

**OFF – SITE
EMERGENCY
PLAN**

**DISTRICT
KURUKSHETRA**

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INTRODUCTION

District Crises Group for the district Kurukshetra in Haryana State has been constituted in accordance with the notification. No S.O. 57/ C.A. (E.P. P. and R.) R. 1996/ R. 8/2001. The District Crises Group constituted in accordance with the stipulation of above notification shall be the apex body in the Kurukshetra district to deal with major chemical accidents and to provide expert guidance for handling chemical accidents.

The Off - Site Emergency Plan is an endeavor of the District Crises Group Kurukshetra towards dealing with chemical emergency arising out of toxic release/fire & explosion during handling/manufacturing, storage and transportation of hazardous chemicals within the district. In the wake of chemical accidents in many parts of our country/ world causing numerous fatality, injuries and evacuation of thousands of inhabitants, the Government has decided to formulate the Off - Site Emergency Plan. Accident in a chemical industry/unit or during transportation of hazardous chemicals may also affect the general public outside the premises. It is therefore not only the concern of the factory management alone but also becomes a concern for the general public and the Government. Therefore it becomes imperative to remain prepared to face any kind of emergency in order to mitigate its effects on the human and environment.

It is mandatory under rule 14 of the "Manufacturing, storage and import of chemical" Rules 1989 and the "Chemical accidents (Emergency Planning, Preparedness and Response) Rules 1996 for District Authorities to prepare an off-site emergency plan in respect of clusters of hazardous chemical industries or at locations where accidents are likely to have an off-site adverse effects.

The planning as suggested in this document for responding to the emergencies is based on some presumptions. It is therefore essential for all responding agencies to practice and rehearse the plan from time to time including Mutual Aid Group members. The Directorate of Industrial Safety and Health Kurukshetra have promoted the formulation of mutual aid group among the industries to respond and help in the mitigation efforts in emergencies.

Despite of taking all safety measures, the possibility of accident can not be completely ruled out. For this reason, it must be a part of safety concept to plan and provide measures, which can mitigate the consequences of an accident. It is therefore essential to formulate the emergency plan at district, state and central levels. The Major Accident Hazards factories have to prepare an "On-site Emergency Plan", to deal with emergencies occurring in the factory premises to minimize the damage to the life and property. The purpose of the "Off - Site Emergency Plan" is to render a support, to the effort on-way under the "On - site Emergency Plan" wherever called or found necessary. The plan is prepared considering the worst case scenario leading to off-site consequences.

This plan deals with emergency related with hazardous materials in factories and during transportation. Every agency such as (Fire, Medical, Police, Civil defense, Red cross, Transport and Municipal corporation etc) expected to respond in emergency should know their role in the event of emergency. It is therefore essential that plan is regularly tested and it is only through rehearsals / mock drills that weakness becomes apparent. Communication is a key component for handling any emergency, it is therefore essential to develop the alternate communication system to be used in case of normal system becomes inoperative. The plan should be reviewed from time to time for up-gradation.

OBJECTIVE

- The overall objectives of the off-site emergency plan are protection of life and property of the community in the industrial area and describes organization of relief during response and recover operation which are given below:
 - (a) To localize the emergency and if possible, eliminate it, and
 - (b) To minimize the effects of the accident life and property & environment.
- Elimination will require prompt action by responders, works emergency staff and District Administration (emergency services like Fire, Medical, Police, Civil defense, Red cross, Transport and Municipal corporation etc).
- Minimizing the effects may include rescue, first aid, evacuation, rehabilitation and giving information promptly to people living in the vicinity.
- To predict the consequence zones of fire, explosion, and toxic gas releases etc. for Industrial and chemical units of the District Kurukshetra.
- To suggest the workable emergency plan to deal with any potential emergency situation.

SCOPE

The scope of the off-site emergency plan includes the following:

1. To identify the hazard arising out of the fire & explosion and toxic release, during the industrial operations or transport of hazard chemicals.
2. To anticipate the consequences of the emergency arising out of the above hazards and to make an account of the existing facility with Govt. and different industries, which can be pressed into service at once in case of emergency.
3. To outline the responsibility of different agencies for the optimum utilization of existing resources both in terms of man & material to minimize the loss of lives and property.
4. To prepare a sequential actions plan to mobilize the resources to cope with disaster and contain the disaster as well as to mitigate the consequential damage, threatening life, property and environment.
5. Propose improvement in existing facilities and provision of additional resources, if possible to achieve the above objective.
6. To establish the co-ordination between the different Govt. departments, Industries, NGO social organization to cope with emergency.
7. The applicability of the plan shall extend to
 - (i) The chemical emergencies in the industries i.e. industrial accident (static installation).
 - (ii) Rail & road accidents during transportation hazardous chemicals
 - (iii) Pipeline accidents
 - (iv) Environmental accidents
 - (v) Sabotages etc.
 - (vi) Explosion/fire accidents in Cooking gas storage places.

District Crisis Group Kurukshetra comprise of the following members:-

1. Deputy Commissioner, Kurukshetra	Chairperson
2. Assistant Director, Industrial Safety & Health, Kurukshetra	Member Sec.
3. Superintendent of Police, Kurukshetra	Member
4. S.D.O.(Civil)-cum-Deputy Controller Civil Defence, Kurukshetra	Member
5. Civil Surgeon, Kurukshetra	Member
6. General Manager, District Industries centre Kurukshetra	Member
7. Fire Officer of Municipal Corporation, Kurukshetra	Member
8. District Public Relation Officer, Kurukshetra	Member
9. General Manager, Haryana Roadways, Kurukshetra	Member
10. Executive Engineer, PWD (Public Health), Kurukshetra	Member
11. Deputy Controller, Civil Defence	Member
12. One representative of Trade Union-Sh.Bhim Singh Saini, President CITU, Kurukshetra	Member
13. Deputy Director Agriculture, Kurukshetra	Member
14. Regional Officer, State Pollution Control Board, Yamunanagar	Member
15. One representative of Industries-Sh.Dharam Pal, President, Rice Miller, Kurukshetra.	Member

PROFILE OF DISTRICT KURUKSHETRA

The history of the area in which the present district of Kurukshetra lies can be traced back to the ancient Aryan past of the five divisions of India. Kurukshetra district lies in the region called Madhadesha. From time immemorial this region has been regarded as extremely sacred. It was on the bank of Saraswati and Drishadvati of the present Kurukshetra that the Rigvedic Aryans kindled the sacred fire and chanted the Vedic hymns (Karnal Gazetteer)

Kurukshetra is a place of great historical and religious importance, revered all over the country for its sacred associations. It was here that the battle of Mahabharata was fought and Lord Krishna preached his Philosophy of "KARMA" as enshrined in the Holy Geeta to Arjuna at Jyotisar. In the very first verse of Bhagwat Gita, Kurukshetra is described as DHARAMKSHETRA i.e. field of righteousness.

The ancient Kurukshetra was not a small town and it comprised an extensive region consisting of 48 Kos or about 100 miles with a large number of temples, sacred tanks. Kurukshetra derives its name from King Kuru, a pious ancestor of Kaurvas and Pandwas.

Keeping in view the pristine glory of Kurukshetra and to develop its inherent potentials, Haryana Government established Kurukshetra as a separate district in January, 1973 as the 10th district of the State.

LOCATION:

Kurukshetra district falls in the North Eastern part of Haryana State between latitude 29°52' to 30°12' and longitude 76°-26' to 77°-04'. The district headquarter Kurukshetra is situated 160 KM north of Delhi, 39 KM North of Karnal & 40 KM south of Ambala on National Highway-1, popularly called Grand Trunk Road. It is at a distance of about 90 KM from Chandigarh.

BOUNDARIES:

The District is bounded on the North by Ambala district, on the east by Yamunanagar, on the South by Karnal and on the West by Kaithal. A perennial river Yamuna touches the outskirts of the District in the east which forms the dividing line between Haryana and Uttar Pradesh.

ADMINISTRATIVE SET UP:

Kurukshetra District was carved out of Karnal District in 1973. The District was reorganized in 1989 and some area of the erstwhile District was transferred to Kaithal & Yamunanagar Districts and new Districts Kaithal & Yamunanagar were created. District Kurukshetra forms a part of Ambala Division. At present Kurukshetra is divided into three revenue Sub-divisions i.e. Thanesar, Pehowa and Shahbad, 3 Tehsils namely Thanesar, Pehowa and Shahabad, 3 Sub Tehsils Ladwa, Babain and Ismailabad. It consists of 4 municipalities i.e. Municipal Council Thanesar, Municipal Committees Pehowa, Shahabad and Ladwa, The district further divided into 6 development blocks Thanesar, Pehowa, Shahabad, Ladwa, Babain & Ismailabad. Total number of villages and Gram Panchayat are 419 and 378 respectively. The area of the district Kurukshetra falls in Lok Sabha constituency Kurukshetra. There are 4 assembly constituencies i.e. Ladwa Shahabad, Thanesar, Pehowa in the district.

Geographical Phenomena

THE BASIC STATISTICS OF DISTRICT KURUKSHETRA

Geographical area	1530 Sq. KM
Date of creation of District	23 January, 1973
Number of Sub-Divisions	3 (Thanesar, Pehowa, Shahbad)
Number of Tehsils	3 (Thanesar, Pehowa, Shahabad)
Number of Sub Tehsils	3 (Ladwa, Babain, Ismailabad)
Number of Municipal Council	1 (Thanesar)
Number of Municipal Committees	3 (Pehowa, Shahabad, Ladwa)
Number of Market Committees	7 (Thanesar, Pehowa, Shahabad, Ladwa, Babain, Ismailabad, Pipli)
Number of Development blocks	5 (Thanesar, Pehowa, Shahabad, Ladwa, Babain, Ismailabad)
Number of villages Inhabited	407
Total number of villages	416
Number of Gram Panchayats/Sabhas	378
Thanesar Sub-Division	2 Tehsil (Thanesar) 1 Sub Tehsils (Ladwa)
Pehowa Sub-Divisions	1 Tehsil (Pehowa) 1 Sub Tehsils (Ismailabad)
Shahbad Sub-Divisions	1 Tehsil (Shahbad) 1 Sub Tehsils (Babain)

AREA:

The District has an area of 1530 sq. km. as per figures supplied by the Surveyor General of India, constituting 3.46% of the total area of the State (i.e. 44212 sq. km.)

CLIMATE:

The climate of the District is of pronounced character i.e. very hot in summer and markedly cold in winter. It is as high as 45^o C in summer and as low as 10^o C in winter. The year may be divided into four seasons. The Cold season is from mid- November to about mid- March. It is followed by hot season which continues to about the end of June. The period from July to about mid-September is the South west Monsoon season, after which a period of one month constitutes the transition period from Monsoon.

As the cold season starts the temperature begin to decrease rapidly. January is generally the coldest month. From about middle of March temperature begins to rise rapidly. From about April hot westerly winds begin to blow and all the weather progressively becomes hot. May and June are the hottest months. During the south west Monsoon season there is an appreciable drop in day temperature while night temperature continue to be nearly as high as in the summer. In the mid-September there is an increase in the day temperature but night temperature drops down rapidly with the progress of the season.

