading LPG from Tank Trucks (TTs) of different capacities (6, 7.5, 12, 14 & 18MT). Unloading operation is carried out in two shifts – morning and afternoon shifts. A period of about 3 hours is required for unloading each LPG tanker. Compressors and steel reinforced rubber hoses of 50mm diameter are employed for unloading TTs. Four LPG compressors are provided at the plant; two are used during TTs unloading operation, one is dedicated for evacuating cylinders while the fourth is employed for

pressurizing the sphere during bottling operation. Each compressor has a discharge pressure of 13.5 kg/cm².

A total of about 900 tank trucks are unloaded per month, which amounts to about 30 numbers of tankers per day. Double earthing with crocodile clip is provided for dissipating static electricity off LPG tankers during unloading.

Two pumps (1 + 1) with a capacity of 48m³/hr and discharge pressure of 14–15kg/cm² would be provided for transferring LPG from horton spheres to the cylinders filling shed. One pump would be operated at a time for the filling operation. A carousel filling machine consisting of 24 filling points, with a capacity of 1,200 cylinders per hour, would be employed for filling a mix of 14.2kg and 19kg cylinders.

5.52 FUEL STORAGE

Two underground tanks (each of 15kL capacity) are available for storage of HSD, which is used for operating fire hydrant pumps and DG sets in the event of power failure. The HSD storage tanks as well as HSD unloading bay are located outside the licensed area for LPG receipt, storage & bottling operations.

5.53 POWER REQUIREMENT

The total power requirement of the bottling plant is about 750KW, which is supplied by Haryana State Electricity Board (HSEB). Four DG sets (one of 500KVA, two of 250KVA and another of 100KVA) are provided at the plant for meeting emergency power demand during a power failure.

5.54 MANPOWER

The IOCL bottling plant operates during two shifts – morning and evening shifts with a total of 69 full time employees and some contract labour. However, the plant premises remains occupied during night shifts as well. The details of manning pattern in shifts and shift timings are tabulated below:

<u>Shifts</u>	Timings	Number of	
		Employees	Guards
General (G)	0830 – 1700hrs	08	1
Morning (A)	0600 – 1400hrs	30	6
Evening (B)	1400 – 2200hrs	31	6
Night (C)	2200 – 0600hrs	Nil	9

5.55 DISASTER SCENARIOS IN BOTTLING PLANT:

There are four disaster scenarios in Bottling Plant:

- 1 Jet Fire : Caused by uncontrolled emission of LPG in vapour phase catching fire without accompanying explosion.
- 2 Pool Fire: Caused by ignition of LPG in liquid phase-generally a localized event without much effect on adjoining areas except due to radiation.
- 3 BLEVE: Boiling Liquid Expanding Vapour Explosion- caused by overheating of LPG pressure vessel where superheated liquid is released into the atmosphere due to sudden failure of pressure vessel resulting in simultaneous explosion of both vapour and superheated liquid phase.
- 4 Vapour Cloud Formation and Explosion: Caused by unconfined release of vapour to the atmosphere. The vapour cloud forms an explosive mixture which on ignition releases a shockwave that can travel great distances causing considerable damage.

5.56 EFFECT OF VARIOUS RADIATION INTENSITIES AND OVERPRESSURES.

The effect on environment, machinery and living beings is enumerated in the adjoining tables

DAMAGE DUE TO INCIDENT RADIATION INTENSITY

INCIDENT RADIATION INTENSITY (kW/m ²)	TYPE OF DAMAGE
117.0	50% lethality after 4 seconds exposure
66.0	1% lethality after 4 seconds exposure
37.5	Sufficient to cause damage to process equipment unless the equipment is fully thermally fire protected (insulation, fire proofing, sprinkler protection, etc.)
25.0	. Minimum energy required to ignite wood at infinitely long exposure (non-piloted) and would damage thermally unprotected tanks, equipment, etc.
12.5	
4.5	Minimum energy required for piloted ignition of wood, melting plastic tubing, etc.
1.0	Sufficient to cause pain to personnel if unable to reach cover within 20 seconds, blistering of skin (1 st degree burns) is likely. Equivalent to solar radiation on a warm day during summer.

VARIOUS OVERPRESSURES AND THEIR EFFECTS

OVERPRESSURE (psi)	EFFECT
0.1 – 0.5	Window breakage
0.5	Minor structural damage to buildings
1.0	Major damage to houses
1.0	Cone roof collapse
1.16	Industrial buildings partially demolished
1.74	Wired glass breakage
3.0	Some broken piping, deluge/ sprinkler piping broken
3.0	
3.0	Steel frame buildings distorted, walls damaged
3.0	Vessels overturned
4.5	Empty part of oil tank collapses
6.0	Much broken piping
6.0	Building steel cladding ruptured
7.0	Damage to distillation columns
7.0	Loaded wagons and trucks overturned
10.0	Brick panels in steel or concrete frame ruptured
14.0	Total destruction of buildings
1.5	Large filled vessels overturned
0.5	Damage to human organs
	Damage to hearing

SOME DATA (EFFECTIVE PEAK OVERPRESSURE^a (PSI) ON THE INJURY EFFECTS OF EXPLOSIONS: DIRECT BLAST

<i>Effect</i>	<i>Effective peak overpressure^a (psi)</i>		
	Duration		
	Long	3ms	400ms
<u><i>Eardrum rupture</i></u>			
Threshold	5	5	5
50% (> 20 years old)	15-20	15-20	15-20
50% (< 20 years old)	30-35		
Lung damage			
Threshold	12 (8-15)	37-49	12-15
Severe	25 (20-30)	>98	>37
<i>Lethality</i>			
Threshold	40 (30-50)	112-156	37-52
50%	62(50-75)	156-217	52-72
100%	92(75-11)	217-302	72-100

EFFECT ON HUMANS/LIVESTOCK/POULTRY

As seen from the above tables, a radiation intensity of 4.5 KW /m² is sufficient to cause pain and burns to humans/livestock and poultry

EFFECT ON CROPS

A radiation intensity of 12.5 KW /m² is sufficient to cause irreversible damage to standing crops.

Based on the information given above, it can be observed that the maximum hazard distance for all the accident scenarios of Major Accident Hazard (MAH) units is within 3 km from the accident site. Following points emerge from the analysis of data given in the table and observations made during the field visit.

- The nearest population centers are the respective villages and colonies near the Major Accident Hazard (MAH) units.
- Under all the above scenarios, almost all the employees of the concerned and probably some employees in the adjacent unit will be affected, as the case may be.
- As the LPG bullets/spheres are located adjacent to one another, cascading may also happen within the unit.
- LPG bottling plants at Village Gudha as the quantities and therefore the damage potential is also very large. However, cascading effect amongst other units may not occur due to ample separation distance between them.
- Several LPG tank trucks are always parked near the gates of LPG Plant and also at the parking bay. This increases the hazard potential of the area.

6. OFF-SITE EMERGENCY PLAN:

It is not possible for a company to face a disaster single handedly and calls for use of all available resources in the surrounding areas. It is impossible to predict the time when an accident can occur in an installation. It occurs unexpectedly, calling for emergencies/disasters. An advance meticulous planning minimizes chaos and confusion which normally occur in such a situation and reduces the response time of disaster management organization. A well laid out procedure with proper chain of command, training ,mockdrills, arrangements for proper equipment and safety appliances, mutual aid with neighbouring industries and liaison with district collectorate, police, hospitals, Fire services etc help to take timely and appropriate action so that loss of property /human lives and damage to environment is minimum.

ACTION PLAN:

Plant Incharge of MAH Unit installation/Other unit will be the Works Incident Controller . He will incharge of all activities at the site of the incidence in the affected plant. He will act according to the On-site Emergency plan. He will rush to scene to occurrence and take overall charge and report to Chief Emergency Coordinator in case of disaster .Plant in charge will provide to COEC full details, nature and magnitude of the Emergency and the area likely to be affected.

The Deputy Commissioner, Karnal will be the Chief Off- site Emergency Coordinator (COEC) for operating the off site Emergency plan. Additional Deputy Commissioner will be the Deputy Off- site Emergency Co-ordinator (DOEC). The COEC will be the overall incharge of all off site Emergency activities in the district. The DC office, Karnal shall function as Emergency Control Room during office working hours i.e from 9am to 5p.m and DC Camp Office shall work as emergency control room after office working hours i.e 5pm to 9pm. Control Room will be equipped with detailed location maps of the district, towns & tehsils showing locations of MAH units ,Fire Stations, Hospitals, Roads, Rail Lines etc. During any Disaster all activities of Disaster management shall be conducted from the control Room.

- Emergency communication for emergency at Indane Bottling Plant (i.e MAH unit) and any other emergency like emergency during transportation of chemicals will be as per **Annexure I, Annexure -1-A & Annexure 1-B (attached.)**
- Emergency response organization will be as per **Annexure II attached.**
- Role of emergency organization will be as per **Annexure III attached.**

6.11 DUTIES & RESPONSIBILITIES OF THE DEPUTY COMMISSIONER/COEC IN CASE OF DISASTER IN THE DISTRICT

Pre-Incident:

1. The District Magistrate is overall incharge of all emergency operations to deal with Disaster arising any where in the district.
2. To constitute the District Crisis group in accordance with the Govt. Notifications S.O. 65/CA (EPP and R.) R. /2001.
3. Assessment of possible major hazards in the district with special focus on major hazard industry/ installations, major railway/ road accidents, air raids and the natural calamities e.g. Earth quake, flood, lighting etc.
4. Make the assessment of facilities and equipment available with all departments, organization and to suggest improvement for the up gradation of facilities and equipment for dealing with emergency.
5. Formulate District Disaster Management Control plan in order to mitigate the effects of disaster so as to minimize the loss of life property & environment. Nominate additional DDM Controller or his subordinate to take charge of control room in case of disaster.
6. To establish the District Disaster control room with suitably skilled person for taking action in case of emergency and to equip it with necessary information, documents route map, MSDS, composition and sufficient & effective mean of communication.
7. Issue instructions, standing order to all departments, organisation, industries and services to prepare and act in accordance with the District Disaster Management Plan.
8. Be familiar with the major hazards industries and installation as well as possible effects of natural calamities.
9. Ensure the training of all the members of DDM/P.
10. Ensure awareness in respect of the public emergency preparedness through News Paper, Radio, T.V. & D. P.R.O. etc.
11. Hold periodical mock/ training exercise to ensure optimum operational preparedness.
12. Review the efficiency of the DDM/P.

During the Emergency / Incident:

1. On getting information of the incident Deputy Commissioner will contact the site incident controller or other sources of information for detailed information regarding the level of emergency.
2. If he is satisfied that the emergency is major he will immediately put all the emergency services into action as per procedure laid down in the District Disaster Management Plan. After that he will rush to the scene of emergency if it is localized.
3. On reaching the accident site he will assess the gravity of the emergency.
4. He will ensure the arrival of all the emergency services at the site.
5. Direct and co-ordinate the activities of various agencies involved in the emergency operation like fire fighting, rescue operation, evacuation of employees and General public, shifting of injured to hospitals and management of casualties.
6. Keep in constant touch with District emergency control room.
7. Take latest information of the situation.
8. Direct the rescue operation.
9. Seek help from State crisis group and Central Crisis group, adjoining Districts and Central Government if required.

After the emergency / incident :

1. Declare the emergency to be over.
2. Arrange for the rehabilitation of evacuated public.
3. Ensure essential amenities for the public.
4. Keep watch on any disease/ epidemics due to and after effects of the emergency.
5. Arrange for the treatment rehabilitation of effected employees and public.
6. Provide relief under public liability Insurance Act 1991.
7. Investigate the cause of accident/ major emergency or constitute an investigating committee.
8. Arrange for the implementation of remedial action to prevent the recurring of emergency based on investigation.
9. Keep records of weakness/ shortfalls/ lapses and causes of failure of disaster control management plan during emergency operation and suggest measures for improvement.

6.12 DUTIES AND RESPONSIBILITY IN EMERGENCY

FIRE SERVICE

Pre - Incident :

1. To be aware of the location of major hazard units and potentially hazardous installation as well as the level of possible emergency.
2. To be familiar with works incident controller and key personal of each unit and their role.
3. To be familiar to deal with the leakage of flammable toxic substances.
4. To keep a list of adverse effects of chemicals and methods to deal with emergency involving each chemical in each unit.
5. Prepare the team to attend the emergency on each particular location.
6. Review the adequacy of existing facilities available with fire service Deptt., concerned major hazard units and suggest/ arrange to procure the additional equipments / facilities.
7. Review the adequacy of fire prevention arrangements in each unit (before and after the installation) and suggest to make adequate fire prevention arrangements.
8. Participate in mutual aid programme/ scheme with major hazard units and suggest for improvement in the existing plan.
9. Involve in on site emergency rehearsals/ mock drills.
10. Prepare the rescue plan for each unit in consultation with the management and review the arrangements for rescue operation suggest to procure or arrange to procure essential equipments for rescue operation.
11. Identify roads/ routs of access and escape.
12. Impart training to the fire fighting staff including the employees of major hazard units.

During the incident :

1. After getting the information, quickly rush to the scene of emergency.
2. Take incharge of fire fighting and rescue operations from works main controller and start the fire fighting operation.
3. Assess the level of emergency and inform district administration to take further action for evacuation.
4. Evacuate the employees inside the building/ plant.
5. Co-ordinate fire fighting activities of mutual aid group and the concerned unit.
6. Co-ordinate the operation to stop leakage or release of flammable / toxic substance.

7. Keep in touch with site incident controller of the industry and district administration.
8. Advise the district administration for the development of additional fire fighting personnel/ requirement of additional equipment etc.
9. Seek help of police/ civil defence in fire fighting operation.
10. Safe guard the adjacent property/ population from fire by confining the fire spread.
11. Search for injured/ trapped/ burried persons and casualties and take them out for first aid/ medical aid.

After the incident :

1. Ensure that there is no chance of re-ignition of fire/ leak / release at site before leaving the site.
2. Search for injured / casualties etc.
3. Make record of damages/ casualties / losses.
4. Make record of fire fighting facilities used.
5. Record the lapses/ promptness in action during fire fighting operation.
6. Check the conditions of drains/ Storm drain for the presence of harmful substances.
7. Investigate into the cause of fire in collaboration with investigating officer and suggest remedial measures for future.

6.13 DUTIES AND RESPONSIBILITY IN EMERGENCY

POLICE

Pre - Incident :

1. To help the planning team in the preparation of emergency plan.
2. To be aware of nature, causes and consequences of emergencies.
3. To be familiar with Major Hazard Units with personal visit.
4. To set up and maintain the emergency control room.
5. To stop/ control of dwelling in the vicinity of Major Hazard Units.
6. To control the encroachment/ congestion on the roadways leading to Major hazard unit.
7. Constitute teams to deal with emergency in different area on call and assign duties to SHO's of the area concerned.
8. Arrange for the participation in rehearsal.
9. Arrange for public address system and siren.
10. Explain evacuation procedure to general public.
11. Make arrangement for evacuation and dealing with Injured/ casualties.
12. Plan for traffic control for different areas.

During the incident :

1. Rush to the scene of emergency.
2. Be in regular contact of control room and Deputy Commissioner.
3. Take charge of fire fighting, rescue and evacuation operation.
4. Keep in touch with works main controller of affected unit.
5. Arrange to send the Injured/ affected persons to hospitals.
6. Arrange to control the traffic.
7. Arrange to cordoned off/ barricade the affected area.
8. Maintain the law and order in the area.
9. Declare and arrange for the evacuation of general public to a predetermined safe place.
Communicate with General public.
10. Arrange to guard the public property in the evacuated area.
11. Search the affected area for injured/ affected person and casualties in the unit and out side the unit.

12. Report all significant development and activities to D.C.
13. Take/ preserve evidences.
14. Arrange to deal with casualties.
15. Assist the medical services.
16. Assist the fire fighting team.

After the incident :

1. Arrange for the rehabilitation of evacuated person.
2. Arrange to put the traffic to normal.
3. Communicate the situation to general public.
4. Arrange to give information of Injured/ affected personals and casualties to their relatives.
5. Keep the record of injured / casualties.
6. Set up communication center to give information to the relatives of affected persons.
7. Keep watch on law and order situation.

6.14 DUTIES AND RESPONSIBILITY IN EMERGENCY

MEDICAL DEPARTMENT

Pre - Incident :

1. Keep a list of Major Hazard Units and hazardous chemicals used.
2. Prepare a list of antidote for each chemical.
3. Have the estimate of affected persons in case of emergency in each major hazard unit.
4. Make necessary arrangements for first aid and affected people in various hospital/ nursing home.
5. Keep liaison with all nursing homes and hospitals and have the information of their capabilities along with services available.
6. Send notices to all the nursing homes/ hospital to be prepared for emergency specifying the services to be rendered during emergency.
7. Plan for medical services area wise i.e. select / appoint the hospitals for each area or unit.
8. Arrange/ nominate the medical crew to reach at site for medical aid.
9. Arrange for ambulance/ mobile medical aid for affected site.
10. Arrange to plan adequate beds for affected persons.
11. Arrange to deal with casualties.
12. Plan for additional capacity in hospitals.
13. Arrange for rehearsal and training of medical staff.
14. Arrange for the buffer stock of medicine.
15. Establishment of information center capable of providing relevant information in an emergency on the diagnosis , treatment and rehabilitation of persons injured by chemicals.
16. Take part in exercise with the other relevant authorities involved in emergency plan.

During the incident :

1. On getting information rush to the hospital.
2. Arrange for relevant emergency medicine, blood and antidote in sufficient quantity.
3. Keep in constant touch with D.C./ SP/ AD to know the scale of emergency and no. of people affected.
4. Send the medical crew and ambulances to the affected site for onsite medical aid.

5. Ensure the arrival of all medical staff to their pre-assigned locations.
6. Inform the various hospital to arrange for immediate medical aid.
7. Direct the injured / affected people to different hospital as per premedical plan.
8. Arrange for the treatment for injured and affected person.
9. Take account of the persons attended in the hospitals and admitted for treatment.
10. Deal with casualties.
11. Inform any development or change to Deputy Commissioner.

After the incident :

1. Take account of the affected / admitted persons.
2. Arrange for the treatment of the side effects (long term)
3. Research for any kind of chronic disease/ epidemics after the incident due to long term effect of chemicals.
4. Attend the injured people in hospital.
5. Report all significant development to D.C.
6. Arrange to release the people after treatment.
7. Record all developments/ treatment given during emergency.
8. Give preventive advice and medicine to public.
9. Advise the people and district authorities to take particular precaution related with health, in future i.e. preventive measures and medicine.
10. Arrange medical camps in affected are for the treatment of general public and study purpose.
11. Ensure the availability of essential/ life saving drugs in affected area.
12. Arrange for follow up medical examination.

6.15 DUTIES AND RESPONSIBILITY IN EMERGENCY

TRANSPORT

Pre - Incident :

1. To be familiar about the probable locations/ installation/ industries where emergency can arise.
2. To be well familiar with the routes of the potential hazardous installations.
3. To be familiar with the level of emergency and the no. of person to be shifted from the site of emergency.
4. To earmark the safe and shortest route from the probable scene of emergency/ installation to the shelter.
5. To earmark the shelters & hospitals.
6. Plan to provide sufficient number of vehicle for evacuation & necessary medical services.
7. Make the evacuation point on which the vehicle will be provided for evacuation of General public at the time of emergency.
8. Training to the driver and concerned person in rendering the efficient transport.
9. Decide the alternate route for emergency.
10. To maintain the transport in an efficient and roadworthy condition.

