

OFF SITE EMERGENCY PLAN

INDUSTRIAL POCKET



PREPARED BY

ANAND DISTRICT CRISIS GROUP
ANAND
AUGUST - 2026

FOREWORD

When any industrial emergency develops outside the boundaries of the industrial plant area, then it may affect the neighbouring area and have adverse short or long term consequences affecting life, life support system, properties or the social fabric.

Previously Off- Site Emergency Plan for Anand District was prepared in 2024. In view of fast development of chemical hazardous units in Anand District, the updation of the said documents is required. Now, it is reviewed & improved as per new developments in the District.

It is appealed to all emergency services to go through this document and keep ready & workable conditions of all resources available with you, so that industrial emergency can be handled so quickly, timely and finally controlled.

I am thankful to all the members of District Crisis Group for their valuable contribution and active participation in preparation of this Anand District Off-Site Emergency Plan.

Further, I must record appreciation for preparation of Off – Site Emergency Plan within short period by Mr. R.H. Solanki, Asst. Director, Industrial Safety & Health, Anand.

ANAND

Date: / /2026

**(Praveen Chaudhary, IAS)
Chairman
Anand District Crisis Group
&
Collector & District Magistrate,
ANAND.**

Preface

The main purpose of the Off- Site Emergency Plan is to Control, Contain, Respond and Minimise the effect of major industrial emergency resulting from Industrial Accident that may extend beyond the fence-line of the industrial unit, by emergency services by use of District all available resources.

This Emergency Plan contains the following elements with providing separate Sections.

Action Plan - Objectives, Roles of emergency Services, Action Plan & handling of Emergency.

MAH Details – Details on Major Accident Hazards Unit of Anand District. The Hazard identification Fact Sheet, Material Safety Data Sheet.

Annexures – Details on Preparedness for emergency by Emergency Phone Number, List of Expert Persons, Safe Shelters, Volunteers Organisation, Emergency Equipment Sources, Emergency Instruction to General Public.

The various documents are referred in the Preparation of Off-Site Emergency Plan- 2022. I am thankful for all, as the matter used in good faith.

The following documents are sources in Preparation of the off-site Emergency Plan.

1. Off-site Action Plan for Handling Emergency in Chemical Unit – Vadodara District (Revised Edition).
2. Manufacture, Storage and Import of Hazardous Chemical (Amendment) Rules- 2000
3. Chemical Accidents (Emergency Planning, Preparedness and Response) Rules-1996.
4. Planning of Off- site Response for Chemical Hazards – circulated by Environment and Forest Department, New Delhi.
5. International Labour Organization, Geneva Publications:
 - a) Major Hazard Control
 - b) Technical Guidance for Hazard Analysis.
6. The guideline on the preparation on On- site and Off- site Emergency Plan issued by Director Industrial Safety & Health, Gujarat State.
7. The occupational safety, Health and working Conditions (OSH) Code, 2020
8. The Explosive Act-1884 and The Explosive Rule-1983.

9. Gas Cylinder Rules-2016 and Static and Mobile Pressure Vessel (unfired) Rules-2016.
10. APEIL: Awareness and Preparedness for emergency at local Level–United Nation Environment Programme– (Indian Edition-1994)
11. Toxic and Hazardous Industrial Chemical Safety Manual– The International Technical Information Institute.
12. Off-Site Disaster Management Plan – India Chemical Manufacturers Association.
13. Various Techniques adopted by different experts are published in periodicals, magazines, souvenirs, books, leaflets etc.
14. Contingency Plan prepared by Collectorate Anand District for Relief Work during Heavy Rain, Flood or Natural calamities.
15. The NDMA guidelines on Chemical Disaster-2007.

I am thankful for valuable guidance as provided by Shri P. M. Shah, Director Industrial Safety & Health – Gujarat State, Ahmedabad. Further, we are thankful for get positive response from Shri D. K. Vasava, Jt. Director Industrial Safety & Health, Vadodara Region & Shri.B. V. Raval, Dy.DISH ,Nadiad.

I, further, thankful for the helps and co-operation given by MAH units, Police Departments, Medical Services, Fire Services, etc. in preparation of this emergency plan. Further, I am thankful for the cooperation and helps from my colleague Mr. N.G. Desai, Industrial Safety and Health Officer, Anand

Date: . / / 2026
Anand

(Mr. R.H.Solanki)
Asst. Director
Industrial Safety & Health
&
Member Secretary,
Anand District Crisis Group

OFF-SITE EMERGENCY PLAN

ANAND DISTRICT CRISIS GROUP

GENERAL INDEX

CHAPTER	SUBJECT		PAGE NO.
	FOREWORD	...	1
	PREFACE	...	2
Description Section			
1.	OBJECTIVES	...	7
2.	ANAND DISTRICT	...	14
3.	DETAILS OF MAH UNITS	...	17
4.	PROBABLE MAXIMUM ACCIDENT SCENARIOS	...	61
5.	TRANSPORTATION EMERGENCY	...	69
6.	INDUSTRIAL EMERGENCY MANAGEMENT	...	92
7.	MAJOR ACCIDENT RESPONSE SYSTEM	...	111
8.	POST EMERGENCY	...	136
9.	EMERGENCY INSTRUCTION TO THE GENERAL PUBLIC	...	140
10.	REHEARSAL / EXERCISE / MOCKDRILL	...	144
ANNEXURE SECTION		...	148

OFF-SITE EMERGENCY PLAN

ANAND DISTRICT CRISIS GROUP

INDEX OF ANNEXURE

ANNEXURE	SUBJECT	PAGENO.
1	MAP OF THE DISTRICT WITH IDUSTRIAL POCKET	... 149
2	COMPOSITION OF DISTRICT CRISIS GROUP	... 151
3	CHART-EMERGENCY RESPONSD EDIAGRAM	... 157
4	CHART-COLLECTORA TECOMMOND & CONTROL	... 158
5	CHART-FIRESERVICES RESPONSE	... 159
6	CHART-POLICE RESPONSE	... 160
7	CHART-HEALTH & MEDICAL RESPONSE	... 161
8	EMERGENCY TELEPHONE NUMBERS	... 162
9	LIST OF FIRE STATIONS	... 162
10	LIST OF POLICE STATIONS	... 163
11	EMERGENCY MEDICAL FACILITIES	... 164
12	LIST OF EXPERTPERSONS	... 165
13	LIST OF VOLUNTEERORGANI SATIONS	... 166
14	LIST OF SAFE SHELTERS	... 167
15	POPULATION OF SURROUNDING VILLAGES	... 168
16	METEORO LOGICAL DETAILS	... 169
17	SPECIAL MEDICAL TREATMENTS/ ANTIDOTS FOR HAZARDOUS CHEMICALS	... 170
18	LIST OF TRAINED FIRST RESPONDERS FOR SEARCH,RESCUE & MEDICARE	... 174
19	SALIENT PROPERTIES OF SOME HAZARDOUS CHEMICALS	... 176
20	LIST OF WATER RESOURCES	... 177
21	FORMAT FOR MOCKDRILL/REHEARSAL/EXERCISE	... 178
22	GOVERNMENT NOTIFICATION-CA (EPPR) RULES-1996	... 180
23	GLOSSARY OF TERMS & DEFINITIONS	... 185
24	MATERIALSAFETY DATA SHEETS	... 192

OFF SITE EMERGENCY PLAN

**ANAND DISTRICT CRISIS GROUP
ANAND**

DESCRIPTION SECTION

PREPARED BY

**ANAND DISTRICT CRISIS GROUP
ANAND
AUGUST 2026**

CHAPTER - I**OBJECTIVES**11 1 SCOPE

The scope of the present document on Off Site Emergency Plan for Anand District Crisis Group is limited to MAH Units and to transportation accidents involving hazardous chemicals. It does not cover accident/incident involving hazardous chemicals, where the damage distances are small or minor and may not pose significant Off-site hazard.

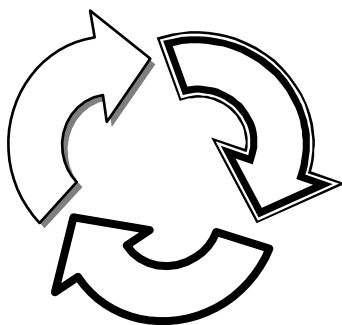
12 2 PURPOSE

This document seeks to address the wide range of issues that need to be dealt with in order to ensure *effective* emergency handling with chemical safety, i.e., the actions that should be taken by Industries, Government Authorities, Communities and other stakeholders, to minimise the likelihood that an accident will occur (prevention); to mitigate consequences of accidents through emergency planning, risk communication (preparedness/ mitigation); and to limit the adverse consequences to health, the environment and property in the event of an accident (response). It also includes actions that are needed to learn from the experiences of accidents and other unexpected events (follow-up) in order to reduce future incidents (prevention).

It is often difficult to clearly delineate which issues and actions fall within each of these stages, and there is significant overlap among them. Therefore, the entire process is sometimes described as a "Safety Continuum" or "Emergency Management Cycle" (see next page).

Emergency Management Cycle

Prevention
Avoiding incidents and reducing impacts, and learning from experience to reduce vulnerability and increase resilience



Preparedness
Being alert, ready and trained to act prior to the onset of an accident

Response
Managing the consequences of an accident and providing immediate relief, as well as taking steps towards restoring and returning to normality

3 **OBJECTIVES**

The main object of the Off-site Emergency Plan is to improve preparedness for handling various types of emergencies / disaster within the shortest possible time by using available resources, if disastrous event arise in industry.

The main purposes of the Off Site Emergency Plan are;

1. To Identify the Major Accident hazardous Installation located within the industrial pocket
2. To evaluate possible major accident credible scenarios, and to identify the potential risks and the geographical zones where effects will likely to occur in the event of an accident.
3. Assessment of potential environmental consequences of accidents, as well as potential health consequences, and identify appropriate prevention, preparedness and response actions.
4. To establish command & control structures.
5. To prepare the respective roles & duties of all emergency services, groups, agencies, govt. authorities, volunteered organizations etc.
6. To establish & locate the implementation procedures, actions, warning system, communication system, co-ordination system control centres, safe shelters, expert persons, etc.

7. Plan to issue recuperation of casualties and injuries. Plan for relief and rehabilitation.
8. To plan for evacuation, safeshelter and transportation, for handle the situation.
9. Plan to carry out training programme on emergency preparedness and tackling procedures for emergency.
10. To maintain liaison between all connected representatives, industries, emergency services, govt. authorities, local authorities and concerned persons & organizations.
11. To plan to obtain and maintain the stock of the latest & effective antidote, medicines, equipments, to keep the record of availability and procurement of stocks.
12. To maintain meteorological information on prevailing weather conditions, wind velocity, direction, rainfall, flood data, humidity etc.
13. to operate the central control room to carryout the functions, duties, responsible on plan- proceedings, meetings, record keeping , information, data, computers with requisite staff.
14. to carryout mock-drill / rehearsal / simulation in Off-site emergency plan to ensure its efficiency, test, response, interaction & co-ordination by emergency services, organization, and to evaluate the effectiveness and adequacy of the equipment and to gain experience tocreate confidence toimplement the Off-site Emergency Plan.
15. To update the plan at regular interval with the views of:
 - a. Accidents / incidents occurred during the period.
 - b. Addition of Major Accident Hazardous Units in the Area.
 - c. Incorporating the additional resources and facilities created.
 - d. Actual experience achieve during emergency.

Further it is essential that the actions on the part of all the emergency aid giving agencies are to ensure that in the event of an accident /incident occurrences, the source of hazard is controlled promptly and the damage to human life and property minimized.

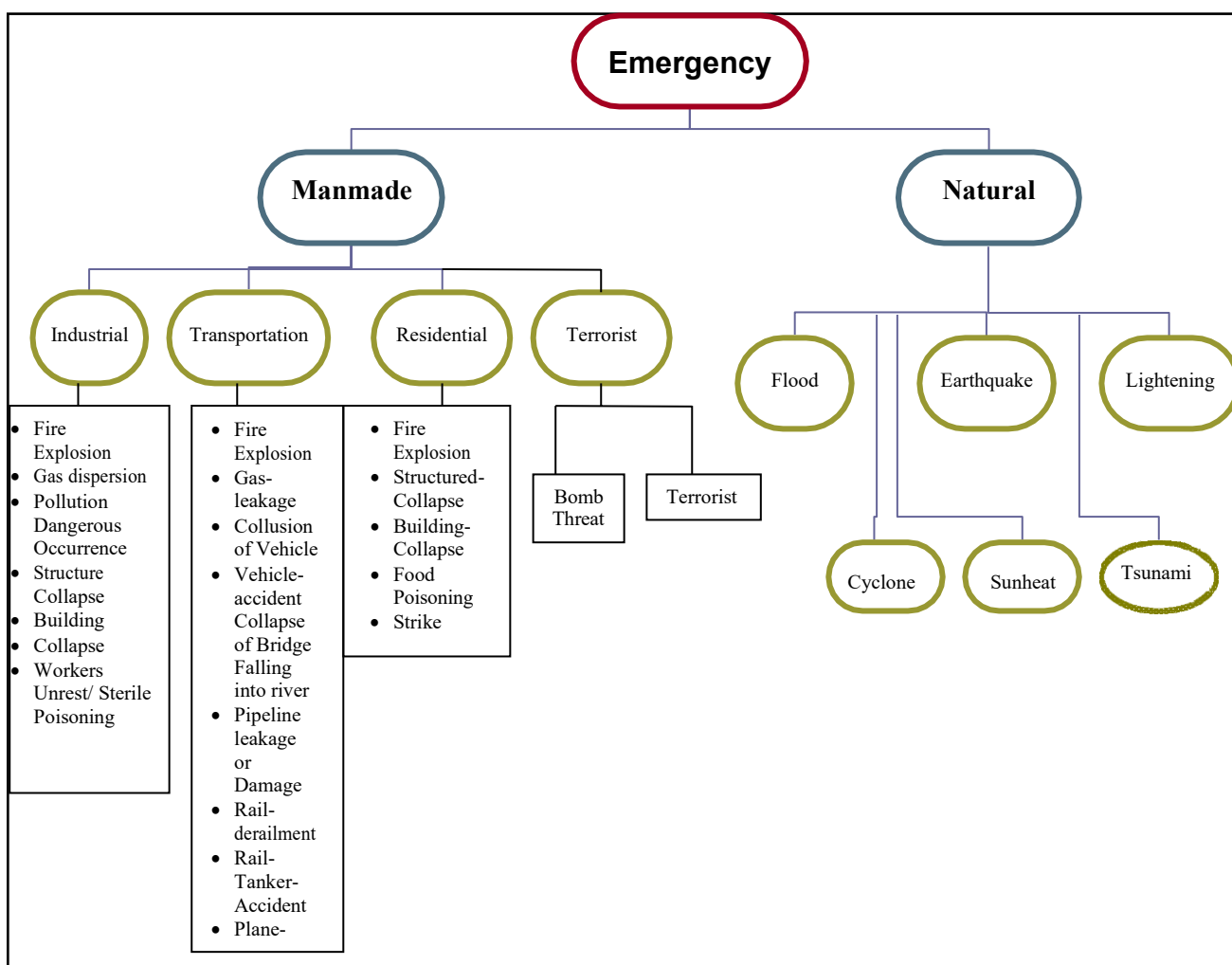
16. to assist the District / Local authorities for preparing or updating the Off-site emergency Plan for the district / local or particular area and to organize mock- drills /rehearsals from time to time and initiate corrective actions based on the lessons learnt.

14 4 TYPE OF EMERGENCY

The off-site emergency, as identified by the management in their on-site emergency plans, may affect the surrounding people and the environment outside their premises. The emergency can be classified broadly in the following manner;

- (1) Natural Calamity.
- (2) Man made Emergency

Further, Emergency can be divided in the following way, please see next page;



5 LEVEL OF EMERGENCY

The level of Industrial Emergency can be classified according to the gravity of the situation at site. The command and control will follow as per the level of emergency.

1.5.1 Level-I: On Site Emergency

The type of emergency arise in the unit, which can be handled and controlled by the management with own resources as per On-site emergency plan prepared, is called as On-site or Level-I emergency.

1.5.2 Level- II: Local Crisis

While the Level – I is uncontrollable by the management, the further more help is needed, the neighbouring units or mutual aided local units will provide their resources to tackle the situation. The emergency of the unit which handle and control by

the out side resources, is called as Mutual Aided Local Crisis or Level – II. Further, this type of emergency may govern by The Local Crisis Group.

1.5.3 Level–III:District Crisis

Even after putting efforts as explained in Level–II,the situation becomes uncontrollable and worst. The District Crisis Group will take over the charge to hand lethe emergency situation.This will term as Level–III.

1.5.4 Level–IV:State Crisis / National Crisis

Considering the gravity and situation of the emergency that it cannot be controlled by the Local or District Crisis Group, The State/National Crisis Group has to command and control such crisis by utilizing all resources from the State or Nation, as prevailing circumstances.

16 6 LAY-OUT OF THE DOCUMENTS

The document is prepared into 10 Chapters with Annexure 1 to 24, as indicated in General Index. Further, Appendix A to G to Chapter 3 provides the specific information pertaining to MAH Units.

Chapter - 1: Describes Scope, Objectives, Industrial Emergency, and Level of Emergency etc.

Chapter - 2: Provides general details about Anand District.

Chapter -3: Covers basic information on MAH Units in respect of chemicals,contact person, PPE, F/F, medical aids etc.

Chapter - 4: Highlights on probable major accident scenarios based on storage of hazardous chemicals by M.A.H.Units.

Chapter - 5: Deals with t ransportation hazardous &provision under Transportation Act & Rules.

Chapter - 6: Describes the role & responsibility of various designated person as emergency management for industrial emergency

Chapter - 7 : Covers the major industrial accident response actions to be performed by emergency management on chemical emergency involving toxic vapour dispersion, spills, fire, explosion etc.

Chapter - 8 : Deals with the post emergency activity required to be performed by emergency management - members to restore normalcy.

Chapter-9: Describes Instruction to the general public during emergency.

Chapter - 10: Deals with testing on preparedness and awareness amongst the emergency management by Rehearsal/ exercise / mockdrill.

Appendix Section to Chapter3 provides the specific details about MAH Units and their preparedness by Appendix A to E.

Annexure : The second part of document is presented by Annexure section, providing various specific details in respect of District Crisis Group, List of expert person, safe Shelter, population, Volunteer Organisation, format on mock drill, Charts on response-action, M.S.D.S. of certain Hazardous Chemicals, glossary of Terms & Definition, abbreviation etc.

CHAPTER - 2**ANAND DISTRICT****2.1 INTRODUCTION**

Off Site Emergency planning is not only involved details analysis of Major Accident Scenarios, Roles & Responsibilities of individuals and teams, management procedure, but also requires information or details on topography, Weather condition, demographic features of the area surroundings of the Major Accident Hazards (MAH) units etc. The data are essential to develop Scenarios, which are simulation of actual condition, thereby providing results which are realistic and help in practical planning.

2.2 ANAND DISTRICT

Anand District is situated on middle part of Gujarat state. Anand District was carved out of the Kheda district in 02.10.1997. Anand is the administrative headquarters of the district. The district had a population of 20,92,745 as of 2011. Vallabh Vidyanagar in Anand District is famous for educational institution.

Mahi, Sabarmati and Shedhi Rivers are located at the boundary of the District. The District consists of 8 Talukas.

The surroundings of the District are given below

<i>North Side</i>	:	<i>Kheda District</i>
<i>East Side</i>	:	<i>Vadodara District</i>
<i>South Side</i>	:	<i>Gulf of Cambay</i>
<i>West side</i>	:	<i>Ahmedabad District</i>

Anand District is connected by following Railway Broad Gaugelines.

1. Western Railway–Ahmedabad–Mumbai line

Connected major Railway stations are- Anand, Vasad, Boriavi, etc.

Further, the narrow gauge lines are located in the District, as below,

1. Anand– Petlad–Tarapur-Khambhat
2. Anand–Petlad-Sojitra
3. Vasad-Anklav–Borsad-Kathana

Anand is connected different part of India by roads, Ahmedabad by Express highway called as Golden corridor-No.1 and National Highway No.8- Ahmedabad to Mumbai.

The different Industrial Estates are located in the District as per below.

Sr. No.	Name of Industrial Estate	Place/Area
1.	GIDC Industrial Estate-V.V.Nagar	V.V.Nagar
2.	GIDC Industrial Estate-Sojitra	Sojitra
3.	GIDC Industrial Estate-Borsad	Borsad
4.	GIDC Industrial Estate-Petlad	Petlad
5.	GIDC Industrial Estate -Khambhat	Khambhat
6.	GIDC Industrial Estate -Umreth	Umreth

The various types of manufacturing units are working in the District like, Engineering, Dairy, Chemicals, etc.

2.3 GENERAL DETAILS OF THE DISTRICT

1.	Total Population	18,56,872					
2.	Total Area	2951.09Sq.km					
3.	North Latitude	22°-15'and 22°-45'					
4.	East Longitude	72°20'and73°20'					
5.	Altitude	79.4Mts. Above Mean Sea Level					
6.	Talukas & Population	Sr. No.	Name of Taluka	No of Villages	Population (2011)	Distance from Anand In K.M.	Area Sq.Km
		1.	Sojitra	25	1,06,526	25	165.34
		2.	Umreth	37	1,88,029	32	235.94
		3.	Tarapur	42	88,522	34	337.65
		4.	Anand	42	6,09,307	0	441.16
		5.	Petlad	55	2,87,924	43	298.87
		6.	Borsad	64	3,79,650	21	418.69
		7.	Khambhat	56	2,85,679	60	853.95
		8.	Anklav	32	1,47,108	24	188.71
			Total	365	20,92,745		2,940.31
7.	Rivers	Mahi, Sabarmati, Shedhi, etc.					
8.	Average Rain Fall in mm	926mm					
9.	Weather Condition	The details on average monthly minimum & maximum temperature, wind velocity, rainfall, etc. are given at Annexure – 21.					
10.	Distances	From Ahmedabad = 73Km, Vadodara = 38Km, Mumbai = 463Km.					

CHAPTER - 3**DETAILS OF MAH UNITS****3.1 MAH UNITS**

Most of MAH units in Anand District are located in Khambhat Taluka. Therefore major area of concern is area situated in and around of Khambhat Taluka, where major chemical industries located and which can create major accidental hazards due to nature of chemicals being used or stored or processed or manufactured.

3.2 HAZARDOUS CHEMICALS

Varieties of the chemicals are used, stored & handled in the industries according to their requirements. Out of these Chemicals, total numbers of chemicals 432 ,684, and 431 are identified by name as Hazardous Chemicals against part I I of the Schedule 1 under Rule 68 - J of the Gujarat Factories Rules-1963 (2004), MSIHC Rules 1996 (2000) and (CAEPPR) Rules 1998, respectively. Further, those chemicals are not listed in part I I, are classified as hazardous chemicals according to the criteria laid down as Toxic, Flammable and explosive, in values as indicative criteria in part I of the Schedule 1. The Major Hazardous Chemicals as stored / used by MAH Units are listed with identification number in the Table at Para 3.5

3.3 THE MAJORACCIDENT HAZARDOUS UNIT(MAH UNIT)

MAH Units means industrial activity ata site handling of Hazardous Chemicals equal to or excess of the threshold quantities specified in Schedule 3 under Rule 2 (ja) of Manufacture, Storage and Import of Hazardous Chemicals Rules 1989 (2000). Some of such hazardous chemicals against their threshold quantities are given next page:

Group-2-Toxic substance

Sr. No.	Name Of Chemical	CAS No.	Threshold Quantity
1.	Chlorine	7782-50-5	10 T
2.	Sulphur Trioxide	7446-11-9	15 Tons

Group -5-Flammable substance

Sr. No.	Name Of Chemical	FP / BP	Threshold Quantity
1.	Flammable Gases		15 T
2.	Extremely flammable Liquid	FP $\leq$ 23°C, BP $<$ 35°C	1000 T
3.	Very highly flammable Liquid	FP $\leq$ 23°C, BP $>$ 35°C	1500 T
4.	Highly flammable Liquid	Which remains liquid Under pressure	25 T
5.	Highly flammable Liquid	FP Between $\leq$ 60°C $>$ 35°C	2500 T
6.	Flammable Liquid	FP Between $\geq$ 60°C $<$ 90°C	5000 T

Note: FP = Flash Point, BP = Boiling Point

The list of the M.A.H. Units is given at Appendix - A. The location of MAH Units is marked on the Maps at Annexure - 1.

3.4 INDUSTRIAL POCKET

All MAH units are in following industrial pocket.

Sr. No.	Industrial Pocket	Area	M.A.H.Units		
			Working	Closed	Total
1.	Khambhat Taluka Industrial Pocket	Khambhat Taluka	15	0	15
TOTAL			15	0	15

Above Industrial pockets are shown in the MAP at Annexure—1

3.5 LIST OF MAH UNITS

List of MAH unit in Anand District is given below;

1. Bodal Chemicals Limited
2. Cambay Organics Pvt. Ltd.
3. Gujarat Halogen Petrochem Corporation
4. Gujarat Industrial Chemicals Corporation

5. Jay Chemical Ind. Pvt Ltd. (Unit-V)
6. Karan Intermediates Pvt. Ltd.,
7. Metachem Industries
8. Rohan Dyes And Intermediates Ltd. (Unit-I)
9. RohanDyesAndIntermediatesLtd.(Unit-II)
10. Savita Intermediates Pvt. Ltd.
11. Shital Chemical Industries
12. Shital Chemical Industries (Unit-II)
13. Baychem Intermediates
14. Achal chemical
15. Ayushi chemical pvt. Ltd.

List of MAH unit with address details is given in Appendix-A.

3.6 DETAILS OF HAZARDOUS CHEMICAL HANDLED BY MAH UNITS

The list of Major Hazardous Chemicals Involved at the different MAH units is given in next page. The serial Number of each hazardous chemical is indicated, as per schedule I under Rule 68-j of The Gujarat Factories Rules 1963 (2004), The Manufacture, storage, Imports of Hazardous Chemicals Rules 1984 (2000) and The Chemical Accident (Emergency Planning, preparedness and Response) Rules 1990.

SR. NO.	MAJOR HAZARDOUS CHEMICAL	GFR	MSIHC	CA (EPPR)	INDUSTRIAL POCKET(1) ANAND TALUKA	INDUSTRIAL POCKET(2) KHAMBHAT TALUKA
1	Chlorine	88	119	84	-	1,2,3, 4,6,11,12
2	Oleum	301	444	301	-	5,7,8,9,10,13
3	Sulphuric Acid	371	591	370	-	5,7,8,9,10,13
4	Toluene	389	628	388	-	2,3,4,11,12
5	Ethylene Oxide	200	269	196	-	5,8
6	Chlorosulphonic Acid	110	136	106	-	9
7	Hydrochloric Acid	223	313	222	-	5,6
8	Hydrogen	224	314	223	-	5
9	Thionyl Chloride	387	620	386	-	5
10	Methanol	259	377	258	-	5,8
11	O-Nitrotoluene	299	440	299	-	7,10,13

3.7 FACT SHEETS

The details in respect of name, address, manufacturing process, storage of major hazardous chemicals, emergency contact persons' Name, Telephone Numbers, etc. of each MAH units is given in form of FACT SHEET, in Appendix-B.

3.8 PRIMARY ASSESSMENT OF HAZARDS

The details on Primary Assessment on possible Accident Scenarios i.e. Fire, Toxic, Explosion, etc of MAH industries, as per their respective Industrial pockets are given in clause 4.6 of Chapter 4.

3.9 MATERIAL SAFETY DATA SHEETS

The M.S.D.S. of selected major hazardous chemicals stored, handled or used by MAH units are given at Annexure - 24.

3.10 PERSONAL PROTECTIVE EQUIPMENTS HELD BY MAH UNITS

The details pertaining to Personal Protective Equipments and Safety Equipment held by each MAH units are given at Appendix – C.

3.11 FIRE PROTECTION SYSTEM HELD BY MAH UNITS

The Details of Fire Fighting Equipments, storage of water etc held by MAH Units is given at Appendix – D.

3.12 MEDICAL FACILITY HELD BY MAH UNITS

The Details on Medical Facilities held by MAH Units is given at Appendix – E.

3.13 COLOUR CODE SYSTEM FOR PIPE LINE

The Details of Colour Code System for Pipe line is given at Appendix-F.

3.14 CARE FOR SAFE HANDLING

The Details of Care for Safe Handling is given at Appendix-G.

OFF-SITE EMERGENCY PLAN

ANAND DISTRICT CRISIS GROUP

INDEX OF APPENDIX

APPENDIX	SUBJECT	PAGE NO.
A	LIST OF MAHUNITS	... 22-23
B	FACT SHEETS OF MAH Units of ANAND DISTRICT	... 24-42
C	PERSONAL PROTECTIVE EQUIPMENT HELD BY MAH UNITS	... 43
D	FIRE PROTECTION SYSTEM HELD BY MAH UNITS	... 44
E	MEDICAL FACILITIES AT MAH UNITS	... 46
F	EMERGENCY VEHICLES FACILITIES HELD BY MAH UNITS	... 47
G	COLOUR CODE SYSTEM FOR PIPE LINE	... 48-49
H	CARE FOR SAFE HANDLING	... 50-60

Appendix-A**ANAND DISTRICT CRISIS GROUP****LIST OF MAH UNITS**

Sr. No	Name of Factory	Address	Contact Person	TelephoneNo.	Major chemical	Max. Quantity
1.	Bodal Chemicals Limited	L.S NO. 338, Villje : Neja, Ta: Khambhat, Dist: Anand	Rajarshi Ghosh, Occupier Hardikbhai Harendrabha Trivedi, Manager	9909950907	Chlorine Cyanuric Acid	54 MT 500 MT
2.	Cambay Organics Pvt. Ltd.	SR. No. 194/1, Village Sokhada, Taluka:Khambhat,Dist.Anand	Mr. Nishant H. Patel, Occupier, Mr. Praksash patel manager	+91- 9825068736 +91 9925670179	Toluene Chlorine HCL	48 KL 27 MT 135MT
3.	Gujarat Halogen Petrochem Corporation	SR.No.293, At, Lunej, Sokhada, Ta.Khambhat,Di.Anand	Mr. Ramanlal A. Patel Partner Mr. Nirav.S. Patel, Manager	+91 – 9825307794 +91- 9510143034	Chlorine Toluene	23 MT 48 KL
4.	Gujarat Industrial Chemicals Corporation	Plot No 194/1, Shokhda, Ta. Khambhat, Dist.Anand	Mr. Dharmesh J. Patel, Occupier Mr. Mahavir Paramar	+ 91 – 9925022746 +91 - 8000396707	Chlorine Toluene	27MT 66 KL
5.	Jay Chemical Ind. Pvt Ltd. (UnitIV)	SRNo. 756/1, 756/2, 757, 733, 739 & 746, Kalamsar, TaKhambhat, Dist.Anand	Mr. Ravi Kabra, Occupier, Kamlesh Patel Safety Head	+91 – 9913130785 +91- 9925207415	Methanol Ethylene OxideOleum H ₂ SO ₄ Hydrochloric Acid	15 KL 14MT 35KL 35KL 25 KL
6.	TeraTech Intermediates Pvt. Ltd.,	Survey No..455/456, Village- NejaTa.Khambhat.Dist.Anand	Mr. Ravi Teja Prativada, Occupier Mr. Sudhir Shougale Manager	+91 – 79- 48919263 +91 - 9898506122	Chlorine HCL Sulphur	59 MT 580KL 20 MT
7.	Metachem Industries	R.S.No.391&393,Village:Neja, Nr.S. V.Dyechem,Ta. Khambhat,Dist. Anand	Mr. Amit G Patel, Occupier Mr.Kashyap Joshi, Chief Chemist	+91- 9825413049 +91- 9974718822	Oleum65% Oleum23%Sul phuric Acid	10 KL 10 KL 35 KL

Appendix-A
(Continue...)