Chemical Accident Hazard in Kurukshetra

Kurukshetra is a place of great historical and religious importance of the country. There is no MAH industry in the district but 54 industries used Hazardous chemical including ammonia gas. The main probable hazard in the district is fire & explosion and toxic release of Sulphur/Oxalic Acid/Phosphoric Acid/Hexane and Ammonia and other Chemicals are stored, handled and used in the industries. Another hazard is due to transportation of these Chemicals by road or by rail through tank lorry or rail wagons more than hundreds of tank lorry containing the highly inflammable or chemicals passes through the National Highway NH-1 imposing serious threat to safety of the area.

The district is having fire fighting system with four fire stations, having 7 fire tender at four different locations. The medical facilities are also adequate in 21 hospitals are having with 266 beds capacity. PGI, Chandigarh is also within the reach of Kurukshetra.

The petroleum product pipe lines of **Indian Oil Corporation** having the potential hazard is passing through the district which is another matter of serious concern for district administration. This pipe line crossing through village Samani-Jirbari-Umri-Devidasspura-Pipli-Bir Pipli-Sanwla-Ramgarh-Khanpur Kolian-Masana-Bakana-Teora-Chhapri-Kishangarh-Jhamra Shahabad-Kankra Shahabad-Ram Nagar-Daumajra-Lundi-Mohri. IOC turned one more line from "T-Point" at Pipli and this reached to Saharanpur crossing from village Bir-Pipli-Bajidpur-Bohli-Bir Mathana-Mathana-Untehri-Sonti-Barhan-Ladwa-Bapda-Budha-Ban-Chhalondi-Jandhera. Heavy Traffic in the densely populated city with in adequate infrastructure facilities may aggravate the problem during Emergency.

RAILWAY

Apart from above Northern Railway line from Jammu-Kashmir to Delhi-Agra crossing in the district. Indian Railways have also been transporting chemicals and hazardous materials e.g. petroleum products (petrol, Naphtha, HSD etc.), Caustic soda, Alcohol, compressed gases (LPG gas etc.), Chemical manures, Acids, Matches etc. These goods are carried either in the SLRs or in the Parcel Vans or in the goods wagons.

Indian Railway's Rules for carrying dangerous (hazardous goods) by rail have been legislated in the Railway Red Tariff Rule 2000 as per which dangerous goods have been classified into following 8 classes:

1. Explosives
2. Gases, Compressed, liquefied or dissolved under pressure
3. Petroleum & other inflammable liquids
4. Inflammable solids
5. Oxidizing substance
6. Poisonous (Toxic Substances)
7. Radio-active substances
8. Acid & other Corrosives.

Out of the above 7 classes of dangerous goods, classes II (Gases, Compressed, Liquefied or dissolved under pressure), III (Petroleum and other inflammable liquids) and VIII (Acids and other corrosives) are dealt in bulk on the railways whereas other classes of dangerous goods are dealt in piecemeal/small quantities in parcel vans/SLRs. Railways may refer to the specific paras pertaining to all these classes of dangerous goods.

Industries which used Hazardous Chemicals

Sr. No.	Name of industry & Address	Hazardous Chemical	Inventory (in tons/ KL) Appx.	Storage Type
1.	The Shahabad Coop.Sugar Mills Ltd. Shahabad(M)	Sulphur	100 tons	Godown
2.	M/s Mahabir Techno Ltd. G.T.Road, Umri	Oxalic Acid Phosphoric Acid Sulfuric Acid Caustic Fuller Earth Activated Carbon	4 tons 4 tons 3 tons 1/2 tons 20 tons 20 tons	Tank
3.	M/s Ankur Foods GT Road, Khanpur Kolian	Hexane	40 KL	Tank
4.	M/s Goya Agro Ind.Ltd., Khanpur Kolian	Hexane	20 KL	Tank
5.	M/s Rajni Agroil Ltd.Pipli Road, Ladwa	Hexane	60 KL	Tank
6.	M/s A.R.Cold Storage, Barara Road, Shahbad	Ammonia Gas	3 tons	Tank
7.	M/s Attwal Cold Storage, Bazidpur Ladwa road, Kurukshetra	Ammonia Gas	3 tons	Tank
8.	M/s Ajmer Cold Store, Thol	Ammonia Gas	3 tons	Tank
9.	M/s Bharat Cold Storage, GT Road, Shahabad	Ammonia Gas	3 tons	Tank
10.	M/s Brij Cold Store, Ladwa Road, Pipli	Ammonia Gas	3 tons	Tank
11.	M/s Bansal Cold Storage, Babain	Ammonia Gas	3 tons	Tank
12.	M/s Dashmesh Cold Storage, Bhatmajra Pehowa	Ammonia Gas	3 tons	Tank
13.	M/s Durga Cold Store, Ismailabad	Ammonia Gas	3 tons	Tank
14.	M/s Durga Cold Store, Roshanpura Road, Ismailabad	Ammonia Gas	3 tons	Tank
15.	M/s Dashmesh Cold Store, Barara Road, Shahbad	Ammonia Gas	3 tons	Tank
16.	M/s Dua Cold Store, GT Road, Shahbad	Ammonia Gas	3 tons	Tank
17.	M/s Gaba Cold Store, Barara Road, Shahbad	Ammonia Gas	3 tons	Tank
18.	M/s Ganeshji Ice Factory, General Mill, Shahbad	Ammonia Gas	4 tons	Tank
19.	M/s Guru Nanak Cold Store, Ladwa Road, Shahbad	Ammonia Gas	3 tons	Tank
20.	M/s Goel Cold Store, Pipli Road, Ladwa	Ammonia Gas	3 tons	Tank
21.	M/s Haryana Cold Store & Allied Ind., GT Road, Shahbad	Ammonia Gas	3 tons	Tank
22.	M/s Hari Om Surbhi Cold Store & Ice Factory, Sirsma	Ammonia Gas	4 tons	Tank
23.	M/s Hafed Cold Store, Shahbad	Ammonia Gas	3 tons	Tank

24.	M/s Indian Ice Factory, Ladwa	Ammonia Gas	4 tons	Tank
25.	M/s Jai Bharat Cold Store, Barara Road, Shahbad	Ammonia Gas	3 tons	Tank
26.	M/s Jai Kissan Cold Store, Ladwa Road, Shahbad	Ammonia Gas	3 tons	Tank
27.	M/s Jagdamba Cold Store, Indri Road, Ladwa	Ammonia Gas	3 tons	Tank
28.	M/s Krishna Ice & Cold Store, Shahbad	Ammonia Gas	4 tons	Tank
29.	M/s Krishna Ice & Cold Factory, Babain	Ammonia Gas	4 tons	Tank
30.	M/s Kissan Cold Store, Babain	Ammonia Gas	3 tons	Tank
31.	M/s K.C.Cold Storage, Chhapra Road, Ismailabad	Ammonia Gas	3 tons	Tank
32.	M/s Kansal Cold Store, Ismailabad	Ammonia Gas	4 tons	Tank
33.	M/s Krishna Ice Factory, Guhla Road, Pehowa	Ammonia Gas	2 tons	Tank
34.	M/s Luxmi Cold Store, Pipli Road, Ladwa	Ammonia Gas	3 tons	Tank
35.	M/s Man Cold Store, Sirsma	Ammonia Gas	3 tons	Tank
36.	M/s Mittal Cold Store, Ambala Road, Ismailabad	Ammonia Gas	3 tons	Tank
37.	M/s Man Srover Cold Store, Ladwa Road, Shahbad	Ammonia Gas	3 tons	Tank
38.	M/s Mahesh Cold Store, Jainpura PO-Kalyana	Ammonia Gas	3 tons	Tank
39.	Mital Cold Store & Ice Factory, Model Town, Pehowa	Ammonia Gas	4 tons	Tank
40.	Narang Cold Store, GT Road, Shahbad	Ammonia Gas	3 tons	Tank
41.	Neelkanth Cold Store, Ladwa Rd, Shahbad	Ammonia Gas	3 tons	Tank
42.	Prag Ice Factory, Near Civil Hospital, Pehowa	Ammonia Gas	3 tons	Tank
43.	Rikhi Ram Cold Storage & Ice Factory, Ismailabad	Ammonia Gas	4 tons	Tank
44.	Rajendra Cold Storage & Ice Factory, Ismailabad	Ammonia Gas	4 tons	Tank
45.	Raj Kamal Cold Storage & Ice Factory, Ismailabad	Ammonia Gas	4 tons	Tank
46.	Saraswati Ice Factory, Guhla Road, Pehowa	Ammonia Gas	2 tons	Tank
47.	Sachdeva Cold Store, Ladwa Road, Shahbad	Ammonia Gas	3 tons	Tank
48.	Sathaneshwar Cold Store & Ice Factory, Kurukshetra	Ammonia Gas	4 tons	Tank
49.	Sidhu Cold Store, Thaska Road, Shahbad	Ammonia Gas	3 tons	Tank
50.	Shankar Cold Store, Pipli Road, Ladwa	Ammonia Gas	3 tons	Tank
51.	Umri Cold Store, GT Road, Umri	Ammonia Gas	3 tons	Tank
52.	Zamindara Cold Store, Ladwa Road, Shahbad	Ammonia Gas	3 tons	Tank
53.	Zamindara Cold Store, GT Road, Umri	Ammonia Gas	3 tons	Tank

MEDICAL EMERGENCY SERVICE AVAILABLE IN THE DISTRICT

S. No.	Name & Address of Hospital	Phone No.	Beds	Burn Ward	Common Antidotes	No. of Ambulance	Oxygen Administration Equipment	Medical Officer	Speciality/ Super Speciality	Trained Staff
1	L.N.J.P.Hospital, Kurukshetra	291512, 102, 290344, 293580,	100	-	Available	5	30	29	20	31
2	CHC, Ladwa	01744-261504	30	-	-do-	1	8	4	-	3
3	CHC, Shahbad	01744-240044	30	-	-do-	1	8	5	1	4
4	CHC, Pehowa	01741-230189	30	-	-do-	1	8	5	-	4
5	CHC, Mathana	01744-282190	6	-	-do-	1	3	4	-	2
6	PHC, Jhansa	01744-257536	4	-	-do-	-	2	1	-	1
7	PHC, Gudha	01744-267633	6	-	-do-	-	2	1	-	1
8	PHC, Tatka	01744-266089	1	-	-do-	-	2	2	-	1
9	PHC, Babain	01744-280320	6	-	-do-	1	4	2	-	1
10	PHC, Deeg	01744-287769	3	-	-do-	0	2	2	-	1
11	PHC Kalsana	01744-289689	3	-	-do-	0	2	1	-	1
12	PHC, I.bad	01744-252224	6	-	-do-	1	4	2	-	1
13	PHC, Thol	01744-258324	3	-	-do-	0	2	2	-	1
14	PHC Thaska Miraji	01744-252569	4	-	-do-	0	2	1	-	1
15	PHC Siana Saidan	01741-285209	6	-	-do-	0	2	1	-	1
16	PHC Pipli	01744-232942	3	-	-do-	1	2	2	-	1
17	PHC, Dhurala	01744-272512	6	-	-do-	0	2	1	-	1
18	PHC, Khanpur Kolian	01744-279432	6	-	-do-	0	2	1	-	1
19	PHC, Barna	01744-274639	1	-	-do-	0	3	2	-	1
20	PHC, Amin	01744-254555	6	-	-do-	0	3	2	-	1
21	PHC, Kirmach	01744-273432	6	-	-do-	0	3	1	-	1

**FIRE FIGHTING FACILITIES AVAILABLE WITH DISTRICT
ADMINISTRATION:**

S. No.	Name of the Fire station	Tel No.	Facilities available											
			Fire tender	Man power	SCBA Set	Trailer pump	Fire suit	Stretcher	Ladder	Rope	Generator portable	Chain saw	Water tanker	Foam compound
1.	MC Thanesar	01744-220601, 645087	3	35	1	-	1	-	3	5	-	1	-	60 Ltr.
2.	MC, Shahbad	01744-245201 101	2	14	-	-	-	-	2	-	-	-	-	100 Ltr.
3.	MC, Ladwa	01744-263101, 101	1	13	-	-	-	-	1	1	-	-	-	100 Ltr
4.	MC, Pehowa	01741-220101	1	14	-	-	-	-	1	1	-	-	-	80 Ltr.