During the incident :

1. After getting the information of level of emergency send the required number of vehicles.
2. Arrange the sufficient number of vehicle to shift the injured from emergency spot to hospital / camp evacuation.
3. Arrange the sufficient vehicle for the casualties.
4. To make arrangement for quick repairs of vehicles or to kept ample rescue spare vehicle or repairing part.
5. Earmark the vehicle for rescue operation.
6. Help in evacuation of the general public.

After emergency :

1. Arrange to normalise the traffic
2. Make arrangement for shifting of general public from shelter to their residence after the situation become normal.

6.16 DUTIES AND RESPONSIBILITY IN EMERGENCY

PUBLIC RELATION OFFICER

Pre - Incident :

1. Collect the information of major hazard units, chemicals used, their adverse effects, toxicological data and emergency measure to be adopted.
2. Prepare plan of evacuation in consultation with MAH unit, police and fire brigade which should include points of evacuation, vehicles to be used, shelter etc.
3. Translate the information regarding emergency procedure in the language best understood to the general public in the locality.
4. Publicize the information in the interest of public for awareness through.
 - Booklets/ Pamphlets
 - Radio / television
 - Film shows
 - Newspaper.
5. Arrange the mock drill.
6. To create the awareness among the General public by suitable means like - documentary film/ cable and door-to-door visit, meetings etc.
7. To involve the person from local community in the emergency evacuation.
8. Training personnel in emergency response.
9. Provide informations to the general public, issued by the District administration from time to time.
10. Liaison with NGO's for participation in Emergency control.

During the incident :

1. After receiving the information immediately rush to the scene of emergency.
2. With the advise of chief co-coordinator start the evacuation of affected person by mean of public address system.
3. Ensure the safe route of evacuation.
4. Keep watch on new developments.
5. Provide factual position to the general public about the emergency to evert the panic & rumor situation.

6. Provide the information regarding the nature of emergency and action taken by the Govt.
7. Provide the necessary instruction as issued by the Govt. to the General public at the time of emergency.
8. Ensure the preventive steps are taken by various agencies.
9. Ensure the various agencies, those are participating in emergency control does not receive any complicity in composing message.
10. To keep in touch with DM/ SP/ other agencies involved in emergency operation.

After emergency :

1. Help in rehabilitation of the affected person by means of providing.
 - Food/ drinking water.
 - Shelter / clothing etc.
2. Develop the good relation between affected, Community Govt. and other agencies.
3. Issue the authentic information to the community, affected persons and mass media.
4. To mobilize public support after the emergency.
5. To get the feed back from the community with regard to any other new development.
6. To keep in touch with District Administration.

6.17 DUTIES AND RESPONSIBILITY IN EMERGENCY

INDUSTRIES

Pre - Incident :

1. To prepare the physically, practicable on site emergency plan.
2. To formulate the accident prevention and emergency preparedness plan.
3. To create awareness among the general public pertaining to the possible emergency due to industrial activity.
4. To conduct the risk assessment in the concern unit.
5. To assist the local administration in establishing the good harmonious relation with general public and other emergency response agencies and provide awareness how to act in case of off site emergency.
6. To create a emergency control room in unit.
7. To encourage the most dedicated & other employees in control of the emergency.
8. To monitor & ensure that all available facilities for emergency are in good working condition.
9. Up to date the on-site emergency plan/ emergency preparedness.
10. Prepare to respond or remove confusion to the general public.
11. Proper road & means of escape route should be earmarked.
12. According to risk assessment ensure the adequate quantity of water for fire fighting.
13. To provide the training to the all concern.

During the incident :

1. To mobilise all the emergency resources into action as per plan i.e. control the fire or stop the toxic release if possible.
2. And inform all the related agencies. Raise emergency alarm.
3. Assess the gravity of emergency and declare emergency.
4. Receive outside aid at the control room.
5. Help the local administration for safe evacuation.
6. Explain the level of emergency to the local administration with facts.
7. Co-ordinate with other rescuers & combating operation team.
8. Provide the technical guidance to the various operation team & local administration.
9. All key personnel must be keep in touch with local administration.

10. Shut down the plant to confined the emergency.

After emergency :

1. Declare the termination the emergency after assessment.
2. Clean the spot site as soon as possible and dispose off the harmful substances in safe manner.
3. Establish links with general public/ leaders and local administration.
4. Keep watch on the situation for any other new development and inform to local administration.
5. Help the rehabilitation & salvage team for quick aid.

6.18 DUTIES AND RESPONSIBILITY IN EMERGENCY

MUNICIPAL COMMITTEE

Pre - Incident :

1. To be familiar with major hazard units possible emergency situation their consequences etc.
2. Plan to provide the building/ guesthouses at different locations to establish control room. First aid, Medical center or shelter at the time of emergency.
3. Review the equipments, vehicle, crane manpower etc. for rescue, demolition or salvage purposes in relation to the possible level of emergency.
4. Prepare a rescue demolition / salvage team to be rushed to the scene of emergency on call.
5. Be familiar with the routs of emergency scene and escape routes.
6. Procure the equipment's essential for dealing with emergency.
7. Insure the training of team in emergency operation.

During the incident :

1. Emergency team will rush to the scene of emergency immediately on call.
2. Help in rescue and fire fighting by providing the suitable equipments like dumper dozer, crane earthmover etc.
3. Help in taking out the people trapped in the building, plant by removal of debris and other obstruction.
4. Help in taking out the dead bodies from debris.
5. Help to prevent the flow of flammable/ toxic materials into the common drain.
6. Help to drain out the pool of water / excessive water from the site.
7. Help in any construction / demolition activity required for dealing with emergency.

After emergency :

1. Help in removal of debris from the site.
2. To repair the damaged services like water, sewer line and road etc.
3. To clean all the sewer and a surrounding to protect the general public from disease.
4. To repair the damaged road.
5. Help in normalizing the general life.
6. Arrange for the corps and disposal service.

6.19 DUTIES AND RESPONSIBILITY IN EMERGENCY

CIVIL DEFENCE

Pre - Incident :

1. To be familiar with major hazard units, chemicals used and other informations regarding the emergency.
2. Arrange for shelter at different locations for general public with the help of Municipal Corporation and other department in respect of probability of population to be affected.
3. Make arrangements to help in fire fighting and salvage operation.
4. Plan for food and water supplies in shelter camp with the help of NGO's and Govt. Deptt.
5. Create public awareness for emergency procedures i.e. preventive measure and evacuation procedures during emergency.
6. Plan for medical aid with the help of CMO.
7. Plan for rehabilitation in collaboration with the district administration.
8. Co-ordinate the activities of all NGO's and social organisation.
9. Help in developing evacuation procedure and liaison with Public Relation Officer.
10. Plan to help in medical and first aid.

During the incident :

1. Help in fire fighting and rescue operation.
2. Help in evacuation operations.
3. Help the police in maintaining law and order and piece.
4. Help in controlling the traffic.
5. Involve in first aid / medical aid team.
6. Help in dealing with casualties and injured people.
7. Help in providing shelter, food, water and other essential amenities for general public.
8. Help in maintaining relation with public.
9. Help in giving information to the relatives of the affected persons.
10. Provide all equipment and manpower for dealing with emergency.

After emergency :

1. Help in the rehabilitation of the general public in planned manner.
2. Help in providing the supplies of essential immunities in perfect condition.
3. Help in maintaining the peace and develop confidence in the general public.
4. Help in relief operation.
5. Help in maintaining law and order.

6.20 DUTIES AND RESPONSIBILITY IN EMERGENCY

INDUSTRIAL SAFETY & HEALTH

1. Conduct Inspection of Major Accident Hazards (MAH) factories to ensure the adequacy of the safety and health arrangement by directing the occupiers where any deficiency is observed.
2. Examine the adequacy of emergency arrangements during the regular inspections of the Factories Act, 1948 and Rules framed there under in consonance with the instructions issued by the Chief Inspector of Factories, Haryana in this regard from time to time.
3. Direct the managements of the MAH factories to prepare and submit their onsite emergency plans.
4. Direct the management of the MAH units for the hazard assessment of their units by conducting safety audit, hazop study, hazard analysis etc. and to have the copy of the same to get information and to suggested corrective action.
5. Constitute the mutual aid group of the factories to deal with emergency.
6. Get the sufficient information hazards and mitigation efforts from each MAH unit.
7. Arrange the meeting of district crises group.
8. Participate in preparation of District Offsite Emergency Plan.
9. Ensure the rehearsal of the periodic mock drill of the onsite emergency plan of MAH units by directing their occupiers.
10. To assist in rehearsal of mock drill of the District Offsite Emergency Plan.
11. Investigation of the incident / accident at the earliest.
12. To keep the list of MAH units updated.
13. Suggest remedial measures in case of incident / accident to prevent reoccurrence.
14. Direct the management in whose unit any incident / accident happens to implement adequate safety measures pointed out in the investigation of the incident/ accident.

6.21 DUTIES AND RESPONSIBILITY IN EMERGENCY

POLLUTION CONTROL BOARD

1. On receipt of information officer of the Pollution control board shall proceed to the affected site.
2. Conduct investigation including collection of data.
3. Ensure that the spills have been totally contained with no further damage possible to humans and environment.
4. In the case of any contamination to the environment, to arrange, with the help of the industry and other agencies, decontamination of the area. Further to declare the area fit for re-entry after the decontamination is completed.
5. In case of an environmental disaster, the pollution control board shall, based on the contaminant released in to the environment, carry out with the help of the industry and other agencies, such investigations as may be necessary to establish the degree of contamination. Arrange for suitable decontamination using resources available in the area as well as with the board.

6.22 DUTIES AND RESPONSIBILITY IN EMERGENCY

PUBLIC HEALTH DEPARTMENT (PWD)

Before the Incident :

1. Be aware of locations of MAH units and potential hazard.
2. Make standby arrangement of generator for running the water pumps.
3. Ensure availability sufficient spare parts.
4. Ensure the availability of site plan of drinking water line and fire water line.
5. Keep sufficient manpower to repair and restore the water supply arrangements.
6. Keep sufficient number of water tanker for the supply of water in emergency.

During the incident :

1. Rush to his office.
2. Call the essential person of PWD department.
3. Be in the state of readiness to attend the damage on call.
4. After receiving the call of damage in water supply system, send the manpower alongwith material for repair.
5. Arrange to send the drinking water by tanker in the area where water supply is disturbed.
6. Arrange to start the supply of contaminated water.
7. Arrange for decontamination of water or water sources.

After the incident :

1. Ensure the repair of all water supply arrangement.
2. Ensure the supply of pure water in all areas.
3. Inspect entire system of water supply.
4. Restore water supply in all areas.

6.23 DUTIES AND RESPONSIBILITY IN EMERGENCY

PWD

Before the Incident :

1. Executive Engineer will lead the rescue team.
2. Be aware of all MAH units and vulnerable buildings.
3. Constitute a rescue team of his own department and nominate the employees for rescue team.
4. Liaise with District authority and give account of all equipments and facilities available with the CPWD department.
5. Earmark the route for each MAH units and vital installation.

During the incident :

1. After getting the information of incident, rush to his office.
2. Ensure to call all members of the rescue team and call back all equipments from various site.
3. Remain in the state of readiness to rush to the site of incident and wait for call.
4. Get in constant touch with D.C. and district administration.
5. Rush to the scene of emergency with all manpower and equipment on request.
6. Direct rescue operation at site.
7. Arrange for the recovery of injured/ dead from damaged building.
8. Make provision of demolition on the request of the service department.

After the incident :

1. Demolish the weak structure/ building which are likely to cause hazard to the public.
2. Arrange to provide the supports or repair the buildings.
3. Arrange for the repair of roads.
4. Arrange for the restoration of situation.
5. Help in removal of debris and contaminated water.

7. TELEPHONE DIRECTORY:

7.1 Control Room

S.No:	Control Room	Location	Phone No
1	District Crisis	DC Office Camp Office	2267500,2255300 2254000
2	Indane Bottling Plant, Village Gudha.	Control room	01748-259253, 259255, 201253

7.2 Expert Agency

S.No.	Agency	STD code	Phone No.
1.	National Crisis Control Room	011	24360734
2.	Dr. V Rajgopalan, Joint Secretary, Ministry of Environment & Forests, Govt. of India	011	24361760, 24101754
3.	Director, Hazardous Substance Management Division	011	24360060
4.	DG-FASLI, Mumbai	022	4074358 4092203
5.	National Safety Council, Mumbai	022	4073694 4073285
6.	Disaster Management Institute, Bhopal	0755	566715 293592
7.	Mr. B N Jha, Assistant Director (S), Inspectorate of Dock Safety, Near Bunder Gate, New Kandla	07249	270724
8.	Dy. Controller of Explosives, Raopura, Vadodara	0265	2420512
9.	Dr. T V Subbaiah, Director Manufacturing, Alembic Chemical Works Co. Ltd., Vadodara	0265	2338466, 2330550 2340816
10.	Dr. H N Saiyed, Director, National Institute of Occupational Health, Ahmedabad	079	2865142, 2866237
11.	Dr. T Rangarajan, Exec. Director (Technical), KRIBHCO, Surat	0261	8420061, 8420426 8420986
12.	Mr. J S Baxi, GM, ONGC, Chandkheda Complex, Ahmedabad	079	2486176
13.	Mr. D V Chudasama, Sr. Manager	0278	225322 to

	development, Excel India Ltd., Bhavnagar		225326
14.	Mr. D R Babalal, Nisarg Environmental Protection Agency, Gandhinagar	079	2321945

7.3 LIST OF NEAR BY SAFETY EXPERTS-

Sr. No.	Name & Address of the Safety Expert	Contact no.
1.	Mr. Ankit C/o. Chill worth (all kind of safety expert)	09560001625
2.	Sh. Alok Dhingra, DM(P), IOCL, Karnal for LPG fire	9466140686
3.	Mr. P. K. Aggarwal, Chief Manager Fire and Safety C/o. Panipat Refinery, IOCL, Panipat (for Petrol, Diesel etc fire accident)	0180-2522371, 2578820 09896419939
4.	Mr. V.C. Gulati, NFL Panipat (for Ammonia accident)	09896066311
5.	Mr. P.S Bhatti C/o. IOC Karnal, Vill. Guddha, Kohand, Assandh Road, Distt. Karnal (Haryana) (for LPG accident)	08901000789 01748-259252
6.	Mr N.S Maan, Assistant Director(Industrial Safety & Health), Chemical, Panipat.	09466119944
7.	Mr. Prem Shankar Rawat C/o. of Parabolic drugs Ltd., I/A, Panchkula	09317749916, 09317749908
8.	Mr. Ullash Kumar Sovani C/o. BILT, Yamuna Nagar	09812302537 09812558654 09812302575
9.	Mr. Dinesh Pandey C/o. N.V Distillery Ltd., Badhouli, Naraingarh, Ambala	09355338054 03955691815
10.	Mr. Rajeev Mishra, Chief Safety Officer, Saraswati Sugar Mill, Yamuna Nagar	09728100757 01732-307585
11.	Mr. Jaideep Kumar C/o. Lalru Territory, Vill. Alamgir, Teh. Rajpur, Lalru, Punjab (for LPG accident)	09466133277 01762-275573
12.	Mr. Vinod Kumar C/o. IOCL Ltd., G.T Road, Ambala Cantt (for Petrol, Diesel etc fire accident)	09996616843

13.	Mr. Naveen Saini, Asstt. Director, IS&H (Chem.)	9416120928
14.	Sh. Subhash Rakshit, DM(T), IOCL, Panipat, for Diesel, Petrol, Naptha and Kerosine Fires	9996681571

7.4 EMERGENCY TELEPHONE NUMBERS:

1	Deputy Commissioner/ COEC	0184-225400,2267500,2255300
2	A.D.C	0184-2267351,2201300
3	SP Karnal	0184-2267700,4091002
4	SDM , Karnal	0184-2267701,2254520
5	SDM,Indri.	2383700
6	SDM, Assandh	01749-278334
7	GM, Haryana Roadways, Karnal	0184-2254290,2267422
8	DTO, Karnal	0184-2251600,2651454,2668668
9	CMO , Civil Hosp., Karnal	0184-2267796
10	Fire Officer, Municipal Council, Karnal	9896973629
11	Fire Brigade, Gharaunda	01748-2524701,101
12	Fire Bgrade, Panipat	0180-2650458
13	SHO , Gharaunda	01748-250029
14	Fire Station, Panipat Refinery.	0180-2524333 0180-257872
15	Red Cross Society, Karnal	0184-2272186
16	Regional Officer, HPCB	01732-200137
17	DPRO, Karnal	0184-2267746, 2275455
18	Deputy Director, Industrial Safety & Health, Panipat. Asstt Director(IS&H),Karnal Assistant Director, Industrial Safety & Health, Chemical.	0180-2651724 9812650026 09466119944
19	GM ,DIC,Karnal.	0184-2230592
20	DFSC, Karnal	0184-2258963
21	X En., Public Health, Karnal	0184-2650003, 2654934, 2680644
22	Tehsildar Karnal	9416077000
23	Tehsildar, Gharaunda	9254169511
24	Tehsildar, Indri	9888889340
25	Plant Head, Bottling Plant, Karnal.	1748259252,0180-2585153
26	Executive Officer,Municipal Council, Karnal	9996300004,2273359(o)
27	Panipat Marketing Complex	0180-2578859
28	BPCL Baholi	0180-2578884,2578885
29	NFL,Panipat	0180-2652876
30	Panipat Thermal Power Station,Panipat	0180-2578859
31	Arpana Hospital,Karnal	01748-2380801,01748-2380802
32	Control Room, Indane Bottling Plant, Gudha Karnal.	01748-259253, 201253
33	BD&PO, Karnal	2252748(o), 94163-02005
34	BD&PO, Nilokheri	01745-

		246223,9991310040
35	BD&PO, Gharaunda	94163-52252
36	BD&PO, Indri	2382279(O), 94666-84041
37	BD& PO,Nissing	2290242(O),90346-02507
38	BD&PO,Assandh	01749-278221(O),94162-96845

7.5 TELEPHONE NO.S OF POLICE DEPARTMENT

S. No.	NAME	DESIGNATION	TELEPHONE NO	MOBILE NO.
1	Sh. Rakesh Kumar Arya, IPS	SP KARNAL	0184-2287700,4091002	8930302001
2	Sh. Surender Singh, HPS	DSP HQ	0184-4091004	8930302003
3	Sh. Joginder Rathi, HPS	DSP CITY	0184-4091005	8930302004
4	Sh. Madan Lal, HPS	DSP ASHAND	01748-276356	8930302056
5	Sh. Keerat Pal, HPS	DSP INDRI	0184-2383300	8930302002
6	Sh. Rajesh, HPS	DSP KARNAL	0184-4091020	9729999907
7	Sh. Rajesh, HPS	DDA	0184-4091006	9729999907
8	Sh Nand Kishore	CIA1	0184-2287860	8930302022
9	Ins. Manoj Kumar	CIA2		9050100002
10	Si. Devndar Kumar	INS. DETECTIVE	0184-4091005	8930302023
11	Ins. Hardev Singh	WI		9896400101
12	Ins. Rambhuj			9466232900
13	S.I. Kulbeer Kaur	WOMEN CELL	0184-40910108	9416202825
14	Ins. Ramesh Kumar	PS CITY KARNAL	0184-2255716	8930302011
15	SI. Omprakash	PP RAMNAGAR	0184-2290405	8930302007
16	Satvinder Singh	PP SADAR BAZAR	0184-2258398	9466067745
17	Jasvinder	PP BUS STAND		9466789041
18	Ins. Manoj Kumar	PP SECTOR 4	0184-22205000	9466321429
19	SI. Ishwar Chander	PS CIVIL LINE	0184-2274848	8930302012
20	Jagannath	PP SECTOR 13	0184-2207202	9896538635
21	SI. Sukhender	PP SECTOR 6	0184-2284004	9896066019
22	Si.Ram Bhajan	PP SECTOR 9		9896066019
23	ASI. Kuldeep Singh	PP MODEL TOWN	184-2267850	9896551267
24	SI. Pritam Singh	PS SADAR	0184-2255896	8930302013
25	Subhash Chand	PP JUNDALA	01745-274159	9416454446
26	ASI. Charan Singh	PP RAMBHA	01745-201568	9416989196
27	Ins. Mahesh Kumar	PS BHUTANA	01745-245100	8930302014