ANAND DISTRICT CRISIS GROUP

LIST OF MAHUNITS

Sr. No	Name of Factory	Address	Contact Person	Telephone No.	Major chemical	Max. Quantity
8.	Rohan Dyes And Intermediates Ltd. (Unit- I)	Sr.No.637, At. Kalamsar, Ta.Khambhat, Dist.Anand	Mr. Rohan R. Agrawal, Occupier Ahir Rao.K.Vittal	+91 – 9979429658 / +91 - 9427873962	Sulfuric Acid 98% Oleum 65% Ethylene Oxide Aniline	30 MT 400 MT 15 MT 500 MT
9.	Rohan Dyes And Intermediates Ltd. (Unit - II)	SR. No. 637/23/A/2, At.Kalamsar, Ta.Khambhat, Dist.Anand	Mr. Rohan R. Agrawal, Occupier Mr.Arvind Dixit	+91 – 9979429658 +91 - 9575569339	Sulphur Oleum (23%) Oleum (65%) H ₂ SO ₄	2000 MT 700 MT 725 MT 2600 MT
10.	Savita Intermediates Pvt. Ltd.	Opp. Cambay Organics Pvt. Ltd., Sokhada, Tal.Khambhat, Dist.Anand	Poras B Patel, Occupier Piyush R Shah, Manager	+91 – 9825732350 / +91 - 9979902815	Ortho Nitro Oleum Sulphuric Acid	30 MT 15 MT 10 MT
11.	Shital Chemical Industries	SR.No.194/1, Vaduchi Mata Road, At.Sokhada, Dist.Anand	Mr. Dilip C. Patel, Occupier Mr.Nipun Patel, Manager	+ 91- 7202038284 / 7226817726	Chlorine Toluene	27 MT 48 KL
12.	Shital Chemical Industries (Unit-II)	SR. No.443/P, Village:Neja, Ta.Khambha, Dist:Anand	Mr. Dilip C. Patel, Occupier Mr.Nipun Patel, Manager	+ 91- 7202038284 / 7226817726	Chlorine Toluene	50.40 MT 50 KL
13.	Baychem Intermediates	Sr. No. 374/363, village- Lunej, Tal.Khambhat, Dist.Anand	hitesh M. Patel, occupier, Vipul M. Patel Manager	+91 – 9426061802 / + 91 – 8000933606	Chlorine ferric chloride anhydrous	40.5 MT 100 MT
14	Achal chemical	Sr. No. 202/13, Sokhada, Tal.Khambhat, Dist.Anand	Prakash Patel, occupier, Sanjay M. Patel Safety Manager	+91 – 9033722398 / + 91 - 6356944912	Chlorine Toluene	30.6 MT 48 KL
15	Ayushi chemical pvt ltd	SR No. 452/453 Paiki, Vaduchi mata road, Sokhada, Tal.Khambhat, Dist.Anand	Hemantbhai Patel Occupier	+ 91 - 9909998861	Chlorine	20 MT

Appendix-B**ANAND DISTRICT CRISIS GROUP
FACT SHEET****MAH UNIT-1**

1.	Name of the Factory		:		M/S.Bodal Chemicals Limited					
	Address		:		L.S NO.338,Villje:Neja, Ta:Khambhat,Dist :Anand					
	Phone no.		:		7069046756					
	Fax no.		:		-					
	E-mail		:		unit11@bodol.com					
2.	Name of Occupier		:		Rajarshi Ghosh					
	Residence Address and MobileNo.				D/58, Nirman Complex, R.C.Technical Road, Ghatlodiya, Ahmedabad - 380061					
3.	Name of Factory Manager		:		Hardikbhai Harendrabhai Trivedi					
	Residence Address and Mobile No.				41,Rajdhani Bunglows, Ramwadi, Isanpur, Ahmedabad - 382443					
4.	Contact Person		:							
	Sr. No.	Name	Designation	Telephone Number						
				Factory/Office		Resident		Mobile		
	1.	Rajarshi Ghosh	Director	-		7567149968		9909950907		
	2.	Hardikbhai Trivedi	Manager	-		6354324711		7069046756		
	3.	Vijaybhai Mujpara	Manager	-		9426939941		7069046798		
5.	Nature of Manufacturing / Product		:		Trichloro Isocynuric Acid (TCCA)					
6.	Man Power & Timing									
	Shift	Time	Direct Employee		Contractor's Person		Security/ Watchman		Total	
			M	F	M	F	M	F	M	F
	General	09:00 AM TO 05:30 AM	15	0	10	0	0	0	25	0
	1 st	07:00 AM TO 03:00 PM	30	0	15	0	2	0	47	0
	2 nd	03:00 PM TO 11:00 PM	30	0	15	0	2	0	47	0
	3 rd	11:00 PM TO 07:00 AM	30	0	15	0	2	0	47	0
		Total	115	0	55	0	6	0	166	0
7.	Storage details									
	Sr. No.	Name	Type of Storage / Container	Capacity of each Container MT	No.of Container	Maximum Storage Capacity MT	Parameters			
							Pressure Kg/cm2	Temperature °C		
	1.	Chlorine	Tonner	900KG	60	54MT	3.KG	Atm.		
	2.	Cyanuric Acid	Bag	01MT	500 MT	500 MT	NTP	Atm.		
	3.	Caustic Lay (48%)	Tank	120 MT	01	120 MT	NTP	40°c.		
	4.	Trichloro Isocynuric Acid	Bag	01MT	500 MT	500 MT	NTP	Atm.		
	5.	Sodium Hypochlorite	Tank	20KL	02	40KL	NTP	Atm		

**ANAND DISTRICT CRISIS
GROUP**

Appendix-B
Continue...

FACT SHEET

MAH UNIT-2

1.	Name of the Factory			: Cambay Organics Pvt. Ltd.						
	Address			: Survey No. 194/1, Village: Sokhada Tal: khambhat-388620 Dist: Anand Gujarat						
	Phone no.			: 9835068736						
	Fax no.			: -						
E-mail			: info@cambayorganics.com							
2.	Name of Occupier			: Nishant H Patel						
	Residence Address and Mobile No.			Sajan fariyu Kharopat Khambhat-388620 Mo No: 9825068763						
3.	Name of Factory Manager			: Prakashchandra Bapulal Patel						
	Residence Address and Mobile No.			Amba Mata Ni khadki Khanpar kharopat Khambhat-388620 MoNo: 9925670179						
4.	Contact Person			: 9925670179						
	Sr. No.	Name	Designation	Telephone Number						
				Factory /Office		Resident		Mobile		
	1.	Mr. Klapesh Patel	Account	+91 6351622130		+91 6351622130		+91 6351622130		
	2.	Mr. Dharmendra Patel	HR	+91 9586627849		+91 9586627849		+91 9586627849		
	3.									
5.	Nature of Manufacturing / Product			: FINE CHEMICALS FOR PHARMACEUTICALS USE						
6.	Man Power & Timing									
	Shift	Time	Direct Employee		Contractor's Person		Security/ Watchman		Total	
			M	F	M	F	M	F	M	F
	General	9:00 to 6:00	07	1	32	3	1	0	40	4
	1 st	8:30 to 5:30	02	0	14	0	0	0	16	0
	2 nd	3:30 to 12:30	02	0	14	0	0	0	16	0
	3 rd	12:30 to 9:30	02	0	14	0	0	0	16	0
		Total	13	01	74	03	01	0	88	04
7.	Storage details									
	Sr. No.	Name	Type of Storage / Container	Capacity of each Container MT	No. of Container	Maximum Storage Capacity MT	Parameters			
							Pressure Kg/cm²	Temperature °C		
	1.	Toluene	Tank	30 KL	2	48MT	...	----		
	2.	Liquid Chlorine	Cylinder	1800kg	20	27 MT	...	----		
	3.	30 % HCL	Tank	25 KL	9	135MT	...	----		
	4.									

Appendix-B
Continue...**ANAND DISTRICT CRISIS
GROUP****FACT SHEET****MAH UNIT-3**

1.	Name of the Factory		:		Gujarat Halogen Petrochem Corporation					
	Address		:		SR.NO.293,Near Ambika Chemical Village:Lunej,Khambhat					
	Phone no.		:		8000493240					
	Fax no.		:		ghpc2000@gmail.com					
E-mail		:								
2.	Name of Occupier		:		Mr. Ramanlal Patel /Amish G.Patel					
	Residence Address and MobileNo.				Sajan Faliyu,Kharopat,Khambhat,M. 8000493240					
3.	Name of Factory Manager		:		Mr.Nirav S. Patel					
	Residence Address and MobileNo.				Khodiyar Mata Khadki, Kharopat, Khambhat,M.9510143034					
4.	Contact Person		:		Amish G.Patel					
	Sr. No.	Name	Designation	Telephone Number						
				Factory/Office		Resident		Mobile		
	1.	Raman Patel	Partner	9825307794		9825307794		9825307794		
	2.	Amish Patel	Partner	8000493240		8000493240		8000493240		
	3.									
5.	Nature of Manufacturing / Product		:		BENZOYL CHLORIDE/CHLORO ACETYL CHLORIDE/4-CHLORO METHYL BENZOIC ACID					
6.	ManPower&Timing									
	Shift	Time	Direct Employee		Contractor's Person		Security/ Watchman		Total	
			M	F	M	F	M	F	M	F
	General	09.00 TO 6.00	30	2	0	0	0	0	30	2
	1 st	08.00 TO 4.00	24	0	0	0	0	0	24	0
	2 nd	4.00 TO 12.00	22	0	0	0	0	0	22	0
	3 rd	12.00 TO 8.00	22	0	0	0	0	0	22	0
		Total	98	02	0	0	0	0	98	02
7.	Storage details									
	Sr. No.	Name	Type of Storage Container	Capacity of each Container MT	No. of Container	MaximumStorage CapacityMT	Parameters			
							Pressure Kg/cm²	Temperature °C		
	1.	BENZOYL CHLORIDE	Godown	0.25MT		60MT				
	2.	CHLORO ACETYL CHLORIDE	Godown	0.25MT		40MT				
	3.	4-CHLORO METHYL BENZOIC ACID	Godown	0.025MT		30MT				
	4.	Liquid Chlorine	Tonner	1 MT	24	24	Normal	25 C		
5.	Toluene	UGTank	48KL	24KL	48KL	Normal	25 C			

Appendix-B

Continue...

ANAND DISTRICT CRISIS GROUP

FACT SHEET

MAH UNIT-4

1.	Name of the Factory			:	Gujarat Industrial Chemicals Co. Pvt. Ltd.					
	Address			:	Survey No194/1,Sokhada Village Khambhat-388620					
	Phone no.			:	9925022746					
	Fax no.			:	NA					
	E-mail			:	giccad1@gmail.com					
2.	Name of Occupier			:	Mr.Dharmesh J Patel					
	Residence Address and Mobile No.				Sajan Faliyu Kharapt Khambhat-388620					
3.	Name of Factory Manager			:	Mr.Niraj Narshibhai Bareya					
	Residence Address and Mobile No.				Katakpur,Khambhat-388620					
4.	Contact Person			:						
	Sr. No.	Name	Designation	Telephone Number						
				Factory/Office		Resident		Mobile		
	1.	Mr.Mahavirbhai Parmar	Safety Manager	8000396707		Khambhat		9909342446		
	2.	Mr.VishalPatel	Manager	8000936707		Khambhat		8000936706		
	3.	Mr.RipulPatel	Administrator	8000396707		Khambhat		8000936705		
5.	Nature of Manufacturing / Product			:	Fine Chemicals for Pharmaceutical use					
6.	Man Power & Timing									
	Shift	Time	Direct Employee		Contractor's Person		Security/ Watchman		Total	
			M	F	M	F	M	F	M	F
	General	9:00 TO 6:00	3	0	14	0	0	0	17	0
	1 st	8:00 TO 6:00	0	0	18	0	1	0	19	0
	2 nd	4:00 TO 12:00	0	0	18	0	1	0	19	0
	3 rd	12:00 TO 8:00	1	0	18	0	1	0	20	0
		Total	4	0	68	0	3	0	75	0

Appendix-B
Continue...

**ANAND DISTRICT CRISIS
GROUP**

FACT SHEET

MAH UNIT-4

Name of the Factory	:	Gujarat Industrial Chemicals Co. Pvt. Ltd.
Address	:	Survey No. 194/1, Sokhada Village. Khambhat-388620

7.	Storage details							
	Sr. No.	Name	Type of Storage / Container	Capacity of each Container MT	No. of Container	Maximum Storage Capacity MT	Parameters	
							Pressure Kg/cm ²	Temperature °C
	1.	Toluene	Tank	33KL	2	66KL	Atmospheric	Ambient
	2.	Chlorine	Cylinder	0.9MT	30	27MT	2Kg/cm ²	Ambient temperature
	3.	Pivalic Acid	Tank	7KL	1	7MT	Atmospheric	Ambient
	4.	Thionyl	Tank	5KL	2	10MT	Atmospheric	Ambient
	5.	Hydrochloric Acid	Tank	15KL	11	150 MT	Atmospheric	Ambient
	6.	Propionic Acid	Tank	30KL	2	60KL	Atmospheric	Ambient
	7.	Butyric Acid	Tank	15KL	1	15KL	Atmospheric	Ambient
	8.	Benzoyl chloride	Tank	5KL	2	10MT	Atmospheric	Ambient

Appendix-B

Continue...

ANAND DISTRICT CRISIS GROUP

FACT SHEET

MAH UNIT-5

1.	Name of the Factory	:	Jay Chemical Ind. Pvt Ltd.(Unit IV)							
	Address	:	PlotNo:756/1,756/2,757,733,739&746, Khambhat-Dhuvaran Road, Village: Kalamsar,Tal.:Khambhat,Dist.:Anand							
	Phone no.	:	9925207415, 9913130785							
	Fax no.	:	-							
	E-mail	:	-							
2.	Name of Occupier	:	Mr.Ravi Kabra							
	Residence Address and Mobile No.		283/C,Line No.15, Satyagrah Chhavani,Satellie,Ahmedabad							
3.	Name of Factory Manager	:	Mr.Sunil Mishra 9909974760							
	Residence Address and Mobile No.		Ahmedabad,Gujarat							
4.	Contact Person	:								
	Sr. No.	Name	Designation	Telephone Number						
				Factory/Office			Resident		Mobile	
	1.	Mr. Surendra Singhvi	VP	(O)9925207415, 9913130785, Ext.4101			9925204404	9925204404		
	2.	Mr.Rakesh Patel	GM	(O)9925207415, 9913130785 Ext.4105			9909255099	9909255099		
	3.	Mr.Kamlesh Patel	EHS Head	(O)9925207415, 9913130785, Ext.4113			9099946412	9099946412		
5.	Nature of Manufacturing / Product		:	Dyes and Dyes Intermediates						
6.	ManPower&Timing									
	Shift	Time	Direct Employee		Contractor's Person		Security / Watch man		Total	
			M	F	M	F	M	F	M	F
	General	9:00 To 17:30	222	10	179	13	00	0	401	23
	1 st	7:00 To 15:00	160	01	131	02	11	0	302	03
	2 nd	15:00 To 23:00	162	00	114	0	11	0	287	0
	3 rd	23:00 To 7:00	111	00	123	0	11	0	245	0
		Total	655	11	547	15	33	0	1235	26

Appendix-B
Continue...

**ANAND DISTRICT CRISIS
GROUP
FACT SHEET**

MAH UNIT-5

Name of the Factory	:	Jay chemical Ind. Pvt Ltd.(UnitIV)
Address	:	PlotNo:756/1,756/2,757,733,739&746, Khambhat-Dhuvaran Road, Village: Kalamsar,Tal.:Khambhat,Dist.:Anand

7.	Storage details							
	Sr. No.	Name	Type of Storage / Container	Capacity of each Container MT	No.of Container	Maximum Storage Capacity MT	Parameters	
							Pressure Kg/cm2	Temperature °C
	1	Thyonil Chloride VS Plant (Facility-02)	Tank	25KL	1	14KL	---	Ambient
	2	Ethylene Oxide (Facility-02	Bullets	7MT	3	14MT	3to4kg/cm2	Less than 10C
	3	ChloroSulphonic Acid (Facility 2)	Tank	50KL	4	80 KL	NTP	Ambient
	4	Sulphuric acid 98% Facility 02	Tank	50KL	1	35 KL	NTP	Ambient
	5	Caustic lye Facility 02	Tank	50KL 20 KL	1 1	40 KL	NTP	Ambient
	6	HCl Facility 02	Tank	15 KL	3	25 KL	NTP	Ambient
	7	Methanol (Facility-01)	UG Tank	32KL	1	NIL	NTP	Ambient
	8	Aniline Facility 2	Tank	60KL& 100 KL	4 1	180 KL	NTP	Ambient
	9	Acetic Acid Facility 2	Tank	40 KL	3	60 KL	NTP	Ambient
	10	Acetic Anhydride Facility 2	Tank	12 KL	3	8 KL	NTP	Ambient
	11	Methanol (Facility-03)	UG Tank	20KL	2	10KL	NTP	Ambient
	12	Oleum 23% Facility 03	Tank	50KL	1	NIL	NTP	Ambient
	13	Sulphuricacid 98% Facility 03	Tank	50KL	1	NIL	NTP	Ambient
	14	HCl Facility 03	Tank	15KL	3	25 KL	NTP	Ambient
	15	Caustic lye Facility 03	Tank	50KL	1	35 KL	NTP	Ambient
	16	Ammonia Cylinder Facility 00	Cylinder	50Kg	Cylinder	20 Cylinder	.....	Ambient

Appendix-B

Continue...

**ANAND DISTRICT CRISIS
GROUP****FACT SHEET****MAH UNIT-6**

1.	Name of the Factory		:	Terratech Intermediates India Pvt. Ltd.						
	Address		:	SurveyNo.455/456 Village-Neja, Tal. Khambhat						
	Phone no.		:	+91 – 9898506122						
	Fax no.		:	-						
	E-mail		:	sc@terratech.in						
2.	Name of Occupier		:	RAVI TEJA PRATIVADA						
	Residence Address and Mobile No.			A 06 TAKSH GALAXY NH 8, VADODARA - 390019						
3.	Name of Factory Manager		:	Sudhirbhai Chougulee						
	Residence Address and Mobile No.			Giriraj Park apartment, Khambhat						
4.	Contact Person		:							
	Sr. No.	Name	Designation	Telephone Number						
				Factory/Office		Resident		Mobile		
	1.	Sudhir Chougale	Factory Manager	9898506122		9898506122		9898506122		
	2.	Manish Chauhan	EHS Manager	9913965738		9913965738		9106825885		
	3.									
5.	Nature of Manufacturing / Product		:	Chemical Manufacture						
6.	Man Power & Timing									
	Shift	Time	Direct Employee		Contractor's Person		Security/ Watchman		Total	
			M	F	M	F	M	F	M	F
	General	9:00To18:00	68	0	0	0	0	0	68	0
	1 st	7:00To15:00	31	0	0	0	0	0	31	0
	2 nd	15:00To23:00	26	0	0	0	0	0	26	0
	3 rd	23:00To7:00	25	0	0	0	0	0	25	0
		Total	150	0	0	0	0	0	150	0
7.	Storage details									
	Sr. No.	Name	Type of Storage /Container	Capacity of each Container MT	No.of Container	Maximum Storage Capacity MT	Parameters			
							Pressure Kg/cm²	Temperature °C		

1.	CAC	Storage Tank	30 KL, 20KL, 8KL, 6KL, 5KL, 3 KL	09	108 KL	Atm	Ambient
2.	TCAC	Storage Tank	20KL, 8 KL, 5KL, 3KL,	07	85 KL	Atm	Ambient
3.	MCA	Storage Tank	50 kgs	200 bags	10 MT	Atm	Ambient
4.	HCL	Storage Tank	33 KL 50 KL	15	580 KL	Atm	Ambient
5.	SBS	Storage Tank	20 KL 50 KL 35 KL	06	176 KL	Atm	Ambient
6	Sulphur	Storage Tank	50 Kgs	400 bags	20 MT	Atm	Ambient
7	MCA ml	Storage Tank	18 KL 30 KL 5 KL	07	137 KL	Atm	Ambient
8	SMC	Storage Tank	12 KL 15 KL 2 KL	09	19 KL	Atm	Ambient
9	Clorine	Toner	900 KG	66	59.4	15 Kg/cm ²	Ambient
10	Caustic Soda Lay 48%	Storage Tank	34 KL	01	30 KL	Atm	Ambient

Appendix-B

Continue...

**ANANDDISTRICT CRISIS GROUP
FACT SHEET****MAH UNIT-7**

1.	Name of the Factory		:	Metachem Industries						
	Address		:	Survey No.391&393,Neja,Khambhat						
	Phone no.		:	9825413049						
	Fax no.		:	-						
	E-mail		:	Info.metachem2019@gmail.com						
2.	Name of Occupier		:	Amit G Patel						
	Residence Address and Mobile No.			65,Astha Bungalows,Sola,Ahmedabad,380060 Mo.9825413049						
3.	Name of Factory Manager		:	Dhruv Patel						
	Residence Address and Mobile No.			4,Parth bungalows,Naroda,Ahmedabad,382330 Mo.8140866087						
4.	Contact Person		:							
	Sr. No.	Name	Designation	Telephone Number						
				Factory/Office		Resident		Mobile		
	1.	Kashyap Joshi	Chief Chemist	9974718822		9974718822		9974718822		
	2.	Nimish Shah	Plant Incharge	9978767931		9978767931		9978767931		
5.	Nature of Manufacturing / Product		:	Blue198 Base,(Dyes & Intermediates)						
6.	Man Power & Timing									
	Shift	Time	Direct Employee		Contractor's Person		Security/ Watchman		Total	
			M	F	M	F	M	F	M	F
	General									
	1 st	8 A.M.to 4 P.M.	3	0	15	0	1	0	19	0
	2 nd	4 P.M.to 12 A.M.	2	0	10	0	0	0	12	0
	3 rd									
		Total	5	0	25	0	1	0	31	0
7.	Storage details									
	Sr. No.	Name	Type of Storage/Container	Capacity of each Container MT	No. of Containers	Maximum Storage Capacity MT	Parameters			
							Pressure Kg/cm²	Temperature °C		
	1.	Oleum 23%	M.S.Tank	10 KL	01	10 KL				
	2.	Oleum 65%	M.sTank	10 KL	01	10 KL				
	3.	Sulphuric Acid 98%	M.S.Tank	10 KL	01	10 KL				
	4.	Sulphuric Acid 70 %	HDPE	25 KL	01	25 KL				
	5.	Hydrochloric Acid 30%	HDPE	25 KL	01	25 KL				
	6.	C.S. LYE 48%	HDPE	25 KL	01	25 KL				

Appendix-B

Continue...

**ANAND DISTRICT CRISIS
GROUP
FACT SHEET**

MAHUNIT-8

1.	Name of the Factory		:	Rohan Dyes and Intermediates Ltd.(Unit-1)						
	Address		:	Survey No.637,Kalamsar Village Dhuwaran Road, Tal:Khambhat,Dist:Anand,Gujarat						
	Phone no.		:	9979429658						
	Fax no.		:	-						
	E-mail		:	rohan@rohandyes.com						
2.	Name of Occupier		:	RohanR.Agrawal						
	Residence Address and Mobile No.		:	42,Sumadthur Society, B/hOcean Park Satellite,Manek baug,Ahmedbad City,Gujarat-380015 M.9979429658						
3.	Name of Factory Manager		:	Mr. Ahirrao Kailas vittal						
	Residence Address and Mobile No.		:	Ba/304 Gitanjali society , moriya residency, Ankleshwar, Bharuch-39001, mo: 9427873962						
4.	Contact Person		:							
	Sr. No.	Name	Designation	TelephoneNumber						
				Factory/Office	Resident	Mobile				
	1.	Mr. Rohan Agrawal	Occupier	-	-	9979429658				
	2.	Mr. Ahirrao k.vittal	Manager	-	-	9427873962				
	3.	Mr. Kuldipsinh Rana	Admin incharge	-	-	8849322103				
5.	Nature of Manufacturing/Product		:	Production of VS, H-Acid, DASA, PNTOSA, DNSDA, DASDA,						
6.	Man Power & Timing									
	Shift	Time	Direct Employee		Contractor's Person		Security/ Watchman		Total	
			M	F	M	F	M	F	M	F
	General	9:00AMto 6:00 PM	62	1	14	11	0	0	76	12
	1 st	7 : 00AMto3: 00PM	68	0	58	0	3	0	129	0
	2 nd	3 : 00PM to11: 00PM	03	0	49	0	2	0	54	0
	3 rd	11 : 00PMto7 : 00 AM	45	0	58	0	3	0	106	0
		Total	178	1	179	11	8	0	365	12

Appendix-B

Continue...

**ANAND DISTRICT CRISIS
GROUP
FACT SHEET**

MAHUNIT-8

1.	Name of the Factory	:	Rohan Dyes and Intermediates Ltd.(Unit-1)
	Address	:	Survey no.637,Kalamsar Village Dhuwaran Road, Tal:Khambhat,Dist:Anand,Gujarat

7.	Storage details							
	Sr. No.	Name	Type of Storage / Container	Capacity of each Container MT	No.of Container	Maximum Storage Capacity MT	Parameters	
							Pressure Kg/cm ²	Temperature °C
	1	Aniline	Yard	110.35 MT	storage Yard	500 MT	NTP	NTP
	2	Chloro- Sulphonic Acid	Yard	65.68 MT	storage Yard	200 MT	NTP	NTP
	3	Acetic Acid	Yard	6.82 MT	storage Yard	30 MT	NTP	NTP
	4	Thionyl Chloride	Yard	818 MT	storage Yard	53 MT	NTP	NTP
	5	Ethylene Oxide	Yard	11.38 MT	storage Yard	15 MT	2.5 kg/cm ²	< 10 C
	6	Sulphuric Acid (98%)	Yard	34.65 MT	storage Yard	30 MT	NTP	NTP
	7	Hydrochloric Acid	Yard	0.0	storage Yard	75 MT	NTP	NTP
	8	Para Nitro Toluene	Yard	10.35 MT	storage Yard	150 MT	NTP	NTP
	9	Oleum 23%	Yard	42.38 MT	storage Yard	400 MT	NTP	NTP
	10	Methanol	UG Storage Tank	106 KL	UG storage Yard	114 KL	2.5 kg/cm ²	230 C
	11	Sulfur Trioxide	Yard	0.0	storage Yard	15 MT	NTP	NTP
	12	Caustic Soda Lye	Yard	33.83 MT	storage Yard	100 MT	NTP	NTP
	13	Sodium Bisulphate	Yard	34.81 MT	storage Yard	50 MT	NTP	NTP
	14	Soda Ash	Yard	52.15 MT	storage Yard	200 MT	NTP	NTP
	15	Dil. Acetic Acid	Yard	29.55 MT	storage Yard	330 MT	NTP	NTP

Appendix-B
Continue...**ANAND DISTRICT CRISISG
ROUP
FACT SHEET****MAHUNIT-9**

1.	Name of the Factory			:	Rohan Dyes and Intermediates Ltd.(Unit-2)					
	Address			:	Survey No:637/ 23/ A/ 2, Kalamsar Village,Dhuwaran Road,Tal:Khambhat, Dist:Anand					
	Phone no.Fax no.			:	9979429658					
	E-mail			:	rohan@rohandyes.com					
2.	Name of Occupier			:	Rohan.R.Agrawal					
	Residence Address and Mobile No.			:	42,Sumadhur Society, B/hOcean Park Satellite,Manek baug,Ahmedbad City,Gujarat-380015 M.9979429658					
3.	Name of Factory Manager			:	Arvind Dixit					
	Residence Address and Mobile No.			:	Address-1,34812, Advans House, Near Hotel Sevan Naroli road, silvasa, Dadra& Nagar Haveli, 396230 Mo: 9575569339					
4.	Contact Person			:						
	Sr. No.	Name	Designation	Telephone Number						
				Factory/Office	Resident	Mobile				
	1.	Rohan Agrawal	Occupier	9979429658	9979429658	9979429658				
	2.	Arvind Dixit	Factory Manager	9575569339	9575569339	9575569339				
	3	Shudhanshu Singh	Project Engg.	9023001195	9023001195	9023001195				
5.	Nature of Manufacturing/Product			:	OLEUM 23 %/65% , CSA, SO2, SO3, H2SO4 98%					
6.	Man Power & Timing									
	Shift	Time	Direct Employee		Contractor's Person		Security/ Watchman		Total	
			M	F	M	F	M	F	M	F
	Genera 1	09:00 TO 18:00	25	0	10	0	0	0	35	0
	1 st	06:00 TO 14:00	15	0	6	0	3	0	24	0
	2 nd	14:00 TO 22:00	15	0	5	0	3	0	23	0
	3 rd	22:00 TO 06:00	15	0	5	0	2	0	22	0
		Total	70	0	26	0	8	0	104	0

Appendix-B
Continue...