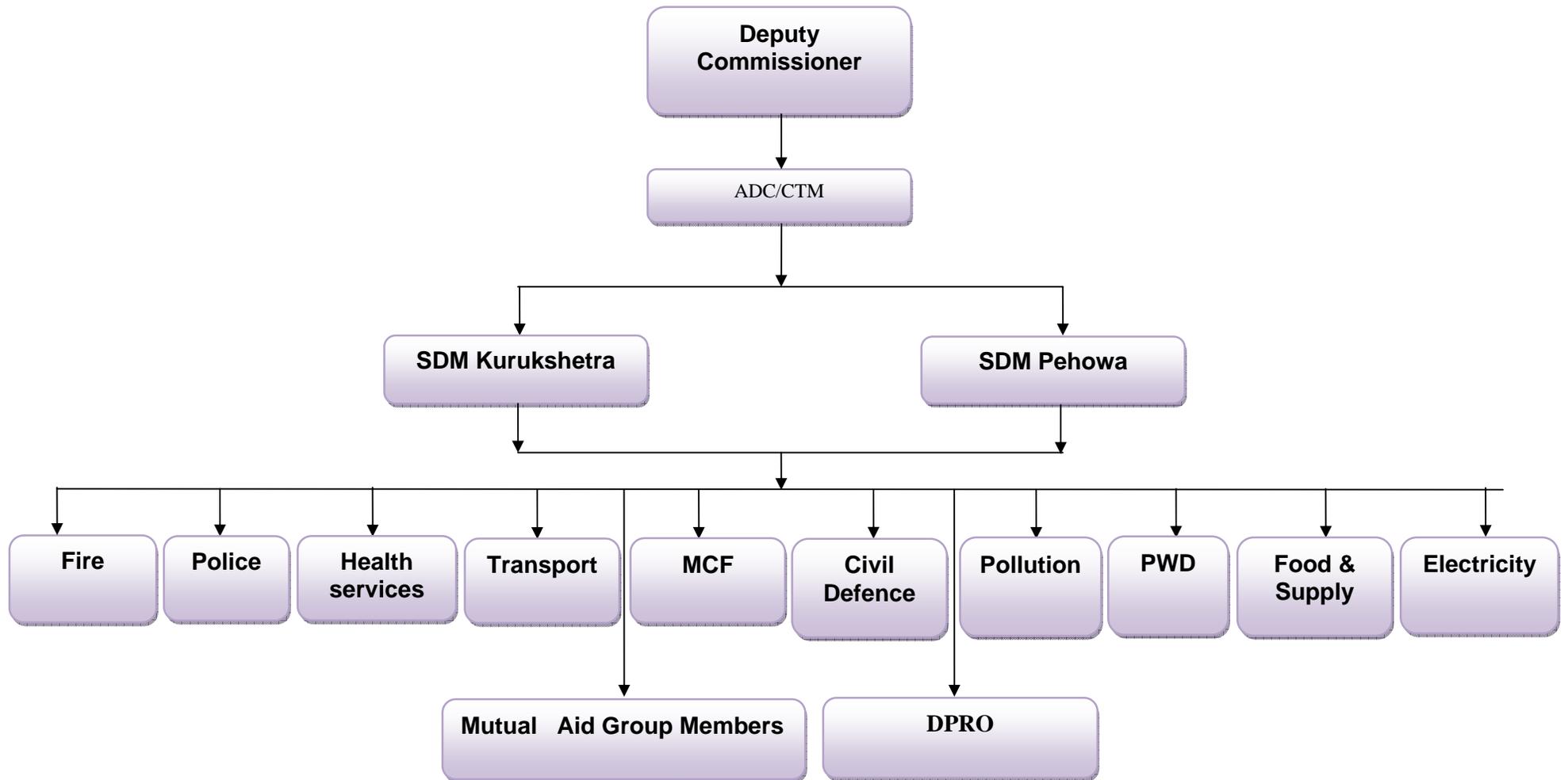
FACILITIES AVAILABLE WITH TRANSPORT/PWD/MCs.

S.No.	Facility / Service	Quantity/ Numbers
1	Buses available for emergency	Roadways= 178 Cooperative=27 School =213
2	Mobile crane/JCB with driver	38
3	Gas cutter with trained welder	--
4	Recovery van	04
5	Skilled workshop technicians (Roadways & Sugar Mill)	20
6	Unskilled manpower (XEN, PR/Irrigation/B&R/MC/HUDA)	500
7	Mobile generators	02
8	Flood lights (SE,UHBN & SDO B&R Electrical)	02
9	Jacks / lifting tackles / equipments	12

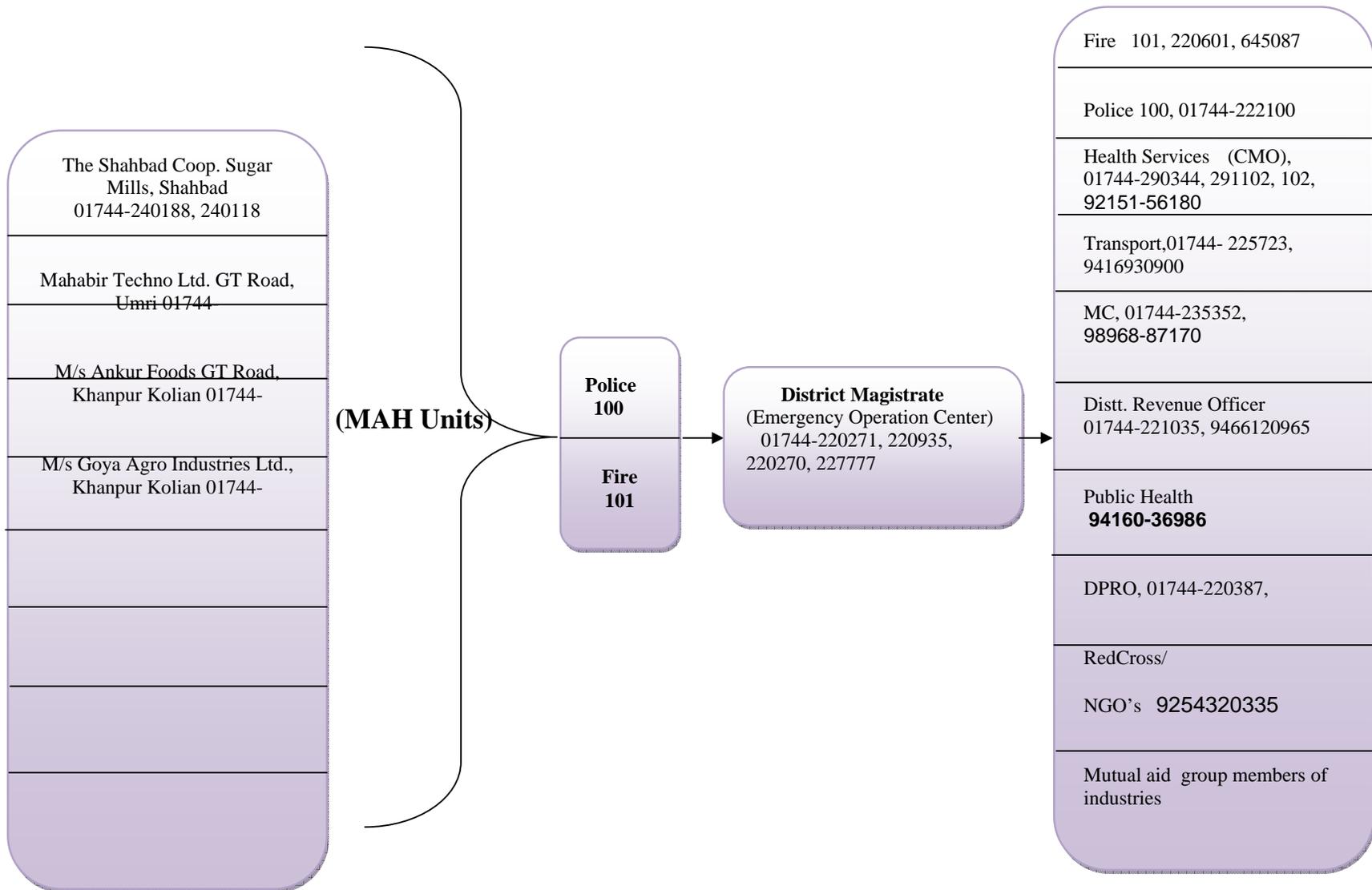
FACILITIES AVAILABLE WITH DIFFERENT DEPARTMENTS

Deptt.	Man Power	Crane	Exca- vator	Dumper	Truck	Tractor Loader	Port- able Gen. set/ lighting	Skilled techni- cian	Contact Person & Phone No. S/Shri
MC TSR	383	1 JCB	-	2	-	9	-	-	MS Jagat, EO MC- 9896887170, CSI- 9996254760
MC Phw	88	-	-	-	-	-	-	-	Nirmal Parkash Secy 9996395192
MC Sbd	75	-	-	-	-	2	-	-	CL Dhiman, Secy 01744-240025
MC Ldw	48	-	-	1	-	-	-	-	Secy 92543-51200, 01744-262268
B&R-I	70	-	-	-	2	-	-	6	Dy.Supt 01744- 238066
B&R-II	205	-	-	3	3	1	-	15	XEN-01744-238530
XEN UHBVN Phw	275	-	-	-	1	-	-	12	XEN 01741-230041

Emergency Response Organizational Chart



EMERGENCY COMMUNICATION FLOW CHART: KURUKSHETRA



NAMES, ADDRESS AND TELEPHONE NUMBERS OF EXPERTS/ INSTITUTIONS

Sl.No.	Names	Address	Telephone Number
1.	CONTROL ROOM ,National Disaster Management Authority of India	Jeevan Bharti, Tower-II,124, Indra Chowk, New Delhi	011-26701728 011-23310156 9868891803
2.	Dr. Muzaffer Ahmad Member NDMA	Ministry of Home Affairs, Government of India North Block, New Delhi - 110001 Tel. Nos. 23092011 & 23092161 Fax Nos. 23093750 & 23092398	011-26701736
3.	DIRECTOR GENERAL, FACTORY ADVICE SERVICE & LABOUR INSTITUTES	Central Labour Institute's Building, N.S. Mankikar Marg, Sion, Mumbai- 400 022.	022-4074358 022-4092203 E-Mail@dgfasli.nic
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5.	Dr. Rakesh Bubey, Director	Disaster Management Institute, Prayavaran Parisar, E-5, Arera Colony, PB No. 563, Bhopal	0755-566715 0755-2466715, 2461538, 2461348, 293592 dmi@dmibhopal.nic.in
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12.	Sh. Naveen Saini, Asstt. Director	Industrial Safety & Healthy (Chemical),	
13.	Sh. Vakeel Punia, Asstt. Director	Industries Safety & Health, Kurukshetra Industries Office, Mini Sectt., Kurukshetra	09467739494
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15.	Sh. P.C. Kataria Jt. Controller of Explosive North Circle , Rohtak	Rama Palace, 3rd Floor Ajrounda Crossing Near Neelam Fly Over Rohtak - 121 007	Tel: 0129-2260902-03,2227140 FAX: 0129-2281084, 0129)2260902 pckataria@explosives.gov.in
16.	Mr. Kapila Regional Officer HPCB, Yamuna Nagar	Pollution Control Board , Yamuna Nagar	8059540611
17.	Sh.Naveen Kumar Saini, Asstt. Director Chemical	Industrial Safety & Health (Chemical) Manav Chowk, Ambala	9416120928 0171-2534390