28	ASI. Ramphal	PS NIGDU	01745-267753	9466789030
29	SI. Baljeet Singh	PS TARAORI	01745-243400	8930302015
30	Jagdish Mor	PS MADHUBAN	0184-2380825	8930302016
31	Ins. Shri Ram Sawroop	PS GHARAUNDA	01748-250029	8930302017
32	ASI. Surinder Singh	PP MUNAK	01748-201649	9896910286
33	SI. Devedendra	PS KUNJPURA	0184-2354084	8930302018
34	SI. Sanjeev Malik	PS INDRI	0184-2382229	8930302019
35	ASI. Deep Chand	PP BIYANA	0184-2396149	9416781864
36	Ins. Subash Chand	PS ASSANDH	01749-278234	8930302020
37	ASI. Jaipal	PP JALMANA	01749-284266	9466891382
38	SI Wazir Singh	PP BALLA		9255138106
39	SI. Satpal	PP SALWAN		9896917447
40	SI. Ishwar Singh	PS NISSIND	01745-271029	8930302021

7.6 Press Corrospodents District Karnal

<u>DESIGNATION</u>	<u>OFFICE</u>	<u>RESIDENCE</u>	<u>MOBILES</u>
S/Shri	-	-	-
Hindustan Times			
Vishal Joshi			9354221644
The Tribune			
Bhanu P. Lohami	2266070		9996623883
Ravi Kumar, Photographer			9466048259
PTI			
T.C.Gupta		2230670	9813211670
UNI			
Rajesh Sharma		2257919	9416275175
The Hindu Business line			
Nitish Sharma			9466623384
Dainik Tribune			
Vijay Sharma		2266080	9215271800
Punjab Kesri Jalandhar/Amabala/Panipat			
Shailender Jain, B.Chief			9996789937
Harish Chawla	9996789965	9255757533	9896067538
Parveen Walia	8950645617	8901580322	
Mrs. Alka Singla			9815606930
Mrs. Devender Kaur Bhinder, Photographer	9255479433	2254737	9991610342
Punjab Kesri Delhi			
Sunny Chauhan, B.Chief		9896722864	9416301177
H.O.Gandhi			9996390100

Surinder Marwaha		9416032600	9896865176
Love Kishore Ganotra		9813013345	9896215634
Ajay Goyal			9996301000
Gian Parkash Bagi		9215506003	9315515295
Dainik Jagran			
Raj Kumar Prince, B.Chief			9896276156
Ashwani Sharma			9996155749
Manoj Chaudhary			9896196999
Karmabir Lathar			
Anil Bhandari, Photographer			9896345888
Amar Ujjalla			
Mukesh Tandon, B.Chief			9466516999
Lalit Ahuja		9416034050	9255408850
Azad Singh			9466648431
Chaman Lal, Press Photographer		9996188801	9255557925
Dainik Bhaskar			
Sushil Barghav, B.Chief	2273655	2255647	9671717000
Ramesh Pal			9671716541
Ramesh Saroha			9416871655
Parveen Arora	2273655	9671705749	9671705749
Dharam Singh, Photographer			9671792533
Pehli Khabar/Gangaputra times			
Bishpal Rana, B.Chief		9034260662	9416468707
Uttam Hindu Daily			
Ashutosh Gautam, B.Chief	2257909	9254012160	9813012160
Kadam Singh, Photographer		9466388166	
Veer Arjun			
Aman Sachdeva, B.Chief		5533662	9416281238
Punjabi Tribune			
Sukhvinder Sohi		2266070	9254000615
Ajit Punjabi			
Gurmeet Singh Saggu	9991610345	2240830	9896362113
Ajit Samachar			
M.S.Nirmal, Correspondent		2396232	9416259900
Yashpal Kadian, Correspondent		2283030	9812061570
Hari Bhoomi			
Dharmender Khurana, B.Chief	2250999	9215607100	9017507100
Rastriya Sahara			
Vikas Sukhija, B.Chief	2273256	2253256	9896050580
Viomkesh Times (Evening Paper)			
Khush Dyal Sharma, Editor	951745-245200		9416002201
Abhi Abhi (Evening Paper)			
Devender Gandhi			9215710050

Divay Himachal/ANI			
Karamjit Singh Virk			9416368478
New Bright Star			
Krishan Lal (Shankar)		9215636777	9416956777
J.K. Sharma			9354108188
Sach Kahoon			
Randhir Rana, B.Chief		9215572019	
Surinder Mokal, Correspondent		9466753100	9991610433
Nai Duniya			
Rajender Chauhan			9812116926
Bhedi Nazar Dainik			
Amit Sharma		98967451004	9043130844
Aaj Samaj			
Shishpal Rana, B.Chief			9813430001
Arvind Chauhan, Reporter			9034300313
Rajesh Chaudhary (Cameraman)			9255450182
Najar Aap Tak (Evening Paper Daily)			
Dr.Ashok			9215544515
Pankaj Sharma			9017377778

7.7 TELEPHONE NO.S OF VOLUNTARY ORGANISATIONS				
S No	Name Of Department	Name of Incharge	Office	Residence
1	District Red Cross Society ,Karnal	Secretary	2272188	
2	Shiv Kripa Mandal, Civil Hospital Premises		9416030899	
3	Pabhu Kripa Mandal, Civil Hospital Premises		9896011314	98960011314
4	Sardhananda-Nand Ashram, Karantaal, Karnal		2271288	
5	Mhavabeer Dal, Karnal	Sh. Satish Goyal, Secretary	2274234	2255578
6	MDD, Bal Bhawan , RajeevPuram, Karnal		2284235	9896011314
7	Jaycee Club, karnal		9812008140	9812103434
8	Arya Samaj , Karnal	Sh. Dinesh Lather, President	2256199	
9	Manav Seva Dal, Karnal	Swami Prem Murti	2254415	2203320
10	Sri Ramsamkirtan Mandal, Karnal	Sh. Vishan Das, Secretary Karnal	2273477	2203577
11	Sh. Jai Sewa Dal, Karnal	Sh. Amar Nath,	2268689	

		President		
12	Maharaja Agarsain Charitable Trust, Sec-3, Main Market, Shop No: 99, KNL	Sh Parveen		8930692553
13	Karnal Junior Chamber, Karnal	Sh. Kapil Garg	989604789 7	

Telephone list: Sarpanches Block Karnal

Sr. No.	Name of Gram Sachiv	Name of Gram Panchayat	Name of Sarpanch	Father's/ Husband's Name	Mobile No.
1	Parkash Chand	Dhakwala	Karm Singh	Janesar	9416660070
	9416868813	Nalvi Kalan	Renu	Shakti Singh	9050461000
		Nalvi Khurd	Jasmer	Ant Ram	9416656284
		Nalvipar	Parkash Devi	Puran Singh	9813446519
		Kunjpora	Mahinder Kumar	Ram Kala	9416483247
		Dabarki	Seema	Puran	9813648580
		Chundipur	Pushpa Devi	Kirpal	9813648403
		Nasirpur	Savita	Krishan	9466552071
2	Subhash-II	Danialpur	Tek Chand	Mahinder Singh	9813295172
	9466541337	Mainmati	Jagdish	Kehar Singh	9466389177
		Newal	Pintu Nayak	Ramesh Singh	9215531115
		Rindal	Om Devi	Surender	9050171716
		Mugal Majra	Arjun	Kalu Ram	9991956661
		Mehmadpur	Bala	Pal Singh	9416323033
		Mohidinpur	Ishwar Devi	Gela Ram	9671405425
		Tikri	Seeta	Satbir	9813243495
3	Rohtas Kumar	Rasulpur Kalan	Jai Parkash	Mam Singh	9416653126
	9416989125	Sarfabad Majra	Sandeep Kumar	Jeet Singh	9991243000
		Subhri	Shyam Lal	Suraj Bhan	9991523009
4	Subhash-I	Chaura Khalsa	Om Devi	Baldev Singh	9813880003
		Ramba	Sukhbir Singh	Santu Ram	9896842512
		Salapura	Sunder Singh	Surjan Singh	9813450176
		Salaru	Vikramjeet	Puran Chand	9896588386
		Chorpura	Mewa Singh	Hari Singh	9416174039
5	Shyam Lal	Ganjo Garhi	Satpal	Ram Parsad	9416814501
	9416468330	Kachhwa	Chandermani Narang	Haray Chand	9416031087
		Kalampura	Kusum Devi	Shiv Kumar	9813450908
6	Satish Kumar	Ranwar	Raj Pal	Parsa Ram	9813946773
7	Sunder Singh 9813608790	Kharkali	Bulli Devi	Banwari Lal	9813510334
8	Partap Chand	Budhanpur	Surender Kumar	Kansi Ram	9813178910
	9253320226	Pundrak	Saroj Bala	Karmbir	9671140032
		Rukkanpur	Madan Lal	Suraj Bhan	8950679064

9	Hari Chand	Bazida Jattan	Ashok Kumar	Prem Singh	9416566375
	9255147948	Bhoosli	Rajesh Kumar	Om Parkash	9812700007
		Kalwaheri	Surender Kumar	Jiya Lal	9215600356
		Khirajpur	Bateri	Mam Raj	9813642500
		Taprana	Ranbir Singh	Sohan	9466028596
10	Narender Sharma	Bazidpur	Kuldeep Kumar	Lal Singh	9996211827
	9896330036	Churni Jagir	Jagjeet Singh	Harinder Singh	8053671199
	9416257967	Makkhu Majra	Ved Parkash	Lilu Ram	9050232811
		Jaroli	Brahmjeet	Rohtas	9354653589
		Modipur	Bimla	Sushil Kumar	9416172236
		Nabipur	Reena Devi	Sanjay Kumar	9728674006
11	Mahender Sharma	Darar	Som Nath	Prem Chand	9991054345
		Kurali	Sukhdev Raj	Gori Sankar	9996031535
		Sangoha	Richhpal	Heera Singh	9416469920
		Rattan Garh	Ram Niwas	Ramdia	9896092133
		Sangohi	Mamta Rani	Suresh Kumar	8053863300
		Uncha Samana	Pooja	Sanjeev Goswami	9416068500
12	Harsh Dutta	Baragaon	Anguri Devi	Puran Chand	9466239610
	9253138891	Gheer	Lajwanti	Ishwar	9991722475
		Landora	MAnoj Kumar	Sham Lal	9215932005
		Shergarh Tapu	Rattan Singh	Punna Ram	9812894890
13	Narender Gupta	Nagla Megha	Puran Chand	Parsa	8953173424
	9541763000	Sheikhpura Jagir	Neelam	Bhupender Singh	9212100086
		Sohana	Jagbir Singh	Chandgi Ram	9416781841
14	Anand Kumar	Chhapra Jagir	Ramesh Kasyap	Sadan Ram	9416801710
	9541763000	Dilawara (Andhera)	Kavita	Gopal	9466773557
		Maglora	Sudesh	Devi Singh	9896744038
		Margain	Krishan Lal	Rattan Lal	9050435225
15	Om Parkash	Rasulpur Khurd	Baljeet	Multan	9254100456
	9896349778	Mustafabad	Lakhi Ram	Sohan Lal	9896190846
16	Kishan Chand	Abdullapur	Sohan Lal	Gala Ram	9896072496

Telephone List: Sarpanches Block Gharaunda

Sr. No.	Name of Village	Name of Sarpanch / Lambardar / Gram Sachiv	Mobile No.
1	Amrit Pur Kalan	Om Pati Devi (Sarpanch)	9813198809
2	Amrit Pur Khurd	Karn Singh -do-	9896010272
3	Lal Pura	Suresh Kumar -do-	9991992811
4	Sadar Pur	Rani Devi -do-	9728656900
5	Peer Badoli	Seema Devi -do-	9813059081
6	Mundi Garhi	Meharban -do-	9991251927
7	Balhera	Shrafat Ali -do-	9813989323
8	Garhi Bharal	Khatija -do-	9991435434
9	Amrit Pur Kalan	Sapatar Singh (Lambardar)	9813505274
10	Amrit Pur Khurd	Mohar Singh -do-	-
11	Lal Pura	Kareshan -do-	9991236053
12	Sadar Pur	Sudarshan -do-	9416292676
13	Peer Badoli	Randhir -do-	9255564436
14	Mundi Garhi	Mohammad Sajad -do-	9896413308
15	Balhera	Sampal -do-	9466620276
16	Garhi Bharal	Gulab Singh -do-	9813233150
17	Amrit Pur Kalan	Shyam Sunder (Gram Sachiv)	9896252144
18	Amrit Pur Khurd	-do-	-do-
19	Lal Pura	Darshan -do-	9255324361
20	Sadar Pur	-do-	-do-
21	Peer Badoli	-do-	-do-
22	Mundi Garhi	-do-	-do-
23	Balhera	Suresh -do-	9896921360
24	Garhi Bharal	-do-	-do-

8. MEDICAL & FIRE FIGHTING FACILITIES IN THE DISTRICT KARNAL:

A) IDENTIFICATION OF MEDICAL FACILITIES :

Facilities Available

1) G.H ,Karnal

*Round the clock emergency services in Trauma Centre.Ph: 0184-2268811
*ICU
*All the Specialists Services.
*Round the clock X-Ray Services.
*Round the Clock Ultrasound Services.
*OPDS: All Specialists Servies.
*Burn Ward
*24 hrs Blood Bank facilities.
*Public Health Laboratory.
*Eye Department: Free Cataract and IOL Services & SPP Facilities.

Trauma Centre No:

:0184-2268811, PMO: 2268775

2) In Private Sector: Super specialists.

- Dr.Rakesh Jindal , Plastic Surgery (Balaji Plastic & Burn Centre).
Mobile No: 98120-52697,0184-2261313
- Dr Sandeep Chaudhary, Urologist (Moolchand Kidney Hospital).
Mobile No: 98120-24481,0184-2201666
- Dr Sunil Mittal , Urologist (Shri Hari Hospital)
Mobile No: 92158-51411,0184-2200900
- Dr Sameer Agarwal, Neurosurgeon(Brain & Spin Hspital)
Mobile No: 98120-30306,0184-4042306
- Dr Rohit Goyal, Neurosurgeon (Parveen Hospital)
Mobile No: 99925-99972,0184-2205584
- Dr Ajay Gupta, Gastroenterologist
Mobile No: 98966-24191.

3) Arpana Hospital

Free Cataract/IOL Facility.

Dr Tannu Goyal : 9896551492, Arpana Hospital : 0184-2380801

4) Prem Hospital, Panipat.

*Modern Equipment for any surgery in burn cases like facilities for artificial respiration.
Beds: 20 to 50
Ambulances:06
Doctors: 05
Nurses: 06
*Skin grafting facility.

B) FIRE FIGHTING FACILITIES IN THE DISTRICT:**Fire Fighting Facilities at Indane Bottling Plant, IOCL, Village Gudha, Distt. Karnal.**

➤ Fire water tank	: 2 x 5000 KL
➤ Hydrant engine	: 07 Nos. (04 No.s 200 l/sec, 03 no.s 180 l/sec)
➤ Jockey pumps	: 02 Nos.
➤ Security Air Comp	: 02 Nos.
➤ 10 kg Fire Ex	: 132 Nos.
➤ 75 kg Fire Ex	: 18 Nos.
➤ CO2 Fire Ex	: 16 Nos.
➤ Water Gel blankets	: 02 Nos.
➤ Fire Proximity suit	: 01 Nos.
➤ Hand Operated siren	: 13 Nos.
➤ Hydrant Monitors	: 26 Nos.
➤ Double Hydrants	: 49 Nos
➤ Largest Risk Area	: Filled Shed
➤ Water Required for above	: 6415 kl/04 hours
➤ Gas Monitoring System:	: 40 sensors
➤ ILSD System	: 13 MCP
➤ Deluge valves	: 26 . no.s
➤ Self contained breathing apparatus	: 02 no.s
➤ Fog nozzle	: 02 no.s
➤ Universal nozzle	: 02 no.s
➤ Jet nozzles and hoses	: 01+02 with each hydrant
➤ Sprinkler system	: In all the LPG working sheds
➤ Helmets	: 100 no.s
➤ Fire buckets	: 36 no.s

Fire Fighting Facilities available with Fire Department, Karnal.**Manpower for Firefighting:**

S.No:	Name of Post	Karnal	Gharaunda	Indri	Assandh	Nilokheri	Tarori
1	Fire Station Officer	1	-	-	-	-	-
2	Sub Fire Officer	-	1	Add Charge	-	Add Charge	1
3	Leading Fireman	2	-	-	1	-	-
4	Fireman Regular	9	-	-	-	-	-
5	Driver Regular	-	-	-	-	-	-
6	Contact	18	10	10	10	10	10

	Staff F/M						
7	Contact Staff D/O	6	3	3	3	3	3

PROTECTIVE EQUIPMENTS AND CLOTHING:

S.No:	Name of Fire Station	Fire Unit	Fire Extinguisher	Protective Clothing
1	Karnal	*Water Boiser- 1 No *F.C.T-2 No *W.T-1 No R.T-1 nNo S.MFE-1 No. Total : 6 Nos	A.F.F.F Fire Extinguisher: 10 No A.B.C Type: 6 No CO2 Type: 2 No D.C.P Trolly: 2 No.	Fire Entry Suit: 1 No.
2	Gharaunda	Water Tender- 1 No.	10 Nos. A.F.F.F. A.B.C Type: 4 Nos	-No-
3	Nilokheri	Water Tender-1 No.	-	-No-
4.	Tarori	Water Tender -1 No	-	-No-
5	Indri	Water Tender-1 No	-	-No-
6	Assandh	Water Tender- 1 No	ABC Type: 6 Nos	-No-

Fire Fighting Facilities available with Best Foods Limited , Karnal.

Emergency Contact No: 0184-2382202, 23822266, 0972870008

BEST FOODS LIMITED (INDRI UNIT)

Summary of safety masures (Fire, Safety, First Aid)

S.NO	ITEM DETAIL	NUMBER OF AVAILABILITY	REMARKS
1	Ambulance	1	HR45A-7794
2	Dr. Rajkumar	1	everyday
3	Number of First- Aid boxes	11	For every plant and gate
4	Medicine in first aid box	Crocine,betadine,Itone, Burnol,dettol,bandage, cotton	Checking time once in a Month
5	Fire Extinguishers(Ceasefire)	62	Co2-21.5kg-----01.