**ANAND DISTRICT CRISIS
GROUP
FACT SHEET**

MAHUNIT-9

Name of the Factory	:	Rohan Dyes and Intermediates Ltd.(Unit-2)
Address	:	Survey No:637/ 23/ A/ 2, Kalamsar Village,Dhuwaran Road,Tal:Khambhat, Dist:Anand

7.	Storage details							
	Sr. No.	Name	Type of Storage/ Container	Capacity of each Container MT	No. of Container	Maximum Storage Capacity MT	Parameters	
							Pressure Kg/cm2	Temperature ⁰ C
	1	Sulphur	Godown	300 MT	Stored in Godown	2000 MT	NTP	NTP
	2	HCL (30%)	Tank	116 MT	3	165 MT	NTP	NTP
	3	Caustic Lye	Tank	8 MT	1	20 MT	NTP	NTP
	4.	Chloro Sulphonic Acid	Tank	107 MT	1	1190 MT		
	5	Oleum(65%)	Tank	125 MT	1	771 MT	NTP	NTP
	6	Oleum(23%)	Tank	210 MT	2	663 MT	NTP	NTP
	7	70% H2SO4	Tank	80 MT	4	1214 MT	NTP	NTP
	8	98% H2SO4	Tank	230 MT	2	1400 MT	NTP	NTP
	9	Liquid SO2	Receiver	10.5 MT	2	100 MT	NTP	NTP
	10	Liquid SO3	Receiver	Nil	4	351 MT	NTP	NTP

Appendix-B

Continue...

**ANAND DISTRICT CRISIS GROUP
FACTSHEET****MAHUNIT-10**

1.	Name of the Factory		:		Savita Intermediates Pvt.Ltd					
	Address		:		194/1Sokhada Village Opp.Cambay Organic Pvt Ltd. Khambhat					
	Phone no.		:		9825732350					
	Fax no.		:		-					
E-mail		:		siplkhambhat@gmail.com						
2.	Name of Occupier		:		Poras B Patel					
	Residence Address and Mobile No.				55,SunrisePark Drive In Road Vastrapur Ahemdabad					
3.	Name of Factory Manager		:		Piyush R Shah					
	Residence Address and Mobile No.				27,Sukhsagar BunglowsBh.Manoharvila Society Nicol, Nava Naroda Road ahemdabad 9825732350					
4.	Contact Person		:							
	Sr. No.	Name	Designation	Telephone Number						
				Factory/Office		Resident		Mobile		
	1.	PorasB Patel	Director	-		-		9825732350		
	2.	Bansal Patel	supervisor	-		-		9825368409		
	3.	Dhirav Patel	Accountant	-		-		9978545021		
5.	Nature of Manufacturing/Product		:		Dyes Intermediates					
6.	Man Power & Timing									
	Shift	Time	Direct Employee		Contractor's Person		Security /Watchman		Total	
			M	F	M	F	M	F	M	F
	General	9 A.M TO 5 P.M	5	0	0	0	2	0	7	0
	1 st									
	2 nd									
	3 rd									
	Total		5	0	0	0	2	0	7	0
7.	Storage details									
	Sr. No.	Name	Type of Storage/Container	Capacity of each Container MT	No.of Container	Maximum Storage Capacity MT	Parameters			
							Pressure Kg/cm2	Temperature °C		
	1.	OrthoNitroToluene	M.S.Tank	15MT	02	30MT	-	-		
	2.	Oleum 65%	M.S.Tank	20 MT	01	20 MT	-	-		
	3.	Oleum 23%	M.S.Tank	10 MT	01	10 MT	-	-		
	4.	CausticSodaFlakes &Lye	M.S.Tank	20 MT	01	20 MT	-	-		
	5.	Sulphuricacid70%	HDPE Tank	5 MT	01	5 MT	-	-		
6.	SulphuricAcid98%	M.S.Tank	20 MT	01	20 MT	-	-			

Appendix-B
Continue...

**ANAND DISTRICT CRISIS
GROUP
FACT SHEET**

MAHUNIT-11

1.	Name of the Factory			:	Shital Chemical Industries (Unit1)					
	Address			:	SR.NO.194/1,Village Sokhada,Ta.Khambhat-388620					
	Phone no.			:	+91-7226817726					
	Fax no.			:	-					
	E-mail			:	sci@shitalchem.com					
2.	Name of Occupier			:	Mr. Dilip C. Patel					
	Residence Address and Mobile No.				Amba Matani Khadki, Kharopat, Khambhat-388620					
3.	Name of Factory Manager			:	Mr.Nipun M. Patel					
	Residence Address and Mobile No.				sanjay Faliyu, Kharopat, Khambhat					
4.	Contact Person			:						
	Sr. No.	Name	Designation	Telephone Number						
				Factory/Office	Resident		Mobile			
	1.	Mr.Viral A. Solanki	Safety Manager	+91-7383281857	Khambhat		+91-8200537803			
	2.	Mr.NipunMPatel	Accountant	+91-7226817726	Khambhatt		+91-8000936701			
	3.	Mr.Haresh Patel	Purchase Manager	+91-7226817726	Khambhat		+91-9324032512			
5.	Nature of Manufacturing/Product			:	Fine chemicals for pharmaceutical use					
6.	Man Power & Timing									
	Shift	Time	Direct Employee		Contractor's Person		Security /Watchman		Total	
			M	F	M	F	M	F	M	F
	General	9.00 AM TO 6.00PM	17	5	57	4	0	0	74	9
	1 st	8.00 AM TO 4.00PM	7	0	27	0	1	0	35	0
	2 nd	4.00PM TO 12.00 PM	6	0	26	0	1	0	33	0
	3 rd	12.00 AM TO 8.00AM	6	0	26	0	1	0	33	0
		Total	36	5	136	4	3	0	175	9

Appendix-B
Continue...

**ANAND DISTRICT CRISIS
GROUP**

FACT SHEET

MAHUNIT-11

Name of the Factory	:	Shital Chemical Industries (Unit1)
Address	:	Sr.No.194/1,Village Sokhada,Ta.Khambhat-388620

7.	Storage details							
	Sr. No.	Name	Type of Storage/Container	Capacity of each Container MT	No. of Container	Maximum Storage Capacity MT	Parameters	
							Pressure Kg/cm ²	Temperature °C
	1.	Toluene	Tank	2X24KL	2	48KL	.....	Ambient
	2.	Chlorine	Cylinder	900KG	30	27MT	6-8 Kg/cm ²	Ambient
	3.	Pivalic Acid	Tank	20KL	1	20KL	.....	Ambient
	4.	Gammabutyro Lactone	Tank	30KL	2	60KL	.....	Ambient
	5.	Isobutyric Acid	Tank	15KL	1	15KL	.....	Ambient
	6.	Hydrochloric Acid 30%	Tank	15/20 MT	9/1	108/16 MT	.....	Ambient

Appendix-B
Continue...

**ANAND DISTRICT CRISIS
GROUP**

FACT SHEET

MAHUNIT-12

1.	Name of the Factory			:		Shital Chemical Industries (Unit2)				
	Address			:		Sr.No.443/P,Village Neja, Tal.Khambhat-388620,Dist.Anand,Gujarat,India				
	Phone no.			:		+91-7226817726				
	Fax no.			:		-				
	E-mail			:		sci@shitalchem.com				
2.	Name of Occupier			:		Mr. Dilip C Patel				
	Residence Address and Mobile No.			:		Amba Matani Khadki, Kharopat, Khambhat-388620				
3.	Name of Factory Manager			:		Mr. Rakesh S. Patel				
	Residence Address and MobileNo.			:		Shreeji kupa society, Jalundh, Khambhat				
4.	Contact Person			:						
				:						
	Sr. No.	Name	Designation	TelephoneNumber						
				Factory/Office		Resident		Mobile		
	1.	Mr.Kishan Yadav	Safety Manager	+91-7383281857		Khambhat		+91-7383281857		
	2.	Mr.NipunMPatel	Accountant	+91-7226817726		Khambhatt		+91-8000936701		
	3.	Mr.Haresh Patel	Purchase Manager	+91-7226817726		Khambhat		+91-9324032512		
5.	Nature of Manufacturing/Product			:		Fine chemicals				
				:						
6.	Man Power&Timing									
	Shift	Time	Direct Employee		Contractor's Person		Security/ Watchman		Total	
M			F	M	F	M	F	M	F	
	General	9.00AM TO 6.00 PM	6	0	2	0	0	0	8	0
	1 st	8.00AM TO 4.00 PM	1	0	12	0	1	0	14	0
	2 nd	4.00PM TO 12.00 PM	2	0	11	0	1	0	14	0
	3 rd	12.00AM TO 8.00 AM	2	0	11	0	1	0	14	0
		Total	11	0	36	0	3	0	50	0

Appendix-B
Continue...

**ANAND DISTRICT CRISIS
GROUP**

FACT SHEET

MAHUNIT-12

Name of the Factory	:	Shital Chemical Industries (Unit2)
Address	:	Sr.No.443/P,VillageNeja, Tal.Khambhat-388620,Dist.Anand,Gujarat,India

7.	Storage details							
	Sr. No.	Name	Type of Storage / Container	Capacity of each Container MT	No. of Conta iner	Maximum Storage Capacity MT	Parameters	
							Pressure Kg/cm ²	Temperature °C
	1.	Toluene	Tank	2 X 25KL	2	50 KL	....	Ambient
	2.	Chlorine	Cylinder	900KG	56	50.4 MT	6 – 8 Kg/cm ²	Ambient
	3.	30%HCL	Tank	15KL	7	96 MT	...	Ambient

Appendix-B
Continue...

**ANANDDISTRICT CRISISGROUP
FACTSHEET**

MAHUNIT-13

1.	NameoftheFactory			:	Baychem Intermediates					
	Address			:	Sr. no 374/363, vill. Lunej ,Khambhat					
	Phone no.Fax no. E-mail			:	94260618032 : : : baychem3@gmail.com					
				:						
2.	NameofOccupier			:	Hitesh M patel					
	ResidenceAddressandMobileNo.			:	Kumar faliyu, kharopat, khambhat-388620					
3.	NameofFactoryManager			:	Vipul M. Patel					
	ResidenceAddressandMobileNo.			:	Kumar faliyu, kharopat, khambhat-388620					
4.	Contact Person			:						
	Sr. No.	Name	Designation	TelephoneNumber						
				Factory/Office		Resident		Mobile		
1.	Hitesh M. Patel	Partner					9426061802			
2	Parag M. Patel	Partner					8000933606			
5.	NatureofManufacturing/Product			:	Ferric Chloride Anhydrous, Calcium chloride Fused					
				:						
6.	ManPower&Timing									
	Shift	Time	Direct Employee		Contractor's Person		Security/ Watchman		Total	
			M	F	M	F	M	F	M	F
	1 st	9:00 AM to 5:00 PM.	10	0	0	0	0	0	10	
	Total	10	0	0	0	0	0	10	0	
7.	Storedetails									
	Sr. No.	Name	TypeofStorage/Container	Capacity ofeachContainer MT	No.of Container	Maximum StorageCapacity MT	Parameters			
							Pressure Kg/cm2		Temperature °C	
1.	Ferric Chlorid Anhydrous	Godown	100 MT		150 MT					
2.	Calcium Chloride-Fuse	Godown	200 MT		250 MT					
3.	Liquid Chlorine	Godown	40.5 MT		50 MT					

Appendix – B

Continue.....

ANAND DISTRICT CRISIS GROUP FACT SHEET

MAHUNIT- 14

1.	Name of the Factory		:		ACHAL CHEMICAL					
	Address		:		SR. NO. 202/13, SOKHADA VILLAGE TAL. KHAMBHAT-388620, DIST.ANAND, GUJARAT, INDIA					
	Phone no.		:		6355944912					
	Fax no.		:		NA					
E-mail		:		info@achalchemical.com						
2.	Name of Occupier		:		Mr. Dhaval R. Patel					
	Residence Address and Mobile No.				Kumar faliyu, Kharopat, Khambhat, mo: 9033722398					
3.	Name of Factory Manager		:		Mr. Sanjay Patel					
	Residence Address and MobileNo.				Amba matani khadki, Kharopat Khambhat-388620,					
4.	Contact Person		:							
	Sr. No.	Name	Designation	Telephone Number						
				Factory / Office		Resident		Mobile		
	1.	Mr. Prakash N.Patel	Partner	9033722398		9033722398		903372239 8		
5.	Nature of Manufacturing/ Product			:		Chlorination Unit				
6. Man Power & Timing										
	Shift	Time	Direct Employee		Contractor's Person		Security / Watchman		Total	
			M	F	M	F	M	F	M	F
	General	9.00 AM TO 6.00 PM	0	0	0	0	0	0	0	0
	1 st	8.00 AM TO 4.00 PM	5	0	0	0	0	0	5	0
	2 nd	4.00 PM TO 12.00 PM	5	0	0	0	0	0	5	0
	3 rd	12.00 AM TO 8.00 AM	3	0	0	0	0	0	3	0
		Total	13	0	0	0	0	0	13	0
7. Storage details										
	Sr. No.	Name	Type of Storage / Container	Capacity of each Container MT	No. of Container	Maximum Storage Capacity MT	Parameters			
							Pressure Kg/cm2	Temperature °C		
	1.	TOLUENE	TANK	48 KL	2	48 KL	At atmospheric pressure	At ambient temperature		
2.	CHLORINE	CYLINDER	30.6 MT	34	30.6 MT	2 Kg/cm ²	At ambient temperature			

Appendix – B

Continue.....

ANAND DISTRICT CRISIS GROUP FACT SHEET

MAHUNIT- 15

1.	Name of the Factory		:		AYUSHI CHEMICAL PVT. LTD.					
	Address		:		R S No. 452/453 PAIKI VADUCHI MATA MANDIR ROAD, SOKHADA G I D C, AT & PO. NEJA, KHAMBHAT, ANAND, GUJARAT – 388620.					
	Phone no.		:		9909998860					
	Fax no.		:		N.A.					
E-mail		:		ayushichem@gmail.com						
2.	Name of Occupier		:		Mr. HEMANTBHAI PATEL / Mr. ASHOKBHAI PATEL					
	Residence Address and Mobile No.				4, harekrishna society, VVN road, Anand					
3.	Name of Factory Manager		:		Mr. HARSHADBHAI PRAJAPATI					
	Residence Address and Mobile No.				TAPASVI NAGAR SOCIETY, KHAMBHAT-388620. 9909998861					
4.	Contact Person		:							
	Sr. No.	Name	Designation	Telephone Number						
				Factory / Office		Resident		Mobile		
	1.	Mr. HEMANTBHAI PATEL	DIRECTOR	9909998860		ANAND		9909998860		
	2.	Mr. ASHOKBHAI PATEL	DIRECTOR	9825566299		ANAND		9825566299		
	3.									
5.	Nature of Manufacturing/ Product		:		FERRIC CHLORIDE ANHYDROUS					
6.	Man Power & Timing									
	Shift	Time	Direct Employee		Contractor's Person		Security / Watchman		Total	
			M	F	M	F	M	F	M	F
	GENERAL	9 : 00AM TO 6 : 00PM	15	N.A.	N.A.	N.A.	N.A.	N.A.	15	N.A.
	1.	8 : 00AM TO 8 : 00PM	0	N.A.	N.A.	N.A.	N.A.	N.A.	0	N.A.
	2.	8 : 00PM TO 8 : 00AM	0	N.A.	N.A.	N.A.	N.A.	N.A.	0	N.A.
		TOTAL	15	N.A.	N.A.	N.A.	N.A.	N.A.	15	N.A.
7.	Storage details									
	Sr. No.	Name	Type of Storage / godown	Capacity of each godown MT	No. of godown	Maximum Storage Capacity MT	Parameters			
							Pressure Kg/cm2		Temperature °C	
1.	FERRIC CHLORIDE ANHYDROUS	godown	145 MT		200 TN	N.A.		N.A.		
2.	CHLORINE	cylinder	900KG		22 tonner fill up	N.A.		N.A.		

Appendix-C

ANAND DISTRICT CRISIS GROUP

PERSONAL PROTECTIVE EQUIPMENT HELD BY MAH UNITS

Sr. No.	Name	STD Code	Phone 1	Phone 2	Phone 3	SCBA	Canister Masks	Full Body PVC Suit	Air line BA	Chemical Splash suit	Emergency Kit	Water Gel
1.	Bodal Chemicals Limited	02698	7069046756	7069046798	7069046899	03	200	03	02	0	02	0
2.	Cambay Organics Pvt.Ltd.,Sokhada		9925670179	6351622130	9586627849	02	05	02	0	0	03	0
3.	Gujarat Halogen Petrochem Corporation,Lunej	02698	8000933602	8000933603	8000933604	04	100	10	02	02	02	01
4.	Gujarat Industrial Chemicals Co Pvt.Ltd.,Sokhada		9925022746	8000396705	8000396706	40	20	1	2	0	1	0
5.	Jay Chemical Ind.Pvt.Ltd.(Unit-IV)	02698	9925207415	9913130785		12	20	20	04	04	04	0
6.	Terratech intermediates Private limited ,Neja		9898506122	9913965738		04	08	10	04	15	01	0
7.	Metache mIndustries		8140866087			00	02	0	0	0	02	0
8.	Rohan Dyes and Intermediates Ltd. (Unit-1),Kalamsar	798431370				02	08	01	00	04	02	0
9.	Rohan Dyes And Intermediates Ltd.(Unit -II)	8200824288				02	07	00	00	05	01	0
10.	Savita Intermediates Pvt.Ltd.		9825732350 / 9979902851			00	06	00	00	00	02	0
11.	Shital Chemical Industries (Unit 1),Sokhada		+91-7226817726	+91-8000936701	+91-9377928905	07	35	08	12	02	02	0
12.	Shital Chemical Industries (Unit-II),Neja		+91-7226817726	+91-8000936701	+91-9377928905	04	29	08	0	0	02	0
13.	Baychem intermediates		9426061802 / 9376582473			03	02	0	0	0	01	0
14.	Achal chemical		9979421511/6356944912/9033722398			3	02	1	0	0	01	0
15.	Ayushi chemical pvt ltd		9998964493 / 9909998861			02	03	0	0	0	1	0

ANAND DISTRICT CRISIS GROUP

FIRE PROTECTION SYSTEM HELD BY MAH UNITS

Sr. No	Name of MAH Unit	Overhead underground/On Water GRDT ank		Emergency D. G.Set		Fire Pump Set		Fire Extinguishers								Other Equipment
								CO ₂		DCP		FOAM		OTHER HOSERE EL		
		No.	Capacity	No.	KVA	Type	LPM	Kg	Nos.	Kgs	Nos	Ltr.	Nos .	Length	Nos.	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1.	Bodal Chemicals Limited	3	550000 Liters	2	125 KVA 500 KVA	MainElectric Pump	766	9 KG 4.5 KG	02 06	6 KG 9 KG	35 15	-	-	15 MTR	1	ELECTRICAL KIT
2.	Cambay Organics Pvt Ltd	3	3.5 LAC LTRS	1	250 KVA	1.DB 100/26 2. CPHM 25/26A 3. KFE-E1429R – GO2	110 KW 9.30 KW 152 HP	9 kg	03	5 kg/6kg/9kg/25kg	15	50ltr	5	-	-	Hydrant-3000 system
3.	Gujarat Halogen Petrochem Corporation	3 1	10,000 LTR 3 LAC LTRS	1	200KVA	1 FIRE FIGHTING SYSTEM	...	6 9 25	10 10 10	6 9 25 30	5 5 5 5	9 25 30	2 2 2	30 MTR	1	Fire Hydrant System
4.	Gujarat Industrial Chemicals Co Pvt.Ltd.	3	4 LACL TRS	1	250	...	...	9KG 22KG	5 5	6KG 9KG	3 2	9Ltr 50Ltr	6 5	....	...	ABC 6Kg 9No 9Kg 12No 25Kg 5No
5.	Jay Chemical Ind. Pvt. Ltd. (Unit-IV)	01	20lakhltr	1 2 3 4	500 KVA 625 KVA 625 KVA 1250 KVA	1 Main Pump 1Jockey Pump 1Diesel Pump	273 m3/hr	2 3.2 4.5 9 22.5	92	6kg & 9kg	199 nos	9ltr/ 45 Ltr	51	15mtr	05 nos.	Multi purpose fire tender
6.	Karan intermediates Private limited	01	200KL	01	750	-	-	5	6	5 9 1	20 2 2	-	-	10 mtr	2 nos	
7.	MetachemIndustries	01	1 LAC ltr	01	250 KVA	...	...	4.5	3	.. ...	...	50 Ltr	02			ABC Exting 16 nos.

Appendix-D
Continue...

ANANDDISTRICTCRISISGROUP
FIREPROTECTIONSYSTEMHELDDBYMAHUNITS

Sr. No	NameofMAHUnit	Overhead underground/On Water GRDT ank		Emergency D.G.Set		Fire Pump Set		Fire Extinguishers								Other Equipment
		No.	Capacit y	No.	KVA	Type	LPM	CO ₂		DCP/ABC		FOAM		OTHER HOSE REEL		
								Kg	Nos.	Kgs	Nos	Ltr.	Nos.	Len gth	Nos .	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
8	Rohan Dyes and Intermediates Ltd.(Unit-1)	03	500KL	01	500 KVA	03	500 LTR	4.5 Kg	12	9 KG 6 KG	25 15	200 ltr 45 ltr 9 ltr	1 1 5	15 M	10	Fire Hidrant System
9	Rohan Dyes And Intermediates Ltd.(Unit -II)	...	...	...	500 KVA	02	1500	4.5	10	5 KG	20	200 LTR	1	15 M	10	Fire Hidrant System
10	Savita Intermediates Pvt.Ltd.	1	70,000 LTR	...	...	...	...	...	...	9 KG	5	...	...	...	...	...
11	Shital Chemical Industries (Unit1)	3	60000ltr 60000ltr 80000ltr	1	250 KVA	Jocky Pump Diesel Pump Main Pump	180 2850 2850	9 22.5	3 3	6 9 25	25 18 2	...	...	22 feet	27	Fire Hidrant System
12	Shital Chemical Industries (Unit-II)	3	120000 120000 60000 ltr	1	125 KVA	Jocky Pump Diesel Pump Main Pump	180 2850 2850	4.5	4	6 9 25	13 10 4	5/9/ 50 liter	5	22 feet	32	Fire Hidrant System
13	Baychem intermediates	...	...	1	25 KVA	...	..	4.5	2	6	...	...	..	..	..	...
14	Achal chemical	1	1.65 LAKH LTR	1	62.5 KVA	1 PUMP	...	4.5	5	9	5	9/45 LTR	5	22 feet	27	...
15	Ayushi chemical pvt ltd	1	30000 ltr	1	30 KVA	...	...	9	2	...	...	...	...	...	...	...

ANAND DISTRICT CRISIS GROUP**MEDICAL FACILITIES AT MAH UNITS**

Sr. No.	Name	Telephone Numbers	FMO & Contact Number	Ambulance	OHC Beds
1	2	3	4	5	6
1.	Bodal Chemicals Limited	8320300449	Dr. Hardevsinh Gohel 8320300449	..	1
2.	Cambay Organics Pvt. Ltd. ,Sokhada	9879062647	Dr.Suresh Patel 9879062647	..	1
3.	Gujarat Halogen Petrochem Corporation,Lunej	8000933602 8000493240	8000933603 8000933604	..	5
4.	Gujarat Industrial Chemicals Co Pvt.Ltd., Sokhada	8000936707	Dr.Rathi +91-9712705839	..	2
5.	Jay Chemical Ind. Pvt. Ltd. (Unit-IV)	9925207415(Ext. 4302)	Dr. Chanki Makwana	1	4
6.	Karan intermediates Private limited,Neja	7600654503	Dr. Bipin Makwana 8849187229	1	1
7.	Metachem Industries	9879998911	9879998911	--	..
8.	Rohan Dyes and IntermediatesLtd.(Unit-1), Kalamsar	635994274	Suresh triedi 635994274	..	2
9.	Rohan Dyes and Intermediates Ltd. (Unit-2)	635994274	Suresh triedi 635994274	..	2
10.	Savita Intermediates Pvt. Ltd.	9879998911	9879998911	..	..
11.	Shital Chemical Industries (Unit1),Sokhada	+91-7226817726	Dr.Kartik Patel +91-942900217	1	1
12.	Shital Chemical Industries (Unit-II)	+91-7226817726	Dr.Kartik Patel +91-942900217	1	1
13.	Baychem intermediates	9426061802	9376582473	..	..
14.	Achal chemical	8320879166	8320879166	.	...
15.	Ayushi chemical pvt ltd	9909998861	9909998861	..	..

Appendix-F**ANAND DISTRICT CRISIS GROUP****EMERGENCY VEHICLES FACILITIES HELD BY MAHUNITS**

Sr. No.	Name of MAH Unit	Emergency Vehicles / Equipments						Car
		Bus	Truck	Dumper	JCB	Tractor	Crane	
1	2	3	4	5	6	7	8	9
1.	Bodal Chemicals Limited	0	0	0	0	0	0	2
2.	Cambay Organics Pvt.Ltd.,Sokhada	0	2	0	0	0	0	2
3.	Gujarat Halogen Petrochem Corporation,Lunej	0	0	0	0	0	2	5
4.	Gujarat Industrial Chemicals Co Pvt. Ltd.,Sokhada	0	0	0	0	0	0	0
5.	Jay ChemicalInd.PvtLtd.(UnitIV)	04	00	00	01	04	01	01
6.	Karan intermediates Private limited,Neja	0	0	0	0	0	0	01
7.	Metachem Industries	0	0	0	0	1	0	1
8.	Rohan Dyes and Intermediates Ltd. (Unit-1),Kalamsar	0	0	0	1	2	1	3
9.	Rohan Dyes and Intermediates Ltd.(Unit-2)	0	0	0	1	2	1	3
10.	Savita Intermediates Pvt.Ltd.	0	0	0	0	0	0	1
11.	Shital Chemical Industries (Unit 1),	0	1	0	0	1	0	1
12.	Shital Chemical Industries (Unit-II),	0	1	0	0	1	0	1
13.	Baychem intermediates	0	0	0	0	0	0	1
14.	Achal chemical	0	0	0	0	0	0	1
15.	Ayushi chemical pvt ltd	0	0	0	0	0	0	1

APPENDIX –G**ANAND DISTRICT CRISIS GROUP****COLOUR CODE SYSTEM FOR PIPELINES*****COLOUR CODE FOR GENERAL SERVICES (UTILITY)***

Table–2 [IS 2379: 1990 (Clauses 7.5 and 9.1)]

Sr. No.	Contents	Ground Colour	First Colour Band	Second Colour Band
WATER:				
1.	Boiler Feed Water	Sea Green	Gulf Red	-
2.	Central Heating Below 60°C	Sea Green	Canary Yellow	-
3.	Central Heating 60°C To 100°C	Sea Green	Dark Violet	-
4.	Central Heating Above 100°C	Sea Green	Dark Violet	Signal Red
5.	Chilled Water	Sea Green	Black	Canary Yellow
6.	Condensate	Sea Green	Light Brown	-
7.	Cooling	Sea Green	French Brown	-
8.	Filtered Water	Sea Green	Light Brown	-
9.	Fire water	Fire Red	Crimson Red	-
10.	Hydraulic Power	Sea Green	Black	-
11.	Treated	Sea Green	Light Orange	-
12.	Waste Water	Sea Green	Canary Yellow	Signal Red
AIR :				
13.	Compressed Up to and including 15 kg/cm ²	Sky Blue	-	-
14.	Compressed to over 15kg/cm ²	Sky Blue	Signal Red	-
15.	Dry Vacuum	White	-	-
16.	High Pressure Steam	Aluminium to IS 2339	French Blue	-
17.	Medium Pressure Steam	Aluminium To IS 2339	Gulf Red	-
18.	Low Pressure Steam	Aluminium To IS 2339	CanaryYellow	-
19.	Instrument Air	Sky Blue	FrenchBlue	-
20.	Drainage	Black	-	-
OILS:				
1.	Furnace Oil	Light Brown	French Blue	-
2.	High Speed Diesel Fuel	Light Brown	-	-
3.	Hydraulic Power	Light Brown	Dark Violet	-
4.	Light Diesel Fuel	Light Brown	Brilliant Green	-
5.	Lubricating Oil	Light Brown	Light Grey	-

COLOUR CODE SYSTEMS FOR INDUSTRIAL GASES (For Pipelines)***Table–3[IS2379:1990 (Clauses7.5 and 9.1)]***

Sr. No.	Contents	Ground Colour	First Colour Band	Second Colour Band
1.	Acetylene	Canary Yellow	Service Brown	-
2.	Ammonia	Canary Yellow	Dark Violet	-
3.	Butane	Canary Yellow	Signal Red	-
4.	Chlorine	Canary Yellow	Dark Violet	Light Orange
5.	Ethylene Oxide	Canary Yellow	Dark Violet	Brilliant Green
6.	Hydrogen	Canary Yellow	Signal Red	French Blue
7.	Hydrogen Sulphide	Canary Yellow	Gulf Red	-
8.	Methane	Canary Yellow	Signal Red	Light Brown
9.	Methyl bromide	Canary Yellow	Fresh Blue	Black
10.	Nitrogen	Canary Yellow	Black	-
11.	Oxygen	Canary Yellow	White	-
12.	Phenol	Canary Yellow	Dark Violet	Smoke Grey
13.	Phosgene	Canary Yellow	Black	White
14.	Propane	Canary Yellow	Signal Red	Black
15.	Sulphur Dioxide	Canary Yellow	Dark Violet	Golden Brown

APPENDIX-G

Continue...

ANAND DISTRICT CRISIS GROUP

COLOUR CODE SYSTEM FOR PIPE LINES

COLOUR CODE HYDROCARBON AND NAPHTHA(PETROLEUM PRODUCTS)

Table-4 [IS 2379:1990 (Clauses 7.5 and 9.1)]

Sr. No.	Contents	Ground Colour	First Colour Band	Second Colour Band
1.	Acetone	Dark Admiralty Grey	Black	Canary Yellow
2.	Benzene	Dark Admiralty Grey	Canary Yellow	-
3.	Butadiene	Dark Admiralty Grey	Black	-
4.	Ethylene Di-Chloride	Dark Admiralty Grey	Gulf Red	-
5.	Methanol	Dark Admiralty Grey	Deep Bull	-
6.	Naphtha	Dark Admiralty Grey	Light Brown	Black
ACIDS:				
1.	Hydrochloric Acid	Dark Violet	Silver Grey	-
2.	Hydrofluoric Acid	Dark Violet	Signal Red	French Blue
3.	Nitric Acid	Dark Violet	French Blue	Light Orange
4.	Phosphoric Acid	Dark Violet	Silver Grey	-
5.	Sulphuric Acid	Dark Violet	Brilliant Green	Light Orange
CHEMICAL & ALLIED PRODUCTS				
1.	Brine	Black	White	-
2.	Carbon Disulphide	Black	Light Orange	-
3.	Caustic Solution	Smoke Grey	Light Orange	-
4.	Lime	Smoke Grey	White	Canary Yellow
5.	Sodium Sulfide	Black	Brilliant Green	Canary Yellow

APPENDIX –H

ANAND DISTRICT CRISIS GROUP

CARE FOR SAFE HANDLING

1. Precaution In Flammable Area

Mobile vehicles without exhaust muffles (spark arrester) should not be allowed, where flammable gas / vapour is suspected. No open flame, lighter, bidi / cigar or hot substance will be permitted.