18.	Mr.Animesh Kumar, Chief State Coordinator, IOC, Vill. Gudha (Karnal)	01748-259149 01748-259094 Fax-259150	9416011616	IOC
19.	Mr.P.S.Bhatti (Plant Manager) IOC, Vill. Gudha(Karnal)	01748-259252 01748-259254	08901000789	IOC
20.	Mr.Umesh Pal (Sales Officer) C-14, IOC Colony, Ambala Cantt.		9416911619	IOC
21.	Mr.Joginder Pal Cheema SRM, HPC Jind	01681-252027 01681-254983		HP
22.	Mr.Pardeep Tanwar Plant Manager, HP Jind		9996628838	HP
23.	Mr.Mithun Taneja, Area Manager,		9896142929	HP
24.	Mr.Gagandeep Singh, Sales Officer, HP, Jind	01681-254983	9729030094	gaganskarir@hpcl.co.in
25.	Mr.Jaijeet Kumar (Plant Manager, Banud (Pb.)	01762-275276	9466133277	BP
26.	Mr.Chirag (Sales Officer) Vill. Banud (Punjab)	01762-653760	9466139014	BP chiragminocha@bharatpatroleum.co.in
27.	NFL, Panipat	0180-2522302 0180-2522372		
28.	Mr.B.K.Gulati, Sr.DM		9896066311	
29.	Mr.R.K.Bhatia, Exe.Dir.	0180-2652676 Fax-2652515 0180-2652676 0180-2652481		
30.	Indian Oil Cor.Panipat	0180-2522001 0180-2578804	Fax-2578833	
31.	Fire Station, IOCL, Panipat	0180-2522301 0180-2522372	9416206003	Ashwani Sharma, Exe.Director
32.	NAVY, Delhi	011-23011706 011-23010823	011-23010503	
33.	Army, Ambala	0171-2623421 0171-2626422		

ROLE OF EMERGENCY ORGANISATION FOR THE MANAGEMENT OF DISASTER IN THE DISTRICT KURUKSHETRA

1	2	3	4	5
FIRE	POLICE	MEDICAL	CIVIL DEFENCE	TRANSPORT
<ul style="list-style-type: none"> • Control of fire • Rescue operation • Control of toxic / flammable release • Guidelines for evacuation • Requisition of additional fire resources • Co-ordination with other emergency service 	<ul style="list-style-type: none"> • Traffic Control & rescue • Cordoning of emergency area • Shifting of injured and casualties • Law and order • Evacuation of general public • Deal with casualties • Guarding the property • Preserve evidence • Watch on new developments 	<ul style="list-style-type: none"> • Care of injured • Ambulance service • First aid arrangements • Arrangements of antidotes • Hospitalization • Mobile Medical Services • Liaison with Distt. Admn. • Establishment of Medical information center • Shifting of injured and casualties 	<ul style="list-style-type: none"> • Help in fire fighting • Help in evacuation & rescue • Help in shifting the injured • Deal with casualties • Create Public awareness • Rehabilitation • Shelter 	<ul style="list-style-type: none"> • Transport facility for the shifting of injured and evacuation • Change the route of buses • Provide facilities like Recovery vans, crane, manpower, vehicles and maintenance equipments / facilities • Keep the workshops open for any requirements

6	7	8	9	10
PUBLIC RELATION	INDUSTRIES	NGO / RED CROSS	MUTUAL AID GROUP	MUNICIPALITY
<ul style="list-style-type: none"> • Create public awareness • Evacuation of General Public • Help in rehabilitation • Release of authentic information • Information sharing • Keep watch on new developments 	<ul style="list-style-type: none"> • Put the emergency resources in to action as per plan • Inform to all concerned immediately • Receive out side help. • Render help under mutual aid as per procedure • Explain level of emergency • Coordinate rescue and combating operation • Provided technical guidance 	<ul style="list-style-type: none"> • Help in evacuation • Rehabilitation • First aid and medical aid • Arrange for civil amenities (water, clothing, food, shelter etc.) 	<ul style="list-style-type: none"> • Participate in mutual aid • Help in fire fighting, rescue, first aid, medical aid and evacuation operation 	<ul style="list-style-type: none"> • Ensure adequate water supply for fire fighting • Help in rescue operation and evacuation • Rehabilitation (water, clothing, food, shelter etc.) • Salvage operation

DUTIES & RESPONSIBILITIES IN CASE OF DISASTER IN THE DISTRICT

DEPUTY COMMISSIONER

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. 57/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 Off-Site Emergency 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, organization, industries and services to prepare and act in accordance with the Off-Site Emergency 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 DCG.
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 Off-Site Emergency Plan.

During the Emergency / Incident:

1. On getting information of the incident Deputy Commissioner will contact the site incident controller. 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 Off-Site Emergency 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 crises 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. Keep records of weakness/ shortfalls/ lapses and causes of failure of disaster control management plan during emergency operation and suggest measures for improvement.

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 making 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 in charge 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 defense in fire fighting operation.
10. Safe guard the adjacent property/ population from fire by confining the fire spread.
11. Search for injured/ trapped/ buried 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.

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 outside 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 persons 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.

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.

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.

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 avert 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.

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.

DUTIES AND RESPONSIBILITY IN EMERGENCY
MUNICIPAL COUNCIL/MUNICIPAL COMMITTEES

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.

DUTIES AND RESPONSIBILITY IN EMERGENCY
CIVIL DEFENCE

Pre - Incident :

1. To be familiar with major hazard units, chemicals used and other information 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.

DUTIES AND RESPONSIBILITY IN EMERGENCY
DIRECTORATE OF INDUSTRIAL SAFETY & HEALTH

Pre - Incident :

1. Make inspection/ examination of the premises, plant, machinery , chemical/ substances in the industries and ensure the adequacy of the safety arrangement by directing the occupier to do so.
2. Examine the adequacy of emergency arrangements in the industries and direct the occupier to take corrective action, if arrangements are not satisfactory.
3. Enforce statutory provisions pertaining to safety in all industrial establishment.
4. Direct the management to prepare and submit on site emergency plan of the industrial units.
5. Direct the management for the hazard assessment of their units by conducting safety audit, hazop study, hazard analysis etc. of the units and have the copy of the same to get information and to suggested corrective action.
6. Constitute the mutual aid group of the industries to deal with emergency.
7. Get the sufficient information hazards and mitigation efforts from each industry.
8. Arrange the meeting of district crises growth.
9. Participate in preparation of District Disaster Management Plan.
10. Arrange rehearsal of the district disaster management plan and review the plan.
11. Review the actions and rehearsal of MAG.

During the incident :

1. Rush to the scene of emergency.
2. Assist the control room and D.C. in technical manner.
3. Be in constant touch with control room and DC for technical support.
4. Provide guidelines for combating the situation and evacuation of the people.
5. Provide technical support to the works main incident controller.
6. Keep a watch on the overall situation and involve in advising on emergency operation.

After emergency :

1. Arrange for an investigation of the incident and collect information.
2. Keep the D.C. informed of the investigation and information.
3. Suggest remedial measures to prevent recurrence.
4. Direct the management to implement adequate safety measures suggested by him.
5. Ensure rehabilitation of affected area in safe manner.

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.

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.

DUTIES AND RESPONSIBILITY IN EMERGENCY

PWD (B & R)

Before the Incident :

1. Executive Engineer will lead the rescue team.
2. Be aware of all hazardous 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 PWD 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.

DISASTER CONTROL MEASURES

A. Basic Assumptions :

Response:

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 realized that it is not possible to have an unified single remote command person/ centre, while responding to HAZMAT emergencies. Additionally, there would be many organizations performing different tasks in a response simultaneously; some of them under the guidance of specialists 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 practiced and other exercises how near they are to real situations and how methodically they have been executed and assessed.
5. Judgment about the grey areas and unforeseen developments.

Psychology :

It should also be realized 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 judgments 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, realize 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 organizing 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 below :

- Up to date information on the hazards present in the area and inventory, historical data on local meteorology, emergency response etc in 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 organization will mainly be in the form of training, planning and co-ordination. Material resources that would be required are communication and warning facilities, transport and 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. CO-ORDINATION between the various agencies involved in the emergency operation shall be constantly maintained during periodical meetings and mock drills organized by the District Crisis Group.

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 utilized 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 Mutual Aid Response Group, 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 organization should have such a procedure that it will notify not more than two other organizations/ individuals according to protocol demanded by the situation. If one organization 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.
- Neighboring 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 neighbors 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 neighboring 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 :

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 neighboring 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

Organize 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.
- The Directorate of Industrial Safety & Health 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 mobilizing 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 outline for Police

- 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 vapors are harmless because of lack of smell.
- Use the Transport Emergency Guide and isolation/ evacuation table for initiating emergency action.
- Evacuate person from the area and building under risk.
- 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.
- 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 plan. 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.	Fire Fighting/ Combating Service	Fire Officer Kurukshetra
3.	Law and Order & Traffic service	S.P. Kurukshetra
4.	Causality Service	Civil Surgeon Kurukshetra
5.	Rescue Service	Ex. Engineer PWD and Fire Officer Kurukshetra
6.	Transport Service	G.M. Haryana Roadway Kurukshetra
7.	Evacuation	DPRO assisted by Police, Fire Service & Transport
8.	Electricity	Ex. Engineer UHBVN Kurukshetra
9.	Water Supply & Sewage	Ex. Engineer Public Health Kurukshetra
10.	Food & Supply	District Food & Supply Controller and Red cross/ NGO
11.	Telecommunication Service	D.G.M. Telecommunication
12.	Welfare Service & Shelter	City Magistrate / SDM concerned assisted by DPRO, Municipal Council, Food & supply, Red cross, NGO
13.	Salvage Service	SDM/ Tahsildar concerned
14.	Corps Disposal Service	Municipal Council/Committees
15.	Technical Advisor	Asstt. Director (IS&H) Chemical
16.	Sanitation	Municipal Council/Committee concerned

(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) Neighboring factories in the area and public in the vulnerable zone.
- (c) 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) Alert 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 Defense Personnel.
- (f) Telephonic contact with schools and other organization / 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 focused 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 mobilize 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 utilization of all available local medical resources in the incident areas as well as the additional resources should be mobilized 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) Specialized 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 group wise.
- (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 organizational response be implemented. The organizational 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 immunization. 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 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 the plan.

(xvi) Welfare of Evacuated Person:

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 disorganization would be handled by the welfare service headed by the City Magistrate/ SDM Kurukshetra assisted by the various departments shown in the organization structure.