			Co2-9.5kg-----01.
			AFFF- 45kg-----05
			ABC-05kg-----55
			Total-62
6	Health & safety Team	10 members committee	review every two months
7	Trained fire fighter	20	Trained by CEASEFIRE
8	Trained First-Aid Staff	30	Trained by RED CROSS Karnal
9	Ambulance Room	1	M.I. Room for daily doctor visit
10	Number of Borewell	2	Commercial
11	Number of SKY SHOWER	2	For fire tank filling
12	Fire water tank with engine & hose pipe	1	Capacity-20000 ltr.

BEST FOODS LIMITED (DARAD UNIT)

Summary of safety masures (Fire, Safety, First Aid)

S.NO	ITEM DETAIL	NUMBER OF AVAILABILITY	REMARKS
1	Fire Extinguisher(Ceasefire)	1	ABC -05 kg-----16
2	First - Aid boxes	3	gate, W.H. Office, Plant office
3	Trained fire fighters	10	Trained by CEASEFIRE
4	Trained first - aid staff	11	Trained by RED CROSS
5	Medicine in first aid box	Crocine,betadine,lton e,	Checking time once in a Month
		Burnol,dettol,bandage , cotton	
6	Number of Borewell	2	Commercial
7	Health & safety Team	06 members committee	Review every two months

Fire Fighting Facilities available with M/s Liberty Footware Ltd, Karnal.

Emergency

Contact No: 9812002266, 09354111132

Fire Fighting System		Equipment	No
1	Fire Extinguishers (with self Illuminated Signage Board & Instructions to Operate)	ABC type , Cap-10 & 5 Kg.	117
2	Sand Buckets	Cap.-10 Kg.	20

3	Emergency Siren System (with self Illuminated Signage Board)	Showing Display of Emergency site in Every production. Hall.	1
4	Pre - decided Assembly Points	at the time of Emergency	4
5	Display Board -- Today's head count in the plant.		4
6	Gen- Set (Independent for fire pump)	Cap- 75 KVA	1
7	Fire Water Pump	Cap.- 60 H.P.	2
8	Water Reservoir Tank	Cap.- 80,000 ltr	1
9	Fire Hydraunt Pipeline having Hydrant Points	Always live with water.	23
10	Water Sprinkling System (with Diesel Storage Tank)	Always live with water.	1
11	Emergency Exits Doors in the Plant. (with self Illuminated Signage Board)		18
12	Emergency Evacuation Plan.	Minimum 2 in each Hall	18
13	Aisels & Arrow Marking on Floor. As per the Evacuation Plan.	As per the Evacuation Plan leading to the Emergency Exits' Doors	Deployment areas
14	Well Trained Fire Fighting Team		34 persons
15	Separate Storage of Adhesives & Cleaning Agents.	Away from the Production Premises.	1
16	Eye washer/ Emergency Shower.		3
17	Monitoring System of Fire Fighting Equipments		Regular
18	Fire Fighting Drill		Monthly
19	Evacuation Moc Drill		Half Yearly
20	Fire Fighting Refresher Training		Half Yearly
Medical/ First Aid System			
18	First Aid Boxes	Minimum one in each production Hall	18
19	First Aid Trained Personnel	Minimum 2 Persons in each Production Hall	34 Persons
20	Ambulance Van	Reg. No. 45-A 7139	1
21	Doctors Room/ Dispensary	Visit of Dr. Seema Singh, twice in a week	1
22	Monitoring System of First - Aid Boxes	Regular/ Fortnightly	1

AVAILABILITY OF SPECIAL RESCUE EQUIPMENT

Sr No	Name & Add. of Vender	Equipment	Quantity	Phone No.
1	Maa Bhagwati Crane Service, Karnal	Crane	3	9991649757, 9896633896
2	Bagha Singh Crane Service, Karnal	Crane	1	9253043069 9992126267
3	Dashmesh Tractor Workshop, Karnal	Crane	2	9255941445 9992449849

AVAILABILITY OF PORTABLE DG SET SUPPLIERS

Sr. No.	Name & Add. of the Vendor	Phone No.	Mobile No.
1	Rampal Sharma, Karnal		9416153509
2	Titu Generators, Karnal	0184-2258878	9896093338
3	Rama Generators, Karnal	0184-2270829	9812189901

INDICATIVE LIST OF MEDICINES / EQUIPMENT

Medicines to be stocked at Treatment Center (per 1000 persons)

ITEM	QTY.	ITEM	QTY.
General Medicines			
Methyl Cellulose Eye Drops, 5 ml.	500 Bottles	Injection Tetanus Toxoid, multidose	250 Vials
Surgical Spirit	10 Bottles	5% GNS IV Fluid, 540 ml.	100 Bottles
Normal Saline Fluid, 540 ml.	100 Bottles	Sterile Distilled Water, 500 ml.	100 Bottles
Vinegar	5	Liquid Paraffin	5 Bottles
Vaseline	1 tin	Tincture Benzoin	5 Bottles
Tincture Iodine	5 Bottles	Tincture Cetrimide	20 Bottles
Savlon Liquid	25 Bottles	Ointment Soframycin	100 Tubes
Ointment Atropine (Eye)	50 Tubes	Atropine Eye Drops	50 Bottles
Neosporin Dusting Powder	100 Tubes	Pilocarpine Eye Drops	25 Bottles
Acridflavin Gauze with Plastic Jar	5	Ointment Gentamycin (Eye)	50 Tubes
Gentamycin Eye Drops	50 Bottles	-	-
Injectables (Ampoules / Vials)			

Decadron	100	Deriphyline	500
Coramine	100	Calcium Glutamate	100
Adrenaline	100	Dopamine Hydrochloride	25
Mephentine	50	Sodium Bicarbonate	500
Atropine Sulphate	1000	Aminophyline	100
Lasix	200	Vitamin K	20
Lignocaine Hydrochloride	70	Salbutamol	10
Perinorm	25	Pethidine Hydrochloride	50
Ampicillin	25	Avil	50
Clampose	100	Morphine Sulphate	10
Surgical Items			
Eye Plastic Undine	50	Absorbant Cotton Wool	100 Rolls
Bandage 2", 4", 6"	100 Rolls	Adhesive Plasters (Different sizes)	100 Rolls
Oxygen Cylinders	50	Mackintosh (Rubber Sheet 3' x 6')	20 Rolls
Polyethylene Masks (Surgical)	1000	Pathology Gloves (Misc. sizes)	50 Pairs
Disposable Syringes (2, 5 & 10 ml.)	150	Catgut Chromic	100 Boxes
Suture Needles Cur. Cutting (Different sizes)	100	Suture Needles Str. Cutting (4, 6, 8 mm)	100 Each
Catgut Plain	100 Boxes	BB Silk	100 Reels
Operation Scissors, str.	5	Operation Scissors, Cur.	5
Tracheotomy Set	10	Forceps Artery, Str.	50
Forceps Artery, Cur	50	Forceps Mosquito	50
Plaster of Paris Bandage (10 & 15 cm)	50 Rolls Each	Forceps Dissecting (Toothed & Non-toothed)	5
Forceps Cheatles	4	Thomas Splints (arm/hip)	123 Each
Boyels Apparatus	1	Respirator Bear (Adult/child)	2 Each
Laryngoscope (Adult/child)	1Each	Endotracheal Tubes	25

		(diff. sizes)	
IV Set, Disposable	100	Wooden Splints	100
Elastic Bandage	100	Electric Sterilizer	5
Hypodermic Needles (diff. Sizes)	100	SS Tray with Lid (rectangular)	10
El Jar, (5")	10	El Jar, (12")	5
Scissors shop	2	Basins (18" dia)	5
Kidney Tray	10	Loup (Eye Examination)	4
Others			
G N S IV Fluid	100 Bottles	Water	100 Bottles
Plasma	-	Oxygen Cylinders	50
Miscellaneous Items			
Overshoes	100 Pairs	Torchlight (3 Cells)	10
Torch Cells	60	Stretchers	50
Mattress	100	Wheel Chairs	10

9.0 GUIDE LINES FOR PUBLIC EVACUATION & LANDUSE NEAR TO MAJOR HAZARD WORKS

(Prescribed In The Major Hazard Control Manual Published By International Labour Officer Geneva)

An early decision will be required in many cases on the advice to be given to people living "within range" of the accident - in particular whether they should be evacuated or told to go indoors. In the latter case, the decision can regularly be reviewed in the event of an escalation of the incident. Consideration of evacuation may include the following factors :

- (a) In the case of a major fire but without explosion risk (e.g. an oil storage tank), only house close to the fire are likely to need evacuation, although a severe smoke hazard may require this to be reviewed periodically.
- (b) if a fire is escalating and in turn threatening a store of hazardous material, it might be necessary to evacuate people nearby, but only if there is time, if insufficient time exists, people should be advised to stay indoors and shield themselves from the fire. This latter case particularly applies if the installation at risk could produce a fireball with very severe thermal radiation effects (e.g. LPG storage).
- (c) For release or potential releases of toxic materials, limited evacuation may be appropriate down wind if there is time. The decision would depend partly on the type of housing "at risk". Conventional housing of solid construction with windows closed offers substantial protection from the effects of a toxic cloud, while shanty houses which can exist close to factories, particularly in developing counties, offer little or no protection.

The major difference between release of toxic and flammable materials is that toxic clouds are generally hazardous down to much lower concentrations, and therefore hazardous over greater distances. Also, a toxic cloud drifting at, say, 300 meters per minute covers a large area of land very quickly. Any consideration of evacuation must take this into account.

Although a plan should have sufficient flexibility built into cover the consequences of the range of accidents identified for the on-site plan, it is suggested that it should cover in some detail the handling of the emergency to a particular distance from each major hazard works. This distance may be judged to be similar to the separation zone distance or the information to the public distance as mentioned below in the Land use near to major hazard works.

LAND USE NEAR TO MAJOR HAZARD WORKS :

It should generally be considered to try to separate works & storing and using significant quantities of hazardous materials from nearby centres of population including housing, shopping centres, schools, hospitals etc. through land use planning legations. Separation should be maintained in the development stage from the major works. This will achieve almost complete protection from the more common but relatively minor accidents and in addition, worth while but not complete protection from the severe but very rare major events.

Based on this approach, the table given hereunder gives suggested approximate separation distance for a range of major hazard works. These distances should be regarded as tentative and would need to be considered under local circumstances to decide on their applicability.

Catagorisation of Development :

In deciding on the separation required from a works, it can be helpful to categories the proposed development. This will enable individual development decisions to be made within the framework of a consistent approach.

Categories of development can take account of a number of relevant factors in deciding on whether to permit development, e.g. amount of time individuals spend in the development, ease of implementing an emergency plan, vulnerability of occupants of the development (old people more vulnerable to thermal radiation).

One broad categorisation which has been widely used is based on three general categories :

Category A : Residential, including houses, hotels, flats;

Category B : Industrial, including factories (unless they have high density employment), warehouses.

Category C : Special, including schools, hospitals, old people's homes.

Other types of developments can then be added to the most appropriate of these categories, e.g. theatres/ cinemas and shopping centres could be included as Category A.

The separation distances given should be considered as follows :

- (a) Within the separation distance - no Category C development.
- (b) Within about two thirds of the distance- no category A development.
- (c) No restriction of Category B development.

Suggested Approximate Separation Distance For Major Hazard Works

Substance	Largest tank size (t)	Separation distance (m)
Liquified petroleum gas, such as propane and butane, held at a pressure greater than 1.4 bar absolute	25-40	300
	41-80	400
	81-120	500
	121-300	1000
	25 or more, only in cylinders or small bunk tanks of upto 5 te capacity.	100
Liquified petroleum gas, such as propane and butane, held under refrigeration at a pressure of 1.4 bar absolute or less	50 or more	1000
Phosgene	2 or more	1000
Chlorine	10 -100	1000
	More than 100	1500
Hydrogen fluoride	10 or more	1000
Sulphur trioxide	15 or more	1000
Acrylonitrile	20 or more	250
Hydrogen cyanide	20 or more	1000
Carbon disulphide	20 or more	250
Ammonium nitrate and mixtures of ammonium nitrate where the nitrogen content derived from the ammonium nitrate exceeds 28% of the mixture by weight	500 or more	See note 1

Liquid oxygen	500 or more	500
Sulphur dioxide	20 or more	1000
Bromine	40 or more	600
Ammonia (anhydrous or as solution containing more than 50% by weight of ammonia)	More than 100	1000
Hydrogen	2 or more	500
Ethylene oxide	5 – 25	500
	More than 25	1000
Propylene oxide (atmospheric pressure storage)	5 or more	250
(stored under pressure)	5 – 25	500
	More than 25	1000
Methyl isocyanate	1	1000

Classes of substances not specially named

1. Gas or any mixture of gases which is flammable in air and is held in the installation as a gas (except low pressure gasholders)	15 or more	500
2. A substances or any mixture of substances which is flammable in air and is normally held in the installation above its boiling point (measured at 1 bar absolute) as a liquid or as a mixture of liquid and gas at a pressure of more than 1.4 bar absolute.	25 – 40	300
	41 – 80	400
	81 – 120	500
	121 – 300	600
	More than 300	1000
	25 or more only in cylinder or small bulk tanks or upto 5 te capacity	1000
3. A liquified gas or any mixture of liquefied gases	50 or more	1000

which is flammable in air, has a boiling point of less than 0°C (measured at 1 bar absolute) and is normally held in the installation under refrigeration or cooling at a pressure of 1.4 bar absolute or less

4. A liquid or any mixture of liquids not included in items 1-3 above which has a flashpoint of less than 21°C	10000 or more	250
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10. DISASTER CONTROL MEASURES

A. Basic Assumptions :

Localised Response - Need :

As is the case with any other planning, there would be some assumptions in emergency planning as well. HAZMAT emergencies give very little warning and have very small onset time. Response in such situations is confined to local levels. Due to this typical restraint it is to be realised that it is not possible to have an unified single remote command person/ centre, while responding to HAZMAT emergencies. Additionally, there would be many organisations performing different tasks in a response simultaneously; some of them under the guidance of specialises or experts and some by using the special purpose equipments, which will require a closer supervision and guidance.

The tasks to be accomplished are the links in the long chain of sequence, in tandem, with an objective of reducing the damage. Any break in the link would affect the response. The time available is very much on premium. The success will mainly depend upon;

1. Response related capability
2. Resources availability and their reliability - manpower and machinery.
3. Co-ordination presumed and reality - the gap between, the time, communication, supervision.
4. Simulations practised and other exercises how near they are to real situations and how methodically they have been executed and assessed.
5. Judgement about the grey areas and unforeseen developments.

Psychology :

It should also be realised that for successful tackling of emergencies one has to consider the psychological factors that can affect the performance during response and recovery stages. It is applicable for both, the rescuers and being rescued. This plan however has not considered these finer but essential aspects of emergency planning.

Additionally the development of judgements for logistics and resources in off-site emergency management plan requires determination of damage potential from various possible accident scenarios. This is normally done through simulation of various loss of containment scenarios such as fire, explosion, realise of gases and spill.

Centre of Action :

Chemical accident occur suddenly and leave no room for graduated response. Normally, the effects of accident last for 30-60 minutes giving little time for external agencies to reach the scene of the accident to take control of the off-site situation. There are, further, constraints posed by quality of communication notifying the incident. All these point towards the centre of emergency action to have it located in the immediate vicinity of the scene of the incident. The district authority can, at best, play an advisory and overview role and assist in organising necessary support and reinforcement in case the situation out of control.

Control Room :

Police Control Room is best option in view of its resources base due to high integrity communication system linked with the entire district, district authorities, and emergency response agencies. It can be used more effectively by suitable upgrading and additions as thought below :

- Up to date information on the hazards present in the area and inventory, properties of hazardous materials, historical data on local meteorology, emergency response etc in as easily retrievable form.
- Details map of the area showing location of industries, residential building, sensitive location, water course and access routes etc.

Resources :

The requirement of resources for off-site emergency management organisation will mainly be in the form of training, planning and co-ordination. Material resources that would be required are communication and warning facilities, transport, medical services to treat the affected. In addition, fire services would be required to deal with any on-site situations and transport accidents.

The medical professionals in the area should also examine the need for any special medicines (industry specific medicines/ antidotes).

B. Accident Types :

The type of accidents involving hazardous material can be classified as under.

- Industrial accident (static installations)
- Transportation Accidents
- Pipeline accidents
- Environmental Accident
- Natural calamities

C. Liaison :Liaison between the various agencies involved in the DDMP shall be constantly maintained during periodical meetings and mock drills organised by the member Secretary of the District Crisis Group (Assistant Director IS& H)

D. Rescue and Relief Plan :

(i) Communication

(a) Notification of incident :

Incident notification has to be brief and precise. It has to take into account the fact that several of the variables may not be fully intimated at the time of notification. The factory or person/ authority/ individual mostly in respect of transport emergency, informing the emergency to the local control room should bear these factors in mind. The following information is considered essential for notification.

- Name of person notifying the emergency.
- Chemicals involved in accident.
- Likely magnitude of accident (release quantity).
- Prevailing wind direction (if available)
- Any other important information (impact, toxicity etc.)
- Extent of damage, as a distance.

Since incidents could also be notified by anyone in the public (in the case of transport or other emergencies), the notification requirements must be simple. The notification should, further, enable the local control room to take action based on the minimal parameters notified. Once minimum required is provided in the control room (Local Police Station with wireless facility), this information could be gainfully utilised by it to assess the vulnerable zones. This would, however, depend upon facilities provided, the skills of personnel available which depends upon their levels of training and preparedness.

(b) Intimation of emergency :

Once the incident has been notified to the control room, the situation has to be conveyed to others for information and necessary action as follows :

- Responding agencies having action at site, responders under MAG, technical experts are to be contacted first for the emergencies other than fire. The Police in turn should inform the D.C., City Magistrate, SDM and other officials to initiate action at their level;
- It may be noted that during emergency the communication should be as brief and precise as possible. To achieve this a certain protocol is to be followed strictly. The protocol would be

mitigation, rescue/ relief (which includes treatment to injured) and rehabilitation. Each, responding organisation should have such a procedure that it will notify not more than two other organisations/ individuals according to protocol demanded by the situation. If one organisation is burdened with communication with all responders/ responding agencies, no sooner, its communications channels will be jammed.

- The district control room must first be informed by wireless, by local level police station, to initiate the co-ordination process at the district level and initiating the district machinery or by the affected industry through telephone or other suitable means.
- Other support agencies should either be informed to keep them in readiness for action or for initiating the action.
- Neighbouring communities should be informed of occurrence of an emergency situation in the area. Some of the bigger units with populations around have already provided the sirens with some conditions. In some cases, installed public address system should be to inform the neighbours to inform regarding emergency situations. It will be necessary to ensure that the surrounding population understands the various codes and takes the required precautions when notified. The drills and exercise involving neighbouring population would be very much useful to achieve this.
- District Emergency communication chart is attached as annexure - 2.

(ii) The Action Plan :

A. For Static Emergencies :

The Action Plans given below are for control room, are of generic nature. It is better to take them as reminder. All these instruction will have to be understood along with the specifics of the site of the factory and hazard being considered. The dovetailing and action details will have to be worked out case by case as we are not opting for the specific individual off-site plan for each factory. At simulation/ drills level it is expected to overcome these shortcomings which are basically due to generalisation in the approach to planning.

Upon receiving information from facility (or any other agency) regarding an accident with off-site consequences, the Control Room shall take the following actions in accordance with the roles and responsibilities :

- Inform the nominated technical experts to assemble in the Control room.
- Inform City Magistrate/ SDM through police wireless network of need for local level action.
- Inform response agencies e.g. fire, medical, industry to reach the area where their assistance would be required.