Wind direction, velocity should be ascertained sufficient water pressure with required range, hydrants, intact hose pipes with connections trained personnel and proper PPE are essential.

2. Explosion Hazards

The following factors may lead to explosion due to presence of flammable mixtures in the atmosphere. Therefore, due care should be taken to avoid such factors, while handling flammable gas or liquid during emergency.

- 1.** Electrical
- 2.** Smoking
- 3.** Friction
- 4.** Hot surfaces
- 5.** Welding sparks
- 6.** Gas Cylinders
- 7.** Spontaneous ignition
- 8.** Static Electricity
- 9.** Overheated materials
- 10.** Lubricants
- 11.** Flammable metals
- 12.** Inflammable Solids/ Liquids / Gases.
- 13.** Lightning Strokes
- 14.** Mobile Vehicles

CARE FOR SAFE HANDLING**APPENDIX-H**Continue..**3. Precaution For Explosion**

There must be following attack in preventing an explosion.

- a. Development & accumulation of explosive mixture.
- b. To lower down the lower explosive limit of explosive mixture
- c. To eliminate the source of ignition
- d. Proper ventilation, which will prevent excessive accumulation of gases or vapour under certain conditions.
- e. Changes in the temperature will also change its density
- f. .To provide exhaust or sucking system Care should be taken to use flameproof or explosion proof electricale quipment.
- g. Use of inert gases such as Carbon-di-oxide, nitrogen, flue gas or other non-combustible gases.Their function is to keep the concentration of oxygen below the point at which it will not support the combustion.
- h. Winter poses potential hazards because of colder and drier weather create more static electricity and f lammable vapour concentration attains its explosive limits easily. Further hazards increases doubly when the doors and windows of the building where such f lammable substances are used, are kept closed in order to conserve heat for human comfort during cold weather.

4. Toxic Hazard

Harmful chemical in form of gas,vapour,dirt,fumes,mists,powder etc. can exert its toxic effect only when they come in contact with body cells. Their routes of entries are inhalation, skin. Most of the harmful chemicals get entry during inhalation. The self-contained breathing apparatus, canister mask,f reshair mask like personnel protective equipment are to be used.

CARE FOR SAFE HANDLING**APPENDIX-H**Continue..**5. Water Reactive Chemicals**

Certain chemicals, which are highly reactive with water, therefore, do not use water during their spillages, leakages, overflowing etc. The Oleum, Chlorine, Phosphorus etc. have affinity with the water. The sand, dry earth or soda ash, lime etc. can be used, instead of water.

6. Specialized Resources

These resources are those specifically designed to deal with oil and hazardous material spills. They may range from simple containment booms to elaborate trailer-mounted incinerators and unit processes to deal with hazardous material spills. A typical list follows:

a) Booms and Barriers:

A wide variety of floating barriers are manufactured of different sizes, shapes and materials to contain spilled materials, divert spilled material or exclude spilled materials from sensitive areas.

b) Skimmers:

A wide range of skimmers use one or more of such processes as weirs, oleophilic drums, belts or ropes, inclined planes, vortices or suction to remove oil or hazardous materials from the water surface for transport to receiving facilities.

c) Sorbents:

Absorbent or adsorbent materials selectively absorb oil or hazardous materials for removal and disposal. These sorbents are made from a wide range of natural and manufactured materials.

d) Chemicals:

Specialized chemicals are used to disperse oil and hazardous materials after surface tension and thus spreading, make and break emulsions and neutralize or alter hazardous materials.

CARE FOR SAFE HANDLING**APPENDIX-H**

Continue..

e) Chemical Spreading Equipment:

A wide range of chemical spreading equipment, ranging from hand sprayers and truck sprayers to vessel and aircraft spraying equipment, dispose the special chemicals.

f) Storage Facilities:

Emergency storage facilities, range from fast erecting tanks to rubber and plastic pillows and liners for pits and reservoirs.

g) Special Treatment Units:

A wide variety of special treatment units have been developed (but not widely distributed) for oil-water separation, chemical processing, incineration and the like.

h) Instrumentation / Safety Equipment:

A wide range of safety equipment in the form of breathing equipment, protective clothing, and protective footwear and so on, is needed, particularly for hazardous material spills. Similarly, a wide range of analysis equipment, including explosion meters, gas-measuring equipment and organic vapour analyzers is needed to measure hazard characteristics.

i) Unit Operations and Processes:

The traditional and specialized resources are utilized together to achieve components of the cleanup process. The terms "unit operations" and "unit processes" are borrowed from chemical and environmental engineering to describe the collection of the individual unit operations (single activities) into unit processes (groups of activities) to achieve a purpose in the clean up operation.

CARE FOR SAFE HANDLING**APPENDIX-H**Continue..**7. Dealing With Spillages Of Common Hazardous Chemicals****1. Aromatic Amines:**

These are toxic and readily absorbed through skin. Washing with water effects immediate removal of spills or skin or clothing. Vapours are toxic too.

2. Halogenated Amines and Nitro Compounds:

These are toxic via inhalation or skin penetration. Remove spills with water.

3. Chlorosulfonic Acid:

In moist air HCl and H_2SO_4 are formed. Avoid breathing in fumes. In Spillage area spray lime solution instead of water.

4. Cyanides and Nitriles:

Toxic, if inhaled, swallowed or absorbed through skin. Liquid nitriles and HCN are flammable. Use CO_2 extinguishers. Clean up cyanide spills with water. Flush small amounts down the sink the copious quantities of water.

5. Peroxides:

70% H_2O_2 may spontaneously explode. Organic peroxides such as benzyl peroxide are flammable as dry solids and may explode by shock. Use trays for storage. Use vermiculite or sand to clean up spills.

6. Aniline

Use mixture of sand and soda ash.

CARE FOR SAFE HANDLING**APPENDIX-H**Continue..**8. Leak Detection.Neutralisation and Disposal**

Leak Detection	Neutralisation & Disposal
CHLORINE To detect the chlorine leak an ammonia spray or swab is used. Chlorine gives white dense fumes of ammonium chloride which is greenish yellow gas with pungent and irritating odour.	Emergency disposal of chlorine is done by absorbing it in the solution of caustic soda, soda ash or hydrated lime slurry. Chlorine can't be vented off as it is toxic gas. Cylinder of any part of cylinder should not be immersed in the tank holding caustic or other solutions. Don't use rubber hose or polyethylene pipe connection for neutralising chlorine gas. Do not pour water on the leak.
AMMONIA Ammonia leak can be detected easily due to its specific pungent odour. The exact location of leak can be found out by hydrochloric acid swab in suspected region. This will give white vapours of ammonium chloride. Another method used in the detection of ammonia leak is by the use of sulphur dioxide gas, which also forms white fog or cloud in contact with ammonia.	As it is toxic gas it cannot be vented to atmosphere. Ammonia leakage can be absorbed in water in a suitably designed system, as its solubility in water is very high. Mild steel is used as material of construction.
SULPHUR DIOXIDE Sulphur dioxide leak can be detected by odour as it has characteristic odour. But the exact location of the leak can be found out by ammonia vapours from a swab or squeeze bottle. Sulphur dioxide will produce dense white fumes with ammonia vapours. Leak may also be detected by applying soap solution. Soap solution in case of leakage will give bubbles.	Sulphur dioxide leak can be absorbed in caustic solution. For this purpose scrubber should be preferably fabricated of polypropylene backed by FRP. Do not use water on the leak.
BROMINE Bromine spillage can be found out as it has intensely irritating odour. Bromine leak can be detected by using ammonia swab or spray. Bromine gives white dense fumes with ammonia solution.	As bromine is toxic, and fuming liquid, it can't be vented to atmosphere. Water should not be directly poured over the spillage with mud or earth and mop up with plenty of water.
ETHYLENE OXIDE Ethylene oxide leak can be detected by using soap solution. Leak will produce bubble with soap solution.	As the gas is extremely flammable, all the ignition sources should be shut off. Leaking gas can be slowly vented off in a safe and open area. Put water spray to cool down, if necessary. The gas can be burnt off in a suitably designed burner.
BUTADIENE Butadiene leak can be detected by its mild aromatic odour. Butadiene leak can also be detected by using soap solution, which will produce bubbles.	Leaking gas should be slowly vented off to air in a safe open area or can be burnt off in a suitable burner. Put water spray for cooling, if necessary.

CARE FOR SAFE HANDLING**APPENDIX-H**

Continue..

8. Leak Detection, Neutralisation and Disposal

Leak Detection	Neutralisation & Disposal
BENZENE As benzene is flammable gas, flames should not be used to detect the leak. Leak will produce bubbles with soap solution.	As the gas is highly inflammable, shut off all the sources of ignition. Apply non-flammable dispersing agent. Run the waste diluting greatly with running water. Due to non-availability of dispersant, this can be absorbed on sand. Site of spillage should be thoroughly washed with water and soap or detergent.
VINYL CHLORIDE Vinyl chloride leak can be detected due to its characteristic odour. Leak can also be detected with soap solution, which will produce bubbles.	Leaking gas can be vented slowly to air in a safe open area or gas should be burnt off in a suitable burner.
CAUSTIC SODA Detect the leak of caustic soda with wet litmus paper; caustic will change the colour of the paper from red to blue.	Caustic soda should be scrubbed in water scrubber made of MS or neutralize it with dilute HCl acid.
SULPHURIC ACID Detect the leakage of oleum with its sharp penetrating odour. Leakage can also be detected by using wet blue litmus which when coming in contact turns red.	Sulphuric acid should be scrubbed in lime or caustic or water scrubber made up of MSRL or PVC/FRP. Do not put water directly on the leak. Contain the leak by mixing it with earth/sand and lime sludges slowly. Neutralize by pouring water and dilute alkali.
HYDROCHLORIC ACID Detect the leak with its sharp pungent odour. Leak can also be detected by using wet litmus paper. Hydrochloric acid will change the colour of the paper from blue to red.	Hydrochloric acid should be scrubbed in lime or caustic or water scrubber made of MSRL. Do not put water directly on the leak. Contain the leak by mixing it with earth/sand and lime sludge. Slowly neutralize by pouring water and dilute alkali.
NITRIC ACID Detect the leak of nitric acid with wet litmus paper. Nitric acid will change the colour of the paper from blue to red.	Nitric acid should be scrubbed in lime or caustic or water scrubber made of MS or SS. Do not put water on the leak. Contain the leakage by mixing it with earth/sand and lime sludge. Slowly neutralize by pouring water or dilute alkali.
PHOSPHORIC ACID Detect the leak of phosphoric acid with wet litmus paper, which will change the colour of litmus paper from blue to red.	Spread soda ash liberally over the spillage and mop up cautiously with plenty of water. Dilute the waste greatly with running water.

CARE FOR SAFE HANDLING**APPENDIX-H**Continue..**9. ANTIDOTES & TREATMENT PROCEDURES****9.1. ANTIDOTES**

An antidote is an agent that removes or prevents the absorption of poison, changes its toxic properties of contractors its physiological effects.

There are three general types of antidotes:

1. MECHANICAL

Removes a poison or prevents its absorption, e.g. gastric lavage, surface washing or cathartic types and activated animal charcoal.

2. CHEMICAL

Acts chemically to form a non-toxic or a less toxic compound by formation of insoluble products by oxidation, e.g. tannin, calcium compounds and dilute potassium permanganate.

3. PHYSIOLOGICAL

Action is opposite to that of the poison, e.g, barbiturates (For convulsions), atropine (parathion and other parasympathomimic poisons).

4. OTHERS SPECIFICS

Disodium calcium salt of ethylene diamine tetra acetic acid (EDTA), Versene, Edathamil for lead, Dimercaprol (BAL) for arsenic or mercury and N-allylnorphine hydrochloride (Nalline) for morphine and derivatives.

CARE FOR SAFE HANDLING**APPENDIX-H**Continue..**9.2. SUGGESTED EMERGENCY TREATMENT WITH GENERAL ANTIDOTES**

1. Immediate action is necessary
2. First possibility of poisoning is determined by history, signs, symptoms, residue in glasses or bottles or any other related information
3. Prompt removal of toxic substance from stomach by tube or emetic unless otherwise contra-indicated as in case where kerosene or other petroleum product, acids, alkalies, or other corrosive, or strychnine (strong convulsions) are suspected. Removal is not easily possible if the patient assists vomiting (for patients 1-5 years old: 1-2 cups, for patients 5 years and older: up to 1 quart). During lavage or emesis every possibility of determining the toxic agent is taken.
4. All vomitus and gastric lavage is saved for analysis. Urine collected. Every effort should be made to identify the poison.
5. Emetics used if not contra-indicated by cardiac diseases, late pregnancy, kerosene or other petroleum products, acids/alkalies or other corrosives. Avoid emetics if patient is comatose, markedly depressed or in convulsions.

Emptying the stomach even several hours later may still be worth the effort. It can be accomplished by tickling the back of the throat by a finger or spoon.

6. Demulcents given for corrosive action: Flour paste, crushed bananas, cream of milk, egg white, gelatine solution, acacia solution, butter, oleo, lard, mineral or olive oil. Fats and oils are contra-indicated when poison is oil soluble as with acetone, aniline, aspidium, BHC, cresols, CTC, chloroform, chlorodane, dieldrin, DFD, DDD, DDT, HETP, Kerosene, Lsol, Phenol, Phosphorous, Pyrethrum, rotenone, TEPP, Toxaphene, turpentine and xylene.

CARE FOR SAFE HANDLING

APPENDIX-H

Continue..

1.2 SUGGESTED EMERGENCY TREATMENT WITH GENERAL ANTIDOTES

7. As general rule, the patient should be given saline cathartic (a purgative), unless contra-indicated. Following are some examples of common purgatives:

7.1 Sodium sulphate:1 Tablespoonful in a warm water

7.2 Magnesium Oxide: 1Teaspoonful in a glass of warm water

7.3 Citrate of Magnesia:200 cc (6oz)

d.Castor Oil : 1 Tablespoonful

e. Enema

8. If the specific poison is known or if the antidote for the specific poison is unknown or not available, the following general“universal antidote” is recommended:

2 parts of activated animal charcoal

1 part of tannin

1 part of magnesium oxide

9. For inhaled gases, patient should be immediately removed to fresh air (carried horizontally), minimising exertion. Artificial respiration and/or oxygen therapy should be given as required. Cardiac and/or respiration stimulants may also be administered if so required.

CARE FOR SAFE HANDLINGAPPENDIX-HContinue..**1.2 SUGGESTED EMERGENCY TREATMENT WITH GENERAL ANTIDOTES**

10. Great caution must be exercised before administering a specific antidote. Some antidotes are capable of producing harmful effects themselves if the poisons for which they are given are not actually of vomits, gastric lavage and other findings and then treatment proceeded with prudence and close observation.
11. Once the nature of poison is known, treatment may begin with more certainty. Specific antidotes, if available, may now be used safely. However, general symptomatic treatment is equally important to ensure survival and should not be underestimated. General measures adopted are:
 1. Removal of poison by gastric lavage, emesis or cathartics, unless contraindicated
 2. Rendering the poison inactive by precipitation, neutralization, absorption, or by oxidation
 3. Providing physiological antagonism such as hypnotics for excitation or convulsions and stimulants for depression.
 4. Maintaining body heat, fluids, electrolytes and acid/base balance
 5. Preventing or correcting circulatory and respiratory difficulties.
 6. Preventing superimposed infections with antibiotics
 7. Relieving pain as well urinary and bowel retention

1.3 SPECIAL MEDICAL TREATMENT / ANTIDOTES FOR CERTAIN HAZARDOUS CHEMICALS

The chemical wise details for medical treatment / Antidote are given at Annexure 17.

CHAPTER - 4**PROBABLE MAXIMUM ACCIDENT SCENARIOS****11.1 INTRODUCTION**

The intensity of hazard and its like lihood to escalate can be gauged from the development at site. It is at the incident site where initially action on On site plan are applied to contain the On site emergency. If the incident is uncontrollable by the Unit, it may pose threat to Off site population.

The Major Accident Hazardous Units are venerable to different type of risks during handling, storing or processing of the hazardous chemicals. The maximum storage quantities are the basic potential risk for MAH Units. However, transportation, processes and handling pose to various hazards. The failure scenarios can be obtained from Risk Assessment as reflected in on-site emergency plan of the units as submitted by them. However, Maximum Credible Scenarios for MAH Units are prepared by quantitative analysis.

11.2 SELECTED FAILURE CASES AND CONSEQUENCES

The selected failure cases and consequences are given in the following table:

Sr. No.	Failure Cause	Consequences
1.	Flammable Liquid storage Tank e.g. HSD, Petrol, Toluene & Solvent, Methanol, etc.	Fire, Smoke, Radiation Heat
2.	Toxic Liquefied Gas storage Container /Tonner/Tank-e.g. Chlorine, Oleum etc.	Toxic Gas Dispersion
3.	Toxic Liquid storage Tank, e.g. Sulphuric Acid, Oleum, etc.	Toxic Fumes and liquid spreading in atmosphere
4.	Flammable Gas Tank/Tanker e.g. LPG	Fire, Explosion, UVCE, BLEVE, Blast effect, Radiation, Smoke.
5.	Toxic, Poisonous liquid e.g., Malthion	Poisonous gas Dispersion.
6.	Poisonous effect by Pesticides Tank/Containers	Dispersion, Spill of Pesticides.

NOTE: UVCE: Unconfined Vapour Cloud Explosion.
BLEVE: Boiling Liquid Expanding Vapour Explosion.

11.3 LEVEL OF EFFECTS

Released LPG or Hydrocarbon Vapour will normally spread out in the direction of the wind. If it catches any source of ignition before being dispersed below Lower Explosive Limit, a flash fire is likely to occur and the flame may travel back to the source of the leak. Any other flammable substances with in flash fire are likely to catch fire and a secondary fire may cause various degrees of burn.

The following table indicates the damage effect due to radiation.

Table-1-Damage Due to Radiation Heat Intensity

Radiation Intensity [kw/sq.m.]	Type of Damage
0.7	Equipment to solar radiation
1.6	Will cause discomfort to long exposure
4.5	Sufficient to cause pain to personnel (First degree of burn is likely)
12.5	Minimum energy required for pilot ignition of wood, plastics etc.
25.00	Minimum energy required to ignite wood.
37.5	Sufficient to Cause Damage to process equipment

Table- 2 - Physiological effect of Radiation

Radiation Intensity [kw/sq.m.]	Type of Effect
65	Blistering of skin is caused
125	First Degree burns
250	Second Degree burns
375	Third Degree burns

NOTE: 1st Degree Burns: Involve only epidermis. (Sun burn is example).
Blisters may occur.
2nd Degree Burns: Whole epidermis along with portion of dermis
is affected.
3rd Degree Burns: Involves whole of epidermis & dermis. Sub-
cutaneous tissues may also be affected.

Table – 3- EFFECT OF OVER PRESSURE ON BUILDING/ STRUCTURE

Over Pressure		Effect
Bar	Psi.	
0.7	10.0	Total destruction of conventional structures.
0.5	7.2	Unreinforced brick panels 200-300 mm thick fail.
0.3	4.3	Cladding of light industrial buildings ruptured. Self-framing steel panel building demolished.
0.2	2.9	50% destruction of brick work in house.
0.15	2.2	Particle collapse of walls and roof of houses.
0.1	1.4	Steel frame of clad building distorted.
0.07	1.0	Partial demolition of houses.
0.05	0.07	Minor damage to house structures.
0.03	0.04	Windows shattered.Occasional damage of frame.

Table-4-DAMAGE EFFECT OF BLAST OVER PRESSURE

Blast Over Pressure(psi)	DAMAGE LEVER
5	Major structural damage would be fatal to people inside or Under the structure.
3	Storage tank failure
2.5	Ear drum failure
2	Reportable damage storage tanks,pumps etc.
1	Window pane breakages causing injuries

Table – 5 - OVERPRESSURE Vs CAUSALITY PROBABILITY

Over Pressure		Causality # Probability
Bar	psi	
<0.07	<1.0	0
0.07-0.21	1.0-3	0.1
0.21-0.34	3-4.9	0.25
0.34-0.48	4.9-6.7	0.7
>0.48	>6.7	0.85

Causality includes fatalities and injuries derived from nuclear explosion pressure wave.

11.4 **TYPICAL GAS DISPERSION DISTANCES**

The most adverse impacts are due to the toxic / flammable gas releases at ground level and in down-wind direction. Further, the basic dispersion equation for concentration from ground level release can be calculated from Gaussian Formula, or from the module. As per down - wind scaling law, the following tables give the gas dispersion for Ammonia, Chlorine & LPG.

Table-1:Ammonia Gas Dispersion

Considering Wind Velocity V = 2.3 Meter / Second			
Sr.	Mass Release in Tons required for contaminated air to No.	Range of Evacuation in Tons	in Meters reach in minutes
1	1	230	1.7
2	3	360	2.6
3	5	450	3.3
4	10	600	4.3
5	20	810	5.9
6	30	960	7.0
7	40	1080	7.8
8	50	1190	8.6

Table – 2 : Chlorine Gas Dispersion

Considering Wind Velocity V = 2.3 Meter / Second			
Sr.	Mass Release in Tons required for No.	Range of Evacuation Tons	
1	1	360	2.4
2	3	570	3.8
3	5	710	4.7
4	10	950	6.3
5	20	1270	8.5
6	30	1500	10.0
7	40	1690	11.3
8	50	1860	12.4

Table- 3 : Liquefied Petroleum Gas (LPG)

Considering Wind Velocity V = 2.3 Meter / Second			
Sr. No.	Mass Release in Tons	Range of Evacuation in Meters	Time required for contaminated air to reach in minutes
1	1	150	1.0
2	3	240	1.7
3	5	290	2.0
4	10	390	2.7
5	20	530	3.7
6	30	630	4.4
7	40	710	4.9
8	50	780	5.4

Table – 4 : Gas Dispersion Concentration

The basic dispersion equation for concentration from ground level release can be calculated from Gaussian Formula.

Assuming leak rate (Q) = 3 kg./Sec i.e. 3×10^6 mg/sec and velocity (u) = 2 & 5m/sec., downwind concentration of some gases at various distances are Calculated and tabulated as follows:					
Product	Maximum concentration (PPM) in downwind direction at distance X wind velocity = 2 m/sec				
	1KM	2KM	3KM	4KM	5KM
(A) (2 M /Sec)					
Chlorine	4.11	1.03	0.45	0.26	0.16
SO ₃	3.65	0.91	0.41	0.23	0.15
Phosgene	2.95	0.74	0.33	0.18	0.12
Ammonia	0.68	0.17	0.08	---	---
(B) (5 M / Sec)					
Chlorine	1.64	0.41	0.18	0.18	0.06
SO ₃	1.46	0.36	0.16	0.09	0.05
Phosgene	1.18	0.30	0.13	0.07	0.05
Ammonia	1.5	0.3	0.15	0.07	---

11.5 MAXIMUM CREDIBLE LOSS SCENARIO

Chemical emergencies either arise from the industrial installations or from transportation of chemicals. Wherever it occurs, depending on the nature and quantity of hazardous chemical and the location of accident, it may have the potential of affecting the general population in the surrounding area. Maximum Credible Loss Scenario is described as the worst “credible” accident or as an accident with a maximum damage distance, which is still believed to be possible.

11.6 CONSEQUENCE DAMAGE DISTANCES

Industrial Pocket wise Damage distance due to Probable Major accident scenarios at the MAH units in these are as are given as follows:

Khambhat Industrial Pocket : Table 4.6.1

Table 4.6.1 - Consequence Analysis Results for Accident Scenarios at Khambhat Taluka Area

[illegible]

Legend:

- IZR: Injury Zone Radius : Corresponds to 1st degree burns (5 KW/sq.m) for Pool Fire / BLEVE and corresponds to 1% injuries (0.01bar) for UVCE
- FZR : Fatality Zone Radius:Corresponds to 1% Lethality (10 KW/sq.m) for Pool Fire / BLEVE and corresponds to 1% lethality (1 bar) for UVCE
- D-3 : Toxic vapour dispersion under Atmospheric Stability Class "D" (Neutral) and wind speed of 3m/s
- F-1 .5 Toxic vapour dispersion under Atmospheric Stability Class "F" (Very Stable) with a wind speed of 1.5m/s

CHAPTER - 5**TRANSPORTATION EMERGENCY****5.1 INTRODUCTION**

The ultimate responsibility to manage for emergency rests with the Chairman of District Crisis Group in case of level –III, i.e. District crisis as arise in District area of his command. The District Crisis Group will prepare the off-site emergency plan for their industrial pockets. A central control room under the supervision and guidance by District Crisis Group will function and carry out their duties. The District Crisis Group should ensure to get equipped with essential facilities with working order.

Large Number of MAH Units is located at different cluster of the Anand District, which are receiving or dispatching a variety of hazardous chemicals. Therefore, the transportation of hazardous chemical is the distance is due to the following:

1. Dispatching the hazardous chemicals by manufactures the units within or outside the district.
2. Receiving the hazardous chemicals to manufactures from manufactures located within or outside the district.
3. Receiving hazardous chemicals in Bulk by Bulk- storage terminals through pipelines & dispatching to the users within or outside the district.
4. Transit traffic of hazardous chemicals lorry / truck / carrier passing through the major corridors of the district.

5.2 STATUTORY PROVISIONS

5.2.1 Motor vehicle Act 1988

The provisions for transportation of hazardous chemical by Motor-Vehicles are given below:

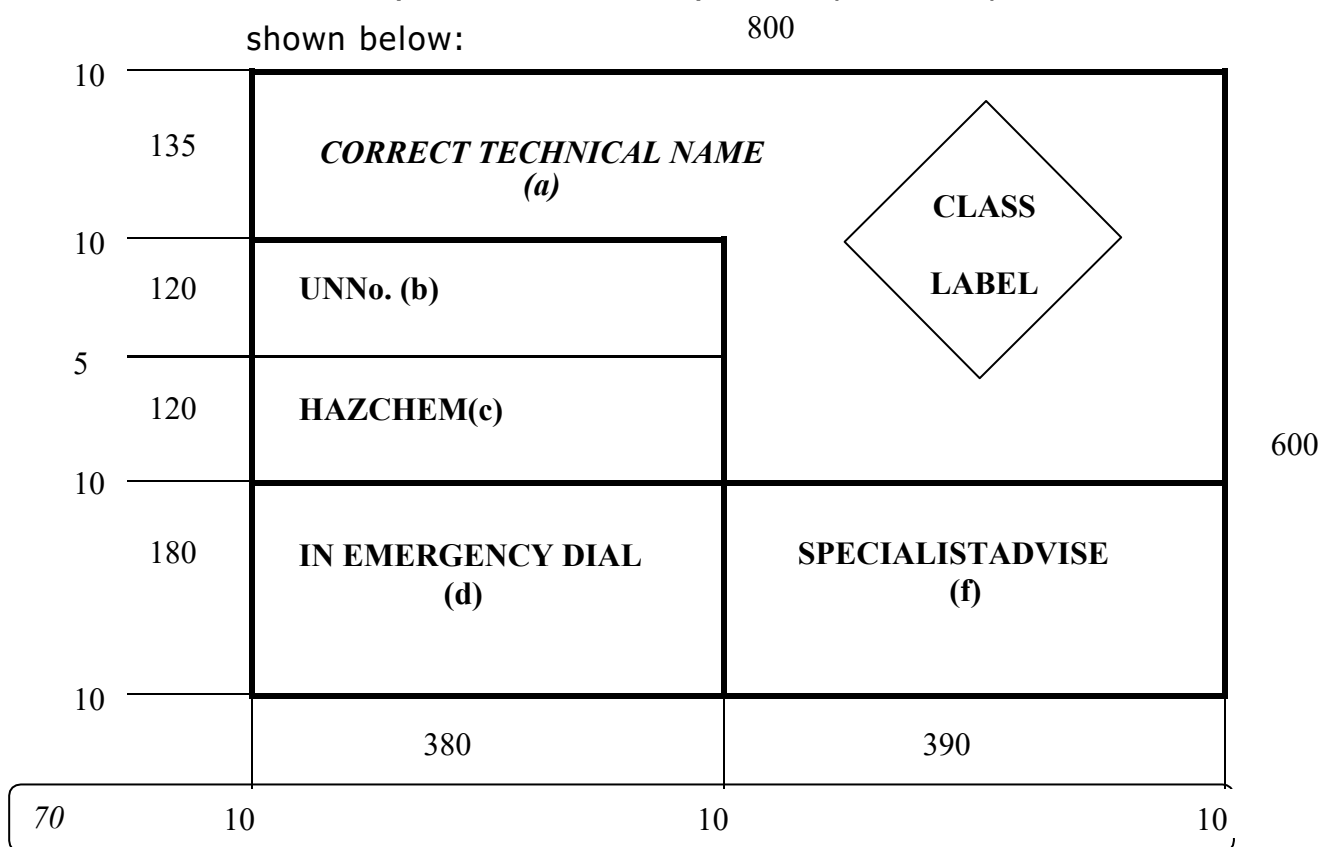
The salient features on regulations on the following subjects are explained as below

1. Emergency Information Panel
2. TremCard
3. Emergency Kit
4. Training

5.2.1.1 EMERGENCY INFORMATION PANEL

The emergency information panel provides details in the event of emergency. It indicates the correct Technical Name of the substance being transported, its UN No., Hazchem Code and UN Hazard Class Label (Diamond Shaped). The panel also provides emergency telephone no., specialist advice in case of emergency. The vehicle should have emergency information panel on both sides and on the rear.

The size (600 MM x 800 MM) and shape of the panel is shown below:



(a)) Correct Technical Name

The correct Technical name of contain /substance should be indicated at this corner.