The function of this service is

(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, Deputy 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 normally in the area.
- Organizing 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 morgue 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 authorized 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 owner 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.

PLAN TESTING AND UPDATION

TRAINING OF RESPONDERS :

Appropriate and adequate programmes for capacity building of all the agencies involved, will have to be carried out, along with their refresher courses. Such a programme will also include the activities of sensitization 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 District Crisis Group is functional, it will be essential to organize these orientation programmes for group members, to ensure better deliberation in their meetings. The second area is that of emergency management. This required a thorough 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-à-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 organization 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, cordoning 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.

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 to assess the capability , skill of individual, response methodology and response time.

Adequacy of infrastructure and resources:

Identification of gaps in planning and resources.

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, specialized 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 analyzed 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.

It is expected that the meeting at district level is organized at least once in a six months to start with, to review and update the plan. In between a small group comprising of experts and representatives of industry shall review and authorize regarding these up-dating.

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.

1. ACIDS AND CORROSIVES

- a. Phosphoric Acid
- b. Hydrofluoric Acid
- c. Hydrochloric Acid
- d. Nitric Acid
- e. Sulphuric Acid
- f. 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 aluminum hydroxide gel, milk, raw egg, or water to drink. Do not give bicarbonate or carbonates.

Relieve pain and treat shock :

Perform esophagus copy 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 slit lamp 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.

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, per formation 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 practiced, 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 neutralize 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 tranquilizers may be given, if advised by a physician. If pulmonary oedema develops, the person must 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.

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 neutralization with water.
- (iii) Do not try to neutralize with chemicals.
- (iv) Administer 2 to 3 drops of 0.5% solution of Pontocaine or other effective topical anesthetic 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. 'Lazyx' is suggestive.
- (iv) Aminophylene 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 nublized into the intermittent positive pressure gas stream are often beneficial.

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.

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 hemoglobin level. At 14 g / dl hemoglobin, give 0.39 ml/kg of 3% sodium nitrite intravenously and 1.95 ml./kg of 25% sodium thiosulphate intravenously. At lower hemoglobin 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.

EMERGENCY RESPONSE GUIDE FOR DEFFERENT CHEMICALS

1. Ammonia :

POTENETIAL 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 causes 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 material 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. If may provide little or no thermal protection.

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

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 of 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.

2. 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.

3. Petrol & HSD :

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. It 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 leak if you can do it without risk.

Water spray may reduce vapours; 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.

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.

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.

4. 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 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, 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 or 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.

5. Chlorine :**POTENTIAL HAZARDS****Health Hazards :**

Poisonous may be fatal if inhaled.

Contact may cause burns to skin and eyes.

Contact with liquid may causes frostbite.

Runoff from fire control or dilution water may cause pollution.

Fire or Explosion :

May be 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 material.

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.

6. 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 lead, 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.

7. 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.

8. Methanol & 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.

9. 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.

MATERIAL SAFETY DATA SHEET

Formaldehyde		CAS 50-00-0	
HCHO		RTECS LP8925000	
Synonyms & Trade Names Methanal, Methyl aldehyde, Methylene oxide		DOT ID & Guide	
Exposure Limits	NIOSH REL: Ca TWA 0.016 ppm C 0.1 ppm [15-minute]		
	OSHA PEL: [1910.1048] TWA 0.75 ppm ST 2 ppm		
IDLH Ca [20 ppm]		Conversion 1 ppm = 1.23 mg/m ³	
Physical Description Nearly colorless gas with a pungent, suffocating odor. [Note: Often used in an aqueous solution (see specific listing for Formalin).]			
MW: 30.0	BP: -6°F	FRZ: -134°F	Sol: Miscible
VP: >1 atm	IP: 10.88 eV	RGasD: 1.04	
Fl.P: NA (Gas)	UEL: 73%	LEL: 7.0%	
Flammable Gas			
Incompatibilities & Reactivities Strong oxidizers, alkalis & acids; phenols; urea [Note: Pure formaldehyde has a tendency to polymerize. Reacts with HCl to form bis-Chloromethyl ether.]			
Measurement Methods NIOSH 2016, 2541, 3500, 3800; OSHA ID205, 52			
Personal Protection & Sanitation Skin: No recommendation Eyes: Prevent eye contact Wash skin: No recommendation Remove: No recommendation Change: No recommendation		First Aid Eye: Irrigate immediately Breathing: Respiratory support	
Respirator Recommendations NIOSH At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full face piece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-face piece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus			
Exposure Routes inhalation, skin and/or eye contact			
Symptoms Irritation eyes, nose, throat, respiratory system; lacrimation (discharge of tears); cough; wheezing; [potential occupational carcinogen]			

MATERIAL SAFETY DATA SHEET

Sulfuric acid		CAS 7664-93-9	
H ₂ SO ₄		RTECS WS5600000	
Synonyms & Trade Names Battery acid, Hydrogen sulfate, Oil of vitriol, Sulfuric acid (aqueous)		DOT ID & Guide 1830 137 1831 137 (fuming) 1832 137 (spent)	
Exposure Limits	NIOSH REL: TWA 1 mg/m ³		
	OSHA PEL: TWA 1 mg/m ³		
IDLH 15 mg/m ³		Conversion	
Physical Description Colorless to dark-brown, oily, odorless liquid. [Note: Pure compound is a solid below 51°F. Often used in an aqueous solution.]			
MW: 98.1	BP: 554°F	FRZ: 51°F	Sol: Miscible
VP: 0.001 mmHg	IP: ?		Sp.Gr: 1.84 (96-98% acid)
FLP: NA	UEL: NA	LEL: NA	
Noncombustible Liquid, but capable of igniting finely divided combustible materials.			
Incompatibilities & Reactivities Organic materials, chlorates, carbides, fulminates, water, powdered metals [Note: Reacts violently with water with evolution of heat. Corrosive to metals.]			
Measurement Methods NIOSH 7903; OSHA ID165SG			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash (>1%), Quick drench (>1%)		First Aid Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendations NIOSH/OSHA Up to 15 mg/m³: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode [†] /(APF = 25) Any powered, air-purifying respirator with acid gas cartridge(s) in combination with a high-efficiency particulate filter [‡] (APF = 50) Any chemical cartridge respirator with a full face piece and acid gas cartridge(s) in combination with a high-efficiency particulate filter/(APF = 50) Any air-purifying, full-face piece respirator (gas mask) with a chin-style, front- or back-mounted acid gas canister having a high-efficiency particulate filter/(APF = 50) Any self-contained breathing apparatus with a full face piece/(APF = 50) Any supplied-air respirator with a full face piece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full face piece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a			

full face piece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus
Escape: (APF = 50) Any air-purifying, full-face piece respirator (gas mask) with a chin-style, front- or back-mounted acid gas canister having a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, nose, throat; pulmonary edema, bronchitis; emphysema; conjunctivitis; stomatis; dental erosion; eye, skin burns; dermatitis

Target Organs Eyes, skin, respiratory system, teeth

MATERIAL SAFETY DATA SHEET

Hydrogen chloride		CAS 7647-01-0	
HCl		RTECS MW4025000	
Synonyms & Trade Names Anhydrous hydrogen chloride; Aqueous hydrogen chloride (i.e., Hydrochloric acid, Muriatic acid) [Note: Often used in an aqueous solution.]		DOT ID & Guide 1050 125 (anhydrous) 1789 157 (solution)	
Exposure Limits	NIOSH REL: C 5 ppm (7 mg/m ³)		
	OSHA PEL: C 5 ppm (7 mg/m ³)		
IDLH 50 ppm	Conversion 1 ppm = 1.49 mg/m³		
Physical Description Colorless to slightly yellow gas with a pungent, irritating odor. [Note: Shipped as a liquefied compressed gas.]			
MW: 36.5	BP: -121°F	FRZ: -174°F	Sol(86°F): 67%
VP: 40.5 atm	IP: 12.74 eV	RGasD: 1.27	
FLP: NA	UEL: NA	LEL: NA	
Nonflammable Gas			
Incompatibilities & Reactivities Hydroxides, amines, alkalis, copper, brass, zinc [Note: Hydrochloric acid is highly corrosive to most metals.]			
Measurement Methods NIOSH 7903; OSHA ID174SG			
Personal Protection & Sanitation Skin: Prevent skin contact (solution)/Frostbite Eyes: Prevent eye contact/Frostbite Wash skin: When contaminated (solution) Remove: When wet or contaminated (solution) Change: No recommendation Provide: Eyewash (solution), Quick drench (solution), Frostbite		First Aid Eye: Irrigate immediately (solution)/Frostbite Skin: Water flush immediately (solution)/Frostbite Breathing: Respiratory support Swallow: Medical attention immediately (solution)	
Respirator Recommendations NIOSH/OSHA Up to 50 ppm: (APF = 10) Any chemical cartridge respirator with cartridge(s) providing protection against the compound of concern*/(APF = 50) Any air-purifying, full-face piece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/(APF = 25) Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern*/(APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full face piece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full face piece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full face piece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus			

Escape: (APF = 50) Any air-purifying, full-face piece respirator (gas mask) with a chin-style, front- or back-mounted acid gas canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion (solution), skin and/or eye contact

Symptoms Irritation nose, throat, larynx; cough, choking; dermatitis; solution: eye, skin burns; liquid: frostbite; in animals: laryngeal spasm; pulmonary edema

Target Organs Eyes, skin, respiratory system

MATERIAL SAFETY DATA SHEET

n-Butane		CAS 106-97-8	
CH ₃ CH ₂ CH ₂ CH ₃		RTECS EJ4200000	
Synonyms & Trade Names normal-Butane, Butyl hydride, Diethyl, Methylethylmethane [Note: Also see specific listing for Isobutane.]		DOT ID & Guide 1011 115 1075 115	
Exposure Limits	NIOSH REL: TWA 800 ppm (1900 mg/m ³)		
	OSHA PEL†: none		
IDLH N.D.		Conversion 1 ppm = 2.38 mg/m ³	
Physical Description Colorless gas with a gasoline-like or natural gas odor. [Note: Shipped as a liquefied compressed gas. A liquid below 31°F.]			
MW: 58.1	BP: 31°F	FRZ: -217°F	Sol: Slight
VP: 2.05 atm	IP: 10.63 eV	RGasD: 2.11	Sp.Gr: 0.6 (Liquid at 31°F)
FLP: NA (Gas)	UEL: 8.4%	LEL: 1.6%	
Flammable Gas Class IA Flammable Liquid			
Incompatibilities & Reactivities Strong oxidizers (e.g., nitrates & perchlorates), chlorine, fluorine, (nickel carbonyl + oxygen)			
Measurement Methods OSHA 56			
Personal Protection & Sanitation Skin: Frostbite Eyes: Frostbite Wash skin: No recommendation Remove: When wet (flammable) Change: No recommendation Provide: Frostbite		First Aid Eye: Frostbite Skin: Frostbite Breathing: Respiratory support	
Respirator Recommendations To be added later			
Exposure Routes inhalation, skin and/or eye contact (liquid)			
Symptoms Drowsiness, narcosis, asphyxia; liquid: frostbite			
Target Organs central nervous system			