- Advise neighbouring communities to take protective action based on the advise of the experts. Some of the common advise can be :

- Keep calm and follow instruction.
- Keep windows closed and remain inside the house
- Keep wet cloth or handkerchief over your nose and
- Evacuate area and proceed cross wind.

- Based on prevailing wind direction, evaluate vulnerable area requiring attention.

- With the help of technical experts available, take emergency action as required. This can be as follows :

- Cordon off the area affected and regulate traffic.
- Maintain law and order in the area.
- Ensure safety and security of the affected area

Organise evacuation if required,

Protect evacuee property, and

Co-ordinate emergency operation with other agencies.

The District Control Room shall also take the following action upon receipt of information :

- Inform the Deputy Commissioner and Superintendent of Police of the incident and provide them with continuing information based on progress in the field.
- Arrange for the Directorate and Pollution Control Board and industrial safety & health to be informed of the incident.
- Perform such tasks as may be required by the Deputy Commissioner / Superintendent of police in mobilising additional resources for emergency response.
- Keep communication channel open for emergency purposes.

B. Action Plan for Transport Emergencies :

Upon receipt of information regarding transport emergencies, the police shall proceed to the location and take the following precautions and actions as outlined in the roles and responsibilities outlined in Annex. 2

- Inform nominated technical expert nearest to the area to reach the spot of the incident for assistance.
- Approach incident from an upwind direction, if possible.
- Do not walk into or touch any spilled material.

- Avoid inhaling fumes, smoke or vapour unless specifically cleared by technical expert. Do not assume that gases or vapours are harmless because of lack of smell.
- Use the Transport Emergency Guide and isolation/ evacuation table for initiating emergency action in Annex. 3
- Evaluate person from the area and building as far as recommended in evacuation table.
- Isolate to a distance of 800 m. in all directions in the event of a tanker fire.
- Observe suitable personal protection e.g. full protective clothing, SCBA, Canister masks etc. as recommended.
- Regulate traffic to enable response personnel to take emergency action.
- Do not allow use of water where this is contra-indicated and
- Clothing and equipment of response and other personnel involved in the area of the accident should be decontaminated as soon as possible after contact occurs.

(iii)Appointment of key personnel or Emergency Management Structure :

The emergency management structure of the district is given in the Annexure-1. The functions of the various agencies are briefly described in the structural diagram.

Apart from the emergency management structure various Govt authorities are entrusted emergency services as under:

1.	Chief District Emergency Controller	Dy. Commissioner
2.	Casualty Service	Civil Surgeon Karnal
3.	Rescue Service	Ex. Engineer CPWD and Fire Officer Karnal
4.	Transport Service	G.M. Haryana Roadway Karnal
5.	Telecommunication Service	G.M. Telecommunication
6.	Welfare Service & Shelter	City Magistrate / SDM Karnal assisted by DPRO, Municipal Council, Food & supply, Red cross, NGO
7.	Salvage Service	SDM/ Tahsildar Karnal

8.	Corps Disposal Service	Sanitary Inspector
9.	Fire Fighting/ Combating Service	Fire Officer Karnal
10.	Law and Order & Traffic service	S.P. Karnal
11.	Water Supply & Sewage	Ex. Engineer Public Health Karnal
12.	Electricity	Ex. Engineer HSEB Karnal
13.	Food & Supply	District Supply Officer and Red cross/ NGO
14.	Technical Advisor	Asstt. Director (ISH)
15.	Evacuation	DPRO assisted by Police, Fire Service & Transport
16.	Sanitation	Municipal Council & Public Health

(iv) The Control Room :

The control of crisis during major accidents is to be exercised through a Control Room established at an easily accessible central location in the area. This control Room should be capable of functioning on being required to be activated at any time. The Control Room for off-site plan is thus over and above the Control Room set up by each unit for its on-site plan. The Control Room shall :

- (i) Act as a focal point of emergency management.
- (ii) Keep records of all messages.
- (iii) Inform operation officer on receipt of first information relating to accident.
- (iv) Monitor implementation of mutual aid.
- (v) Serve as the focal point for meeting of the Crisis management group (CMG).

In order to operate the Control Room round the clock, manpower and transport are required on a shift basis. The Control Room should be equipped with proper communication system, data processing network and should be a storehouse of information to combat emergencies.

(v) Communication Network System :

An efficient and reliable communication system is required for the success of the off-site emergency plan. The efficient communication system is required to alert :

- (a) Off-site Emergency Authorities and services.

(b) Neighbouring factories in the area and public in the vulnerable zone.

A communication network of the following type may be helpful :

(i) Radio communication between Control Room to Unit Control Rooms of the Industrial Unit and respondent outside the area.

(ii) Hotlines between Control Room to industrial units and Emergency Services. Meteorological Station and the Media.

(iii) Paging system with the Control Room for alerting the members of the CMG and Operation Response Group.

(iv) Data processing Network hooked to all Computers / PCs.

A Communication flow chart is to be prepared and kept in the Control Room. An up-to-date Telephone Directory of key personnel concerned with the emergency should be available at all times.

In coordinating the communication system efficiently, there should be a Communication Officer in Control Room to ensure that all the modes of communication are functional round the clock. All communication operators should maintain a log-book for the message received in/ out and actions taken. These activities should be incorporated in the data processing system.

(vi) Warning System :

In an off-site Management Plan, one of the most important pre-requisites a good 'Warning System'. Efficient warning system will save lives, prevent injuries and reduce losses. Emergency Commander will decide the appropriate Warning System and implement it. The Superintendent of Police will be responsible for implementation of the Warning System.

The Warning Systems are of the following types :

(a) **Disaster Warning** : (Maximum Credible loss Scenario)

High pitched continuous wailing siren

(b) **Fire/ Toxic Release** :

Long Siren followed by short Siren

(c) **All Clear** :

Long Continuous

Note : Depending upon the nature of hazards and the area affected, other methods of warning may be used as follows :

(a) Out-Door Warning Siren

(b) Public Address System with Police

- (c) ARP Sirens
- (d) Mass media
- (e) Door to Door visit by Civil Defence Personnel.
- (f) Telephonic contact with schools and other organisation / public institutions.
- (g) Information to be provided at common gathering places such as Canteens, Shops etc.

(vii) Public Information System :

During a crisis following an accident, the people of the area and large number of media representatives would like to know about the situation from time to time and the response of the district authority to the crisis. It is important to give timely information to the public in order to prevent panic and rumour mongering. The emergency public information could be carried out in three phases.

(a) Before the Crisis :

This will include the safety procedure to be followed during an emergency through posters, talks and mass media in different languages including local languages. Leaflets containing do's/ don'ts should be circulated to educate the people in the vicinity.

(b) During the Crisis :

Dissemination of information about the nature of the incidents, actions taken and instructions to the public about protective measures to be taken, evacuation, etc. are the important steps during this phase.

(c) After the Crisis :

Attention should be focussed on information concerning restoration of essential services, travel restrictions etc.

Various tasks of the public information system could include :

- (a) Quick dissemination of emergency instructions to the public.
- (b) To receive all calls from media/ public regarding emergency situations and respond meticulously.
- (c) Obtain current information from the Central Control Room.
- (d) Prepare news release.
- (e) Brief visitors/ media.
- (f) Maintain contact with hospital and get information about the casualties.

(viii) Fire Fighting System :

The industrial areas having major accident-prone hazardous installations should have special fire fighting arrangements. In most of the industries, gaseous hydro-carbons or liquid hydro-carbons having low flash points are used thereby posing great risk of fire explosion, spillage of hazardous liquid or release of toxic gases. In order to tackle such possible situations, there is need for constant preparedness to mobilise all available fire fighting and toxicity control resources in minimum time. There should be an inside control of all fire fighting resources in the affected areas under the overall fighting resources in the affected areas under the overall charge of the Fire Officer. The operational response will be coordinated from the Central Control Room. The planning for fire fighting should be as follows :-

(a) Before the Crisis :

- (i) Proper road and means of escape should be identified.
- (ii) Considering the possible hazards, there must be adequate water supply.
- (iii) Training of the personnel in fire fighting duties in the industry.
- (iv) Provision of adequate and proper arrangement of fire fighting vehicles is important.

(b) During the Crisis :

Immediate response to an emergency should be coordinated by the Control Room by matching all the resources. In a major emergency having wide off-site implications, more than one industry would be affected necessitating concurrent fire fighting operations at a number of places. In this case, the whole area may be divided in different fire zones. The task of the fire zone commanders should be as under :

- (a) Command and control of all fire fighting resources in the respective fire zones.
- (b) Deployment of additional fire resources allocated by Control Room.
- (c) Coordination of fire fighting institutes.

(ix) Mutual Aid :

All the industrial units in the affected areas should have mutual aid arrangement for getting/ extending help in fire fighting facilities, special fire fighting agents, trained manpower etc. The Control Room will allocate additional resources to fire zone including protective equipments kept centrally as a pool.

(x) Health & Medical :

A major off-site emergency in an area may affect a number of units and the surrounding colonies resulting in more casualties. The medical response plan has to cater for immediate pooling of all available medical resources and provide emergency medical treatment to the

victims of the incident. For an emergency from poisoning, a reference is invited. A coordinated utilisation of all available local medical resources in the incident areas as well as the additional resources should be mobilised under the overall charge of the District Health Department. The operational response should be coordinated by the Civil Surgeon from the Control Room. Before the Crisis, the following actions should be carried out :

- (i) Specialised training of doctors relating to chemicals hazards.
- (ii) Blood grouping of all employees working in the industrial unit
- (iii) Maintenance of list of blood donors groupwise.
- (iv) Arrangement of adequate buffer stock of essential medicines.
- (v) Stocking of anti-dotes and special medicines for hazardous substances.
- (vi) Planning of additional capacity in the base hospital for large-scale casualties.

During the crisis, medical plan in terms of manpower, transport and equipment as per organisational response be implemented. The organisational response structure should be set up as under:-

- (a) First - aid Post
- (b) Casualty Response Centre
- (c) Base Hospital.

It is essential to guide medical relief and establish public health measures like sanitation immunisation. etc. In the absence of proper information about the chemical exposure, their symptoms, first aid and treatment, the physicians attending such emergencies are generally faced with great problems. Information on some widely used toxic chemicals is compiled and given in Annexure- 6.

(xi)Transportation :

A large number of ambulances would be necessary to transport casualties to the casualty response centre and base hospital. For this purpose, jeeps/ matadors/ special wagons which can be converted as ambulance at short notice should be kept at the unit and the Control Room.

(xii) Security & Police :

Security, protection of life and property and traffic control and maintenance of law and order are the traditional and statutory functions of the police. During an emergency, duties and responsibilities of the police may be :

- (a) Cordoning of the incident area

- (b) Warning public about the hazards
- (c) Traffic Control
- (d) Assist fire fighting services
- (e) Assist first aid and medical teams
- (f) Assist evacuation and ensure protection of property in evacuated areas.

control of security operations in the area should be exercised by the Superintendent of Police. Different phases of emergency management practices would be as under :

(a) Before the Crisis :

Contingency plan of manpower, transport and communication network to coordinate possible incident areas and to regulate traffic should be made for each industry in the area.

(b) During the Crisis :

The Security Commander / Superintendent of Police of the area will set in motion the relevant contingency plan to control the operation.

(c) After the Crisis :

Protect property in the evacuated area.

(xiii) Media :

The Control Room should release an up-to-date information to the media.

(xiv) Evacuation including safe Evacuation Areas :

In a disaster situation, evacuation is the movement of people from the place of danger to places of relative safety. It is most effective action to protect people. A comprehensive and coordinated planning is necessary to implement orderly evacuation of population.

The process of evacuation should be based on the nature of threat, possibility of spreading of toxic gases and weather conditions. In this case, the hazard analysis in maximum credible loss scenario would help in planning of evacuation. The people of the area should be advised to leave the threatened area and to take shelter in the nearest reception centres. The whole process is required to be completed within quickest possible time. The command and control of the evacuation should be under the supervision of the District Public Relation Officer / District Development Officer. The evacuation process should be carried out in three phases.

(a) Before the Crisis :

- (i) The public should be informed and educated properly for chemical hazards. Local police should warn the people in this regard and install the siren in the vulnerable places.

(ii) The probable affected areas should be divided in several evacuation centres which are entirely site specific.

(iii) Detailed contingency plan of evacuation of various scenarios should be prepared.

(iv) Availability of all transport resources needs to be ensured. Planning of adequate reception centres including accommodation, food, water supply and sanitary arrangements for the affected population should be done.

(b) During the Crisis :

Implementation of the plan should be done in the quickest possible time.

(c) After the Crisis :

Once the crisis is over, the affected people should be rehabilitated and the follow up measures should be taken up.

(xv) Duties & Responsibilities of various agencies :

Duties & responsibilities of various agencies are mentioned in annexure-5.

(xvi) Welfare of Evacuated :

In the event of major accident large number of people may be rendered homeless, without food or without adequate clothing. Grave social problem resulting from death, injury, loss of home and family disorganisation would be handled by the welfare service headed by the City Magistrate/ SDM Hisar assisted by the various departments shown in the organisation structure chart as annexure -1.

The function of this service are

(i) Information ::

Supply of information regarding missing relatives, dead, etc nature of facilities and assistance available for affected.

(ii) Care of homeless :

Provisions of centres where homeless people may be given temporary shelter, food and clothing.

(iii) Evacuation :

Disposal of population from the large congested and hazardous areas to the safe area and making suitable arrangements for evacuees.

(xvii) Post Emergency Management :

(a) Post emergency management of an incident requires a proper assessment of the after effect of accident. It is expected that City Magistrate/ SDM or Executive Officer Municipal

Council, District Commissioner, representative of the Directorate of ISH & Pollution Control Board, experts and other relevant agencies would reach the incident site. These persons together with the technical experts have to decide on post emergency actions regarding.

- Review of mitigation measures being carried out and corresponding augmentation of all response related activities.
- Rescue related efforts.
- Restoration of normalcy in the area.
- Organising further medical attention for the affected persons either locally or at other locations based on the nature of treatment required.
- Victim identification, helping the kith and kins in formalities, financial relief, arranging for morque funerals etc.
- Shelter for affected if required.
- Decision to decontaminate the area and prepare the area for re-entry of evacuees.
- Order investigation of incident including assessment of damage to life, property and the environment.
- Make suitable release to the media conveying information on the accident. This should, normally, be authorised by the District Collector/ Commissioner.

(b) Relief to the Victims :

Post emergency activities include the relief to the victims. The Public Liability Insurance Act - 1991 provides for the owners who has control over handling hazardous substances to pay specified amount of money to the victims as interim relief by taking insurance policy for this purpose. The district collector has definite role in implementation of PLI 1991 as mentioned in hereunder.

- (i) Whenever it comes to the notice of the collector that an accident has occurred at any place within his jurisdiction, he shall take action, among other things, to provide relief to the victims.
- (ii) He will receive applications in the prescribed forms accompanied by supporting documents.
- (iii) He may follow summary procedure for conducting an enquiry on the application for relief.
- (iv) He shall maintain a register of the applications as also a register of awards and payment made.
- (v) On receipt of an application under sub section 6, the collector after giving notice of the application to owner and after giving the parties an opportunity of being heard, hold an enquiry

into the claim and may make an award determining the amount of relief which appears to him to be just and specifying the person or persons to whom such amount of relief shall be paid.

(vi) The collector shall be responsible for disbursement of the funds to the victims. He may, for this purpose, draw upon the insurance companies or emergency relief fund as the case may be. For this, he would liaise with the units, the nearest insurance companies and the control pollution control board.

(vii) He should ensure that the owners of the MAH units or the units covered under PLI Act 1991 shall take. Insurance policy before handling any hazardous substance and get renewed from time to time before the expiry of the period of validity.

11.0 PLAN TESTING AND UPDATION

TRAINING OF RESPONDERS :

Appropriate and adequate programmes for building up the capabilities of all the agencies involved, mostly those or the parts of off-site planning; will have to be carried out, along with their refresher courses. Such a programme will also include the activities of sensitisation and orientation related courses for decision makers at senior levels. The expertise available with some of the factories will be of help for such courses and its involvement will benefit all the concerned. Once LLCG & DLCG are functional, it will be essential to organise these orientation programmes for group members, to ensure better deliberation in their meetings. The second area is that of emergency management. This required a through knowledge of the roles and responsibilities and linkages that have to be ensured during emergencies. This aspect can only be checked through a plan testing process in which an emergency situation is simulated. The testing of the plan is discussed below.

TESTING OF PLAN :

Effective testing of plan is only possible through drills and exercise alone. Field drills are very much essential for following reasons :

- To perfect the response vis-a-vis the plan document.
- To build confidence amongst the responders
- To assess the appropriateness of the equipment,
- To assess the level of preparedness.
- To gain an experience akin to one, gained from real situation.

The suggested method provide a step by step approach for testing the plan, devoid of such limitations. This approach suggesting a sequence of exercises and drills, helps in improving the response related capabilities. It is also useful in identification of resources and personnel requirement, and thus, fine tuning the plan.

To satisfy these requirements, the exercises or drills will have to be planned in a particular sequence. The sequence has to be chosen in such a fashion that it builds capability, first at individual level, follows by organisation or team responding to the task contemplated. At a later stage, it will gradually percolate to all persons agencies, wings or teams. Once such a capability is evident, it will gradually expand the scope and size of drill and ultimately lead to various types of drills. The following sequence is recommended based on experience. Due to

adaptability and flexibility built in these types of exercise, minor variation in sequencing might not affect the objectives.

A careful study of a plan will reveal various components of emergency planning. These would be communication, fire fighting, repairs, calling external assistance, cardoning etc. These components could be the tasks for individual or teams. The tasks if they have to be successful, will require appropriate skills. The analysis of plan on the basis of components and tasks will facilitate procedures for preparedness.

Truncated drill

Full Scale/ field drill

Demonstration drill

Drills, as would be experienced, are multipurpose and versatile tools. Therefore one can opt for a particular objective, component, or parameter of planning to be tested. Those can be evaluated or even corrected by conducting a drill.

Drill can be tailored to evaluate :

- a. Response time,
- b. Response quality
- c. Co-ordination and Communication.

The broad classification of drill objectives are as under :

Assessment of

Size of emergency organisation,

Capability.

Skills of individuals,

Response methodology,

Response time,

Adequacy of infrastructure and resources.

2. Identification of gaps in planning and resources.

3. Search for alternatives wherever applicable.

Exercise objectives, can be further subdivided and limited to only one or few of the following components, to facilitate the assessment in those areas :

Co-ordination

Sequence

Correctness of action

Communication

Schedule of resources required (on time scale)

By this method, it will be easier to identify drawbacks and difficulties, and search for right solutions for quick and correct actions.

TABLE TOP STUDY :

In a table top exercise members of the response team take part in a "paper exercise" to ensure that each member known his, or her, role in an emergency situation, that has been pre-prepared in written form. The written scenario should identify clearly the following :

- The objectives of the drill
- The components of the plan to be tested.
- The expected participants.
- The sequence of events
- The simulated hazard levels and
- Exercise evaluation checklists.

The written scenario should be as realistic as possible, and could be taken from the sequence of events from an actual emergency.

Critique sessions during which the results of the evaluation are presented are crucial. The plan should be modified following these sessions, to rectify any shortcomings highlighted by the drill.

A table top exercise is particularly useful for testing a new plan, for the following reasons.