(b)) UNN umber

The relevant UN Hazard Class Label (UN Symbol) has to be displayed on the front part of the vehicle(Central Motor Vehicle Rules 129,134).

The UN Committee has classified various hazardous substances according to the risk involved. Each hazardous substances included in the list has been allocated a unique four-digit number, which is the substance's UN Number. Since the Numbers are in Arabic Letters, it helps in ready identification of the chemical being transported e.g.

Ammonia	: 1005
Chlorine	: 1017
LPG	: 1075
Methanol	: 1230
Petrol	: 1203
EthyleneOxide	: 1040
Kerosene	: 1223

(c)) Hazchem Code

The Hazchem Code is an emergency action code designed by the London Fire Brigade. It enables the fire brigade to know at once the action to be taken in case of fire or spillage e.g.

Ammonia	: 2PE
Chlorine	: 2XE
LPG	: 2WE
Methanol	: 2PE
Petrol	: 3YE
EthyleneOxide	: 2PE
Kerosene	: 3Y

Hezchem Code

- 1 : Jet**
2 : FOG
3 : Foam
4 : Dry Agent

P	V	Full Body Protective Clothing with BA	Dilute
R			
S	V	SBA	
S		SBA for FIRE Only	
T		SBA	
T		SBA for FIRE Only	
W	V	FULL	Contain
X			
Y	V	SBA	
Y		SBA for FIRE Only	
Z		SBA	
Z		SBA for FIRE Only	
E	Consider Evacuation		

V : Can be Violently or even explosively reactive

Full : Full Body Protective Clothing with BA

SBA : Self Breathing Apparatus Plus Protective Gloves

Dilute : May be used Plenty of Water.

Contain : Prevent, by any means, available, Spillage from entering drains or water courses.

P:R : Use Water than Drain into gutter.Use pressured Air suit

S:T : Use SBA Set.Use Water & Drain into gutter

W:X : Use Pressured Suit

Y:Z : Use SBA Set Don't allow effluent water into gutter.

(d)) In Emergency Dial

The Telephone No. of the contact person in case of emergency.

(e)) Class Label

Chemicals have been grouped into nine basic classes depending on the nature of the hazard. Shaped label bears a pictogram for quick hazard recognition classes. It is hazard-warning sign by different Diamond represented numerically from 1 to 9 which are given below:

- Class-1 : Explosives
- Class-2 : Gases, Compressed, Liquefied, Dissolved under pressure or deeply refrigerated
- Class-3 : Flammable Liquids
- Class-4 : Flammable Solids, Substances Liable to Spontaneous Combustion, Substance which on contact with water emit flammable gases.
- Class-4.1 : Flammable Solids
- Class-4.2 : Substances liable to spontaneous combustion
- Class-4.3 : Substances which in contact with water emit flammable gases
- Class-5 : Oxidizing Substances, Organic Peroxides
- Class-5.1 : Oxidizing Substances
- Class-5.2 : Organic Peroxides
- Class-6 : Poisonous (Toxic) & infections substance
- Class-6.1 : Poisonous (Toxic) Substance
- Class-7 : Radioactive Substances
- Class-8 : Corrosives
- Class-9 : Miscellaneous Dangerous Substances

Each United Nations Hazard Class Label has a distinctive diamond. Each label also has a characteristics background colours.

Colour	HazardType
Orange	Explosives
Red	Flammable
Blue	Water Reactive
Yellow	Oxidizing Substance
White	Toxic / Infections
Yellow & White	Radio Active
Black & White	Corrosive

Ø) **Special Advice**

The fire extinguishing media, special protection system etc.can be given briefly.

5.2.1.2 TREM CARD

Written information in Trem Card

As a precaution against any accident or emergency that may occur during carriage, the driver shall be supplied with instructions in writing specifying concisely;

- a. The nature of the danger presented by the dangerous substances carried and the necessary safety measures that must be taken to avert that danger,
- b. The action to be taken and treatment to be given in the event of persons coming into contact with the dangerous substances being carried or with any substances which might escape there from;
- c. The measures to be taken in case of fire and, in particular, the extinguishing methods and/ or agents or groups of extinguishing methods and /or agents not to be used.
- d. The measures to be taken in case of breakage or deterioration of packing or of the dangerous substances being carried, particularly where such dangerous substances have spilled over the road.

These instructions shall be supplied to the carrier at the latest when the transport order is given, so as to enable him to take all necessary steps to ensure that the employees concerned are aware of these instructions and are capable of carrying them out efficiently.

5.2.1.3 EMERGENCY KIT

The Emergency Kit consists of Personal Protective Equipment, Self Breathing Apparatus, Fire Extinguishers, and Safety Equipments etc. as per statutory requirements, which should be kept with the vehicle during transportation of hazardous chemicals.

5.2.1.4 TRAINING

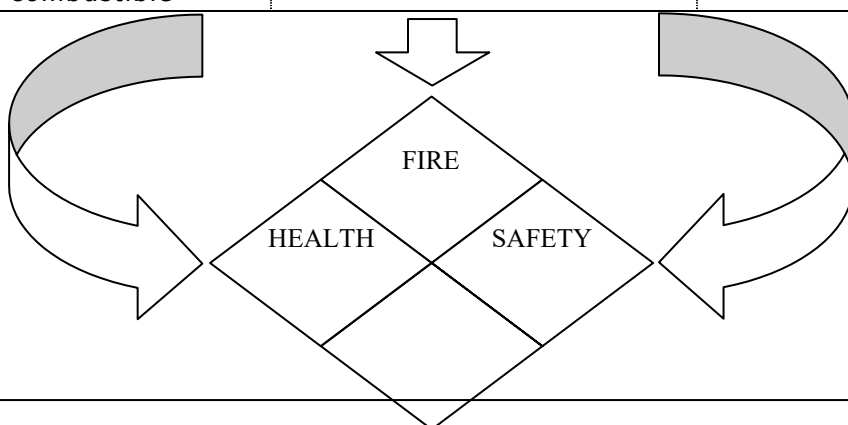
It is necessary to train the drivers, police and fire brigade people in handling of hazardous chemicals and meeting the emergencies arising out of leakages and spillages of chemicals. The lead and initiative should be taken by the manufacturer for training.

Driver has to maintain vehicle, accessories, protective clothing, safety equipments, and Emergency kit in good condition and he should be trained to handle all these equipments effectively. The drivers must be fully conversant with the product they carry. They must be conversant with the TMS Card and get accordingly in an emergency. They should keep the TMS Card in a safe place. Driver should maintain the emergency information panel in position on carriers as specified and prescribed manner. In case of mishap, driver should be reported immediately to the nearest Police Station.

5.2.1.5 TRANSPORTATION SIGNALS

Following Systems adopted for hazardous good transportation to identify quickly the degree of hazards. Adopted from National Fire Prevention Association (NFPA) Standard-704

	BLUE	RED	YELLOW
	IDENTIFICATION OF HEALTH HAZARD	IDENTIFICATION OF FLAMMABILITY	IDENTIFICATION OF REACTIVITY
Signal	Type of Possible Injury	Susceptibility to burning	Susceptibility to Release of Energy
4	Materials, which on very short exposure could cause death or major residual injury even though prompt medical treatment, were given.	Materials which will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature and which will burn.	Materials, which are readily capable of detonation or of explosive decomposition or reaction at normal temperatures and pressures.
3	Materials, which on short exposure could cause serious temporary or residual injury even through prompt medical treatment, were given.	Liquids and solids that can be ignited under most all ambient temperature conditions.	Materials that are capable of detonation or explosive reaction but require a strong initiating source or that must be heated under confinement before initiation, or react explosively with water.
2	Materials, which on intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt medical treatment is given.	Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur.	Materials that are normally unstable and readily undergo violent chemical changes but do not detonate also materials that may react with water violently, or that may form potentially explosive mixtures with water.
1	Materials, which on exposure would cause irritation but only, minor residual injury even if no treatment is given.	Materials that must be pre-heated before ignition can occur.	Materials that are normally stable, but that can become unstable at elevated temperatures and pressures, or that may react with water with some release of energy, but / not violently.
0	Materials which on exposure under fire conditions would offer no hazard beyond that of ordinary combustible	Materials that will not burn.	Materials that are normally stable even under fire explosive conditions, and that are not reactive with water.



5.3 HAZARDOUS CHEMICALS TRANSPORTATION

The rapid growth in the use of hazardous chemicals in industry has brought about a very significant increase in the transportation of hazardous chemicals through rail, roads and pipelines, which has the potential to endanger the life of large number of people by an accident involving these chemicals. More often than not, national and state highways pass through large population centers through which such chemicals are transported. This has made the problem of hazardous material transportation, even more complicated. There have been an enormous number of road accidents in general and involving transportation of hazardous chemical in particular. Many of these accidents have led to large scale loss of life, damage to environment and property.

As can be observed from the foregoing sections, Anand district has a small number of MAH Units handling a variety of hazardous chemicals. Some of the units are manufacturers of hazchem, employing more hazchems in the process, others are end users. Therefore, the transportation of hazardous chemical in the district is due to the following:-

Manufacturers are dispatching chemicals to units within or outside the District.

Manufacturers or other chemical industries are receiving chemicals from manufacturers located within or outside the District.

Bulk storage terminals receiving hazchem through pipelines and dispatching to users within or outside the District.

Transit traffic of hazchem carrier passing through the major corridors of the District.

5.4 MAJOR CORRIDORS FOR HAZARDOUS CHEMICALS TRANSPORTATION

▪ **National Highway No.8**

This 25.6 Km stretch enters the district at Mahi River bridge and exits near Boriavi (About 26 km away from Nadiad). Highway is by-passing Anand city, hence all the traffic does not pass through the city. Anand lies on the Ahmedabad – Vapi chemical corridor of the state with Vadodara and Bharuch being major chemical manufacturing districts and have concentration of chemical industries. It also caters to the interstate transit traffic of hazchem and other goods.

▪ **ExpressWay**

Anand is also connected with Ahmedabad –Vadodara ExpressWay. About 20.0 Km of Express Way is passing through the district. However Express way is not entering into any city but by-passing the all city.

▪ **State Highway:**

State Highway passes through Anand, Khambhat, Petlad, Sojitra, Borsad, Tarapur. Major Hazardous chemicals Factories are located in Khambhat Taluka. Anand-Borsad-Khambhat state highway is the busy highway for movement for hazardous chemicals.

5.5 MAJOR HAZARDOUS CHEMICALS TRANSPORTED

Following are the major hazchem transported through the District:-

Area	Flammable Chemicals	Toxic Chemicals
Khambhat Taluka Industrial Area	LPG, Methanol, Toluene	Chlorine, Oleum, Sulphuric Acids, etc.

5.6 TRANSPORTATION HAZARDS

As mentioned above, various hazardous chemicals are being transported through out the district. With heavy transportation activity within the district, the potential for accidents also increases correspondingly. Accidents scenarios have been visualized for major hazardous chemicals passing through the district and the details are given at Table 4.1. This table provides likely scenario, chemical involved, its quantity, expected area of exposure and name of the MAH unit from where technical expertise could be sought. As transport emergency can happen any where in the district, the area and population likely to get affected will depend on the location and prevalent meteorological conditions in the area.

Table: 4.1: Transport Accident Scenario

Sr. No.	Transport Accident Scenario	Area Likely to be Affected	MAH unit having Technical Expertise
1.	Failure of chlorine tonner	1 to 1.4 km downwind	Cambay Organics Pvt. Ltd. ,Sokhada Shital Chemical Industries,Sokhada Gujarat Industrial Chemical Corp., Sokhada Gujarat Helogen Petro Chem.Corp.,Lunej
2.	Failure of acid / alkali tanker	Immediate surrounding and burns to person coming indirect contact with the substance.	Cambay Organics Pvt. Ltd. ,Sokhada Shital Chemical Industries,Sokhada Gujarat Industrial Chemical Corp., Sokhada Gujarat Helogen PetroChem.Corp.,Lunej
3.	SO3 leak from a tanker/Tank	Up to 1.5 km downwind	Cambay Chem Ltd. , Kalamsar Jay Chemical Ltd.
4.	Spill / leak of solvents and other flammable chemicals such as methanol, C9 followed by fire	Thermal radiation effects of unconfined pool fire will be felt up to 15 m from the pool edge for the duration of fire	Cambay Organics Pvt. Ltd. ,Sokhada Shital Chemical Industries,Sokhada Gujarat Industrial Chemical Corp., Sokhada Gujarat Helogen Petro Chem. Corp., Lunej Jay Chemical Ltd.

5.7 OPERATION SEQUENCE

5.7.1 ANALYSIS OF ACCIDENT SCENARIO

If the vehicle carrying the hazardous chemical meets with a scenario accident, there is likelihood of release of chemical to the atmosphere. Such chemicals may also get released during transportation due to damaged container; however, such possibility is rather remote. In both the events, consequences and extent of damage will vary considerably with location. Typical damage distance, In case of catastrophic Failure of container of hazardous chemical during transportation would vary with the type of chemical being transported. If it happens in thickly populated area, it could seriously affect population insurrounding area. However, aquick emergency response can reduce the damage to a large extent.

Immediate emergency response would be required to contain the damage, rescue the trapped / injured people, provide medical help to the affected population, evacuate the affected /threatened areas, control of traffic and curious on lookers etc.

5.7.2 CHAIN OF EVENTS

If the driver of the vehicle is safe and is t rained to handle t ransport emergency (he is supposed to received basic t raining and carry TREMCARD- Transport Emergency card., which gives do's and don'ts during such situation specifically for the chemical being transported), he can be instrumental in providing immediate initial response.He can help:-

- Conveying the accurate information to the authorities.
- Keeping the onlookers away by shouting at them (that this is a hazardous chemical and they should not come near the truck). Further, he can try and keep away all the sources of ignition.
- Communicating with people in downwind direction so that they move away from gas cloud.

5.7.3 INTIMATION OF INFORMATION

The following information is needed to make the initial decision to handle the situation by police, fire and expert person.

A. The hazardous chemicals / goods

1. Correct Name of hazardous chemicals.
2. Degree of health hazard.
3. Quantity involved & type of container
4. Release, type of containment or Control
5. Date of vapour / liquid release. movement

B. The Public in Vicinity

1. Location / mile store
2. No of Hutments, Shops, residential area with maximum Number of people, who get / may get affected.
3. Evacuation area
4. Arrangement for evacuation/ protection
5. Safe shelter or other building etc
6. Authority, Hospitals, Medical treatment etc

C. Weather Condition

1. General condition of wind & Direction
2. Effect of vapour / Liquid
3. Potential to change
4. Effect of production / evacuation etc

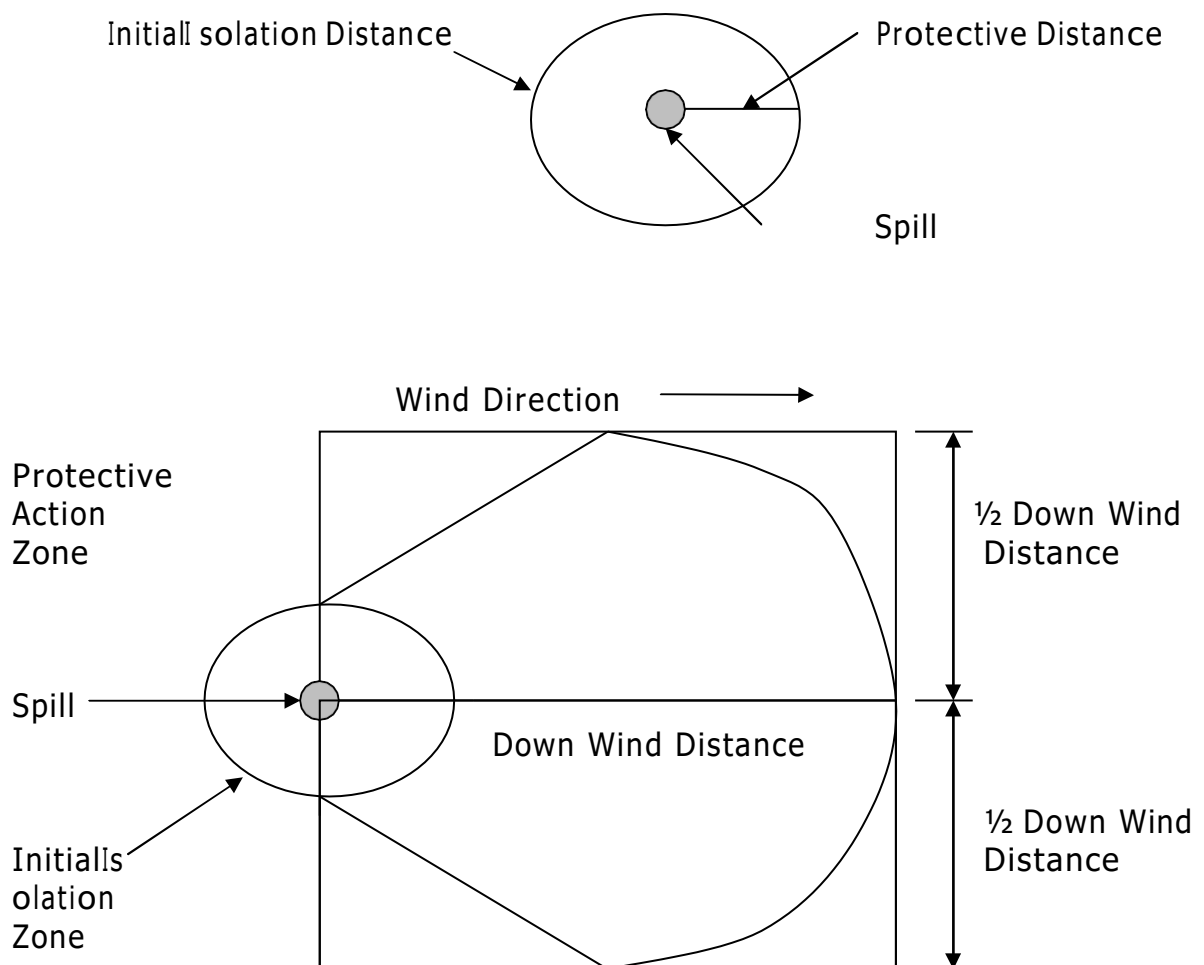
5.8 MAX. DISTANCE FOR INITIAL FOR ISOLATION OR PROTECTIVE ACTIONS

Sr. No.	Chemical Name	SMALL SPILLS (From a large package or from many small packages)			LARGE SPILL (From a small package of small leak from a large package)		
		First Isolation in all Directions (Mts.)	Then Protect persons in down wind during (Mtr.)		First Isolation in all Directions (Mts.)	Then Protect persons in down wind during (Mtr.)	
		Day	Day	Night	Day	Day	Night
1.	Liquid Ammonia, Anhydrous Ammonia	30	100	100	60	600	2200
2.	Chlorine	30	200	1200	240	2400	7400
3.	Hydrogen Chloride	30	100	400	360	3600	10400
4.	Sulphur Dioxide	30	300	1200	210	2000	6300
5.	Oleume	300	400	1000	930	3500	7000
6.	Nitric Oxide	30	200	800	60	600	2700
7	Sulphur Trioxide	60	400	1000	330	2500	6500

5.8.1 HOW TO USE ABOVE TABLE

- The responder should always have:
 - Identified the material by its name,
 - Read the guide for that material and taken the emergency actions recommended,
 - Noted the wind direction.
- Look in this table, use the entry with the largest protective action distances
- Determine if the incident involves a SMALL or LARGE spill and if DAY or NIGHT. Generally a SMALL SPILL is one which involves a single, small package (i.e. up to a 200 litres drum), a small cylinder, or a small leak from a large package. A LARGE SPILL is one, which involves a spill from a large package, or multiple spills from many small packages. DAY is any time after sunrise and before sunset. NIGHT is any time between sunset and sunrise.

4. Look up the initial ISOLATION distance. Direct all persons to move, in a cross wind direction, away from the spill to the distance specified.
5. Next, look up the initial PROTECTIVE ACTION DISTANCE shown in the table. For a given dangerous goods, spill size, and whether day or night, the table gives the downwind distance-in kilometres for which protective action should be considered. For practical purposes, the Protective Action Zone (i.e.the area in which people are at risk of harmful exposure) is a square, whose length and width are the same as the downwind distance shown in the table.



6. Initial Protective Actions to the extent possible, beginning with those closest to the spill site and working away from the site in the downwind direction. When a water reactive PIH producing material is spilled into a river or stream, the source of the toxic gas may move with the current or stretch from the spill point down stream for a substantial distance. The shape of the area in which protective actions should be taken (the Protective Action Zone) is shown in this figure. The spill is located at the centre of the small circle. The larger circle represents the INITIAL ISOLATION ZONE around the spill.
7. Call the emergency response telephone number on the TREMCARD as soon as possible for additional information on the material, safety precautions and mitigation procedures.

5.9 NOTIFICATION TO OFF-SITE AUTHORITIES

Initial reporting of accident could be either by driver / cleaner / any passer by who observes the accident. Therefore, it is more important for the person on duty at control room to extract as much information as possible. As suggested in the case of accident at Major Accident Hazard(MAH) units, here also a format can be developed for transport accidents and kept at Police Station so that Officer Incharge can promptly ask questions and record information. He would ask the caller to:-

- Identify himself.
- Give details of accident (fire / gas leak).
- Give location of the accident (as exactly as possible).

In case the caller is driver or cleaner of the subject vehicle, he should also ask him to:-

- Give name and quantity of chemical transported.
- Give source, destination and name of the transporters.

It will be useful to ask the source (i.e. name of the unit and location from where the product is sent) and destination (i.e. name of the unit and location from where the products is being sent) as this will help in calling the unit's representatives (if located nearby), who are generally aware about the nature of the chemicals and are trained in controlling leaks, transferring the leaking chemical to other container, neutralizing the chemicals etc.

5.10 NOTIFICATION TO RESPONSE ORGANIZATIONS

Action : Departmental Officer Manning the Central Control Room (OCR)

On receipt of call, he will:

- Make sure that information is received at the police and fire stations, which are nearest to the incident site.
- Inform the three first responders i.e. police, fire and medical department by calling their chiefs / alternatives (in case chief is not reachable) as per the list of District Crisis Group (DCG) members available with him.
- Inform DC and all other member of DCG.
- As soon as he receives, further information after making the first call, he will convey that also in the same order.

5.11 RESPONSE BY POLICE, FIRE AND MEDICAL DEPARTMENTS

On receipt of information about off site emergency, first responders will immediately deploy first batch of response teams from a location nearest to the incident site. They will further reinforce, if required, their teams by deploying additional resources from surrounding areas so that effective (based on their assessment of first information received) first response can be rendered at site. In the meantime they will keep additional resources in terms of man power and

equipment on high alert to move to incident site. On getting feedback from their response teams (who would have assessed the situation by then) they will take decision on mobilization of more teams. Once the assessed deployment is made, chiefs may also move to site for better operational control.

The officer of the first agency (police or fire) to reach the accident site would take charge as incident controller He will:-

- Cordon off at least 100 m of the area surrounding the leaking tonner.
- Notify / warn people in the downwind direction to evacuate the area and move in the cross wind direction.
- Control traffic and curious on lookers at the incident site.
- Inform traffic control room to divert traffic coming on the highway and only allow vehicles belonging to emergency response agencies such as fire,medical,red-cross,technical experts etc.

If the personnel of the fire department are the first one to reach the site, they will simultaneously perform the following functions:-

- With appropriate Personal Protective Equipments (PPEs), the fire team personnel will roll the toner (in case of chlorine toner damage) so that the defective / leaking valve is on the upper side.This will prevent the out flow of aerosol from the toner and only gas will come out. In other cases, appropriate action depending upon the situation, will be taken by them. However, if they are not sure, they should wait for inputs from technical experts.

(In case of toxic material):-

- With the help of fire hose, form a water curtain in the downwind direction, so that chlorine / other toxic gases gets dissolved and vapour hazard is minimized.
- Attempt to tighten the defective valve to prevent gas leak, if this does not work, try to stop the leak with the equipment available in the emergency kit.

(In case of flammable material):-

- With fire suit on, the fire team personnel will, if possible, try bunding the surrounding area. This will prevent the spread of the material.
- Inform nearby people/ shops to extinguish cigarettes, bhattis or any other source of ignition as the fire may flash back to the tanker if vapours come in contact with an ignition source.
- Attempt to straighten the vehicle, if possible, using another vehicle such as recovery crane etc.
- Initiate fire fighting measures if the vehicle is on fire.

The off-site emergency response is initiated by the above procedure and will involve specific response functions as discussed earlier in Chapters. However the scale of response for communications, fire medical, evacuation, rescue and public works personnel may be smaller in this case. In addition to the responsibilities described in earlier chapters, certain activities specific to transport emergencies are given in subsequent paragraphs.

5.12 TECHNICAL COORDINATOR

Formulation of Response Strategy

There are potential accident scenarios in which the risks associated with certain types of response activities may exceed benefits, thus providing ample reasons to only undertake protective and containment actions from a safe distance until the situation has stabilized or expert assistance has been obtained. Some examples of situations in which the best course of action may be to hold back from a direct "attack" include:-

- When a major release takes place that poses unknown hazards or hazards for which response personnel are not equipped or prepared.
- When a flammable gas or liquid is on fire and extinguishing could lead to release of toxic or flammable vapours or gases and possibly, explosive re-ignition.

- When there are no endangered persons or structures nearby and the containers and /or hazardous materials present significant hazards to response personnel.
- When the addition of water to a fire may serve to spread highly toxic contaminants into the environment, thus causing a pollution problem that may cost much more to resolve than the value of the burning materials, vehicles or buildings.

5.13 SAFETY COORDINATION

Containment of Spills of Liquids or Solids on Land

The first step in spill response when a liquid or solid has been discharged onto a land surface is to contain the spilled material and to prevent the further spread of contamination. Although specialized equipment has been developed to construct dykes of foamed concrete or plastic materials, the most widely available and generally adequate substances to use are earth, sand, clay and plastic or rubber sheeting. Local safety coordinator and his combat team in association with the specialized personnel and equipment from the municipal corporation shall be responsible for containing the unconfined spill or liquid or solids at the incident site.

Dykes or barriers of earth, sand or clay materials can be quickly constructed with bulldozers, similar equipment or properly equipped individuals with shovels. It is necessary to consider that motorized equipment should not be used indiscriminately in the vicinity of flammable or explosive vapours or gases. Local materials coordinator shall supply the necessary protective clothing and breathing apparatus to response personnel who may need to approach a spill.

Plastic or rubber sheeting can be used to cover spilled solids. This can prevent the wind from causing toxic dusts to become air borne and also protect the bulk of the solid from becoming wet from aid or hose streams used in the area, thus reducing the extent or possibility of soil, ground water or surface water contamination by the spilled substance. Such sheeting can also be useful for lining dykes, basins,

and trenches for similar purposes where liquids are to be contained. Finally, sheeting materials, together with stones or bricks and soil, sand or clay, can be used to cover storm drain openings in a pinch.

When hazardous materials have already entered a storm water drainage system, there are benefits of attempting to limit or contain the flow of the materials by blocking at strategic locations. Since storm water drainage systems typically flow into bodies of surface water, containment might prevent significant water pollution and facilitate later cleanup. However, it is to be noted that volatile chemicals (such as CS₂) should never be trapped in a closed conduit such as a storm water drain, primarily due to the possibility that explosive vapour may accumulate and encounter a source of ignition. Thus, judgments on blocking must be made on a case to case basis by the safety /technical coordinator with special attention to cases in which containment's may enter a water treatment plant.

5.14 FIRE SERVICE COORDINATOR

Spill Control

Where a tanker is losing liquid cargo, it is advisable to turn the body of the vehicle or container so that the point of leakage rises. This is especially true in vessels having volatile liquids or liquefied gases. The rolling over of the vessel will facilitate reduction of the out flow of the contents. Be advised, however, that this may require special equipment, trained personnel and expert supervision for a safe outcome.

Various types of transportation containers have internal emergency shut off valves that can reduce or stop out flow from external valves that have been damaged in an accident. Knowledge of the standard placement and use of these valves can be invaluable, most particularly for highway tank vehicles. Driver and cleaners of vehicle carrying hazardous substances will be instructed and trained in these aspects by the safety coordinator.

Special Fire-fighting Equipment and Materials

Public fire departments primarily rely upon water for fire control, but are well aware that water can be ineffective on some types of fires and may actually be counter productive or dangerous for use in other cases. This list of chemicals on which water SHOULD NOT be used is given as below;

1	Acetyl Bromide	2	Acetyl Chloride
3	Aluminum Chloride	4	Calcium
5	Calcium Oxide	6	Diborane
7	Dimethyl Sulphate	8	Chlorine
9	Phosphorus Oxychloride	10	Phosphorus Trichloride
11	Potassium	12	Potassium Peroxide
13	Potassium Hydroxide	14	Oleume
15	Sodium	16	Sodium Amide
17	Sodium Hydride	18	Sodium Hydroxide (Flakes)
19	Sodium Peroxide	20	Sulphur Chloride

Since water is usually adequate for most large fires encountered, fire departments rarely stock more than a limited number of portable dry chemical or carbon dioxide extinguishers and possibly a small amount of foam concentrate. These supplies of auxiliary agents available with the services may not be adequate for major chemicals or petroleum product fires. Thus for assisting the fire department in identifying sources of additional supplies and equipment for use in emergencies, the fire fighting resources available with the industries in the district are listed at Appendix-D.

5.15 **PUBLIC WORKS COORDINATOR****Cleanup of Spills of Liquids or Solids on Land**

Once a spilled substance has been contained, the next step is to remove it from the environment. The responsibility of cleanup lies with the public works coordinator who shall undertake cleanup operations based on the instructions from the DCG. Local safety and material coordinator shall provide him with backup support of men and material. It is desirable to keep plastic sheets, absorbent material etc. at the local command posts.

The methods usually applied for cleanup of contaminated ground surfaces are:

- Use of pumps, hoses and tanks, drums or vacuum trucks to collect pools of accumulated liquids
- Use of soil, sand, clay, straw sawdust, flyash, cement powder, perlite, vermiculite or commercially available mineral or plastic sorbent materials to absorb and mop up liquid residues and
- Removal of contaminated surface layers (where cleaning in place is not practical) by shovels or mechanical means

In all cases, suppliers and equipment used must be compatible with the hazardous material spilled, workers must be protected from toxic exposures and special care must be taken in the presence of potentially flammable or explosive atmospheres.

Other current cleanup techniques include steam cleaning or detergent washing of solid surface where hydrocarbons or similar materials have spilled, burning off flammable or combustible materials in place where it is safe to do so and permitted by regulatory authorities.