MATERIAL SAFETY DATA SHEET

Propane		CAS 74-98-6	
CH ₃ CH ₂ CH ₃		RTECS TX2275000	
Synonyms & Trade Names Bottled gas, Dimethyl methane, n-Propane, Propyl hydride		DOT ID & Guide 1075 115 1978 115	
Exposure Limits	NIOSH REL: TWA 1000 ppm (1800 mg/m ³)		
	OSHA PEL: TWA 1000 ppm (1800 mg/m ³)		
IDLH 2100 ppm [10%LEL]		Conversion 1 ppm = 1.80 mg/m ³	
Physical Description Colorless, odorless gas. [Note: A foul-smelling odorant is often added when used for fuel purposes. Shipped as a liquefied compressed gas.]			
MW: 44.1	BP: -44°F	FRZ: -306°F	Sol: 0.01%
VP(70°F): 8.4 atm	IP: 11.07 eV	RGasD: 1.55	
FLP: NA (Gas)	UEL: 9.5%	LEL: 2.1%	
Flammable Gas			
Incompatibilities & Reactivities Strong oxidizers			
Measurement Methods NIOSH S87 (II-2)			
Personal Protection & Sanitation Skin: Frostbite Eyes: Frostbite Wash skin: No recommendation Remove: When wet (flammable) Change: No recommendation Provide: Frostbite		First Aid Eye: Frostbite Skin: Frostbite Breathing: Respiratory support	
Respirator Recommendations NIOSH/OSHA Up to 2100 ppm: (APF = 10) Any supplied-air respirator/(APF = 50) Any self-contained breathing apparatus with a full face piece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full face piece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full face piece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: Any appropriate escape-type, self-contained breathing apparatus			
Exposure Routes inhalation, skin and/or eye contact (liquid)			
Symptoms Dizziness, confusion, excitation, asphyxia; liquid: frostbite			
Target Organs central nervous system			
Ammonia		CAS 7664-41-7	

NH₃		RTECS BO0875000	
Synonyms & Trade Names Anhydrous ammonia, Aqua ammonia, Aqueous ammonia [Note: Often used in an aqueous solution.]		DOT ID & Guide 1005 125 (anhydrous) 2672 154 (10-35% solution) 2073 125 (>35-50% solution) 1005 125 (>50% solution)	
Exposure Limits	NIOSH REL: TWA 25 ppm (18 mg/m ³) ST 35 ppm (27 mg/m ³)		
	OSHA PEL†: TWA 50 ppm (35 mg/m ³)		
IDLH 300 ppm		Conversion 1 ppm = 0.70 mg/m ³	
Physical Description Colorless gas with a pungent, suffocating odor. [Note: Shipped as a liquefied compressed gas. Easily liquefied under pressure.]			
MW: 17.0	BP: -28°F	FRZ: -108°F	Sol: 34%
VP: 8.5 atm	IP: 10.18 eV	RGasD: 0.60	
FLP: NA (Gas)	UEL: 28%	LEL: 15%	
[Note: Although NH ₃ does not meet the DOT definition of a Flammable Gas (for labeling purposes), it should be treated as one.]			
Incompatibilities & Reactivities Strong oxidizers, acids, halogens, salts of silver & zinc [Note: Corrosive to copper & galvanized surfaces.]			
Measurement Methods NIOSH 6015, 6016; OSHA ID188			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated (solution) Remove: When wet or contaminated (solution) Change: No recommendation Provide: Eyewash (>10%), Quick drench (>10%)		First Aid Eye: Irrigate immediately (solution/liquid) Skin: Water flush immediately (solution/liquid) Breathing: Respiratory support Swallow: Medical attention immediately (solution)	
Respirator Recommendations NIOSH Up to 250 ppm: (APF = 10) Any chemical cartridge respirator with cartridge(s) providing protection against the compound of concern*/(APF = 10) Any supplied-air respirator* Up to 300 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern*/(APF = 50) Any chemical cartridge respirator with a full face piece and cartridge(s) providing protection against the compound of concern/(APF = 50) Any air-purifying, full-face piece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/(APF = 50) Any self-contained breathing apparatus with a full face piece/(APF = 50) Any supplied-air respirator with a full face piece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000)			

Any self-contained breathing apparatus that has a full face piece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full face piece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion (solution), skin and/or eye contact (solution/liquid)

Symptoms Irritation eyes, nose, throat; dyspnea (breathing difficulty), wheezing, chest pain; pulmonary edema; pink frothy sputum; skin burns, vesiculation; liquid: frostbite

Target Organs Eyes, skin, respiratory system

MATERIAL SAFETY DATA SHEET

Chlorine		CAS 7782-50-5	
Cl₂		RTECS FO2100000	
Synonyms & Trade Names Molecular chlorine		DOT ID & Guide 1017 124	
Exposure Limits		NIOSH REL: C 0.5 ppm (1.45 mg/m ³) [15-minute]	
		OSHA PEL†: C 1 ppm (3 mg/m ³)	
IDLH 10 ppm See:		Conversion 1 ppm = 2.90 mg/m ³	
Physical Description Greenish-yellow gas with a pungent, irritating odor. [Note: Shipped as a liquefied compressed gas.]			
MW: 70.9	BP: -29°F	FRZ: -150°F	Sol: 0.7%
VP: 6.8 atm	IP: 11.48 eV	RGasD: 2.47	
FLP: NA	UEL: NA	LEL: NA	
Nonflammable Gas, but a strong oxidizer.			
Incompatibilities & Reactivities Reacts explosively or forms explosive compounds with many common substances such as acetylene, ether, turpentine, ammonia, fuel gas, hydrogen & finely divided metals.			
Measurement Methods NIOSH 6011; OSHA ID101			
Personal Protection & Sanitation Skin: Frostbite Eyes: Frostbite Wash skin: No recommendation Remove: No recommendation Change: No recommendation Provide: Frostbite		First Aid Eye: Frostbite Skin: Frostbite Breathing: Respiratory support	
Respirator Recommendations NIOSH Up to 5 ppm: (APF = 10) Any chemical cartridge respirator with cartridge(s) providing protection against the compound of concern*/(APF = 10) Any supplied-air respirator* Up to 10 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 25) Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern*/(APF = 50) Any chemical cartridge respirator with a full face piece and cartridge(s) providing protection against the compound of concern*/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern*/(APF = 50) Any self-contained breathing apparatus with a full face piece/(APF = 50) Any supplied-air respirator with a full face piece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000)			

Any self-contained breathing apparatus that has a full face piece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full face piece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus
Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, skin and/or eye contact

Symptoms Burning of eyes, nose, mouth; lacrimation (discharge of tears), rhinorrhea (discharge of thin mucus); cough, choking, substernal (occurring beneath the sternum) pain; nausea, vomiting; headache, dizziness; syncope; pulmonary edema; pneumonitis; hypoxemia (reduced oxygen in the blood); dermatitis; liquid: frostbite

Target Organs Eyes, skin, respiratory system

MATERIAL SAFETY DATA SHEET

Bromine		CAS 7726-95-6	
Br₂		RTECS EF9100000	
Synonyms & Trade Names Molecular bromine		DOT ID & Guide 1744 154	
Exposure Limits	NIOSH REL: TWA 0.1 ppm (0.7 mg/m ³) ST 0.3 ppm (2 mg/m ³)		
	OSHA PEL†: TWA 0.1 ppm (0.7 mg/m ³)		
IDLH 3 ppm		Conversion 1 ppm = 6.54 mg/m ³	
Physical Description Dark reddish-brown, fuming liquid with suffocating, irritating fumes.			
MW: 159.8	BP: 139°F	FRZ: 19°F	Sol: 4%
VP: 172 mmHg	IP: 10.55 eV		Sp.Gr: 3.12
Fl.P: NA	UEL: NA	LEL: NA	
Noncombustible Liquid, but accelerates the burning of combustibles.			
Incompatibilities & Reactivities Combustible organics (sawdust, wood, cotton, straw, etc.), aluminum, readily oxidizable materials, ammonia, hydrogen, acetylene, phosphorus, potassium, sodium [Note: Corrodes iron, steel, stainless steel & copper.]			
Measurement Methods NIOSH 6011; OSHA ID108			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash, Quick drench		First Aid Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately	
Respirator Recommendations NIOSH/OSHA Up to 2.5 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode [£] /(APF = 25) Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern [£] Up to 3 ppm: (APF = 50) Any chemical cartridge respirator with a full face piece and cartridge(s) providing protection against the compound of concern [£] /(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern [£] /(APF = 50) Any powered, air-purifying respirator with a tight-fitting face piece and cartridge(s) providing protection against the compound of concern [£] /(APF = 50) Any self-contained breathing apparatus with a full face piece/(APF = 50) Any supplied-air respirator with a full face piece Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full face piece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full face piece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus			

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern⁶/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Dizziness, headache; lacrimation (discharge of tears), epistaxis (nosebleed); cough, feeling of oppression, pulmonary edema, pneumonitis; abdominal pain, diarrhea; measles-like eruptions; eye, skin burns

Target Organs respiratory system, eyes, central nervous system, skin

MATERIAL SAFETY DATA SHEET

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 Vaporization, KCal/Kg	2.71 E + 05
Specific Heat Liq.	2.343 E + 03
FIRE AND EXPLOSION DATA	
Explosively	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	
Oxidizer	
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	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.
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.
Manufacturer/ supplier	
Name	
Address	
Telephone No.	
Contact Person	

MATERIAL SAFETY DATA SHEET

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 Vaporization, KCal/Kg	2.9 E + 05
Specific Heat Liq.	1.9 + 03
FIRE AND EXPLOSION DATA	
Explosively	
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 load 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	
NFPA Rating	
Health	0
Stability	0
Flammability	2
Special	
Material Factor	10
KNOWN HAZARDS	
Combustible liquid	Combustible liquid
Explosive Material	
Oxidizer	
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.
Manufacturer/ supplier	
Name	
Address	
Telephone No.	
Contact Person	

MATERIAL SAFETY DATA SHEET

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	Colorless
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 Vaporization, KCal/Kg	2.93 E + 05
Specific Heat Liq.	2.2 E + 03
FIRE AND EXPLOSION DATA	
Explosively	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	
Oxidizer	
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
Protective Equipment	
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.
Manufacturer/ supplier	
Name	
Address	
Telephone No.	
Contact Person	

MATERIAL SAFETY DATA SHEET

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	Colorless
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 Vaporization, KCal/Kg	2.72 E + 05
Specific Heat Liq.	2.09 E + 03
FIRE AND EXPLOSION DATA	
Explosively	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	
<u>NFPA Rating</u>	
Health	0
Stability	0
Flammability	2
Special	

Material Factor	16
KNOWN HAZARDS	
Combustible liquid	
Explosive Material	
Oxidizer	
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
Protective Equipment	
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 intubation, in view of risk

	aspiration which can cause chemical pneumonitis for which antibiotic and corticosteroid therapy may be indicated.
Manufacturer/ supplier	
Name & ADDRESS	

MATERIAL SAFETY DATA SHEET

Name of Product/ Chemical : **Naptha**

IDENTITY OF MATERIAL	
Product Name	Naptha, Petroleum, solvent, Benzene, Mineral, Light Ligroin
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	Colorless
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 Vaporization, KCal/Kg	2.9 E + 05
Specific Heat Liq.	2.2 E + 03
FIRE AND EXPLOSION DATA	
Explosively	Moderate
Flammability ⁰	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 comeal ephitheal 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	
Oxidizer	
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	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 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).
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.
Manufacturer/ supplier	
Name	
Address	

GUIDE LINES FOR PUBLIC EVACUATION & LANDUSE NEAR MAJOR HAZARD WORKS

(Prescribed In The Major Hazard Control Manual Published By International Labour Office 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 (e0.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 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 centers, 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.