- A new plan is likely to have many short comings which will be readily discovered during a table top exercise.
- The Participants in the exercise will have an opportunity to work closely together probably for the first time. When members of an emergency team can meet frequently, and work together, they are much more likely to be able to co-operate effectively and efficiently during a real emergency and
- Desk top exercises are far less expensive than full scale emergency drills.

FULL SCALE TESTING :

Nothing can replace a full scale emergency drill as a means of identifying further area requiring improvement in an off-site emergency management plan. Careful pre-planning of the drill, preparing a drill scenario and the evaluation process, are all critical elements to a successful test. The emphasis of these drill might be on one or all of the inter action aspects of the plan. Some examples are given below to indicate this.

- That the degree of co-operation achieved between the various agencies and services involved in plan implementation.
- Test the use and performance of the emergency equipment such as fire extinguishers, breathing apparatus, decontamination equipment, fire engines, ambulances, specialised hospital equipment and services etc.
- The setting up of road block
- Traffic control
- Decontamination
- Environmental monitoring and
- Community alerting evacuation return.

PLAN UPDATING :

The results of a mock trial should be analysed to find out if the intentions of the plan have been adequately met. Normally, observers are posted at various locations to study the progress of the emergency action at various stages. Thereafter, the planning team, together with the observers and responders examine in detail the various aspects of emergency action. The net result is the following :

- To identify aspects of plan which have not worked as planned.
- To evolve modifications to the plan to make the plan properly workable and
- To assure information between planners, responders and the communities on the revisions made to the plan.

Based on the analysis of the trials, the plan is updated. Normally, minor modifications to the plan are updated through addendum to the plan. When the plan accumulated a large number of addenda, the plan is expected to be reissued for sake of clarity.

UPDATING SCHEDULE :

It is expected that the meeting at division level is organised at least once in a six months to start with, to review and update the plan. In between a small group comprising of DISH, SDO/ MC and representatives of industry shall review and authorise regarding these up-dating.

The note communicating the amendments, correction and changes should be signed by one of the member of this group. It is expected that the recipient of these note, tags in his document the amendment and maintains a written record of such correction giving the No. and date and who has authorised such correction. It is hoped to prepare the circulation list of all those to whom this amendment will be notified, which would include amongst others -

The Heads of all responding Organisations, in Government and outside,

The Works Main Controller of Emergencies of all MAH factories

The Member of Local Level Crisis Groups,

The Members of District Crisis groups,

The Members of State Crisis groups,

The Organisations and individuals who are expected to resource base, though directly not involved in response, e.g. The control rooms of Police, Mantrayala Control Room, Casualty Departments of Hospitals, Experts etc.

12.0 BRIEF OUTLINE ON HUMAN RESPONSE TO CHEMICAL EXPOSURE AND THEIR SYMPTOMS, FIRST -AID AND TREATMENT

Handling of hazardous chemicals involves risks to workers as they are constantly exposed to these chemicals during various operations and storages. In the event of an accident, not only the workers but also the general public can be exposed to dangers. The problem of medical treatment of the victims is aggravated by the fact that there is paucity of information on the antidotes required for these chemicals. Keeping this in view, it has been decided to compile the information on widely used hazardous chemicals and their symptoms along with first-aid and line of treatment. For detailed information, "Handbook of Medical Management of Industrial Emergencies, their First-aid and treatment, 1992" published by Thane-Belapur Industries Association, Bombay may be referred to.

12.1 ACIDS AND CORROSIVES

Volatile Acids and fumes	Chlorine	Bromine	Phosphoric Acid
	: Iodine	Fluorine	Hydrofluoric Acid
			Hydrochloric Acid
			Nitric Acid
			Sulphuric Acid
			Acetic Acid

SYMPTOMS :

The strong mineral acids exert primarily a local corrosive effect on the skin and mucous membranes. In severe burns, circulatory collapse may result.

Symptoms include severe pain in the throat and upper gastrointestinal tract, marked thirst, bloody vomits : difficulty in swallowing, breathing and speaking.

Inhalation of volatile acids, fumes or gases such as chlorine, fluorine, bromine or iodine causes severe irritation of the throat and chest with paroxysmal coughing and inhibition of respiration, followed by pulmonary oedema.

FIRST AID AND TREATMENT :

Ingested :

Dilute immediately by giving 200 ml of diluted milk of magnesia, diluted aluminium hydroxide gel, milk, raw egg, or water to drink. Do not give bicarbonate or carbonates.

Relieve pain and treat shock :

Perform esophagoscopy promptly to determine the presence of injury. Perforation, peritonitis, and major bleeding are indications for surgery.

Skin Contact :

Flood with water for 15 minutes. Use on chemical antidotes; the heat of the reaction may cause additional injury. Relieve pain and treat shock.

For hydrogen fluoride (hydrochloric acid) burns, inject 0.5 ml of 10% calcium gluconate with local anesthetic per square centimeter under the burned area.

Eye Contact :

Flood with water for 5 minutes, holding the eyelids open. Relieve pain by use of local anesthetic agent. Arrange for slitlamp examination.

Inhalation :

Remove from further exposure to fumes or gas.

Check skin and clothing.

Treat pulmonary oedema and laryngeal oedema.

Analgesics or morphine for pains.

Steroids to prevent oesophageal and pyloric strictures.

Antibiotics to prevent infection.

Amyl nitrite by inhalation for 30 seconds in a minute.

Sodium nitrite intravenously 10 ml of 30% solution immediately followed by a very slow injection of 50 ml of 25% solution of sodium thiosulphate taking about 10 minutes for the injection of 1% solution of methylene blue is recommended.

Dicobalt edatate is suggestive.

12.2 AMMONIA :

SYMPTOMS :

Irritant, affecting upper respiratory tract and in large concentration affecting CNS with spasm.

Affection of eyes with rapid penetration of the cornea and even death of the eye ball.

FIRST AID :

Prompt treatment is essential remove the patient from the Ammonia exposed area to an area where fresh air is available.

Start artificial respiration immediately. Administer oxygen as soon as possible. Olive oil can be given by mouth for relief from throat irritation. He should drink warm milk.

If gaseous or liquid ammonia has come into contact with eyes.

- (i) When fumes have caused irritation of eyes, wash eyes while holding lids apart and using copious quantity of water or normal saline water or a solution of 0.5 - 1%. alum.
- (ii) Administer few drops of boric acid solution to reduce pain. Lactic acid can also be used.

- (iii) To prevent eye inflammation eye drops with antibiotics may be used. If internal injury is caused due to Ammonia. SOFRACART AND ACTROQUINE eye drops could be used.
- (iv) For external injury to the eye, wash the eye with water or normal saline water and then apply ointment SOFRAMYCIN.

If liquid ammonia is swallowed by chance.

If the patient has swallowed ammonia and complains of burning pain from mouth to stomach with strong soapy, nauseous taste and vomiting occurs, stain will be found on lips and chin.

Mucous membrane swells, tongue and lips become brown and swell extensively.

The pharynx, when damaged, becomes constricted, respiration is difficult.

Urine is small in quantity, and strongly alkaline.

Purging may occur with tenesmus and blood is stained. Mucous shock may occur.

Destruction of gastric glands, perforation of stomach, visual disturbance etc. may also occur.

- (i) No attempt should be made to induce vomiting.
- (ii) Stomach tubes and emetics should not be used. But soft stomach tube or Levine tube can be passed with care within an hour of ingestion.
- (iii) Dilution with water, if practised, should be done with caution, since heat may be generated during dilution.
- (iv) Weak acids such as vinegar, lemon juice or orange juice could be given to neutralise alkali.
- (v) Keep the patient under observation and take necessary action. The period of treatment depends on the injury. The patient may have to be under treatment for about 3 to 4 weeks.

TREATMENT :

If ammonia water is splashed into the eyes, first-aid consists of immediate washing with a large amount of water or a solution of 0.5 - 1% alum. An ophthalmologist should immediately be consulted, even if the injured worker complains of no pain.

Affected parts of the skin should be washed with clean, and a lotion is applied consisting of a 5% solution of acetic, citric, tartaric or salicylic acid.

In the event of ammonia poisoning through the respiratory tract, the person should breathe fresh air and inhale warm water vapour (if possible with the addition of vinegar or citric acid) and a 10% solution of menthol in chloroform.

He should drink warm milk. In the event of asphyxia, oxygen should be inhaled, preferably under low pressure, until the breathlessness or cyanosis is eased followed by a subcutaneous injection of 1 cm² of 1 % solution of atropine.

Resuscitation must be applied if breathing is interrupted or stops. Cardiac preparations or tranquilisers may be given, if advised by a physician. If pulmonary oedema develops, the

person much be kept as quiet as possible and kept warm and oxygen must be administered as soon as possible followed by symptomatic treatment for pulmonary oedema.

12.3 CHLORINE :

SYMPTOMS :

Being irritant causes conjunctivitis and damage to cornea. Asphyxia, affection of respiratory tract, may lead to Bronchitis, Bronchospasm, Pulmonary oedema.

FIRST AID :

Prompt treatment is essential. Remove the patient to an area where fresh air is available. Do not give anything by mouth to an unconscious patient.

CHLORINE GAS INHALATION :

If chlorine gas inhalation is mild and the patient is only coughing etc. the following line of treatment can be given :

- (i) Loosen the clothes and remove shoes. Give Ammonia by inhalation.
- (ii) Place the patient on his back with head and back elevated. Keep the patient warm with a blanket to avoid chilling.
- (iii) Rest is a must.
- (iv) Milk, buttermilk, coffee can be given for relief from throat irritation.
- (v) Cough syrups like Hitadrine, Coughrol, Linctus, Codeine, etc . and common throat lozenges such as Vox, Vicks tablets, Halls etc can be given for soothing the throat irritation.
- (vi) If gas inhalation is severe but breathing has not ceased start oxygen immediately. Phlebotomy (500 - 700 ml), Caffeine and Sodium benzoate 0.5 - 1.0 gm, 1M.
- (vii) In case breathing has ceased start artificial respiration.

If gaseous or liquid chlorine has come into contact with eyes :

- (i) Flush eyes immediately with running water or normal saline water for about 15 minutes.
- (ii) Hold eye lids apart to ensure complete neutralisation with water.
- (iii) Do not try to neutralise with chemicals.
- (iv) Administer 2 to 3 drops of 0.5% solution of Pontocaine or other effective topical anaesthetic in the eyes.
- (v) Do not use oils or oily ointments in the eyes.

If gaseous or liquid chlorine has come into contact with the skin :

- (i) Remove contaminated clothes.
- (ii) Flush the affected portion with copious amount of running water.
- (iii) Wash skin with copious amount of soap and water.
- (iv) Do not apply greases.

If liquid chlorine is by chance swallowed :

Swallowing of liquid chlorine is extremely unlikely if swallowed and the patient is conscious.

- (i) Ask the patient to drink copious quantity of lime water, ammonia water, (1 ml in 60 ml of water), milk of magnesia or fresh water.
- (ii) No attempt should be made to induce vomiting.
- (iii) Keep the patient under observation and take necessary action.

TREATMENT :

1. Pulmonary oedema

- (i) Administer 60 to 100% oxygen at 6 lit. min.
- (ii) Intermittent positive pressure breathing apparatus, set to delivery positive pressure of 5-15 cm of water in the inspiratory cycle, is valuable in reducing the formation of edema.
- (iii) Symptomatic treatment. 'Lazex' is suggestive.
- (iv) Aminophylline intra venously.

2. Bronchospasm

- (i) There is no known antidote for acute chlorine exposures. The exposure is associated with acute symptomatology requiring supportive therapy only. Early treatment is the most effective.
- (ii) Broncho dilators nebulized into the intermittent positive pressure gas stream are often beneficial.

12.4. OLEUM :

SYMPTOMS :

Corrosion of severe nature.

Severe chemical burns of the affected part alongwith pain.

Affection of respiratory tract and mucus membranes of the exposed parts.

Severe bouts of cough with spasm of bronchial tree.

Flooding of the lungs with fluid in serious exposure and asphyxia.

FIRST AID :

Wash with copious water for long duration. Contaminated clothes to be discarded.

Irrigation of all the affected parts.

Eyes should be irrigated for long time.

TREATMENT :

Symptomatic treatment particularly one recommended for Corrosives.

12.5 CYANIDE COMPOUNDS :

SYMPTOMS :

Hydrocyanic acid and the cyanides cause death by inactivation of the respiratory enzyme, preventing utilization of oxygen by the tissues. The clinical combination of cyanosis, asphyxia, and the odour of bitter almonds of the breath is diagnostic. Respiration is first stimulated and later depressed. A marked drop in blood pressure may occur.

FIRST AID :

1. Poisoning by inhalation - Place patient in open air in recumbent position. Remove contaminated clothing. Give artificial respiration.
2. Poisoning by ingestion - Induce vomiting immediately with a finger down the patient's throat. Do not wait until lavage tube has arrived; death may occur within a few minutes.
3. Give amyl nitrite inhalations for 15 - 30 seconds every 2 minutes until intravenous antidotes are given.

TREATMENT :

Use nitrites to form methemoglobin, which combines with cyanide to form nontoxic cyanmethemoglobin. Then give thiosulphates to convert the cyanide released dissociation of cyanmethemoglobin to thiocyanate.

Administration of antidotes must be based on haemoglobin level. At 14 g / dl haemoglobin, give 0.39 ml/kg of 3% sodium nitrite intravenously and 1.95 ml./kg of 25% sodium thiosulphate intravenously. At lower haemoglobin levels, reduce dosage in exact proportion. Further administration should not exceed 40% methemoglobinemia, inject sodium nitrite over 10-15 minutes, monitoring blood pressure during administration.

Cobalt edentate intravenously if cyanide poisoning is confirmed and should never, be given to a conscious patient.

13. EMERGENCY RESPONSE GUIDE FOR DIFFERENT CHEMICALS

13.1 Emergency response guide for Ammonia :

POTENTIAL HAZARDS

Health Hazards :

Poisonous, may be fatal if inhaled or absorbed through skin.

Contact may cause burns to skin and eyes.

Contact with liquid may cause frostbite.

Clothing frozen to the skin should be thawed before being removed.

Runoff from fire control or dilution water may cause pollution.

Fire or Explosion :

Some of these materials may burn, but none of them ignites readily.

Cylinder may explode in heat of fire.

EMERGENCY ACTION

Keep unnecessary people away, isolate hazard area and deny entry. Stay upwind, out of low areas, and ventilate closed spaces before entering.

Positive pressure self-contained breathing apparatus (SCBA) and chemical protective clothing which is specifically recommended by the shipper or manufacturer may be worn. It may provide little or no thermal protection.

Structural firefighters' protective clothing is not effective for these materials.

Isolate the back or spill area immediately for at least 150 feet in all directions. See the table of initial isolation and protective action distance. If you find the ID Number and the name of the material there, begin protective action.

Fire :

Small Fires : Dry chemical or CO₂.

Large Fires : Water spray, fog or regular foam.

Do not get water inside container.

Move container from fire area if you can do it without risk.

Apply cooling water to sides of containers that are exposed to flames until well after fire is out. Stay away from ends of tanks.

Isolate area until gas has dispersed.

Spill or Leak :

Stop leak if you can do it without risk.

Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire.

Use water spray to reduce vapor, do not put water directly on leak or spill area.

Small Spills : Flush area with flooding amounts of water.

Large Spills : Dike for ahead of liquid spill for later disposal.

Do not get water inside container.

Isolate area until gas has dispersed.

First Aid :

Move victim to fresh air and call emergency medical care; if not breathing give artificial respiration; if breathing is difficult, give oxygen.

In case of contact with material, immediately flush skin or eyes with running water for at least 15 minutes. Remove and isolate contaminated clothing and shoes at the site.

Keep victim quiet and maintain normal body temperature.

Effects may be delayed; keep victim under observation.

13.2 Emergency response guide for L.P.G. and Hydrogen :**POTENTIAL HAZARDS**

Health Hazards :

Vapors may cause dizziness or suffocation.

Contact with liquid may cause frostbite.

Fire may produce irritating or poisonous gases.

Fire or Explosion :

Extremely flammable; may be ignited by heat, sparks or flames.

Vapours may travel to a source of ignition and flash back.

Container may explode in heat of fire.

Vapour explosion hazard indoors, outdoors or in sewers.

EMERGENCY ACTION

Keep unnecessary people away, isolate hazard area and deny entry.

Stay upwind, out of low areas, and ventilate closed spaces before entering.

Positive pressure self-contained breathing apparatus (SCBA) and chemical protective clothing which is specifically recommended by the shipper or manufacturer may be worn. It may provide little or no thermal protection.

Isolate for 1/2 mile in all directions if tank, rail car or tank truck is involved in fire.

Fire :

Let tank, tank car or tank truck burn unless leak can be stopped, with smaller tanks or cylinders, extinguish/ isolate from other flammable.

Small Fires : Dry chemical or CO₂.

Large Fires : Water spray or fog.

Move container from fire area if you can do it without risk.

Apply cooling water to sides of containers that are exposed to flames until well after fire is out. Stay away from ends of tanks.

For massive fire in cargo area, use unmanned hose holder or monitor nozzles, if this is impossible, withdraw from area and let fire burn.

Withdraw immediately in case of rising sound from venting safety device or any discoloration of tank due to fire.

Spill of Leak :

Shut off ignition sources, no flares, smoking or flames in hazard area.

Do not touch or walk through spilled material; stop leak if you can do it without risk.

Use water spray to reduce vapours; isolate area until gas has dispersed.

First Aid :

Move victim to fresh air and call emergency medical care; if not breathing give artificial respiration; if breathing is difficult, give oxygen.

In case of frostbite, thaw frosted parts with water.

Keep victim quiet and maintain normal body temperature.

13.3 Emergency response guide for Petrol & Petroleum Oils :**POTENTIAL HAZARDS**

Health Hazards :

May be poisonous if inhaled or absorbed through skin.

Vapors may cause dizziness or suffocation.

Contact may irritate or burn skin and eyes.

Fire may produce irritating or poisonous gases.

Runoff from fire control or dilution water may cause pollution.

Fire or Explosion :

flammable/ combustible material maybe ignited by heat, sparks or flames.

Vapours may travel to a source of ignition and flash back.

Container may explode in heat of fire.

Vapour explosion hazard indoors, outdoors or in sewers.

Runoff to sewer may create fire or explosion hazard.

EMERGENCY ACTION

Keep unnecessary people away, isolate hazard area and deny entry.

Stay upwind, out of low areas.

Positive pressure self-contained breathing apparatus (SCBA) and chemical protective clothing which is specifically recommended by the shipper or manufacturer may be worn. If may provide little or no thermal protection.

Isolate for 1/2 mile in all direction if tank, rail car or tank truck is involved in fire.

Fire :

Small Fires : Dry chemical or CO₂, water spray or regular foam.

Large Fires : Water spray, fog or regular foam.

Move container from fire area if you can do it without risk.

Apply cooling water to sides of containers that are exposed to flames until well after fire is out. Stay away from ends of tanks.

For massive fire in cargo area, use unmanned hose holder or monitor nozzles, if this is impossible, withdraw from area and let fire burn.

Withdraw immediately in case of rising sound from venting safety device or any discoloration of tank due to fire.

Spill of Leak :

Shut off ignition sources, no flares, smoking or flames in hazard area.

Stop lead if you can do it without risk.

Water spray may reduce vapours; but it may not prevent ignition in closed paces.

Small Spills : Take up with sand or other noncombustible absorbent material and place into containers for later disposal.

Large Spills : Dike for ahead of liquid spill for later disposal.