CHAPTER - 6**INDUSTRIAL EMERGENCY MANAGEMENT****6.1 INTRODUCTION**

Being Apex body in the District to deal with major Chemical accidents, and frontal organisation, the Chairman of District Crisis Group is ultimate responsible to control the industrial emergency with immediate effect, in case of level III. The local Crisis Groups, (LCG), are constituted in different industrial pockets to respond the industrial emergency in case of level II. If the emergency could not control by LCG, Then DCG will Take over the charge of situation and try to control the emergency by pooling the resources from the District.

6.2 FUNCTION OF DISTRICT CRISIS GROUP

The District Crisis Group is the apex body in the District to deal with major chemical accidents and to provide expert guidance for appropriately handling them. As per CA Rules-1996, the District Crisis Group Will;

1. Assist in preparation of the District Off-Site Emergency Plan.
2. Review all the On –Site Emergency plans prepared by the occupiers of respective Major Accident Hazard (MAH) installations as inputs for the preparation of the District Crisis Off-site Emergency plan.;
3. Assist the District administration in the management of chemical accidents at a site lying within the District.
4. Continuously monitor every chemical accident.
5. Ensure continuous information flow from the District to the centre and State Crisis Groups regarding accident situation and mitigation efforts.

6. Conduct at least one full scale mock-drill of a chemical accident at a site each year and forward a report of the strengths and weaknesses of the plant to the State Crisis Group.
7. Meet every 45 days and send a report to the State Crisis Group.

6.3 AID & ASSISTANCE FOR FUNCTION OF DISTRICT CRISIS GROUP

As per Rule 12.1 of the Chemical Accident (Emergency Planning, Preparedness and Response) Rules-1996 (2000) "The Major Accident Hazard installations" in the industrial pocket in the District shall aid, assist and facilitate functioning of the District Crisis Group.

6.4 COMPOSITION OF DISTRICT CRISIS GROUP

The designated person have to perform the role and responsibility for the purpose of emergency as composite under Chemical Accident (Emergency Planning, Preparedness and Response) Rules -1996 (2000) as appended in Annexure-7.

6.5 PRELIMINARY PLANNING & PREPAREDNESS FUNCTIONS

While implementation of accident prevention measures at an industrial installation is an internal function of the unit, there are various activities that go into planning and preparedness to effectively counter the impacts of chemical accidents at off-site level. For such accidents, which have off-site consequences, it becomes the responsibility of external authorities to apply countermeasure efforts and minimize the damage to men and material. For effectively handling such situations, the response agencies need to be in a good state of operational readiness and this requires meticulous planning on their part. While each member needs to identify and train first and second alternate officers, who can act on their behalf during their absence at the time of emergency handling emergency situations,

Following paragraphs discuss the pre emergency planning and preparedness functions for each member of District Crisis Group (DCG) and their respective teams including counterparts in Local Crisis Group (LCG).

The various departments, organizations, agencies, industries and persons will be largely involved to tackle the industrial emergency. The refore, their roles must be identified in the plan so that industrial emergency can be handled timely and in co-ordinated way. The authorities, department involved in the emergency plan are requested to prepare their own action plan with necessary requirements, keeping the risk of hazards posed by the industries. Further involved persons / key persons should be trained to tackle the industrial emergency in systematic manner. The guidelines indicating various actions /roles expected from the different services /authorities are explained below briefly. The emergency services include;

- 1) FIRE SERVICES
- 2) POLICE DEPARTMENT
- 3) MEDICAL SERVICES
- 4) EXPERTS

6.6 ROLES & RESPONSIBILITIES

The present plan document identifies the roles and responsibilities of the organizations, in key identified sectors. Taskforces have been constituted for taking response measures in specific sectors. Action plan has been prepared for each task force which covers their roles & responsibilities in development of incident / emergency. It is expected that each taskforce shall develop the standard operating procedures for specific disasters / emergency. In addition, District collector has to ensure that all the members acquire knowledge and skills to perform their assigned roles.

6.6.1 CHAIR PERSON (DISTRICT MAGISTRATE & COLLECTOR)

Being Chair Person of District Crisis Group, he will be in over all command & control of emergency actions to control the industrial emergency effectively for the District industrial pockets. The Chair person has to perform the role as follows:

- A). Preparation or updating of off-site emergency plan for District industrial pockets.
- B). To ensure to able to perform the role of each involved emergency service effectively.
- C). To activate and maintain the Central Control Room round the clock. To provide essential facilities with the Central Control Room.
- D). To access emergency situation and have to declare the industrial emergency, call and direct the emergency services to respond the industrial emergency by providing reinforcement and support by pooling the resources from the District industrial pockets.
- E). The arrangement for rescue, evacuation, shelter, food,water, clothing, and transportation to affected area, announcement to the public.
- F). To keep inform to the higher authority time to time. To declare the withdrawal or termination of emergency.
- G). Rehabilitation, restoration, cleanity etc on post-emergency actions.
- H). To submit the reports on industrial emergency. To conduct the meetings.
- I). To conduct the mockdrill / exercise on industrial emergency.

Please see Charts at Annexure-9.

6.6.2 MEMBER SECRETARY (DEPUTY DIRECTOR, INDUSTRIAL SAFETY & HEALTH)

He has to perform the following role as Member Secretary of District Crisis Group:

- A). To prepare or update the off-site emergency plan for local industrial pocket. The Off-site emergency plan should dovetail with the on-site emergency plan as prepared by the major accident hazardous units in the local industrial pockets.
- B). To arrange the meetings of District Crisis Group in consultation with Chairperson. To feed technical & chemical data & information in respect of industrial units, situated in Local industrial pockets. To provide technical inputs to ensure safety, health & environment of workers, properties and population in vicinity.
- C). To advice & guide the proper & effective handling actions as required by emergency services during industrial emergency / plan. To help to conduct the mock drills, post emergency inquiry etc.

6.6.3 DISTRICT DEVELOPMENT OFFICER - MEMBER

Being a responsible person of Taluka / District the following actions are to be given prime importance for industrial emergency purpose.

- A). Ensure the different authorities, agencies, organization persons, as specified their role, should participate immediately during industrial emergency in District Pocket area.
- B). To advice & guidance to the District Crisis Group.
- C). To participate meeting, mockdrill & training.
- D). To prepare own detailed action plan to ensure effective control on industrial emergency.
- E). Liaison & co-ordination with Chair Person, Central Control

Room,emergency services,organization,agencies,person etc.

F). Other duties as specified by District Crisis Group.

6.6.4 POLICE DEPARTMENT - Member-(Part of EmergencyService)

Another authority who gets the first information on incident / accident is police department. The following actions are to be carried out by police department for industrial emergency purpose.

- A). To access the situation and report immediately.
- B). To maintain the law and order during the industrial emergency to control the traffic and control the affected area.
- C). To protect the life of people, inside, outside as well as road movers.
- D). To protect the property & environment & public announcement.
- E). Evacuation, rehabilitation, shelter & transportation work during the industrial emergency as per prevailing situation.
- F). Help & assist to make area clean, removing of any structure and other similar work as required during actual emergency.
- G). To participate the meetings & Mock Drill / Rehearsal & Training.
- H). Liaison with Central Control Room and other emergency services / organization / agencies.
- I). To prepare their own details action plan & to ensure the provisions to handle the industrial emergency.
- J). Other duties as required during actual emergency.

Please see Chartsat Annexure–11.

6.6.5 PRESIDENT, MUNICIPALITY - MEMBER

On receiving the information the Collector, the Anand Municipality will help by making arrangements like:

1. To receive casualties during an emergency in the municipality run Hospitals.
2. To mobilize the fire fighting equipments.
3. To provide medical supplies and equipments to Civil Hospital.
4. To check for expected effects to the citizens of Anand and to take actions accordingly.
5. To make schools available for shelters.
6. To blow the city sirens for alarming the public.
7. To inform the concerned department heads such as water and sewage supply, electricity section, hospitals, education department etc. about their DCPC plans and their functions and preparedness during emergencies.
8. To rehabilitate evacuated city population after the emergency.

6.6.6 FIRE SERVICES (FIRECOMMANDANT)-MEMBER (Part of E.S.)

Most probably, the first information regarding any incidence / event / fire / gas leakage is received by the fire services. Thus, fire service being first informant has to play the major role during the industrial emergency.

- A). Inspection, Survey & assess the situation where incident occur & give the report.
- B). To decide the proper & effective actions and immediate response actions to control the industrial emergency, under intimation to Central Control Room or Chair Person.
- C). Proper training to fight against industrial hazards and knowledge on identification of such hazards.

- D). Rescue, Evacuation, Remove of debris, and other emergency work as directed or instructed.
- E). To maintain the proper and adequate fire fighting, equipments, neutralizing media, self-breathing apparatus, emergency equipments, personnel protective equipments with keeping in working order.
- F). The knowledge & information on different type of alternative resources, various types of extinguishing media, neutralizing media, chemical properties and their hazards with safe handling procedure.
- G). To participate the meetings Mock Drill / Rehearsal & training.
- H). Liaison with Central Control Room and other emergency services.
- I). To prepare their own details action plan & to ensure the provisions to handle the industrial emergency.
- J). Other duties as required during actual emergency.

Please see Charts at Annexure–10.

6.6.7 MEDICAL & HEALTH DEPARTMENT (COMMANDANT)- MEMBER (Part of E.S.)

The health and medical services have to play vital role following the emergency. One fold is proper & timely treatments to the victims injured or affected persons. Other fold is to safe guard the public health. The following actions are suggested for health & medical services.

- A). To ensure the arrangement & preparedness for special medical treatment antidotes and trained doctor Para-medical staff as specified in toxicology at the time of industrial emergency in local pocket area.
- B). On declaration of emergency or on receiving the message or information, prompt medical facilities should be set up

e.g. first aid post, casualty receiving center/ camp, as per gravity of situation at site. Similarly, arrangement for emergency operation or special treatment on chemical burn, injury, gas dispersion etc with adequate arrangement, which will can serve the purpose of Base Hospital.

- C). Identification of dead bodies and post mortem arrangement.
- D). To maintain upto-date list with telephone nos. of services of doctors, hospitals, ambulance, primary health center, Para- medicals taff, vehicle to meet the emergency situation.
- E). Arrangement to inform the upto-date status time to time to Central Control Room, Chair Person, Relatives of injured or admitted patients, emergency services etc.
- F). Arrangement to safe guard the public health in case of development of epidemic situation & announcement on safety measure to be taken by public at the time of industrial emergency situation.
- G). To advice & guide the District Crisis Group in respect of medical & health part time to time.
- H). Provision for proper and adequate medicines, life saving drugs, equipments, antidotes etc. related to industrial emergency.
- I). To participate meetings, mockdrills / examine and training.
- J). To prepare own detailed action plan to ensure the effective handling of industrial emergency.
- K). Liaison with Central Control Room, Chair Person, Emergency Services organization, agency and other related person.
- L). Other duties as required during actual emergency.

Please see Charts at Annexure–12.

6.6.7 EXPERT PERSONS- MEMBERS

The chemical manufacturing activities along with large storage of various chemicals is day-to-day increasing. The chemical emergency of ten gives very short time to respond their containment. There fore it requires special treatment with specific knowledge of hazards and their consequences. This needs chemical & technical expertise in handling of large-scale toxic and hazardous emergency. They will provide careful evacuation of emergency and advise prompt responding actions to control the emergency.

Since the every industry is exposed to threat of disaster having various chemicals being stored, handled or processed. The planned responding resources will help to alert such emergency. The expert person can advise on this matter for maintaining type of neutralizing agents or containment measures against chemical emergency. The list of expert person is given in Annexure- 17.

6.6.8 DISTRICT INFORMATION OFFICER - MEMBER

The proper and correct news should be reach to the public to avoid rumour and panicky. The role of District Information Officer is to create awareness and preparedness amongst the public for industrial emergency because of wide & fast spreading news.

- A). To participate meeting, mockdrill / exercises and training.
- B). To assist the public in case of rescue operation and evacuation work during emergency.
- C). To provide immediate, correct, adequate, reliable and authentic news.
- D). Liaison & co-ordination with Chair Person, Central Control Room and emergency services.
- E). Ensure to safe guard the public at large during actual emergency by providing correct reliable authentic guideline and news.

6.6.9 RTO - MEMBER

- A). Respond to collector and police instructions about emergency transport actions.
- B). Provide adequate transport required for both persons and material.
- C). Arrange for deployment of vehicles with full fuel levels.
- D). Streamline traffic flow and parking yard movement.
- E). Co-ordinate deployment of private vehicles, if required.
- F). To participate meeting, mock drills & training
- G). To prepare own detailed action plan to ensure effective handling on industrial emergency

6.6.10 CIVIL SUPPLIES DEPARTMENT - MEMBER

- A). Arrange to provide cooked food and clothing to evacuees and others involved in emergency controlling operation.
- B). Ensure availability of sufficient cooked food, water ready for distributaries at various locations.
- C). To participate meeting, mock drills & training
- D). To prepare own detailed action plan to ensure effective handling on industrial emergency.

6.6.11 REGIONAL OFFICER (GPCB) - MEMBER

The authority or officer from Gujarat Pollution Control Board is the member of District Crisis Group, who has to perform the role as per following:

- A). To participate meetings, mock drills / exercises and training.
- B). To prepare own detailed action plan to ensure the effective control of industrial emergency & subsequent action.
- C). Liaison with Central Control Room, Chair Person, Emergency Services, Organization agencies & other related persons.
- D). Advice & guidance to the District Crisis Group in respect of environment protection in the industrial pocket.

- E). To provide the technical input regarding environment and evaluate the contamination or adverse effect during industrial emergency.
- F). To provide the details & information on development of emergency situation regarding in safe level to the life and suggest area to be evacuated and other safety measures.
- G). To suggest the safe level for restoration & restarting of work on termination of emergency.
- H). Co-ordination with emergency services & expert persons etc.
- I). Other duties or work as directed by District Crisis Group or Chair person.

6.6.12 REPRESENTATIVE FROM MAH UNITS-MEMBERS

The management of major accident hazardous unit has to maintain updated onsite emergency plan with necessary details with accurate information and a correct assessment of the situation. The site main controller is responsible to provide immediately on occurrence of crisis at his unit with specific details, development and needed help from Local Crisis Group & District Crisis Group. He will arrange & provide all resources, equipments, manpower, and communication network from his own unit and co-ordinate with Local Crisis Group & District Crisis Group to combat the industrial emergency.

6.6.13 Commandant (CIVILDEFENCE SERVICE)-member

- A). To participate meeting, mockdrills & training
- B). To prepare own detailed action plan to ensure effective handling on industrial emergency
- C). To assist police in rescue and evacuation work during emergency.
- D). To provide security, cordoning the area, and other services as required during the industrial emergency.
- E). Co-ordination with Central Control Room & Emergency Services.

6.6.14 ELECTRICITY BOARD (MGVCL)-member

- A). Arrange for un-interrupted power supply,if needed.
- B). Arrange for lighting at temporary medical camps,rallying points and parking yards.
- C). Take careof electricale quipment within affected zone.
- D). Arrange for switching off power supply if requested by authority.
- E). To participate meeting,mock drills & training
- F). To prepare own detailed action plan to ensure effective handling on industrial emergency

6.6.15 ROLE OF OTHER MEMBERS OF DISTRICT CRISIS GROUP

The other members like controller of explosives, trade union representative, agriculture department, municipal commissioner andother government agencies, etc. have to perform the various duties. However, the following are the suggested duties asrequired during the emergency:

- A). To participate meeting, mock drill / exercise and training.
- B). To assist the public in proper way in case of rescue and evacuation during actual emergency.
- C). To advice and guidance to the District crisis group & Chair person.
- D). To arrange and help the supporting actions and duties in respect of industrial emergency
- E). To provide more and adequate resources & various requirement to tackle the industrial emergency immediately.
- F). Liaison & co-ordination with Central Control Room and emergency services.

6.6.16 Role of Volunteer Organizations (N.G.O.)

The volunteer organization /services can play vital role to convince the person / public to evacuate the residence / place and to shift to safe sheltert imely during Chemical emergency.

Otherwise it may result more serious effect. To save the life of public is more important factor, which will be successfully carried out by the volunteer organization. The list of such organization with address, telephone no. organization etc will be prepared and up-dated time to time.

6.6.17 Role of RAILWAY AUTHORITY

On getting information at the time of disaster from Central Control Room, the Divisional Manager, Western Railway, Anand will take following actions:

1. To issue the standing instruction to all railway gates to take actions on receiving the message from the Station Master.
2. To decide authority level of railway staff to take actions.
3. To carry out evacuation by railway, if required.
4. To take care of floating population at railway stations and on board travellers.
5. To issue the standing instruction to Station Masters on up and down railway stations to stop the train as soon as emergency message is received from CCR.

6.6.18 Role of Chair Person - Local Crisis Group

To attend the meeting of District Crisis Group and report the incident / accident happened in their industrial pockets.

6.6.19 ROLE OF CENTRAL CONTROL ROOM

District Crisis Group has to activate the Central Control room round the clock with man power. The Objectives of Central Control room is described as below:

1. Objectives

The Central Control Room for District industrial pocket is constituted by District Crisis Group and functions round the clock. It is the arrangement for aid of information,

communication, operational actions by co-ordinated way for the industrial emergency. It will provide the data-base, data library, information details on handling chemical emergency or disaster, MSDS, Maps, Charts, Emergency telephone numbers, list of resources, equipments, antidotes, with suppliers etc. as required to combat the industrial emergency.

It is the place where command & control will be carried out to handle the industrial emergency.

The meetings, mockdrills /exercises and training part will be organized by the Central Control Room as instructed by District Crisis Group. It will keep & maintain the records on incidents /accidents from the local industrial pockets. It is the coordinating & liaison center for emergency services, expert person, industrial units, Government department, agencies, organization in respect of industrial emergency.

2. The Setup of Central Control Room:

The executive committee will govern the Central Control Room. The aid & assistance will be provided by industrial units situated in District industrial pockets as framed by District Crisis Group. The suggested set up for Central Control Room is given below:

3. Functions:

The Central Control Room will provide the infrastructure to respond the industrial emergency. It is the command & Control Center for Emergency:

- 1.** To collect the data, information, details and MSDS of chemicals from each unit and maintain up-to-date. It will work as data library.
- 2.** To keep the records of plans, maps, emergency services,

telephone nos. list of expert persons, hospitals, dispensary, doctors, medical treatment systems, resources, suppliers, emergency equipments and fight fighting details, antidotes etc. in respect of industrial emergency requirements.

3. To maintain liaison work with all emergency services, Govt. authorities industries, volunteer or ganizations, agencies, suppliers, resources and others pertaining to emergency activities.
4. Arranging training programmes & education for emergency preparedness amongst industries, workers, management, supervisors and public in vicinity.
5. To maintain arrangement for providing information, media communication and public information in time.
6. It is the center to provide the operational requirement with co-ordinated way by pooling all available resourcesin systematic way and divert to the emergency site to control & handle the emergency effectively.
7. Arranging rehearsal /mock drill on off-site emergency plan
8. Arranging meetings, preparation, record keeping etc.
9. To maintain meteoro logical details.
10. To manage staff, office work, computer work and other work as directed by District Crisis Group.

4. The Essential IFacilities For Central Control Room:

The following essential facilities are to be incorporated at the suggested Central Control Room:

1. Data Base Library
2. Emergency Equipments, Apparatus, Instruments
3. Communication Network
4. Hazard Kit
5. Vehicles
6. Staff

1. Data Base Library:

1. Technical reference:
2. District Area Maps
3. District on-site emergency plans
4. List of Hazardous units with details of Telephone, Contact persons, facilities, resources.
5. MSDS of Hazardous chemicals
6. Reference technical books, Law books.
7. Up-to-date list of experts, police, fires, Govt. agencies, medical, NGO, Voluntary organization etc. with phone & contact person
8. Local Telephone Directory
9. List of Emergency resources, equipments
10. List of neutralizing medias, availability, quantity, with contact person & phone.
11. List of antidotes, availability and procurement, suppliers.
12. Gas Dispersion modules & related details for emergency purpose.
13. Fire, Explosion, Gas Leakage information and case history.

2. Emergency equipments, Apparatus, Instruments

1. Standard Office Furnitures.
2. Emergency Power supply – D.G. Set etc.
3. Computers, software, UPC, response models, printers, head phones, battery backup.
4. Meteorological equipment, instrumentation & recording system.
5. Personal protective equipments & self breathing apparatus.
6. Fire fighting equipments
7. First aid boxes

- 8. Emergency Tools
- 9. Public Addressing System, Emergency vehicle

3. Communication network

- a. Communication equipments:
- b. Telephones, P & T & EPBAX
- c. Wirelesset, Walkie–Talkiesets, Mobile Phone
- d. Internet
- e. Fax
- f. T.V with VCR
- g. Tape recorder
- h. Radio
- i. XeroxMachine
- j. OverheadProjector
- k. Mobile Phone
- l. Posters, Boards, Holdings, Railing / Fencing, Signs, Signals,Torches,Battery
- m. Charts,maps,slogans,posters etc.

4. Hazard Kit

- a. Protective equipment & clothings
- b.SBA Set with spare cylinder
- c. Leak control equipments
- d. Containers,Drums,Carboys,Pipes,
- e. VariousNeutralizingmedia
- f . Tools & Hardwares
- g Monitoring equipments – gas detectors, ph-papers dragger tubes etc.
- h Adequate no. off ire sets –DCP, CO₂ ,water foam, Multipurposefirepump,hosepipes, nozzles.
- i Inert gas N₂, CO₂ etc.
- j Medical First Aid (Oxygen Cylinder, First Aid Box, Emergency Medical Kit, Portable respirator, stretcher)
- k Portable lamps / torches, Portable flood lights.

- l. Emergency Suit
- m. Transportation vehicles
- n. Uniform
- o. Clothes
- p. Siren / Hooters

5. Vehicles:

- a. Cycles
- b. Two Wheeler
- c. Four Wheeler
- d. Mobile Hazmat Van
- e. Ambulance Van

6. Staff:

- a. Officer on Duty–Incharge Officer
- b. Field duty Investigator
- c. Technical supervisor
- d. Computer Operator
- e. Clerical Staff
- f. Messengers / peons
- g. Sweeper & maintenance workers
- h. Casual Workers
- i. Others as specified

CHAPTER - 7**MAJOR ACCIDENT RESPONSE SYSTEM****7.1 INTRODUCTION**

It is not possible to include and discuss every action, which should be taken first during emergency. It is also not possible to describe entire actions on emergency situation. The basic principle of handling emergency, that may be relied upon, who have the knowledge and experience to assess the situation and give direction as per the objectives as quickly as possible. Some times, it is a natural gift and it is an art by heart. However, the aim is to control the situation by safest way in a limited time within existing available resources. Further, it should be handled with such a care that minimum loss of life, property and environment. In short, the objective of the plan should successfully comply with.

Every emergency service has to operate as working group with role as per prevailing circumstances, with Co-ordinated way. No body should wait for others, immediate actions with available resources or if required call more specific resources with immediate effects, should have started without delay. Further, the working groups should report the development of incident time to time, to the authorities and keep them informed the actions completed or actions are on hand etc.

The working group has to evaluate the situation and actions with rapid force should be activated as per pre- decided way. However, the maximum credible scenario for the unit shall be considered.

It is not possible to include and discuss every action, which should be taken first during emergency. It is also not possible to describe entire actions on emergency situation. The basic principle of handling emergency, that may be relied upon, who have the knowledge and

experience to assess the situation and give direction as per the objectives as quickly as possible. Some times, it is a natural gift and it is an art by heart. However, the aim is to control the situation by safest way in a limited time within existing available resources. Further, it should be handle with such a care that minimum loss of life, property and environment. In short, the objective of the plan should successfully comply with.

The every emergency service has to operate as working group his with role as per prevailing circumstances, with Co-ordinated way. No body should wait for others, immediate actions with available resources or if required call more specific resources with immediate effects, should have started without delay. Further, the working groups should report the development of incident time to time, to the authorities and keep them informed the actions completed or actions are on hand etc.

The working group has to evaluate the situation and actions with rapid force should be activated as perpre- decided way. However, the maximum credible scenario for the unit shall be considered.

The intensity of hazard can begauged from the developments at the site. It is at the incident site where the hazard is first noticed and the countermeasures applied to contain the incident to within the plant boundary. If the hazard is uncontrollable within the works, it may pose threat to off site populations. However in case of explosion, bothon-site and off-site consequences may occur simultaneously. Further any transport accident involving hazardous chemicals will immediately become off site emergency. Although the primary functions of respective coordinators may be similar in each type of response, the first response, application of counter measures and the extent may vary for different incidents. Inview ofthis, the " Major Accident Response System "(MARS) has been specifically tailored to meet the response needs of Anand district.

It is not possible to include and discuss every action, which should be taken first during emergency. It is also not possible to describe entire actions one emergency situation. The basic principle of handling emergency, that may be relied upon, who have the knowledge and experience to assess the situation and give direction as per the objectives as quickly as possible. Some times, it is a natural gift and it is an art by heart. However, the aim is to control the situation by safest way in alimited time within existing available resources. Further, it should be handle with such a care that minimum loss of life, property and environment. In short, the objective of the plan should successfully comply with.

The every emergency service has to operate as working group his with role as per prevailing circumstances, with Co-ordinated way. No body should wait for others, immediate actions with available resources or if required call more specific resources with immediate effects, should have started without delay. Further, the working groups should report the development of incident time to time, to the authorities and keep them informed the actions completed or actions are on hand etc.

It is not possible to include and discuss every action, which should be taken first during emergency. It is also not possible to describe entire actions one emergency situation. The basic principle of handling emergency, that may be relied upon, who have the knowledge and experience to assess the situation and give direction as per the objectives as quickly as possible. Some times, it is a natural gift and it is an art by heart. However, the aim is to control the situation by safest way inalimited time within existing available resources. Further, it should be handle with such a care that minimum loss of life, property and environment. In short, the objective of the plan should successfully comply with.

The every emergency service has to operate as working group his with role as per prevailing circumstances, with Co-ordinated way.No body

should wait for others, immediate actions with available resources or if required call more specific resources with immediate effects, should have started without delay. Further, the working groups should report the development of incident time to time, to the authorities and keep them informed the actions completed or actions are on hand etc.

The working group has to evaluate the situation and actions with rapid force should be activated as per pre- decided way. However, the maximum credible scenario for the unit shall be considered.

The working group has to evaluate the situation and actions with rapid force should be activated as per pre- decided way. However, the maximum credible scenario for the unit shall be considered.

7.2 EMERGENCY HANDLING

This section deals with the emergency at MAH Units in Anand District, involving hazardous chemicals leading to fire, explosion or gas dispersion. Simulation of identified major accident scenario were conducted and the results of early those scenarios where there is significant MAH unit in the different Industrial pockets.

▪ **FIRST INFORMATION:**

In The scenario involving large fire, explosion or gas dispersion, in the MAH unit, the site-main controller of affected installation or any other responsible person from neighbouring industries may information to the off site Authorities, Particularly, District Collector, Police Department, Central Control Room, Collector's Control Room, Fire Brigade, Directorate of Industrial Safety & Health, he will intimate at least following details:

- (1) Identification himself by name, designation & organization
- (2) Location of incident (Plant,Section Department)
- (3)) Involvement of chemical (Name of probable chemical)
- (4)) State Brief, the type of emergency (Fire,Explosion,Toxic Release, along with direction of gas cloud movement etc)

- (5) State the casualties, severity of the incident,
- (6) State to render all possible helps
- (7) The help & resumes actual required

There is a possibility that any other person may also see/ hear the fire/ explosion incident and informs the police or fire before they receive call from the affected unit or the District Emergency Control Centre. It may not be possible for an ordinary citizen to provide entire information in given format.

In such a case, it will be responsibility of the information receiving officer to call up the affected MAH unit or the nearby industries (If the communication system of the affected installation is severely damaged) and get the desired information.

7.3 MAJOR ACCIDENT RESPONSE SYSTEM

As per role & responsibility explained earlier, the function will be carried out as follows & each authority who has participate in the controlling emergency, will give their report to the Chair person (Collector & District Magistrate) Anand, in writing also.

The prime responsibilities are allotted to concern Authorities/ Departments in brief as under:

Sr.No	Response Authority	Purpose
1	Collector & District Magistrate	▪ To Control the situation by subordinates. ▪ Arrange for providing Interim Relief to the affected people based on claimed applications.
2	Dy. Director of Industrial Safety & Health (DISH)	Member Secretary, Co-ordination to get experts Advise and other resources information
3	Emergency Commander	Managing Coordination Structure
4	Fire Commander	Fire services - Spill Control of fire

Sr.No	Response Authority	Purpose
5	Medical Commander / Civil Surgeon / District Health Officer	Medical Service-Major Hospitals, Resources & Blood Banks,Chemist Shops / Test Labs, Ambulances & for specific Antidotes etc.
6	Police Commissioner / Evacuation Commander	Traffic Control by Diversion arrangement etc As Evacuation Commander Arrange for Emergency lighting, Battery or Diesel operated Flood light.
7	Superintendent of Police (SP) / Commandant Security	Traffic Control arrangement & Security Commands & Control, Evacuation & Resource Operation.
8	Municipal Commissioner / Chief Fire Officer	As Rehabilitation coordinator andFire brigade/ Water Supplyarrangement
9	Safety Deptt. (Member Industrial Units)	- Advise for Safety Precautions for provision - of PPES / BA Sets etc., - Waste Disposal work & Spill Control for - liquid,solids on land.
10	Technical Coordinator (Experts from Safety, Health & Production Deptt.)	- To Assess & Response strategy to control Hazardous zone (Hot,Warm,Coldzone) - suppression of Hazardous Gas or vapour releases - Structural Inspection Work - Undertake accident Investigation & Document
11	Key Personal & Nodal Officers	- Advice for technically control of situation. - As a coordinator for public works, clean up - of spills of liquid or solids on land.
12	District Development Officer	- Monitoring Collector's Instructions. - As Material Coordination for PPES,Other Material / Equipments / Medicines etc.
13	Civil Defence Control Room SRP Group	Managing Mass Rescue / Causality.
14	GSRTC (Asstt.Transport Commissioner)	Providing Transport facility for Evacuation work.
15	Regional Transport Office As Transport Coordinator	- Providing Transport facility for Evacuation work. - For Water supply tankers
16	Railway Control Room	- Railway Crossing freeness for evacuation - Evacuation by residence

Sr.No	Response Authority	Purpose
17	Crane Services	Crane for urgent lifting / Shifting work
18	ONGC	To Provide Equipment for rescue people. Crane for Lifting / Shifting work
19	Road & Building –PWD	Special tools , Skill for rescue people.
20	Deputy Director of information	Dealing with Media Officer for conveying information.
21	District Information Officer	As a Liaison & PR Coordinator for Educational institutions, Cinema Halls, Hospitals and Prisons coordination Within Local Crisis Group
22	Communication Media	For appealing NGO for Rehabilitation work etc.
23	Regional Officer–GPCB	As a role of Safety Coordinator
24	MGVCL- Anand	Utility– Coordinator Provisioning shut down Electric utility / Back up power
25	GM – BSNL, Anand Communication Coordinator	For Emergency network of communication
26	District Crisis Group - DCG/ Local Crisis Group –LCG	Plan updating if so required. Also provide Training to Community and Staff.