Categorization 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 categorization 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)
Liquefied petroleum gas, such as propane and butane,	25-40	300
	41-80	400
	81-120	500
	121-300	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	500 or more	See note 1
Liquid oxygen	500 or more	500
Sulphur dioxide	20 or more	1000
Bromine	40 or more	600
Ammonia	More than 100	1000
Hydrogen	2 or more	500
Ethylene oxide	5 - 25	500
	More than 25	1000
Propylene oxide	5 or more	250
Methyl isocyanine	1	1000

Glossary of Terms:

- Major Chemical Accident / Major Chemical Emergency : An occurrence including any particular major emission, fire or explosion involving one or more hazardous chemicals and resulting from uncontrolled developments in the course of an industrial activity or due to natural events leading to severe effects, inside or outside the installation likely to cause substantial loss of life and property including adverse effects on the environment.
- Emergency preparedness Plan : A formal written plan on the basis of identified potential accidents together with their consequences, which describes that how such accidents and their consequences should be

handled either on site or off-site.

Emergency planning is an important element of mitigating the effects of major accident hazard i.e. recognizing that accidents are possible assessing the consequences of such accidents and deciding the emergency procedures, both on site and off-site that would be needed to be implemented in the event of emergency.

Emergency	:	A situation created by an accidental release or spill or hazardous chemicals which poses a threat to the safety of workers, residents, the environment or property.
Scenario	:	An unplanned event or sequence of events that result in undesirable consequences. An incident with specific adverse consequences or impacts.
Consequences	:	The direct, undesirable result of an accident sequence usually involving a fire, explosion or release of toxic material. Consequences descriptions may be qualitative or quantitative estimates of the effects of accidents, in terms of factors such as health impacts, economic loss and environmental damage.
Event	:	An occurrence related to equipment performance or human action, or an occurrence external to the system that causes system upset.
Hazard	:	An inherent physical or chemical characteristic or situation or circumstances that have potential for causing harm to people, property or the environment.
Worst case	:	A conservative (high) estimate of the consequences of the most severe accident identified.
Likelihood	:	A measure of the expected probability or frequency of an event's recurrence.
Accident site	:	The location of an unexpected occurrence, failure, or loss either at a facility or along a transportation route.
Airborne Release	:	Release of any chemical into the air.
BLEVE	:	Boiling liquid expanding vapour explosions (BLEVE) are amongst the most feared events when tanks of hazardous chemical are exposed to fire or physical damage or other events that cause excessive pressure within the tank. The pressure inside the tank eventually vents itself through the weakest area of the tank. This sudden venting of pressure and vaporization of product involves violent rupture of the container with rocketing fragment.

CAS No.	:	The chemicals are listed by their common names and also by their Chemical Abstract Service (CAS) number. While a chemical may be known by several different names, the CAS number provides a unique and unambiguous identification.
Chemical Process	:	A particular method of manufacturing or making a chemical, usually involving a number of steps or operations.
Chronic Effects	:	Of long duration or having frequent recurrence. Chronic health effects are those that become apparent or continue for some time after exposure to hazardous chemicals.
Contingency Plan	:	A document to identify and catalogue the elements required to respond to an emergency. To define responsibilities and specific tasks and to serve as a response guide.
Evacuation	:	Removal of residents and other persons from an area of danger.
Exercise / rehearsal	:	A simulated accident or release set up to test emergency response methods and for use as a training tool.
Hazardous chemicals	:	Chemicals which are explosive, flammable, poisonous, corrosive, reactive or radio-active and requires special care in handling because of the hazards it poses to public health and environment.
Hazardous Installation	:	An industry handling hazardous chemicals.
Hazard Analysis	:	Identification of undesired events that lead to the materialization of the hazard. The analysis of the mechanism by which those undesired events could occur and usually the estimation of the extent, magnitude and relative likelihood of any harmful effects.
Hazards Identification	:	Provides information on available extremely hazardous substances (EHSs) on site, their nature, quantities and also on storages and conditions of storage.
IDLH	:	Immediately dangerous to life or health (IDLH) level means the maximum level to which a healthy worker can be exposed for 30 minutes without suffering irreversible health effects or escape impairing symptoms.
LCLO	:	Where acute exposure data are available (30 minutes to 4 hours exposure), the lowest exposure concentration causing death or irreversible health effects in any species is used as the IDLH concentration. These data are often

	reported as lethal concentration Low (LCLO).
Lethal	: Causing or capable of causing death.
Level of concentration (LOC)	: The concentration of an extremely hazardous substances (EHS) in the air above which there may be serious irreversible health effects or death as a result of a single exposure for a relatively short period of time.
On-site Emergency	: An accident which takes place in an industry and its effects are confined to the factory premises involving only the people working in the factory.
Off-site Emergency	: If an accident takes place in a chemical industry and its effects are felt outside the factory premises, the situation thus generated is called an off-site emergency.
Occupier	: "Occupier" in relation to any factory or premises, means a person who has control over the affairs of the factory or the premises and includes, in relation to any substance, the person in possession of the substance.
Probability	: A number expressing the likelihood of occurrence of a specific event, such as the ratio of number of outcomes that will produce a given event to the total number of possible outcomes.
Radius of Vulnerable zone	: The maximum distance from the point of release of a hazardous substance at which the airborne concentration could reach the level of concern (LOC) or LCLO under specified weather condition.
Response	: The efforts to minimize the risks created in an emergency by protecting the people, the environment, or the property, and the efforts to return the scene to normal pre-emergency conditions.
Risk	: The predicted or actual frequency of occurrence of an adverse effect of a chemical or other hazard.
Risk Analysis	: It is a relative measure of the likelihood of various possible hazardous events and enables the emergency plan to focus on the greatest potential risk.
Site/ Facility	: Any location where actually toxic chemicals are manufactured, processed, stored, handled, used or disposed: in short any place where these chemicals may be found.
Storage	: Methods of keeping raw materials, finished goods, or products while awaiting use, shipment or consumption.

- Transfer : Loading and unloading of chemicals between transport vehicles and storage vessels, and sending chemicals via pipes between storage vessels and process reactors.
- Transport : To carry or convey goods from one place to another using ships, tanks, trains, pipelines or aero planes.
- Threshold Planning Quantity (TPQ) : A quantity designated for each chemical which requires the occupier to take various steps in preparation of emergency planning like preparation of onsite plans, submission of information for preparation of off-site plan or making a safety report as per Manufacture, Storage and Import of hazardous chemicals rules, 1989.
- Vulnerable Zone : It is an estimated geographical area that may be affected by the toxic release at levels that could cause irreversible acute health effects or death to human population within the area following an accidental release.

Annexure-I

HARYANA GOVT.GAZ.(EXTRA), MAY 4, 2001
(VYSK 14 1923 SAKA)

[Authorized English translation]

HARYANA GOVERNMENT
ENVIRONMENT DEPARTMENT

NOTIFICATION
THE 4TH May, 2001

No.S.O.57/CA(EPP and R.)R. 1996/R-8/2001-In exercise of the powers conferred by sub-rule (1) read with sub rule (2) of rule 8 of the Chemical Accidents (Emergency, planning, Preparedness and Response) Rules, 1996 the Governor of Haryana here by constitutes the District Crisis Group to be the apex body in Kurukshetra District to deal with the Chemical Accidents and to provide expert guidance for handling Chemical Accidents. The District Crisis Group shall Consist of the following:-

- | | |
|---|------------------|
| 1. Deputy Commissioner , Kurukshetra | Chairperson |
| 2. Assistant Director Industrial Safety, Kurukshetra | Member secretary |
| 3. General Manager, District Industries Centre, Kurukshetra | Member |
| 4. Fire Officer of Municipal Council, Kurukshetra | Member |
| 5. District Public Relation Officer, Kurukshetra | Member |
| 6. One representative of Trade Unions to be nominated by Deputy Commissioner, Kurukshetra | Member |
| 7. Senior Superintendents of Police, Kurukshetra | Member |
| 8. Civil Surgeon, Kurukshetra | Member |
| 9. Executive Officer, Municipal Council, Kurukshetra | Member |
| 10. Executive Engineer, PWD (Public Health) Kurukshetra | Member |
| 11. Regional Officer, Haryana State Pollution Control board, Yamunanagar | Member |
| 12. Deputy Director, Agriculture | Member |
| 13. (i) Senior Assistant Director, Industrial Safety and Health, Gurgaon | Member |
| (ii) Assistant Director, Industrial Safety and Health Circle-I & II, Kurukshetra | Member |
| 14. General Manager, Haryana Roadways, Kurukshetra | Member |
| 15. One representative of Industries to be nominated by Deputy Commissioner, Kurukshetra | Member |

HARYANA GOVT.GAZ.(EXTRA),MAY 4,2001
(VYSK 14 1923 SAKA)

Function of District Crisis Group

- Assist. In the preparation of the district off-site emergency plan
- Review all the on site emergency plans prepared by the occupiers of major accident hazard installation for the preparation of the District off-site emergency plan
- Assist the district administration in the management of chemical accidents at a site lying within the district
- Continuously Monitor every chemical accident
- Ensure continuous information flow from the district to the Centre and State Crisis Group regarding the situation and mitigation efforts
- Forward a report of the chemical accident within fifteen days to the state crisis group and
- Conduct at least one full scale mock drill of a chemical accident at a site each year and forward a report of the strength and the weakness of the plan to the state crisis group

D. S. DHESI
Commissioner and Secretary to Government
Haryana Environment Department

Telephone Directory of the Officers of District Kurukshetra dealing with emergency

Sh.R.P.Gupta, IAS	Commissioner, Ambala Division I.G.Range, Karnal D.C.	0171-2601333	2600444	
Mandip Singh Brar IAS		0184- 220270	220271	
Sumedha Kataria, HCS	A.D.C.	227777 220756 226612	F-220935 226756	9416022220 9215705925
Satbir Singh Kundu,HCS	SDM Thanesar	220032	220352	9466112322
Bhal Singh Bishnoi, HCS	SDM, Pehowa	220448 220124- Fax	220434	8295455559 9354275559
Sushil Kumar, HCS	SDM, Shahbad	242908 240555-Fax		9729068560 9416987121
Shakti Singh,HCS	M.D. Sugar Mills	240188 240118	240282	9466114101
Ashok Bansal, HCS Vikram Singh ,HCS	C.T.M. D.T.O. Asstt. Secy.	290187 294505 225723	220071 9416930900	9466114238 9467728223 09216100489
Ashok Bansal,HCS	C.E.O. K.D.B.	290187 294505	220071	9466114238
Ashok Malik	D.R.O.	221035	227555 9468416600	9813200098 9466120965
Gagandeep Singh Rohtas Singh	DDPO G.M., Roadways	220717 221921	292765	9416469741 9466157803 09417725928 9416566927
Ishwar Chand Pundir POLICE	Dy. CEO/ZP, KKR			
Parul Kush Jain, IPS	S.P.	220320 228000(F)	220345	9729990004
Bhupinder Singh,HPS Ravinder Tanwar, HPS Tekan Raj Sharma,HPS	D.S.P.HQ DSP City D.S.P. Pehowa	220130 220320 220462	220451	9729990402 9729990403 9729990404
DISTRICT OFFICERS				
Bimla Chauhan	DETC(Sales)	220338	220558	9896007842
Vijay Singh	DETC (Excise)	225057		9416914069
Parmod Sharma	D.F.S.C.	220099		9813234033
Ravinder Dhankhar	DFO(T)	230743	228567	9416162005
V.S.Dhanda	GMDIC	225386 220386	220783	9467341005
Ranbir Singh	D.D.A.	220504	221361	9315495064
R.K.Sandhu	D.Dir.ICDP DPRO	220126 220387		9896758102 9354541299
Randhir Sharma	APRO		232904	9034522433 9254301775
Narender Singh Surender Singh Ajay Wasan	APRO Pehowa APRO Secy. Red Cross	220335 9254320335	011-29810187	9992122111 9416943770 9896064900
Sangwan Rajinder Kumar Mr. Kapila	Comm. Home Guard Labour Officer R.O.Pollution Board Ind. Safety & Health	223386 226625 01732-200137 225386PP		9813570588 9416499483 8059540611 09463125403 Amrit Lal,Ast. 9416646714