First Aid :

Move victim to fresh air and call emergency medical care; if not breathing give artificial respiration; if breathing is difficult, give oxygen.

In case of contact with material, immediately flush eyes with running water for at least 15 minutes. Wash skin with soap and water.

Remove and isolate contaminated clothing and shoes at the site.

13.4 Emergency response guide for Natural Gas :

POTENTIAL HAZARDS

Health Hazards :

May be poisonous if inhaled.

Contact may cause burns to skin and eyes.

Vapors may cause dizziness or suffocation.

Contact with liquid may causes frostbite.

Fire may produce irritating or poisonous gases.

Fire or Explosion :

Extremely flammable;

May be ignited by heat, sparks or flames.

Vapours may travel to a source of ignition and flash back.

Container may explode in heat of fire.

Vapour explosion hazard indoors, outdoors or in sewers.

EMERGENCY ACTION

Keep unnecessary people away, isolate hazard area and deny entry.

Stay upwind, out of low areas, and ventilate closed spaces before entering.

Positive pressure self-contained breathing apparatus (SCBA) and chemical protective clothing which is specifically recommended by the shipper or manufacturer may be worn. If may provide little or no thermal protection.

Isolate for 1/2 mile in all direction if tank, rail car or tank truck is involved in fire.

Fire :

Let tank, tank car or tank truck burn unless leak can be stopped, with smaller tanks or cylinders, extinguish/ isolate from other flammable.

Small Fires : Dry chemical or CO₂.

Large Fires : Water spray, fog or regular foam.

Move container from fire area if you can do it without risk.

For massive fire in cargo area, use unmanned hose holder or monitor nozzles, if this is impossible, withdraw from area and let fire burn. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tank due to fire.

Cool container with water using unmanned device until well after fire is out.

Spill of Leak :

Shut off ignition sources, no flares, smoking or flames in hazard area.

Stop leak if you can do it without risk.

Water spray may reduce vapour, but it may not prevent ignition in closed spaces.

Isolate area until gas has dispersed.

First Aid :

Move victim to fresh air and call emergency medical care; if not breathing give artificial respiration; if breathing is difficult, give oxygen.

In case of frostbite, thaw frosted parts with water.

Keep victim quiet and maintain normal body temperature.

13.5 Emergency response guide for Chlorine :

POTENTIAL HAZARDS

Health Hazards :

Poisonous may be fatal if inhaled.

Contact may cause burns to skin and eyes.

Contact with liquid may cause frostbite.

Runoff from fire control or dilution water may cause pollution.

Fire or Explosion :

May ignite other combustible material (wood, paper, oil etc.)

Mixture with fuels may explode.

Cylinder may explode in heat of fire.

Vapour explosion hazard indoors, outdoors or in sewers.

EMERGENCY ACTION

Keep unnecessary people away, isolate hazard area and deny entry.

Stay upwind, out of low areas, and ventilate closed spaces before entering.

Positive pressure self-contained breathing apparatus (SCBA) and chemical protective clothing which is specifically recommended by the shipper or manufacturer may be worn. It may provide little or no thermal protection.

Structural firefighters' protective clothing is not effective for these materials.

Isolate the back or spill area immediately for at least 150 feet in all directions. See the table of initial isolation and protective action distance. If you find the ID Number and the name of the material there, begin protective action.

Fire :

Small Fires : Water only, No dry chemical, CO₂ or Halon.

Contain and let burn. If fire must be fought, water spray or fog is recommended.

Move container from fire area if you can do it without risk.

Apply cooling water to sides of containers that are exposed to flames until well after fire is out. Stay away from ends of tanks.

For massive fire in cargo area, use unmanned hose holder or monitor nozzles, if this is impossible, withdraw from area and let fire burn.

Spill of Leak :

Keep combustibles (wood, paper, oil etc.) away from spilled material.

Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire.

Stop leak if you can do it without risk.

Water spray may be used to reduce or direct vapors.

Isolate area until gas has dispersed.

First Aid :

Move victim to fresh air and call emergency medical care; if not breathing give artificial respiration; if breathing is difficult, give oxygen.

In case of contact with material, immediately flush eyes with running water for at least 15 minutes.

Remove and isolate contaminated clothing and shoes at the site.

Keep victim quiet and maintain normal body temperature.

Effects may be delayed, keep victim under observation.

13.6 Emergency response guide for Sulphuric Acid & Oleum :

POTENTIAL HAZARDS

Health Hazards :

Poisonous if inhaled or swallowed.

Contact may cause burns to skin and eyes.

Runoff from fire control or dilution water may cause pollution.

Fire or Explosion :

Some of these materials may burn, but none of them ignites readily.

May be ignite other combustible material (wood, paper, oil etc.)

Violent reaction with water.

Flammable/ poisonous gases may accumulate in tanks and hopper cars.

Runoff to sewer may create fire or explosion hazard.

EMERGENCY ACTION

Keep unnecessary people away, isolate hazard area and deny entry.

Stay upwind, out of low areas, and ventilate closed spaces before entering.

Positive pressure self-contained breathing apparatus (SCBA) and chemical protective clothing which is specifically recommended by the shipper or manufacturer may be worn. It may provide little or no thermal protection.

Structural firefighters' protective clothing is not effective for these materials.

Isolate the back or spill area immediately for at least 150 feet in all directions. See the table of initial isolation and protective action distance. If you find the ID Number and the name of the material there, begin protective action.

Fire :

Do not get water inside container.

Small Fires : Dry chemical or CO₂.

Large Fires : Flood fire area with water from a distance.

Do not get solid stream of water on spilled material.

Move container from fire area if you can do it without risk.

Apply cooling water to sides of containers that are exposed to flames until well after fire is out. Stay away from ends of tanks.

Spill of Leak :

Do not touch or walk through spilled material, stop leak if you can do it without risk.

Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire.

Use water spray to reduce vapor, do not put water directly on leak, spill area or inside container.

Keep combustibles (wood, paper, oil etc.) away from spilled material.

Spills : Dike for later disposal. Do not apply water unless directed to do so.

Cleanup only under supervision of an expert.

First Aid :

Move victim to fresh air and call emergency medical care; if not breathing give artificial respiration; if breathing is difficult, give oxygen.

In case of contact with material, immediately flush eyes with running water for at least 15 minutes.

Speed in removing material from skin is of extreme importance.

Remove and isolate contaminated clothing and shoes at the site.

Keep victim quiet and maintain normal body temperature.

13.7 Emergency response guide for Hydrochloric Acid :

POTENTIAL HAZARDS

Health Hazards :

Contact may cause burns to skin and eyes.

If inhaled, may be harmful.

Fire may produce irritating or poisonous gases.

Runoff from fire control or dilution water may cause pollution.

Fire or Explosion :

Some of these materials may burn, but none of them ignites readily.
Flammable/ poisonous gases may accumulate in tanks and hopper cars.
Some of these material may ignite other combustible (wood, paper, oil etc.)

EMERGENCY ACTION

Keep unnecessary people away, isolate hazard area and deny entry.
Stay upwind, out of low areas, and ventilate closed spaces before entering.
Positive pressure self-contained breathing apparatus (SCBA) and chemical protective clothing will provide limited protection.
If water pollution occurs, notify the appropriate authorities.

Fire :

Some of these material may react violently with water.

Small Fires : Dry chemical or CO₂ .water spray or regular foam.

Large Fires : Water spray, fog or regular foam.

Move container from fire area if you can do it without risk.

Apply cooling water to sides of containers that are exposed to flames until well after fire is out.
Stay away from ends of tanks.

Spill of Leak :

Do not touch or walk through spilled material, stop leak if you can do it without risk.

Small Spills : Take up with sand or other noncombustible absorbent material and place into containers for later disposal.

Small Dry Spills : With clean shovel place material into clean, dry container and cover loosely; move containers from spill area.

Large Spills : Dike for ahead of liquid spill for later disposal.

First Aid :

Move victim to fresh air and call emergency medical care.

In case of contact with material, immediately flush eyes with running water for at least 15 minutes.

Remove and isolate contaminated clothing and shoes at the site.

Keep victim quiet and maintain normal body temperature.

13.8 Emergency response guide for Methanol & Liquid Poisonous & Flammable Pesticides :

POTENTIAL HAZARDS

Health Hazards :

Poisonous, may be fatal if inhaled, swallowed or absorbed through skin.

Contact may cause burns to skin and eyes.

Runoff from fire control or dilution water may cause pollution.

Fire or Explosion :

Flammable/ combustible material, may be ignited by heat, sparks or flames.

Vapors may travel to a source of ignition and flash back.

Container may explode in heat of fire.

Vapour explosion and poison hazard indoors, outdoors or in sewers.

Runoff to sewer may create fire or explosion hazard.

EMERGENCY ACTION

Keep unnecessary people away, isolate hazard area and deny entry.

Stay upwind, out of low areas, and ventilate closed spaces before entering.

Positive pressure self-contained breathing apparatus (SCBA) and chemical protective clothing will provide limited protection.

Structural firefighters protective clothing is not effective for these material.

Isolate for 1/2 mile in all direction if tank, rail car or tank truck is involved in fire.

Fire :

Small Fires : Dry chemical or CO₂ .water spray or alcohol - resistant foam.

Large Fires : Water spray, fog or alcohol - resistant foam.

Move container from fire area if you can do it without risk.

Dike fire-control water for later disposal, do not scatter the material.

Apply cooling water to sides of containers that are exposed to flames until well after fire is out.

Stay away from ends of tanks.

Withdraw immediately in case of rising sound from venting safety device or any discoloration of tank due to fire.

Spill of Leak :

Shut off ignition sources; no flares, smoking or flames in hazard area.

Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire.

Do not touch or walk through spilled material, stop leak if you can do it without risk.

Water spray may reduce vapor, but it may not prevent ignition in closed spaces.

Small Spills : Take up with sand or other noncombustible absorbent material and place into containers for later disposal.

Large Spills : Dike for ahead of liquid spill for later disposal.

First Aid :

Move victim to fresh air and call emergency medical care; if not breathing give artificial respiration; if breathing is difficult, give oxygen.

In case of contact with material, immediately flush eyes with running water for at least 15 minutes. Speed in removing material from skin is of extreme importance.

Remove and isolate contaminated clothing and shoes at the site.

Keep victim quiet and maintain normal body temperature.

Effect may be delayed, keep victim under observation.

13.9 Emergency response guide for Solid & Liquid Poisonous Pesticides

POTENTIAL HAZARDS

Health Hazards :

Poisonous, may be fatal if inhaled, swallowed or absorbed through skin.

Contact may cause burns to skin and eyes.

Runoff from fire control or dilution water may give off poisonous gases and cause water pollution.

Fire may produce irritating or poisonous gases.

Fire or Explosion :

Some of these material may burn, but none of them ignites readily.

Container may explode violently in heat of fire.

EMERGENCY ACTION

Keep unnecessary people away, isolate hazard area and deny entry.

Stay upwind, out of low areas, and ventilate closed spaces before entering.

Positive pressure self-contained breathing apparatus (SCBA) and chemical protective clothing which is specifically recommended by the shipper or manufacturer may be worn. It may provide little or no thermal protection.

Structural firefighters protective clothing is not effective for these material.

Remove and isolate contaminated clothing at the site.

Fire :

Small Fires : Dry chemical, water spray or regular foam.

Large Fires : Water spray, fog or regular foam.

Move container from fire area if you can do it without risk.

Fight fire from maximum distance. Stay away from ends of tanks.

Dike fire-control water for later disposal, do not scatter the material.

Spill of Leak :

Do not touch or walk through spilled material, stop leak if you can do it without risk.

Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire.

Use Water spray to reduce vapor.

Small Spills : Take up with sand or other noncombustible absorbent material and place into containers for later disposal.

Large Spills : Dike for ahead of liquid spill for later disposal.

First Aid :

Move victim to fresh air and call emergency medical care; if not breathing give artificial respiration; if breathing is difficult, give oxygen.

In case of contact with material, immediately flush eyes with running water for at least 15 minutes.

Speed in removing material from skin is of extreme importance.

Remove and isolate contaminated clothing and shoes at the site.

Keep victim quiet and maintain normal body temperature.

Effect may be delayed, keep victim under observation.

14. MATERIAL SAFETY DATA SHEET

14.1 Name of Product/ Chemical : Diesel

IDENTITY OF MATERIAL	
Product Name	Diesel Oil, Gas Oil
Trade Name	HSD
Formula	Complex mixture of Hydrocarbons
UN NO.	1202
CAS No	
HAZCHEM Code	3 Y
Label / Class	Red Flammable Liquid
PHYSICAL AND CHEMICAL PROPERTIES	
Physical State	Liquid
Appearance	Light Brown/ Black
Odor	Diesel
Solubility in water	Insoluble (30 ppm)
Calorific value (Kcal/Kg.)	4.35E + 07
Boiling Point/ Range, Deg C	150-400
Melting/ freezing point Deg. C	
Vapor Density (Air=1)	18 to 46
Specific Gravity , 20 Deg. C	3 to 5
Dyn. Viscosity (PAS 30 deg. C)	0.81 to 0.91
Molecular weight	
Vapor Pressure at 38 Deg C. mm Hg	<1
Evaporation Rate at 30 deg. C	
Heat of Vaporisation, KCal/Kg	2.71 E + 05
Specific Heat Liq.	2.343 E + 03
FIRE AND EXPLOSION DATA	
Explosivity	Moderate
Flammability	Moderate
Auto ignition temp deg. C	256.6
Explosive Limits %	0.7 – 5
Flash point C, CC/OC	32 to 96
Burning Rate	4 mm / min
Extinguishing media	Foam, CO ₂ , DCP, water may be ineffective and cause fire to spread. May be used to cool fire exposed.
Special Procedures	
Unusual Hazards	Flash back may occur along vapour trail.

REACTIVE HAZARDS	
Stability	Stable
Hazardous Poly	
Incompatibility	Oxidizing agents
Hazardous Combustion/ Decomposition product	Toxic gases/ vapours (CO)
Condition to avoid	Keep away from heat and open flame
HEALTH HAZARD DATA	
Entry Route	Inhalation/ Skin absorption
TLV, PPM, Mg/ Cu.M	5 mg/m ³ (inhalation)
PEL, PPM, mg/Cu.m.	
STEL, PPM, mg./Cu.m.	10 mg/m ³
LD 50 oral, Rat g/kg	28
Odor Threshold, PPM	0.1
LD 50, Rabbit g/Kg	0.2
Delayed Toxicity	
SIGN/ SYMPTOMS OF EXPOSURE	
Inhalation	Dizziness, headache, Aspiration - rapidly developing, potential fatal chemical pneumonitis.
Ingestion	Nausea, vomiting
Contact	Skin-irritation, eyes-irritation, Dermatitis may result on prolonged contact
Emergency Treatment (Immediate Medical Attention Required)	
Inhalation	Remove victim to fresh air, give artificial respiration if necessary. If unconscious but breathing place in the unconscious (recovery) position. give external cardiac massage if necessary.
Ingestion	Do not induce vomiting
Contact	Remove contaminated clothing and wash affected part (skin/ eyes) with plenty of water.
HAZARD SPECIFICATION	
<u>NFPA Rating</u>	
Health	0
Stability	0
Flammability	2
Special	
Material Factor	10
KNOWN HAZARDS	
Combustible liquid	
Explosive Material	
Oxydiser	
Compressed Gas	

Carcinogen	
Flammable material	Flammable liquid
Unstable material	
Organic Peroxide	
Irritant	
Mutagen	
Phosphoric material	
Water reactive material	
Corrosive material	
Sensitizer	
Other	
SAFE USAGE DATA – PRECAUTIONS	
Ventilation	Adequate ventilation
<u>Protective Equipment</u>	
Eyes	Goggles / face shield
Respiratory	Self contained breathing apparatus for containment/ cleanup operations.
Gloves	Rubber
Clothing	Rubber
Others	
Handling and Storage	Diesel should be stored in well ventilated, properly labeled and approved containers, Sniffing, siphoning and use as a solvent and cleaning agent should be avoided. Do not transfer to unlabeled, unsuitable or incorrectly labeled containers. All containers should be kept out of reach of children and kept fully closed when not in use. Cleaning and inspection/ maintenance of storage tanks should be done according to proper procedures and precautions (work permit system, gas freeing of tanks, using lifeline and wearing air supplied breathing apparatus)
Others	
EMERGENCY RESPONSE DATA	
Release / Spill	Avoid spillage, should they occur, sand or earth are useful means of containment and absorption.
ADDITIONAL INFORMATION	Gastric lavage should be done after endotracheal intubation, in view of risk

	aspiration which can cause chemical pneumonitis for which antibiotic and corticosteroid therapy may be indicated.

MATERIAL SAFETY DATA SHEET

14.2 Name of Product/ Chemical : Fuel Oil

IDENTITY OF MATERIAL	
Product Name	Fuel oil, Residual fuel oil, Bunker fuel oils
Trade Name	FO
Formula	Complex mixture of Hydrocarbons
UN NO.	1270
CAS No	
HAZCHEM Code	3 Y E
Label / Class	Not requested
PHYSICAL AND CHEMICAL PROPERTIES	
Physical State	Liquid
Appearance	Brown to black
Odor	Diesel fuel
Solubility in water	Insoluble
Calorific value (Kcal/Kg.)	4.34E + 07
Boiling Point/ Range, Deg C	185-500
Melting/ freezing point Deg. C	29 to (At 38 deg C, mm Hg.)
Vapor Density (Air=1)	3 to 5
Specific Gravity , 20 Deg. C	0.9 to 1.05
Dyn. Viscosity (PAS 30 deg. C)	
Molecular weight	
Vapor Pressure at 38 Deg C. mm Hg	<1 mm Hg 20 C (Approx.)
Evaporation Rate at 30 deg. C	
Heat of Vaporisation, KCal/Kg	2.9 E + 05
Specific Heat Liq.	1.9 + 03
FIRE AND EXPLOSION DATA	
Explosivity	
Flammability	Moderate
Auto ignition temp deg. C	263 to 407
Explosive Limits %	1 to 5
Flash point C, CC/OC	66 C and above
Burning Rate	4 mm / min
Extinguishing media	Foam, CO ₂ , DCP, water may be ineffective and cause fire to spread. May be used to cool fire exposed. containers.
Special Procedures	If a leak or spill has not ignited, use water spray to disperse the vapours and to provide for men attempting to stop a leak. Water spray may be used to flush spills away from exposure area.
Unusual Hazards	

REACTIVE HAZARDS	
Stability	Stable
Hazardous Poly	
Incompatibility	Oxidizing agents
Hazardous Combustion/ Decomposition product	Toxic gases/ vapours (CO)
Condition to avoid	Keep away from heat and open flame
HEALTH HAZARD DATA	
Entry Route	Inhalation/ Skin absorption
TLV, PPM, Mg/ Cu.M	5 mg/m ³ (inhalation)
PEL, PPM, mg/Cu.m.	
STEL, PPM, mg./Cu.m.	10 mg/m ³
LD 50 oral, Rat g/kg	
Odor Threshold, PPM	0.1
LD 50, Rabbit g/Kg	
Delayed Toxicity	
SIGN/ SYMPTOMS OF EXPOSURE	
Inhalation	Dizziness, headache
Ingestion	Nausea, vomiting
Contact	Skin-irritation, eyes-irritation, Dermatitis may result on prolonged contact
Emergency Treatment (Immediate Medical Attention Required)	
Inhalation	Remove victim to fresh air, give artificial respiration if necessary. If unconscious but breathing place in the unconscious (recovery) position. give external cardiac massage if necessary.
Ingestion	Do not induce vomiting as it may lead to chemical pneumonitis.
Contact	Remove contaminated clothing and wash affected part (skin/ eyes) with plenty of water, kerosene / gasoline should never be used.
HAZARD SPECIFICATION	
<u>NFPA Rating</u>	
Health	0
Stability	0
Flammability	2
Special	
Material Factor	10
KNOWN HAZARDS	
Combustible liquid	Combustible liquid
Explosive Material	
Oxydiser	

Compressed Gas	
Carcinogen	
Flammable material	Flammable liquid
Unstable material	
Organic Peroxide	
Irritant	
Mutagen	
Phosphoric material	
Water reactive material	
Corrosive material	
Sensitizer	
Other	
SAFE USAGE DATA – PRECAUTIONS	
Ventilation	
<u>Protective Equipment</u>	
Eyes	Goggles / face shield
Respiratory	
Gloves	neoprene, butyl rubber
Clothing	Rubber
Others	
Handling and Storage	Fuel oil should be stored in well ventilated, property labeled and approved containers.
Others	
EMERGENCY RESPONSE DATA	
Release / Spill	Avoid spillage, should they occur, sand or earth are useful means of containment and absorption.
Waste Disposal	
ADDITIONAL INFORMATION	Gastric lavage should be done after endotracheal incubation, in view of risk aspiration which can cause chemical pneumonitis for which antibiotic and corticosteroid therapy may be indicated.