7.4 DISTRICT MAGISTRATE & COLLECTOR

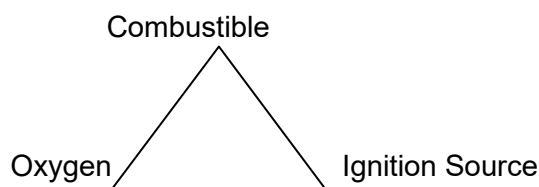
On receipt of information of the accident the District Collector (DC) will rush to the District Emergency Control Centre (DECC), where he will be joined by Asst. Director Industrial Safety & Health, Anand and two technical experts. Other technical experts (nearest to the incident location) will directly rush to the Local Command Post (LCP) and remain in touch with the DECC for regularly updating the information. Also they will provide technical support to combat teams at the incident site. The DC will address the following issues along with other members present at DECC:-

- Obtain update of the incident situation from Local Command Post(LCP) and establish a link for continuous communication (such as dedicated telephone line with speaker phones, set of walkie talkies, computer link, etc.) with the help of communication coordinator.
- Identify the hazardous and threatened areas based on map and templates available and information received from LCP.
- Supervise the overall management of each function through respective member of the District Crisis Group(DCG) and expediting response wherever required
- Take a decision on requirement and priorities of evacuation and organize the resources to execute the same. They will contact transport and evacuation coordinators (already on high alert) and issue instructions.
- Based on the inputs from the first responders and experts available at LCP, identify the additional resource requirement and initiate mobilization.

After making the required arrangements, District Collector will take decision whether he is required to go to the incident site and who all shall accompany him. In such a situation, his deputy will take charge of the DECC

7.5 Fire SERVICES

For a fire to happen, three components are required as depicted below:-



Cutting off the supply of any one of the above three components can help in getting the fire under control. Therefore the major activities that the fire team will undertake will be directed towards cutting off the supply of one or more of these components.

a) **On-scene Assessment**

The first fire vehicle to reach the site will immediately contact the site controller and collect the necessary information regarding the material involved, the actions taken and the current status. The driver will park the vehicle in a manner to prevent exposure to radiant heat.

b) **Removing the Source of Ignition**

Water is by far the most reliable source for extinguishing fires. However, it may not be applicable on substances, which are lighter than water, insoluble in water or incompatible with water.

The Leading Fire Men (LFM) will assess the use of water for fire fighting. If it is found to be adequate for handling the incident fire, he will formulate the fire fighting strategy keeping in mind the manpower and resources available, access to the incident location, availability of hydrant points/monitors and wind direction. Each crewmember will wear necessary fire suits before entering the "Hot Zone". The crewmembers should work in pairs, taking care of each other.

Fire fighting should be attempted only when it is safe to do so. When water is not the right answer and alternate fire fighting material is not readily available at the incident site it may be wise to let the fire burn while preventing the adjoining vessels from overheating by cooling them. This is true primarily in cases where the possibility of explosions is minimal. In cases where the possibility of explosion is high, all efforts should be directed towards preventing the explosion from occurring and evacuating the area.

Primary function of fire team subsequent to explosions is to prevent secondary fires. During such incidents care should be taken so that the team members are not exposed to risks of secondary or delayed explosions.

During the entire operations, the Leading Fire Men (LFM) would keep the fire service coordinator informed of the development so as to enable him to plan and deploy additional resources at the incident location.

c) **Removing or Limiting the amount of Combustibles**

If the incident involves only major leaks / spills and there is no fire/ explosion, the fire personnel will focus on plugging / stopping of the leak. Small leaks left unattended for extended periods of time can cause large losses of chemicals to the environment and have much more severe effects than would occur if the leak were somehow completely or partially plugged on a prompt basis. There are great benefits, therefore, in having access to one or more individuals with the basic tools and knowledge needed to limit losses from punctured or leaking tanks or pipelines.

The most widely available means for plugging holes or leaks in equipment involves use of conical, cylindrical, square or wedge shaped pieces of wood, rubber or metal sheets, inflatable pipe plugs, special patching compounds, clamps of various types, and a number of other items.

The plugs alone, if available in a variety of sizes, can be jammed into holes and greatly reduce the open area, from which the contents of the tank or pipeline can escape; assuming, of course, that it is safe for individuals to approach the leak area. Many incidents are brought to a rapid end simply by having the proper common tools available to close a valve or tighten some bolts. It is the responsibility of fire personnel to plug/stop leaks based on guidance obtained from technical coordinators.

d) **Suppression of Flammable Vapour**

As fire is a surface phenomenon, it is advisable to restrict the spread of pool. Based on the guidance from technical

coordinators, the response team shall take rapid measures to reduce the rate or amount of flammable / explosive vapours or gases entering the atmosphere using one or combination of the following measures:-

- Physical restriction of liquid pool surface areas.
- Transfer to an alternate or standby container if it is safe to do so.
- Dilution or coverage of liquid pools with water (or other compatible liquids).
- Cooling of spilled liquids or venting tanks.

*e) **Removal of Oxygen***

- This can be achieved by the following:-
- Use of fire-fighting or specialized hazardous material foams to cover the spill.
- Use of water sprays or fogs.

*f) **Provide Rescue Services***

As fire department personnel are adequately trained to rescue trapped people from collapsed structures, two members of the fire response team will help the industry personnel in rescuing the people, till the time rescue team arrives.

7.6 **POLICE DEPARTMENT**

The teams will coordinate the following activities:-

- ★ Controloft raffic near the affected areas so that emergency vehicles reach the incident site at the earliest
- ★ Ensuring law and order at the incident site duringe mergency

7.7 **MEDICAL SERVICES**

On receipt of information from the District Emergency Control Centre (DECC) , the district medical coordinator shall dispatch his medical teams to the incident site. Following are the major activities of emergency medical team sreaching the emergency site:

a) **Establishment of Triage Stations**

Mass casualty situations will require establishment of field hospitals to take care for the injured and to identify, stabilize, and transport more serious cases to hospitals. Medical team will establish triage stations near the affected installation and will be required to evaluate and colour code the victims. The following code is proposed:-

- Red for critical, such victims should to be sent to the hospital in the first available ambulance. Medical Officer manning the triage station will maintain a checklist for the number of victims sent to a particular hospital so as to know when the capacity is reached and further victims may be refused admission.
- Yellow for stable, such victims need to be sent to the hospital when there is room available in an ambulance after all the critical victims have been sent.
- Green for walking wounded, to be provided with first aid and treatment for shock and trauma.

Medical coordinator shall, from the list of the proposed rehabilitation centers, identify such are as to which the public can be directed in the aftermath of an accident where this action is warranted. Outside and local medical care personnel shall be informed by the district medical coordinator of their responsibilities in staffing and equipping such facilities quickly. Such field hospitals shall maintain a record of all the patients (as far as possible) so as to enable accounting of personnel and their destinations after triage. The on- scene medical command post shall be under the direction of the local medical coordinator. Local Medical coordinator shall also be responsible for formulating a mass casualty plan for the local hospitals as discussed in pre emergency activities.

b) **Medical Support for Response Personnel**

Where deemed necessary, properly equipped medical personnel and one or more ambulances shall be made available to check and (if necessary) treat injured response personnel as necessary. These personnel shall check the vital signs and general health of all personnel who will don specialized protective gear and enter "Hot" and "Warm" Zones, particularly where fully encapsulating protective suits are being used. The health of potentially exposed response workers shall be checked upon completion of their duties.

c) **Medical Support at Temporary Shelters**

Once the evacuees are at the shelter, it is the responsibility of local Medical coordinator to ensure their well-being. For this, the medical coordinator will assign team(s) to take care of people who become ill during evacuation or later. The doctors assigned this work should be aware of the signs and symptoms of exposure to flammable / explosive material and smoke so that they can easily identify victims and provide them with necessary treatment & care. Facilities should also be available for care of the handicapped and elderly.

7.8 **EXPERT PERSON**

Establishment of hazard control zones at the incident scene to limit the number of people in the most hazardous areas. The exact size and configuration of these hazard control zones must be determined and visually differentiated at each particular incident based on incident-specific factors and situations. These shall be determined by the technical coordinator based on the results of hazard analysis and may include the following:-

"Hot Zone" - Area of maximum hazard surrounding the damaged container(s) or fire area, which may only be entered by specially equipped and trained response personnel.

"Warm Zone" - Area of moderate hazard outside the Hot Zone in which properly equipped and trained backup crews stand by.

"Cold Zone" - Area outside the Warm Zone that poses minimal or negligible hazards to emergency personnel. The command post, most of the deployed apparatus, and the resource staging area should be located in the Cold Zone.

7.9 TRANSPORT COORDINATOR

Performing transport functions requires planning for the availability of buses / trucks / vans / ambulances and other vehicles to transport school children, residents of hospitals / nursing homes and general members of the public who do not own vehicles to safe shelters. For this the prime responsibility rests with the local transport coordinator who, on receipt of information about the emergency from District Emergency Control Centre (DECC), will direct the fleet (drivers) and coordinate the following transport activities during an emergency:-

- During the emergency, he will work in close liaison with the communication and evacuation coordinators.
- On getting instructions from the District Crisis Group (DCG), he will effect the warning / instruction / notification operation,
- Arrange for the fleet of vehicles at a pre-designated location so that they can transport the affected population to safer areas (Rehabilitation Centers),
- Make coordinating efforts with vulnerable areas such as schools, hospitals, nursing homes, cinema halls, shopping malls, etc. for evacuation of people to safer places.
- He will also be responsible for ensuring that any needed response equipment, material and personnel, are arranged promptly to the scene of an accident and for ensuring an adequate state of operational readiness thus consolidating the management of all transport related activities.

- Through mutual aid and other services, he shall be responsible for arranging ambulances at the incident site. Emergency transport and ambulance facilities available with the industries in Anand district are listed at Appendix-E respectively.
- He shall also be responsible for arranging the protective equipment, clothing, devices, and any decontamination and /or treatment supplies that may be required by ambulance personnel in an actual emergency.

7.10 LIAISON & PUBLIC RELATIONS COORDINATOR

The public needs to be informed accurately and rapidly as to what is happening during an emergency situation. Significant incidents may result in a large number of reporters arriving on scene and attempting to interview any body and everybody. The Public Relations coordinator shall undertake the following tasks to help reduce confusion, facilitate information transfer, reduce problems that might be otherwise caused by a lack of organization, and reduce the incidence of unfounded rumours.

- Designate one specific individual and an alternate press officer to join the team of press officers that may be formed from representatives of all major parties to an emergency response operation (be they from local, state or central government agencies or the company responsible for the accident).
- Compile a list of telephone numbers of local radio and television station personnel who can initiate special "on air" announcements.
- Provide designated press officers with secretarial support, photocopy machines, and a means of communications with the overall command of the response operation.
- Select a site, preferably but not necessarily near the central emergency operations center, where the press can convene and be briefed by the press officer team. This site should ideally have telephones, electrical outlets, restrooms, and other facilities that media personnel may require.

- Establish a firm policy among all local officials and response personnel as to who should or should not speak to media personnel.
- Ensure that key emergency response personnel understand the need to relay up-to-date "status reports" to press officers on a regular basis.

Things To Do

- Accommodate the media as much as possible; make the news available to them.
- Schedule news conferences and avoid written releases.
- Be direct and specific.
- Always, always tell the truth.
- Send a press representative to the command post.
- Ensure that the team of press officers is in contact with the command post at all times.
- If safety permits, allow the media to take pictures of the accident site.

Things Not To Do

- Do not permit arguments among public officials or press officers from different organizations in front of the press. Do, however, permit statements of dissenting opinions.
- Avoid giving opinions or conjecturing.
- Do not be evasive. If the answer to a question is not known, refer the question to someone who has the appropriate answer.
- Do not be critical in a personal manner; i.e., avoid personal remarks about other people at the accident scene.
- Do not be philosophical. These kinds of discussions are extremely susceptible to being quoted out of context.
- Do not make off-the-record comments. They may end up in print with later retractions buried in the back pages.
- Avoid friendly chats with media people. Casual comments may appear in print.

- Avoid bad or foul language.
- Do not hide from the media. They can sense this and form an unfavourable opinion of the press officer(s) as a credible source of news.
- Do not answer questions beyond personal knowledge or expertise.
- Do not permit media persons to attend emergency response team meetings. These are likely to be technical meetings with lively discussions that may last forever if people are performing rather than dealing with the problem at hand.
- Reasons for planning for and controlling statements made during a severe emergency go beyond a simple desire to ensure orderly and accurate dissemination of information. One of the groups showing up more frequently at hazardous materials accidents is of lawyers representing a wide variety of interests. It should be remembered that good lawyers would remember everything they see and hear. A thoughtless comment or statement can surfacemonths later in a courtroom. Placements of blame, criticisms of response actions, airing of dirty laundry in public, and similar statements can result in lengthy and messy legal battles over comments or charges made in the heat of a very hectic moment.

7.11 THE MAJOR ACCIDENT RESPONSE TEAM (MART)

The industrial emergency will be managed by two parts to handle & control the incidence from the District Crisis Group.

1. High Level Committee
2. Working Task Force.

7.11.1 HIGHLEVELCOMMITTEE

The committee handled by Chairman, will describe the strategy and pooling and utilization of recourses as policy level on assessing situation & discussion with the other members. The head of department, Executives, etc from the various emergency services / organisation / department will from constitutive high level committee. Suggested high level committee.

- 1.** Chairman-District Magistrate & Collector
- 2.** Member Secretary- Dy. Director, Industrial Safety & Health
- 3.** Fire - Commandant
- 4.** Police Commandant
- 5.** Medical & Health Commandant
- 6.** Expert Person / Representative from MAH Units
- 7.** Chair person for Local Crisis Group

7.11.2 WORKING TASK FORCE

The Task force who have to perform the actual work by different level of the person atsite, will consists of the following

2. Chair person - Additional Collector
3. Law & Order Team
4. Fire & Rescue Team
5. Medical & Health Team
6. Shelter/Evacuation / Rehabilitation Team
7. Public Awareness/ PublicAdditional Team
8. Mutual Aid / Personal Protective Equipment Team

7.11.3 WORK PERFORMANCE BY TASK FORCE:

1. Fire & Rescue Task Force

1. Inspection, Survey & assess the situation where incident & give the report.
2. To decide the proper & effected actions & immediate response action to control the emergency, under intimation control room or Chairperson.
3. Propert raining to fight against industrial hazards & knowledge on identification on such hazards.
4. Rescue, evacuation. Remove of derbies & other emergency work as directed or instructed.
5. To maintain the proper & adequate fire fighting equipments,neutralizing media, SBA sets,

emergency equipments, PPESs with keeping in working order.

6. Keep liaison with central control room & other emergency services.
7. To prepare their own detail action plan & to ensure the provision to handle the industrial emergency.

2. Law & Order / Traffic Control - Diversion Team

1. To regulate entry of person in affected area.
2. To maintain Law & Order in strict manner in affected area.
3. To control all un-wanted traffic via safe route.
4. To verify that no person should left in affected area.
5. To ensure protection of property in evacuated area.
6. To cordon - off the affected area.

3. Health & Medical Team

1. To ensure the arrangement & preparedness for special medical treatment, antidotes & trained doctors, paramedical staff as specified at the time of emergency.
2. On declaration of emergency or on receiving the message or information, prompt medical facilities should be setup e.g. first aid post, causality receiving centre or camp at site. Also make arrangement for emergency operation or special treatment.
3. Identification of dead bodies and post mortem arrangements.
4. To maintain up to date list with telephone nos. of services of Doctors, Hospitals, Ambulance, PHC, Paramedical staff etc.
5. Arrangement to inform to up to date status time to

time from central control room, chairperson, relative of injured or admitted patient.

6. To prepare own detail action plan, to ensure effective handling of emergency

4. Toxicity / Monitoring / Expert / Weather Details Task Force

1. Identify the hazards of different chemical used in the factory.
2. To keep up upto date information on antidotes for the toxic chemicals.
3. To obtain data on wind direction / velocity
4. To assess area of dispersion (Hazardous Chemicals)
5. Monitor the concentration of hazardous chemicals as and when required.

5. Public Awareness / Public Address System

1. To arrange equipments & Vehicles for public address.
2. To direct the public for safe movement according to emergency situation.

6. Shelter / Evacuation / Demolition & Rehabilitation Team

1. To prepare data bank available vehicles for emergency.
2. To fix route of travel to safe shelter / rehabilitation centre.
3. Provide all kind to helps in evacuation / demolition , if necessary.
4. To distribute responsibilities / evacuation in different areas.
5. Ensure & make available Primary facilities at the shelter places.

7.

Mutual Aid / PPE'S Team

1. To keep information regarding trained person for different jobs.
2. To keep information regarding Self breathing apparatus, Chlorine Kits & other Personnel resources.
3. To keep information regarding different types of fire Extinguishers & available water resources.
4. To avail every mutual aid requirements within short notice.
5. To check every equipment in working condition.

7.12 PROBABLE MAJOR ACCIDENT SCENARIO**7.12.1 Introduction**

Emergency preparedness is structured on maximum credible accidents. The primary risk assessment has been discussed in Chapter - 4. However, it is pertinent to discuss the type and escalation of emergency situation which may arise from Liquid Flammable Material release and Toxic Material release.

7.12.2 Flammable Substance Release

The following examples show how events involving flammable materials may need different planned responses:

❶ **A major fire but with no danger of an explosion, e.g. fire in oil storage tank:**

The hazards would be prolonged high levels of thermal radiation and smoke. It is unlikely that anyone outside the site would be affected immediately. Only houses close to and directly exposed to severe thermal radiation would need to be evacuated. In some cases, it might be desirable to evacuate those areas severely affected by smoke.

● **A fire threatening a major item of plant or a storage tank containing hazardous materials:**

As a part of the on site assessment, the consequences of such an event should have been estimated and the area that it might be necessary to evacuate determined. Hence, the appropriate response might be to evacuate those potentially at risk.

● **A fire similar to (ii) above, but developing too quickly to allowing no time for evacuation:**

The best possible response might be to advise people to remain indoors away from windows and shielded from line of sight of fire. Evacuation should NOT be attempted if there is a significant risk that fireball or BLEVE could occur while the people were in the open.

● **Catastrophic**

For some major catastrophic events that occur without warning, it may not be possible to take prior emergency action. However, most such events are of very short duration. The role of emergency services would be to rescue and do medical treatment of the victims, extinguishing secondary fires etc. on emergency basis.

7.12.3 Explosion:

Explosions may be variously classed as.

1. Chemical Explosions. / Thermal Explosion
2. Physical Explosions
3. Mechanical Explosion
4. Dust Explosions
5. Electrical Explosions
6. Nuclear Explosions

Explosions are frequently accompanied by fires and occur under similar circumstances. They may be sub - divided in to:-

1. Confined explosions in buildings, boilers, process plants, storages, Godowns etc.
2. Unconfined vapour cloud explosions.

Both confined and unconfined vapour cloud explosions usually originate in a leak of gas or vapour or vaporising liquid into the atmosphere.

Flammable gas- air mixtures have limits of detonability which have in many cases been determined and which lie within the flammability limits. On their sudden release to atmosphere through vents, leaks etc, they form clouds which will depend upon the released quantity, physical properties, wind velocity, readily spread over the site. As most of the hydrocarbons gases are heavier than air, they fill up pits, pipes, trenches and other low lying areas. An explosion will occur if such a mixture of hydrocarbon and air within certain concentrations come in contact with a source of ignition. The leakage shall be quickly isolated and shall be allowed to disperse.

7.12.4 Toxic Substance Release:

The following examples show how events involving toxic materials may need different planned responses.

● A slow intermittent release e.g. Through a leaking relief valve:

It would be unlikely that any one outside the site would be severely affected immediately, although many of the notifiable substances have irritant properties or an unusual smell. If there were reason to foresee that the release would not be controlled quickly or would grow with time, it might be desirable to evacuate those people nearest to the site or release and most closely downwind of it, provided that this evacuation would, increase their safety.

● **A fire or mechanical damage that threatened an installation containing toxic materials:**

If the fire could not be controlled and there will likely to be a reasonable period before over pressurisation or plant failure can occur, evacuation might be appropriate. Once again priority should be given to those nearest the plant (in full directions) and those in an appropriate sector. (30°,downwind)

● **Rapid event with a limited duration e.g. The fracture of a component that could be isolated within a reasonable time:**

Incident that grow and are immediately controlled should warrant evacuation. Any toxic cloud formed would be limited in size and would be likely to drift past a particular spot relatively quickly. The best place for people in the area would be indoors, upstairs with windows and doors closed.

● **A Major Event**

A major event leading to a sudden release of a large quantity of a toxic substance, which would form a large toxic cloud e. g. release to atmosphere of most of the contents of a storage vessel through the failure of a tank shell, manhole cover etc. Although the probability of such an event occurring is extremely low, the consequences would be severe for people living close to the incident and in the path of the cloud. All the emergency services need to be summoned on war footing. The major difference between releases of toxic and flammable material is that toxic clouds tend to be hazardous down to much lower concentration than flammable clouds and there fore may remain hazardous over greater distances, while travelling with the wind. The consequences arising from release of toxic material, drifting at perhaps 300 meters a minute and dispersing slowly are difficult to

predict. In every case, however, the hazard is greatest close to the source and near the downwind plume. Unless there is a delay, as in (a) or (b) above, the best course NOT to attempt evacuation. For those, who were not evacuated, but were then exposed to a prolonged release, the chances of survival would diminish with the passing of time. The Emergency Coordinating Officer (in-charge of off-site plan) perhaps in consultation with the Site Main Controller of the factory from which the emergency has arisen or the nearby factory in case of emergency outside the factory premises, would have to make quick decision when and how to attempt rescue.

CHAPTER - 8

POST EMERGENCY

8.1 INTRODUCTION

Once the situation at the site is under control, the spill/leak has been plugged, fire has been extinguished, the emission of vapours to the atmosphere has been effectively checked and a SAFE signal has been passed its time for the follow up exercise. Details of post-emergency activities are given below in order of priority.

8.1 INSPECTIONS AFTER FIRES OR EXPLOSIONS

A major explosion could damage or destroy numerous buildings and any nearby bridges or tunnels. Similarly large fires can have major effects over a vast area. In either case, residents of partially damaged buildings will want to know if the structures are safe to occupy while they wait repairs. Questions pertaining to the safety of highway or railway bridges must be resolved quickly to avoid traffic complications.

It is important to note that inspection personnel may require special precautions (i.e., chemical protective gear) in addition to normal safety equipment in those cases where the structure may still be contaminated by hazardous residues.

Technical coordinators shall be responsible for coordinating inspection of the structural integrity of damaged buildings, bridges, or other structures in the aftermath of a fire or explosion through expert agencies.

8.2 POST-INCIDENT TESTING FOR CONTAMINATION

To some extent, this item overlaps with monitoring of concentrations. However, activity in "Action Plan" covers sampling and analysis during the initial phases of a response action while this one is concerned with the potential for persistent after effects.

Personnel of the Gujarat Pollution Control Board shall undertake to check crops, water (ground & surface), homes, stored foods, and animals that may become part of the human food chain for possible chemical contamination. Help may be sought from the industries having capabilities for monitoring / testing of contaminant in the target items.

8.3 WASTE DISPOSAL

After a major accident, it may become necessary for public authorities to undertake disposal of hazardous wastes. This requires knowledge of Hazardous Waste (Management & Handling) Rules, 1989 (as amended in 2000 and 2003) of the Ministry of Environment & Forests, Govt. of India. The location of approved and authorized disposal sites and the proper procedures for transporting and transferring wastes to these sites have also to be taken care of. Local authorities should seek assistance from the state department of environment. The items unfit for human consumption will also form part of the Hazardous waste, which needs to be disposed off in accordance with the above mentioned rules.

8.4 CLEANUP OF DEAD OR CONTAMINATED LIVESTOCK OR WILD LIFE

Contaminated animals must be sent to veterinary hospital for decontamination & treatment. A large number of animal carcasses, be they hundreds of cows or chickens or thousands of fish, can pose a variety of health hazards. Emergency response plans do not typically address this topic, possibly because it is somewhat distasteful, but the topic is worthy of consideration during the planning process where

applicable. Where oil spills may contaminate waterfowl, consideration might be given to the formation of work crews to collect, clean, and care for the animals under the direction of experienced personnel. State and local public works agencies can provide assistance in planning for this activity. Local veterinarians and animal conservation groups may also be helpful, but in all cases, it is the responsibility of medical coordinator to ensure that personnel will not be placed at risk of adverse safety or health impacts by their actions.

8.5 PROVISION OF ALTERNATE WATER SUPPLIES

There are a number of circumstances under which a potable water supply may become unfit for human consumption for a time and require replacement. This is most commonly accomplished by bringing in supplies of bottled water and/ or tankers/trailers capable of carrying water. The later are available from local Municipal Corporation. Tankers carrying milk are another possibility for consideration once thoroughly cleaned. It is the responsibility of transport coordinator in association with the social workers for arranging potable water for consumption of personnel engaged at the incident site. The potential sources of potable water are wells of water intake point of River Sabarmati, and ground water from neighbouring villages / towns / agricultural areas where possibility of ground water pollution due to spillage of contaminants is minimal.

8.6 RE-ENTRY INTO EVACUATED AREAS

Based on the assessment of the situation at the site, the LCG would take decision on the termination of emergency. Before this, however, several issues need to be resolved by the members of LCG. Re-entry being again as complex as the evacuation operation, would require the respective coordinators to perform their functions such as transportation of evacuees back to their respective residential areas, restoration of electricity, gas, water supplies, post-accident monitoring of concentration, etc. The issues/activities thus required are listed at Table Below in order of priority. However, as some of these are

parallel activities, the decision should be taken based on actual site conditions.

The activities listed below are only those, which are essential for return of the normalcy. However, as the last item suggests, regular raining to all sections of the society is also of equal importance.

Table : Post Emergency Activities

Activity	Responsibility
Check the industrial unit for possible secondary effect of delayed relapse.	Technical experts
Provide notification at the shelters of termination of emergency	Communications Coordinator
Restoration of water, electricity and gas supplies	Utilities coordinator
Arrange for transportation of evacuees back to residence	Transportation coordinator
Restoration of law and order in the affected areas	Security coordinator
Establish grievance cell	Liaison & PR coordinator and chairperson of DCG
Hold press conference	Public Relations Coordinator
Hold public meetings for answering their queries	PR coordinator in association with officials of the concerned MAH unit
Arrange for providing interim relief to the affected people	Collector
Undertake accident investigation and documentation	Technical coordinator
Arrange further relief to the affected people based on claim applications	Collector
Plan updating,if so required	DCG
Provide training to community and staff	DCG

CHAPTER - 9

EMERGENCY INSTRUCTION TO THE GENERAL PUBLIC

9.1 THE NOTIFICATION OF EMERGENCY

The emergency can be declared by following media to alert or alarm the public;

1. Public address system
2. Blow horns / Bells
3. Sirens / Hooters
4. Telephone message / Fax Messages / Hot lines / Pager /E-Mails/
Mobile Phone / Satellite systems
5. Sending messages through a messenger
6. Rushing personally to the Central Control Room or to the nearest
Police Department or Fire Department for declaration of emergency
7. Raising of Flag for denoting the level of natural calamities
8. Ham Radio
9. VHF link
10. By any other source by which information can reach to the public
in time.

9.2 CATEGORY OF ALARM SYSTEMS

The following alarm system may be considered which will identify the various level of emergency.

9.2.1 First Level Warning (FIRE ALARM)

- For an accident / incident within the unit
- Hooter / Siren – Short, intermittent

9.2.2 **Second Level Warning**

When the District Authority receives information that a toxic or flammable gas has leaked then the siren has to be sounded in order to facilitate early evacuations from the unit.

- Siren—A wailing short and long intermittent siren notification of emergency

9.2.3 **Third Level Warning (All Clear)**

When the District Authority considers that the accident / incident is under control, emergency is withdrawing and it is safe for re-entry.

- Siren – A wailing, long and continues, intermittent siren

9.3 **GENERAL INSTRUCTION TO THE PUBLIC**

A major emergency may affect areas outside the works. The surrounding public will be alerted with public address system by Police or Government Authorities or nearby industrial concerns. The siren / hooter will blow, to indicate arising the emergency situation.

It will be indicated which type of emergency arised, Start the Radio / TV for further instruction & act accordingly. So that public will take prompt action to protect them-selves or rush to the safe shelter as instructed by the authority.

First of all to ascertain which type of emergency arised:

- a. Fire
- c. Explosion
- d. Gas Leakage / Release
- e. Collapse of Building, Bursting of Vessel etc.
- e. Natural Calamities

If Gas Leakage emergency arises, ascertain probability of gas whether flammable, toxic or poisonous. The following actions are suggested as per prevailing situation: Otherwise follow the instruction as issued by the authority;

9.3.1 Flammable Gas:

1. Be calm, don't get panicky.
2. Do not light Bidi / Cigarette / Lighter etc.
3. Shut down open flame, gas, and electrical instruments or any source of ignition.
4. Do not move any vehicle in the area.
5. Do not go near the incident & don't allow any others.
6. Shut down the windows, doors etc & seat open ground or terrace.
7. Follow the instruction as directed by the authority.

9.3.2 Toxic or Poisonous Gas:

1. Cover your nose with wet hand kerchief / cloth and breath through it.
2. Come out in open, check the wind direction and move away quickly in perpendicular direction of wind. (cross wind direction)
3. Immediately go & try to get to a higher elevation, if gas is heavier than air (like chlorine, as it settle in low lying area).
4. Follow the instruction and reach safe shelter as instructed notified by Government Authority or Public authority.