REVENUE

Ashok Malik	DRO	221035	9468416600	9813200098
Dr. Raj Kumar	Tehsil, Thanesar	220545		9996300066
Man Singh	Tehsildar, Pehowa	220307	220307	9896363346

Vinod Sharma	Tehsil, Shahabad	242908	294277	9812075856
Vikram Singla	N.T.(M)Shahbad	242908		09814637177
Chetana Chaudhary	N.T., Thanesar	220545		9253168031
Rajender Kumar	N.T. Ladwa	262929	9466389297	9467127075
Ramesh Kumar	N.T. Accounts			9416227669
Ashok Kumar	N.T. Pehowa	220307		9255902786
O.P.Rana	N.T. Babain	280018		9416032728
Dinesh Kumar	N.T. Ismailabad	253003		9468050336

DEVELOPMENT

Gagan Deep	DDPO	220717		9416469741
Ishwar Chand Pundir	Dy.CEO/ZP, KKR			9416566927
Raj Pal Sharma	XEN, PR	291090	226821	9416120938
Partap Singh	BDPO, Thanesar	290062		9416493666
Balbir Singh	BDPO, Shahabad	240042		9416378725
Rakesh Vohra	BDPO, Ladwa	260229		9034602507
R.D.Sahni	BDPO, Pehowa	220283		9812315017
Rajbir Singh	BDPO, Babain	280121		9813219501

DOCTORS

Dr. Sushma Saini	C.M.O.	290344	290333(R)	9215156180
		291499(F)		
		294683		
Dr. R.L. Arya	SMO Shahabad	240044		9467041061
Dr. Kansal	S.M.O. Pehowa	01741-230189		9467730019

SE/XENS/SDOs

T.K.Mahajan	S.E. , HVPN	238956	222329	9315457363
		238759		
	238046, 238047	Fax-239627		
Gian Chand	XEN, UHBVN, Kkr	292120	230430	9315457364
Yog Raj	XEN,UHBVN, Phwa	230041	230038	9354726083
K.S. Bhoria	XEN,UHBVN, Shbd.	240098	240095	9354726176
N.K.Goel	XEN BBMB	220875	220874	9466120870
		220534		
J.P.Kamboj	XEN, B&R-I	238066	238219	9813506501
S.P. Siroha	XEN, B&R-II	238530	09417527107	9812018234
Sunil Kundu	XEN,N.H.III Jind			9416895576
Birbal Verma	XEN, PH	220358	227347	9416036986
Raj Pal Sharma	XEN, PR	291090	226821	9896501479
C.P. Gupta	XEN, Mkt.B.Pipli	231420	221308	9896793093
V.K.Garg	XEN, Huda (Elec)PKL	0172-2574124		07837759975

M.Cs/MARKET COMMITTEE

M.S.Jagat	E.O. MC. Thanesar	235352	294396	9896887170
K.L. Bathala	Secy, MC, Ladwa	9254351200		9416324600
Chaman Lal Dhiman	Secy, MC, Sbd.	240025	01732-256678	9416619611
		240769		
Nirmal Parkash	Secy. M.C., Pehowa	221703		9996395792
Jai Bhagwan Sharma	Thanesar	220601,101		9466365199
Fire Officer/Fire Brigade		645087		
Fire Brigade	Pehowa	220101		
Fire Brigade	Shahabad	245201	Ashok Inch	9416833887
Fire Brigade	Ladwa	263101	9416113053	
Yogesh Kumar	DGM (Tel.)	227400/227500		9416067800

LIST OF Main Govt. & Private Building

Sr. No.	Main Govt. & Private Building
1.	Mini Secretariat Kurukshetra
2.	Telephone Exchange Sec-13, Kurukshetra
3.	LNJP Hospital Kurukshetra
4.	Bus Stand Old & New, Kurukshetra
5.	Judicial Complex, Kurukshetra
6.	Railway Station, Kurukshetra
7.	Kurukshetra University, Kurukshetra
8.	N.I.T., Kurukshetra
9.	Kessel Mall/Cinema
10.	Post Office, Railway Road, Kurukshetra
11.	HIRMI Building, Kurukshetra
12.	BBMB Power House, Kurukshetra
13.	Main Power House, NIT, Kurukshetra
14.	Shri Krishana Museum, Kurukshetra
15.	Panorama Science Museum, Kurukshetra
16.	Tara Mandal, Jyotisar Road, Kurukshetra
17.	Parakeet Tourist Complex, Kurukshetra
18.	Kurukshetra University Guest House, Kurukshetra
19.	Municipal Council Office, Kurukshetra
20.	Yatri Niwas Tourist Complex, Kurukshetra
21.	Hotels-Heritage, Saffron, Silver Sand, Pearl Mark
22.	Dharamshala- Jaat, Punjabi, Brahaman, Ror, Saini

<u>PEHOWA</u>	
23.	Judicial Complex, Pehowa
24.	SDM/Tehsil Office, Pehowa
25.	Yatrika Tourist Complex, Pehowa
26.	Rest House, Pehowa
27.	Power House, Pehowa
28.	Gurudwaras Pehowa
<u>SHAHABAD</u>	
29.	SDM Office Shahbad
30.	Power House, Shahbad
31.	Sugar Mill, Shahbad
32.	B.D.P.O.Office, Shahbad
<u>LADWA</u>	
33.	Tehsil Office, Ladwa
34.	Power House, Ladwa
35.	Municipal Office, Ladwa
36.	IGN College, Ladwa
<u>BABAIN</u>	
37.	Block Office, Babain
38.	Power House, Babain
39.	Market Committee, Babain
40.	Tehsil Office, Babain
<u>ISMAILABAD</u>	
41.	Tehsil Office, Ismailabad
42.	Block Office, Ismailabad
43.	Market Committee, Ismailabad

LIST OF TELEPHONE NUMBERS OF POLICE STATIONS

<i>S. No.</i>	<i>Name of Officer/Police Station</i>	<i>Mobile No.</i>	<i>Telephone No.</i>
1	SP, Kurukshetra	9729990004	01744-220319 01744-220320 01744-220345-R
2	DSP/HQ	97299-90402	208
3	DSP City	97299-90403	209
4	DSP Pehowa	97299-90404	01741-220462 01741-220451-R
5	Inspector Detective	97299-90406	--
6	Inspector CIA	97299-90407	01744-220252
7	SHO City	97299-90408	01744-222835
8	SHO Sadar	97299-90409	01744-230351
9	SHO Pehowa	97299-90410	01741-230100
10	SHO Shahabad	97299-90411	01744-241100
11	SHO Ladwa	97299-90412	01744-260711
12	SHO Babain	97299-90413	01744-280237
13	SHO Jhansa	97299-90414	01744-257711
14	SHO Ismailabad	97299-90415	01744-252029
15	SHO KUK	97299-90416	01744-291778
16	SHO Traffic	97299-90417	01744-278566
INCHARGE POLICE CHOWKIS			
17	Sector-7, City	97299-90422	98122-98077
18	Krishana Gate City	97299-90423	01744-236200
19	Subhash Mandi City	97299-90424	--
20	Jyotisar KUK	97299-90425	01744-238040
21	3 rd Gate KUK	97299-90430	--
22	City Pehowa	97299-90426	--
23	Gumthala Garu Pehowa	97299-90427	--
24	HUDA Shahbad	97299-90428	01744-244340
25	City Shahbad	97299-90429	01744-240456

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	100	5% GNS IV Fluid, 540 ml.	300 Bottles
Normal Saline Fluid, 540 ml.	100	Sterile Distilled Water, 500 ml.	200 Bottles
Vinegar		Liquid Paraffin	100
Vaseline	200	Tincture Benzoin	10
Tincture Iodine	100	Tincture Cetrimide	30
Savlon Liquid	100	Ointment Soframycin	40
Ointment Atropine (Eye)	150	Atropine Eye Drops	200
Neosporin Dusting Powder	200	Pilocarpine Eye Drops	100
Acridflavin Gauze with Plastic Jar	30	Ointment Gentamycin (Eye)	200
Gentamycin Eye Drops	150	-	-
Injectables (Ampoules / Vials)			
Decadron	400	Deriphyline	300
Coramine	50	Calcium Glutamate	200
Adrenaline	50	Dopamine Hydrochloride	100
Mephentine	100	Sodium Bicarbonate	50
Atropine Sulphate	150	Aminophyline	50
Lasix	200	Vitamin K	30
Lignocaine Hydrochloride	30	Salbutamol	250
Perinorm	350	Pethidine Hydrochloride	50
Ampicillin	400	Avil	250
Clampose	200	Morphine Sulphate	50
Surgical Items			
Eye Plastic Undine	250	Absorbant Cotton Wool	100
Bandage 2", 4", 6"	1000	Adhesive Plasters (Different sizes)	200
Oxygen Cylinders	50	Mackintosh (Rubber Sheet 3' x 6')	100
Polyethylene Masks (Surgical)	1000	Pathology Gloves (Misc. sizes)	1000
Disposable Syringes (2, 5 & 10 ml.)	1000	Catgut Chromic	1000
Suture Needles Cur. Cutting (Different sizes)	1000	Suture Needles Str. Cutting (4, 6, 8 mm)	1000

Catgut Plain	100	BB Silk	100
Operation Scissors, str.	100	Operation Scissors, Cur.	100
Tracheotomy Set	5	Forceps Artery, Str.	200
Forceps Artery, Cur	100	Forceps Mosquito	200
Plaster of Paris Bandage (10 & 15 cm)	50	Forceps Dissecting (Toothed & Non-toothed)	200
Forceps Cheatles	20	Thomas Splints (arm/hip)	500
Boyels Apparatus	2	Respirator Bear (Adult/child)	40
Laryngoscope (Adult/child)	10	Endotracheal Tubes (diff. sizes)	50
IV Set, Disposable	1000	Wooden Splints	500
Elastic Bandage	2000	Electric Sterilizer	20
Hypodermic Needles (diff. Sizes)	1000	SS Tray with Lid (rectangular)	100
EI Jar, (5")	15	EI Jar, (12")	15
Scissors shop	100	Basins (18" dia)	10
Kidney Tray	200	Loup (Eye Examination)	40
Others			
G N S IV Fluid	100 Bottles	Water	100 Bottles
Plasma	-	Oxygen Cylinders	50
Miscellaneous Items			
Overshoes	200 Pairs	Torchlight (3 Cells)	50
Torch Cells	100	Stretchers	100
Mattress	1000	Wheel Chairs	50