MATERIAL SAFETY DATA SHEET

14.3 Name of Product/ Chemical : Gasoline

IDENTITY OF MATERIAL	
Product Name	Petrol, Motor, Spirit, AV gas, Automotive fuel
Trade Name	Gasoline
Formula	Complex mixture of Hydrocarbons
UN NO.	1203
CAS No	
HAZCHEM Code	3 Y* E
Label / Class	Red and white flammable liquid/ 3.2 Group II
PHYSICAL AND CHEMICAL PROPERTIES	
Physical State	Liquid
Appearance	Colourless
Odor	Gasoline
Solubility in water	Insoluble
Calorific value (Kcal/Kg.)	4.5E + 07
Boiling Point/ Range, Deg C	32 – 215
Melting/ freezing point Deg. C	92 to -75
Vapor Density (Air=1)	3 to 4
Specific Gravity , 20 Deg. C	0.69 to 0.77
Dyn. Viscosity (PAS 30 deg. C)	
Molecular weight	
Vapor Pressure at 38 Deg C. mm Hg	300 to 600
Evaporation Rate at 30 deg. C	10 approx.
Heat of Vaporisation, KCal/Kg	2.93 E + 05
Specific Heat Liq.	2.2 E + 03
FIRE AND EXPLOSION DATA	
Explosivity	Moderate
Flammability	Dangerous
Auto ignition temp deg. C	257
Explosive Limits %	1.3 - 7.6
Flash point C, CC/OC	45
Burning Rate	4 mm / min
Extinguishing media	Foam, CO ₂ , DCP, water may be ineffective and cause fire to spread. May be used to cool fire exposed. containers.
Special Procedures	If a leak or spill has not ignited, use water spray to disperse the vapours and to protect men attempting to stop a leak. Water spray may be used to flush spills away from exposures.
Unusual Hazards	Flash back may occur along vapour trail.

REACTIVE HAZARDS	
Stability	Stable
Hazardous Poly	
Incompatibility	Oxidizing agents
Hazardous Combustion/ Decomposition product	Toxic gases/ vapours (CO)
Condition to avoid	Keep away from heat and open flame
HEALTH HAZARD DATA	
Entry Route	Inhalation/ Skin absorption
TLV, PPM, Mg/ Cu.M	300 ppm/ 900 mg/m ³
PEL, PPM, mg/Cu.m.	
STEL, PPM, mg./Cu.m.	500 ppm/1500 mg/m ³
LD 50 oral, Rat g/kg	
Odor Threshold, PPM	0.25
LD 50, Rabbit g/Kg	900 ppm/ 1 hr
Delayed Toxicity	
SIGN/ SYMPTOMS OF EXPOSURE	
Inhalation	In very high conc. causes loss of consciousness, coma and sudden death, In less severe cases headache, nausea, mental confusion and depression occurs. Moderately toxic by inhalation.
Ingestion	Irritation of gastrointestinal tract with vomiting, colic and diarrhea, Fatal dose for adult 350 g and for children 10-15 gms.
Contact	Skin dry and defeat skin with dermatitis, splash contact with eyes causes pain and slight transient corneal epithelial disturbances.
Emergency Treatment (Immediate Medical Attention Required)	
Inhalation	Remove victim to fresh air, give artificial respiration (not mouth to mouth) if breathing is stopped. Oxygen if breathing is labored, Resources should take suitable precautions to prevent being overcome by high vapour conc.
Ingestion	Give conscious victim water to drink, do not induce vomiting. Liquid paraffin, olive oil or some vegetable oil is to be given orally to retard absorption of gasoline. Gastric lavage and induction of vomiting are not advisable.
Contact	Remove contaminated clothing and wash affected part.
HAZARD SPECIFICATION	
NFPA Rating	
Health	1

Stability	0
Flammability	3
Special	
Material Factor	16
KNOWN HAZARDS	
Combustible liquid	
Explosive Material	
Oxydiser	
Compressed Gas	
Carcinogen	
Flammable material	Flammable liquid
Unstable material	
Organic Peroxide	
Irritant	
Mutagen	
Ptsophoric material	
Water reactive material	
Corrosive material	
Sensitizer	
Other	
SAFE USAGE DATA – PRECAUTIONS	
Ventilation	Adequate ventilation
<u>Protective Equipment</u>	
Eyes	Goggles / face shield
Respiratory	Self contained breathing apparatus for containment/ cleanup operations.
Gloves	Rubber
Clothing	Rubber
Others	
Handling and Storage	Gasoline should be stored in well ventilated, properly labeled and approved containers, Sniffing, siphoning and use as a solvent and cleaning agent should be avoided. Do not transfer to unlabeled, unsuitable or incorrectly labeled containers. All containers should be kept out of reach of children and kept fully closed when not in use. Cleaning and inspection/ maintenance of storage tanks should be done according to proper procedures and precautions (work permit system, gas freeing of tanks, using lifeline and wearing air supplied breathing apparatus) Additional precautions are required where tanks may contain leaded gasoline.
Others	

EMERGENCY RESPONSE DATA

Release / Spill

Avoid spillage, should they occur, sand or earth are useful means of containment and absorption. Because the vapours can travel along the ground for considerable distances, naked flames in surrounding areas should be extinguished. Any action which might cause ignition of gasoline/ vapours should be avoided. Any body in the nearby low laying confined space should be evacuated immediately until the area has been thoroughly ventilated and checked as safe to re-enter. The sand/ earth should be removed to safe area.

Waste Disposal**ADDITIONAL INFORMATION**

Gastric lavage should be done after endotracheal incubation, in view of risk aspiration which can cause chemical pneumonitis for which antibiotic and corticosteroid therapy may be indicated.

MATERIAL SAFETY DATA SHEET

14.4 Name of Product/ Chemical : Kerosene

IDENTITY OF MATERIAL	
Product Name	Kerosene, Stove oil, Jet fuel, illuminating oil, range oil fuel oil No. 1 Coal oil
Trade Name	Kerosene
Formula	Complex mixture of Hydrocarbons
UN NO.	1223
CAS No	
HAZCHEM Code	3 Y
Label / Class	Red flammable liquid/ 3.3 Group II
PHYSICAL AND CHEMICAL PROPERTIES	
Physical State	Liquid
Appearance	Colourless
Odor	Gasoline like
Solubility in water	0.0002 to 0.0004
Calorific value (Kcal/Kg.)	4.35E + 07
Boiling Point/ Range, Deg C	145 – 300
Melting/ freezing point Deg. C	43 to -49
Vapor Density (Air=1)	4.1
Specific Gravity , 20 Deg. C	0.80 to 0.85
Dyn. Viscosity (PAS 30 deg. C)	
Molecular weight	
Vapor Pressure at 38 Deg C. mm Hg	5
Evaporation Rate at 30 deg. C	
Heat of Vaporisation, KCal/Kg	2.72 E + 05
Specific Heat Liq.	2.09 E + 03
FIRE AND EXPLOSION DATA	
Explosivity	Moderate
Flammability	Moderate
Auto ignition temp deg. C	
Explosive Limits %	
Flash point C, CC/OC	
Burning Rate	
Extinguishing media	Foam, CO ₂ , DCP, water may be ineffective and cause fire to spread. May be used to cool fire exposed containers.
Special Procedures	If a leak or spill has not ignited, use water spray to disperse the vapours and to provide men attempting to stop a leak. Water spray may be used to flush spills away from exposures.

Unusual Hazards	
REACTIVE HAZARDS	
Stability	Stable
Hazardous Poly	
Incompatibility	Oxidizing agents
Hazardous Combustion/ Decomposition product	Toxic gases/ vapours (CO)
Condition to avoid	Keep away from heat and open flame
HEALTH HAZARD DATA	
Entry Route	Skin absorption
TLV, PPM, Mg/ Cu.M	500 ppm
PEL, PPM, mg/Cu.m.	
STEL, PPM, mg./Cu.m.	
LD 50 oral, Rat g/kg	20 gm/ kg
Odor Threshold, PPM	1
LD 50, Rabbit g/Kg	2.8
Delayed Toxicity	0.2 (oral)
SIGN/ SYMPTOMS OF EXPOSURE	
Inhalation	Dizziness, headache and nausea, CNS depressant / anesthetic effect. Continued inhalation procures visual and auditory, hallucinations, delirium and mania. Also symptoms of fatigue, somnolence, staggering gait, loss of memory.
Ingestion	Spontaneous vomiting, low to moderate oral toxicity. Irritation of mouth, throat & gastro intestinal tract, nausea, weakness, dizziness, slow and shallow respiration, convulsions, unconsciousness.
Contact	Skin irritation, prolonged contact can result in drying of skin, dermatitis and eye irritation.
Emergency Treatment (Immediate Medical Attention Required)	
Inhalation	Remove victim to fresh air, give artificial respiration if breathing has stopped. Oxygen if breathing is labored.
Ingestion	Give conscious victim water to drink, do not induce vomiting. Liquid paraffin, olive oil or some vegetable oil is to be given orally to retard absorption of gasoline. Gastric lavage and induction of vomiting are not advisable.
Contact	Remove contaminated clothing and wash affected part (skin/ eyes) with plenty of water.
HAZARD SPECIFICATION	
NFPA Rating	
Health	0

Stability	0
Flammability	2
Special	
Material Factor	16
KNOWN HAZARDS	
Combustible liquid	
Explosive Material	
Oxydiser	
Compressed Gas	
Carcinogen	
Flammable material	Flammable liquid
Unstable material	
Organic Peroxide	
Irritant	
Mutagen	
Ptsophoric material	
Water reactive material	
Corrosive material	
Sensitizer	
Other	
SAFE USAGE DATA – PRECAUTIONS	
Ventilation	Adequate ventilation
<u>Protective Equipment</u>	
Eyes	Goggles / face shield
Respiratory	Self contained breathing apparatus for containment/ cleanup operations.
Gloves	Rubber
Clothing	Rubber
Others	
Handling and Storage	Kerosene should be stored in well ventilated, properly labeled and approved containers, Sniffing, siphoning and use as a solvent and cleaning agent should be avoided. Do not transfer to unlabeled, unsuitable or incorrectly labeled containers. All containers should be kept out of reach of children and kept fully closed when not in use. Cleaning and inspection/ maintenance of storage tanks should be done according to proper procedures and precautions (work permit system, gas freeing of tanks, using lifeline and wearing air supplied breathing apparatus).
Others	

EMERGENCY RESPONSE DATA

Release / Spill	
Waste Disposal	
ADDITIONAL INFORMATION	Gastric lavage should be done after endotracheal incubation, in view of risk aspiration which can cause chemical pneumonitis for which antibiotic and corticosteroid therapy may be indicated.

MATERIAL SAFETY DATA SHEET

14.5 Name of Product/ Chemical : Naptha

IDENTITY OF MATERIAL	
Product Name	Naptha, Petroleum, solvent, Benzene, Mineral, Light Ligorin
Trade Name	Naptha
Formula	Complex mixture of Hydrocarbons
UN NO.	1225
CAS No	8052 - 41- 3
HAZCHEM Code	3 Y*E
Label / Class	Red and white flammable liquid/ 3.2 Group II
PHYSICAL AND CHEMICAL PROPERTIES	
Physical State	Liquid
Appearance	Colourless
Odor	Gasoline
Solubility in water	Insoluble
Calorific value (Kcal/Kg.)	4.5E + 07
Boiling Point/ Range, Deg C	35 – 205
Melting/ freezing point Deg. C	<30
Vapor Density (Air=1)	2.5 to 4.8
Specific Gravity , 20 Deg. C	0.69 to 0.78
Dyn. Viscosity (PAS 30 deg. C)	
Molecular weight	
Vapor Pressure at 38 Deg C. mm Hg	0 to 67
Evaporation Rate at 30 deg. C	10 approx.
Heat of Varporisation, KCal/Kg	2.9 E + 05
Specific Heat Liq.	2.2 E + 03
FIRE AND EXPLOSION DATA	
Explosivity	Moderate
Flammability0	Dangerous
Auto ignition temp deg. C	229 to 293
Explosive Limits %	1.1 - 5.9
Flash point C, CC/OC	20 to 50
Burning Rate	4 mm/ min.
Extinguishing media	Foam, CO ₂ , DCP, water may be ineffective and cause fire to spread. May be used to cool fire exposed containers.
Special Procedures	If a leak or spill has not ignited, use water spray to disperse the vapours and to provide men attempting to stop a leak. Water spray may be used to flush spills away from exposures.

Unusual Hazards	
REACTIVE HAZARDS	
Stability	Stable
Hazardous Poly	
Incompatibility	
Hazardous Combustion/ Decomposition product	
Condition to avoid	Keep away from heat and open flame
HEALTH HAZARD DATA	
Entry Route	Inhalation / Skin absorption
TLV, PPM, Mg/ Cu.M	500 ppm / 2000 mg/m ³
PEL, PPM, mg/Cu.m.	
STEL, PPM, mg./Cu.m.	
LD 50 oral, Rat g/kg	0.5 to 5.0
Odor Threshold, PPM	5
LD 50, Rabbit g/Kg	1600 ppm
Delayed Toxicity	2.5 g/ kg
SIGN/ SYMPTOMS OF EXPOSURE	
Inhalation	In very high con. causes loss of consciousness, coma and sudden death. In less severe cases headache, nausea, mental confusion and depression occurs. Moderately toxic by inhalation.
Ingestion	Irritation of gastrointestinal tract with vomiting, colic and diarrhea, fatal dose for adult 350 g and for children 10-15 gms.
Contact	Skin dry and defeat skin with dermatitis, splash contact with eyes causes pain and slight transient corneal epithelial disturbances.
Emergency Treatment (Immediate Medical Attention Required)	
Inhalation	Remove victim to fresh air, give artificial respiration (not mouth to mouth) if breathing has stopped. Oxygen if breathing is labored. Rescuers should take suitable precautions to prevent being overcome by high vapour conc.
Ingestion	Give conscious victim water to drink, do not induce vomiting. Liquid paraffin, olive oil or some vegetable oil is to be given orally to retard absorption of gasoline. Gastric lavage and induction of vomiting are not advisable.
Contact	Remove contaminated clothing and wash affected part (skin/ eyes) with plenty of water.
HAZARD SPECIFICATION	
<u>NFPA Rating</u>	

Health	1
Stability	0
Flammability	3
Special	
Material Factor	16
KNOWN HAZARDS	
Combustible liquid	
Explosive Material	
Oxydiser	
Compressed Gas	
Carcinogen	
Flammable material	Flammable liquid
Unstable material	
Organic Peroxide	
Irritant	
Mutagen	
Ptsophoric material	
Water reactive material	
Corrosive material	
Sensitizer	
Other	
SAFE USAGE DATA – PRECAUTIONS	
Ventilation	Adequate ventilation
<u>Protective Equipment</u>	
Eyes	Goggles / face shield
Respiratory	Self contained breathing apparatus for containment/ cleanup operations.
Gloves	Rubber
Clothing	Rubber
Others	
Handling and Storage	Naptha should be stored in well ventilated, properly labeled and approved containers, Sniffing, siphoning and use as a solvent and cleaning agent should be avoided. Do not transfer to unlabeled, unsuitable or incorrectly labeled containers. All containers should be kept out or reach of children and kept fully closed when not in use. Cleaning and inspection/ maintenance of storage tanks should be done according to proper procedures and precautions (work permit system, gas freeing of tanks, using lifeline and wearing air supplied breathing apparatus).
EMERGENCY RESPONSE DATA	

Release / Spill	Avoid spillage, should they occur, sand or earth are useful means of containment and absorption. Because the vapours can travel along the ground for considerable distances, naked flames in surrounding areas should be extinguished. Any action which might cause ignition of gasoline/ vapours should be avoided. Any body in the nearby low laying confined space should be evacuated immediately until the area has been thoroughly ventilated and checked as safe to re-enter. The sand/ earth should be removed to safe area.
Waste Disposal	
ADDITIONAL INFORMATION	Gastric lavage should be done after endotracheal incubation, in view of risk aspiration which can cause chemical pneumonitis for which antibiotic and corticosteroid therapy may be indicated.

14.6 PROPERTIES OF LPG

Liquefied Petroleum Gas is a generic expression for propane and butane and mixtures of the two. LPG is produced from two distinct sources; firstly it is obtained from the processing of crude oil in Refineries or as a bye product from secondary processing plant. Second source of LPG is natural gas streams, which largely consist of methane but smaller quantities of heavier hydrocarbons also.

LPG is normally available in pressurized form and is marketed in pressure cylinders or small pressure tanks.

Physical properties of commercial propane and commercial butane are given in the table.

S. No.	Properties	Unit	Commercial Propane	Commercial Butane
1	Chemical Formula		C_3H_8	C_4H_{10}
2	Vapor Pressure at: 20 deg. C 40 deg. C 45 deg. C 55 deg. C	Bars Absolute	8.95 14.82 16.72 19.80	1.03 2.85 3.45 4.62
3	Liquid Specific Gravity (Water = 1)		0.504	0.582
4	Relative Vapor Density (Air = 1)		1.55	2.09
5	Boiling Point at atm. Pressure	Deg. C	(-) 42	(-) 9
6	Critical temp.	Deg. C	96.8	153
7	Critical pressure	Bars, abs.	42.6	38.1

8	Flash point	Deg. C	(-) 105	(-) 60
9	Ignition temp. In air	Deg. C	493-549	482-538
10	Auto-ignition temp.	Deg. C	468	365
11	Flammable range in air	% Vol.	2.15-9.60	1.55-8.60
12	Flammable range in Oxygen	% Vol.	2.15-55.0	1.55-49.0
13	Maximum flame temp.	Deg. C	1980	2008
14.	Specific heat of liquid At 15.56 deg. C	KJ / Kg.	1.464	1.276
15	Latent heat of vaporization at boiling point	KJ / Kg. KJ / Litre	428 216	388 226
16	Total Heating Value after vaporization	KJ / Cu. M KJ / Kg. KJ / Litre	92430 49920 25140	121280 49140 28100
17	Condensing Ratio	Dm3 Liquid / m ³ gas	3.380	4.32