9.3.3 General Instruction:

(A) DO'S

- a. Listen radio, T.V. or Public Addressing System.
- b. Emergency will be communicated by public addressing system / TV / Radio or siren (Siren - code wailing sound for one minute).
- c. Follow the instruction & convey to others accordingly.
- d. On announcement of withdrawal of emergency or clearance Siren, start your routine work.
- e. On inquiry, deposit your statement as required by authority at the time of investigating the incident.
- f. Co-operate, Help and Assist the person (s) / authority handling the emergency and rescue operation.

(B) DON'T

1. Do not get panicky, be calm.
2. Do not approach the site of incident as a spectator.
3. Do not approach unnecessarily for information or more enquiries.
4. Do not allow unnecessarily crowd nearby incident place.
5. Do not believe in rumours unnecessarily.

CHAPTER - 10

REHERSAL / EXERCISE / MOCK DRILL

10.1 SUBJECT

Exercise /Rehearsal /Simulation onOff-Site Emergency Plan, Considering any one of the event related with hazardous chemical which may create maximum credible scenario.

10.2 AIM

It is necessary that all aspect of emergency plan is tested, often to ensure that they carry out their responsibility & function as specified and in particular to:

Test the response from emergency services, and other govt. departments, local agencies,volunteer groups, media etc.

Test and evaluate the interaction of various agencies / authorities involved and ensure that all components are properly coordinated.

Evaluate the available resources, equipments, its effectiveness, accuracy etc.

Gain experience to create the confidence to handle & control the emergency amongst the participating persons, members and others.

10.3 AUTHORITY OF EXERCISE /REHEARSAL

The chair person is required to assume responsibilities & make decisions as seen to be legitimate. The members secretary will works as co-ordinators for mockdrill purpose.

10.4 TABLE DISCUSSION

The first part of exercise is 'Table Top' exercises to test that emergency plan do not interrupt the day-to-day running of their concerns. This will identify the difficulties involved and practical approaches. The scenarios will be decided and consideration shall be given to live practical involving all concerned at suitable intervals, in addition to those of a theoretical nature. The mock drill shall not create any panicky to any person.

10.5 BLUE PRINT

A blue print will be prepared as guideline to act, for a selected scenario. The details, maps, affected areas, role & responsibility will be specific and information will be supplied to all concerned persons. The scenario will be explained by co-ordinator/ member secretary. The Off Site Emergency Plan will be helpful.

10.6 CODE-NAME FOR REHEARSAL

The code name shall be give to identify the case of rehearsal not real incident. So that, on getting message there will be no panicky amongst the operative person. If real emergency arised, then there will be no code-name. Further, the code name will be announced to conveying the message to authority, operative persons, etc.

10.7 NATURE

Origin, Date & time, location and Duration of exercise etc. will be pre-decided in particular manner.

10.8 AFFECTED AREA

It is the indication of the spread of disaster. This will be reflected in Blue print & give details of original place, units, surrounding identities, villages, roads, locations etc.

10.9 EMERGENCY CONTROL CENTRE

An Emergency Control Centre will be established for exercise purpose where communication & other activities can be performed. The control center will have emergency facilities. The required documents like Off-Site Emergency Plan, details on weather conditions, list of persons to participate, emergency scenario, maps, affected areas, emergency telephone numbers, list of hospitals, list of emergency vehicle & equipment will be kept ready. An experienced & expert person will be posted in Control Room.

10.10 PREPARATION STAGE

The responsibilities & duties will be allotted to each group, services and involving all personnel. Educative meeting will be arranged to explain the role of each participant. Blue print, scenarios and arrangements will be discussed at large. Charts, maps, Posters, Banners etc. will be prepared for good performance.

10.11 RESOURCES AND FACILITIES

Certain essential facilities shall be provided to the participants as required during actual emergency period. Further, adequate resources shall be made available to handle the situation. The some dummy- person have to select as to play and act as dead, serious injured, minor injury for purpose of realization of scenario, and they will be identified by colour badges like, RED indicates as dead, GREEN indicates as immediatead mission to the hospital for operation, YELLOW indicates first aid treatment, WHITE indicates no physical injury. The Experienced person shall be invited as OBSERVERS and separate identity cards shall be issued to them.

10.12 SEQUENTIAL ACTIONS

The whole exercise /rehearsal will be arranged in sequential actions as per off-site emergency plan. Thus rehearsal will be conducted, as actual performance.

10.13 OBSERVATIONS

The outsiders / third party will perform the role of observers and they will submit their reports on various site-observations with shortcomings & good features.

10.14 DE - BRIEF MEETING

On completion of exercise, a de-brief meeting will convene to discuss the conducted exercise, give views on performance of each area; explain difficulties, resources, limitation, planning etc. All these observations, with corrective steps will be noted & reports will be prepared.

10.15 PHOTOGRAPHS, VIDEO & PRESS COVERAGE

Photography, videography will be carried out for the work performed. The reports of such exercise will be sent to press for coverage. Leaflets and Pamphlets will be issued to the public to educate them for the emergency.

10.16 FORMAT FOR REHEARSAL /EXERCISE /MOCK DRILL

A format for rehearsal / exercise / mockdrill is given in Annexure-26.

OFF SITE EMERGENCY PLAN

**ANAND DISTRICT CRISIS GROUP
ANAND**

ANNEXURE SECTION

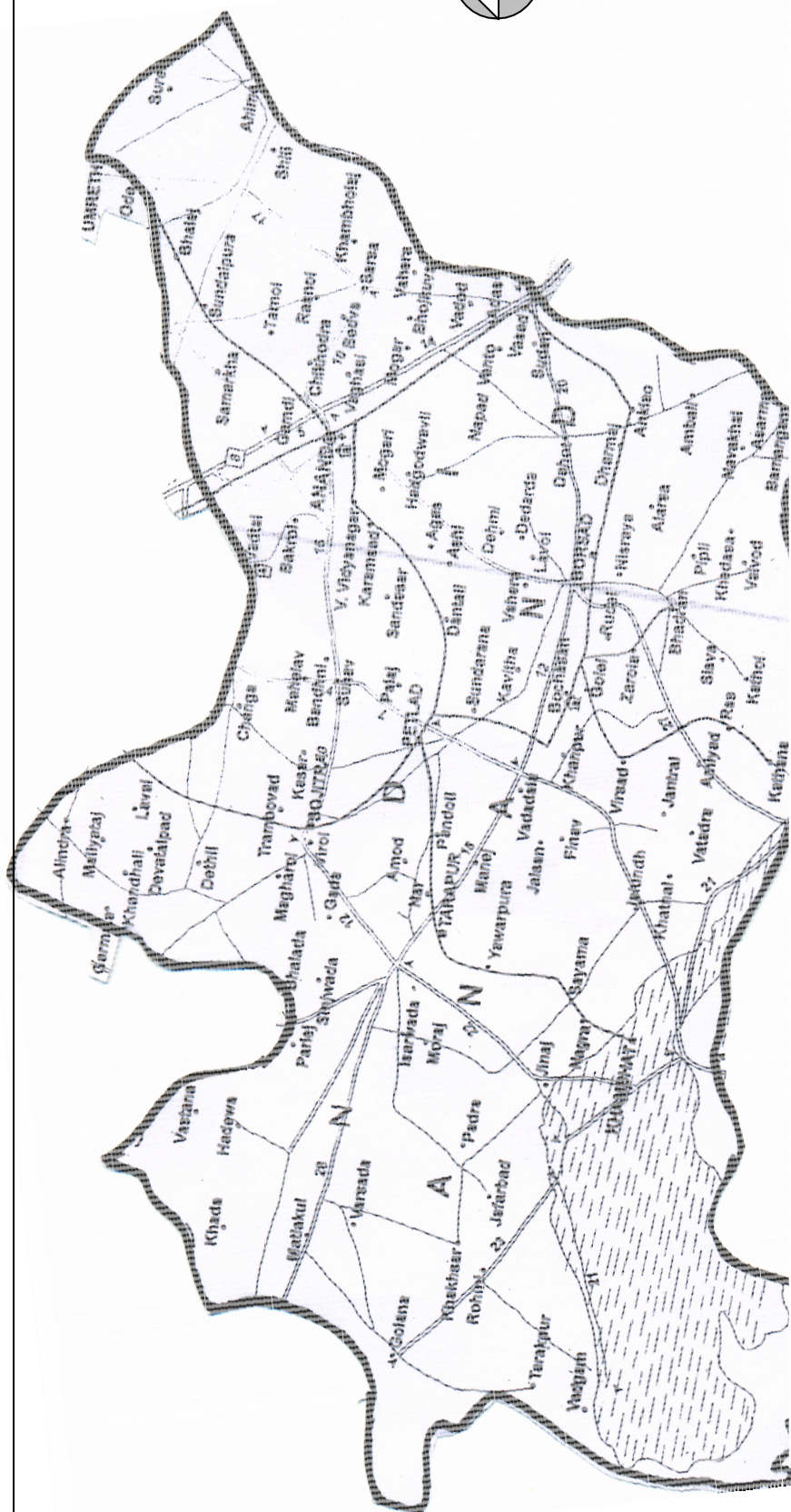
: Prepared By :

**ANAND DISTRICT CRISIS GROUP
ANAND**

May 2026

ANNEXURE-1

ANANADDISTRICTCRISISGROUP MAPOFTHEDISTRICTWITHMAHIDUSTRIESLOCATION



LOCATION OF MAH UNIT			
Cambay Chem Ltd- M1	Cambay Organics P.Ltd- M2		Gujarat Ind. Chem. Corp- M4
Jay Chemicals Ltd- M5	Sheetal Chemical Ind.- M6		

LEGENDS			
District Boundary		Road	
River		Railway	

ANNEXURE-2

ANAND DISTRICT CRISIS GROUP

COMPOSITION OF DISTRICT CRISIS GROUP

આણંદ જિલ્લા કાઇસીસ ગ્રુપની રચના

આણંદ

પ્રતિ,

અધિક મુખ્ય સચિવશ્રી,

શ્રમ અને રોજગાર વિભાગ,

સચિવાલય, ગાંધીનગર,

વિષય : જિલ્લા કક્ષાએ કાઇસીસ ગ્રુપની રચના અંગે આણંદ જિલ્લો.

ઉપર્યુક્ત વિષય બાબતમાં ભારત સરકારશ્રીના પર્યાવરણના અને વન વિભાગના તા-૦૧/૦૮/૧૯૮૬ ના જાહેરનામા ક્રમાંક:જી.એસ.આર.૩૪૭(ઇ)અન્વયે કેમીકલ એક્સીડન્ટસ (ઇમરજન્સી પ્લાનીંગ, પ્રિપેડનેસ એન્ડ રીસ્પોન્સ)રૂલ્સ-૧૯૮૬ ના નિયમ - ૮(૧) મુજબ જિલ્લા કક્ષાએ કાઇસીસ ગ્રુપની રચના કરવામાં આવે છે. પરિશિષ્ટ-અ મુજબ પ્રસ્તુત કાઇસીસ ગ્રુપની રચના કરવામાં આવે છે. પરિશિષ્ટમાં દર્શાવેલ હોદ્દદારશ્રીઓ/ અધિકારીશ્રીઓ તેમજ તેના અનુગામી અધિકારીશ્રીઓએ ઉપરોક્ત રૂલ્સમાં દર્શાવેલ ફરજો ઇમરજન્સી વખતે બજાવવાની રહેશે.

(sd/-)

અધ્યક્ષશ્રી

ડિસ્ટ્રીક્ટ કાઇસીસ ગ્રુપ, આણંદ

અને

ડિસ્ટ્રીક્ટ કલેક્ટરશ્રી, આણંદ

બિડાણ :

જય ભારત સાથે નકલ રવાના જાણ અર્થે,

(૧) શ્રમ આયુક્ત , ગુજરાત રાજ્ય અમદાવાદ.

(૨) ડાયરેક્ટર ઇન્ડસ્ટ્રીયલ સેફ્ટી એન્ડ હેલ્થ , ગુજરાત રાજ્ય, અમદાવાદ.

(૩) જોઇન્ટ કાયરેક્ટર ઇન્ડસ્ટ્રીયલ સેફ્ટી એન્ડ હેલ્થ , વડોદરા રીજીયન , વડોદરા.

ANAND DISTRICT CRISIS GROUP**ANNEXURE-2****COMPOSITION OF DISTRICT CRISIS GROUP**

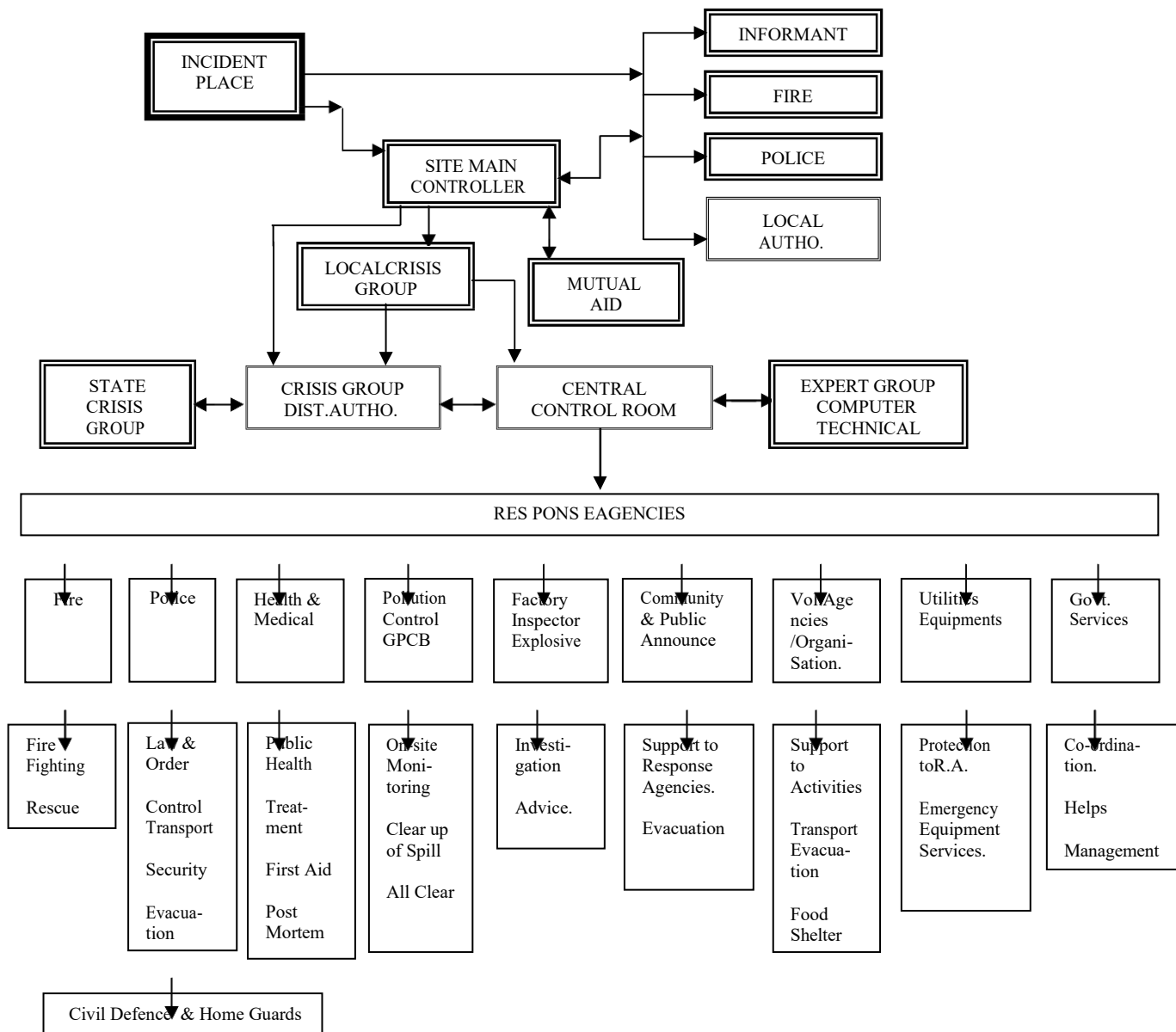
Sr. No.	Name	Designation in Crisis Group	Address		Phone	
			Office	Resident	Office	Resident
1	2	3	4	5	6	7
1.	Mr.Praveen Chaudhary,(IAS) District Collector	Chairman	Dist. Collector Office, New Seva Sadan,Nr.Ganesh Crossing,Anand 388001	-	(02692) 262271	(02692) 261000
					M:9978406203	
2.	Mr R.H. Solanki.Asst.Dir ector,Industrial Safety&Health	Member Secretary	Room No.218, JillaSeva Sadan, Nr.Borsad Chokdi,Anand	-	(02692) 264396	-
					M:8980029190	
3.	Engela Gamadiya DPO/District Emergency Officer	Member	District Emergency Operation Center, Circuit House Compound,Amul Dairy Road,Anand	-	0269226 243222	
					M:9898283817	
4.	S.P.BHagora, IAS Regional Commissioner of Municipalities	Member	Office of regional Commissioner of Municipalities,6 th floor,VUDA Bhavan,nearlion circle,karelibag, Vadodara-38	-	+91-265-2493315	---
						
5.	Mr. J. N. Panchal DSP, Anand	Member	DSP Office, Anand	-	(02692) 240515	....
					M :9978408879	
6.	Mr.Ketan shah SE,MGVCL,Anand	Member	GEB Office,Anand	-		M. 98792007 40
7.	Mr. DharmeshGaur Chief Fire Officer,Anand	Member	Anand Municipality,Sardar Gunj Road,Anand	-	(02692) 223408	75748317 11
8.	Mr. Hetalbhai Dave Deputy Director of Information, Anand	Member	Room No.113, JillaSeva Sadan, Nr.Borsad Chokdi,Anand	-	(02692) 264994	9825599 149
9.	Dr. Venugopal Deputy Controller of Explosive,Vadodara	Member	Dy. Chief Controller Office, 9 th floor, Park paradise, Vadodara	..	(0265) 2225159	...
10.	District Chief Home Guard Commandant	Member	Jilla Seva Sadan,Opp.DSP Office, 4 th floor,Borasad Chokadi, Anand	-	(02692) 260956	....

ANNEXURE-
Continue...

ANAND DISTRICT CRISIS GROUP
COMPOSITION OF DISTRICT CRISIS GROUP

Sr. No.	Name	Designation in Crisis Group	Address		Phone	
			Office	Resident	Office	Resident
1	2	3	4	5	6	7
11.	Mr.Arvinbhai Patel, President, Mazdoor Mahajan,Anand	Member	Mazdoor Mahajan,Opp. Amul Dairy. Anand	-	(02692) 223401	M. 9904161591
12.	Dr. Dipak Parmar,CDHO Anand Incharge	Member	Dist Panchayat Office ANAND	-	(02692) 263277	-
					M. 7567870001	
13.	Mr. Hitesh ghadhvi Executive Engineer, and R&B.Anand	Member	Executive Engineer, R & B Office Opp.DSPOffice, ANAND	-	(02692) 260455	9879650171
14.	Mrs.Pavan Sharma Regional Officer GPCB,Anand	Member	GPCB Office,Anand	-	(02692) 266194, 266195	-
					M:9099011681	
15.	Mr. D.K.Chavda, ARTO,Anand	Member	ARTO Office,Bedwa, Ta/di-Anand	-	(02692) 264800	9737782289
16.	Mr. Prakash.B.Patel Chauhan,Safety Manager	Member	Cambay Organics Pvt Ltd, Khambhat	-	(02698) 221202	M:99256 70179
17.	Mr. Viral Solanki, Safety Manager	Member	Shital Chemical Industries, Khambhat	-	+91- 7383281 857	+91- 82005378 03
18.	Mr. Viajybhaj Mujiara, Manager	Member	Bodal Chemicals Limited, Khambhat	-	94293994 1	70690467 98
19.	Mr.Kamlesh Patel ,Head EHS	Member	Jay Chemicals Ltd., Kalamsar, Khambhat	-	9925207 415	90999464 12
20.	Mr.Hemal R. Patel,Secretary	Member	GIDC Association Office,EleconHall, GIDC,V.U.Nagar, Anand	-	(02962) 236186	
					M.9825089070	
21	Mr.Chintan S. Patel, Distric Agriculture Officer,Anand	Member	District Agriculture Officer,Borasad Chowkadi,Anand	-	(02692) 258102	-
					M:9998966798	
21	Shri Kunjal Shah SDM,Khambhat	Member Member	Dy. Collector Office,Khambhat	-	(02698) 221021	75670104 08

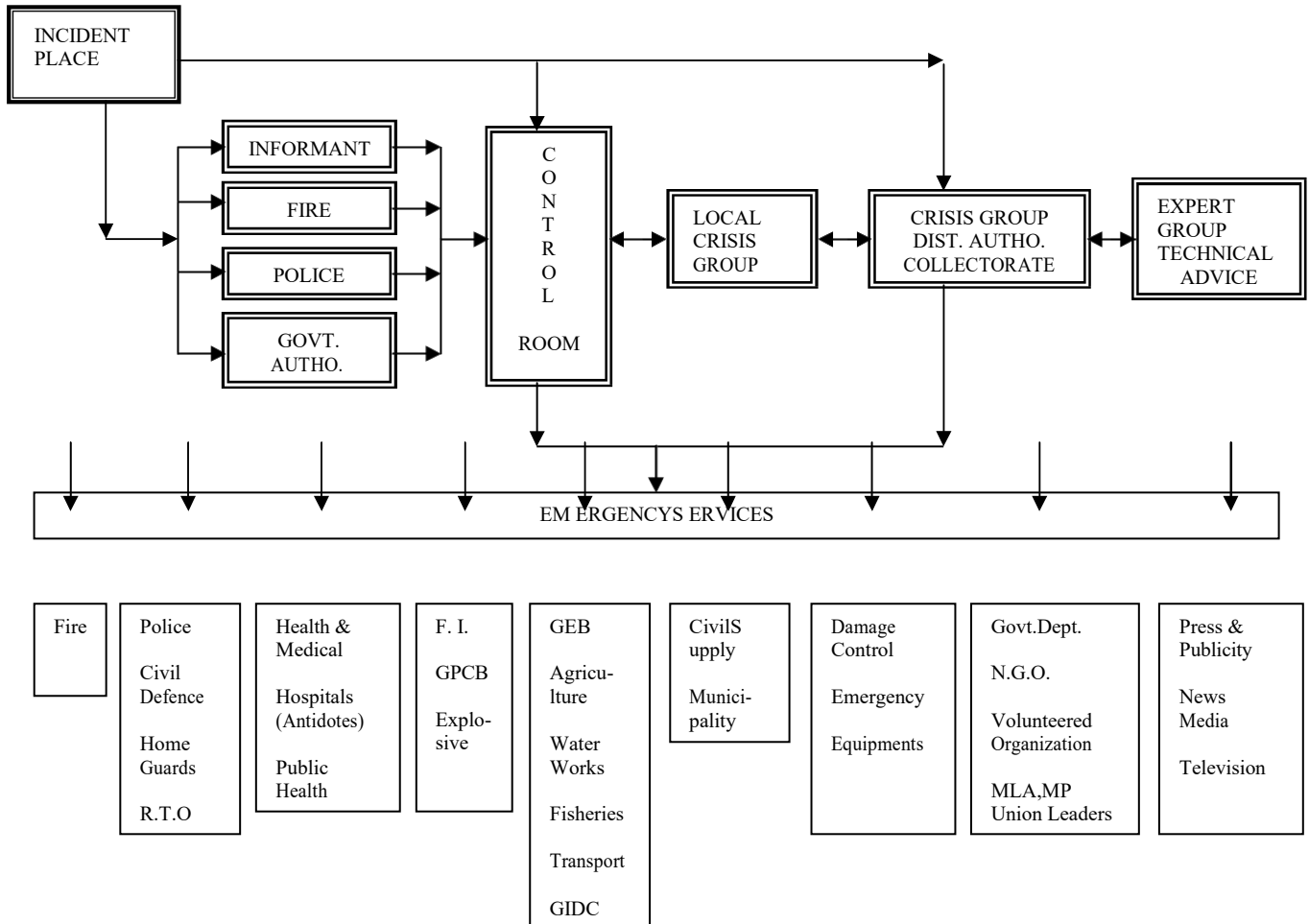
EMERGENCY RESPONSE DIAGRAM



OFF-SITE EMERGENCY PLAN

ANAND DISTRICT CRISIS GROUP

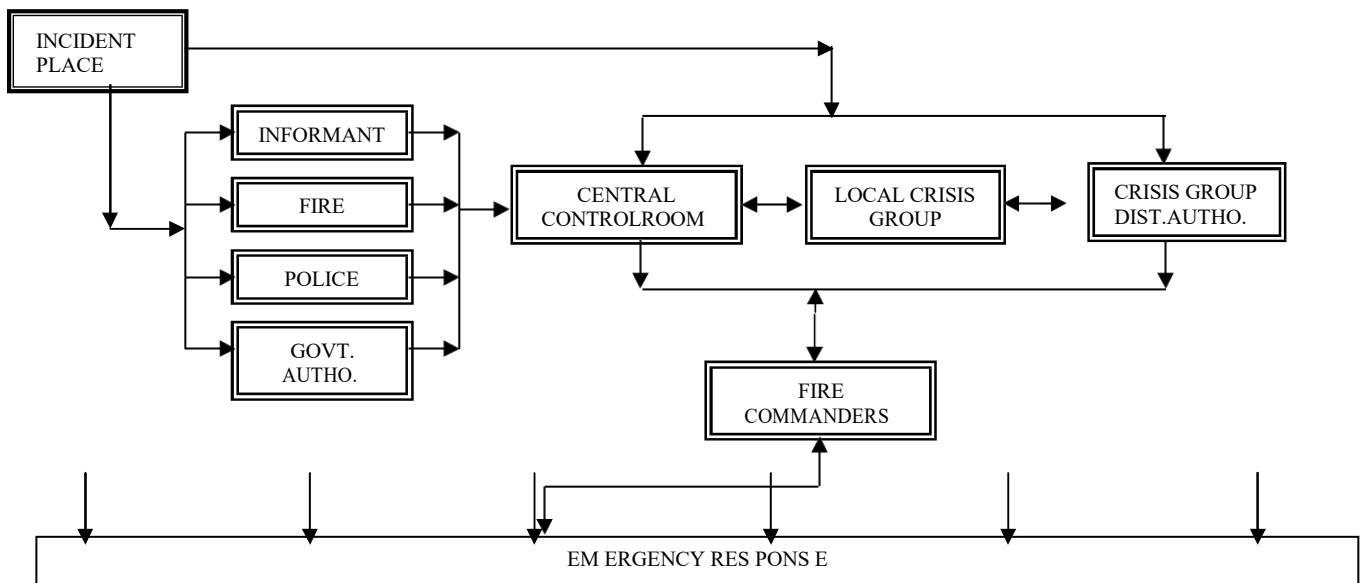
COLLECTORATE COMMAND & CONTROL



OFF-SITE EMERGENCY PLAN

ANAND DISTRICT CRISIS GROUP

FIRE-SERVICES-RESPONSE

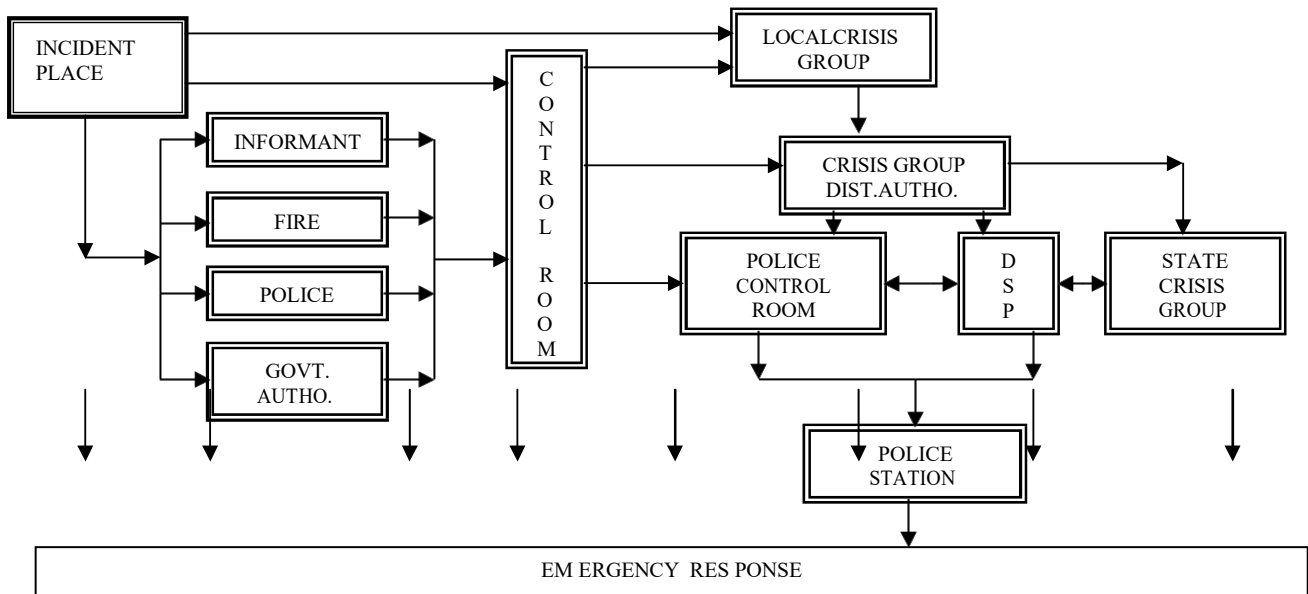


Fire Materials	Gas Leakage	Confine Space	Building Collapse/ Explosion	Trap On High Rise Buildings	Liaison With Emergency Autho.
Type of Fire Chemical Type of Extinguishing Materials Quantity	Chemical Name Type of Material Area SBA,PPE Flammable Toxic Reactive Poisonous	Size Type of Confine Traps – Rescue. SBA PPE F.Equip.	Traps Rescue SBA PPE F.Equip.	Height Req.E quip. F.Equip.	Police Medical Factory Inspector Dir. of Explosive BoilerDept. Water Works etc.

OFF-SITE EMERGENCY PLAN

ANAND DISTRICT CRISIS GROUP

POLICE RESPONSE



Law & Order	Public Announcement.	Traffic Control	Arrangement for Trap, Injured Death.	Evacuation	Controlling Site.	Liaison with other Autho.	Reporting Investigation.
-------------	----------------------	-----------------	--------------------------------------	------------	-------------------	---------------------------	--------------------------

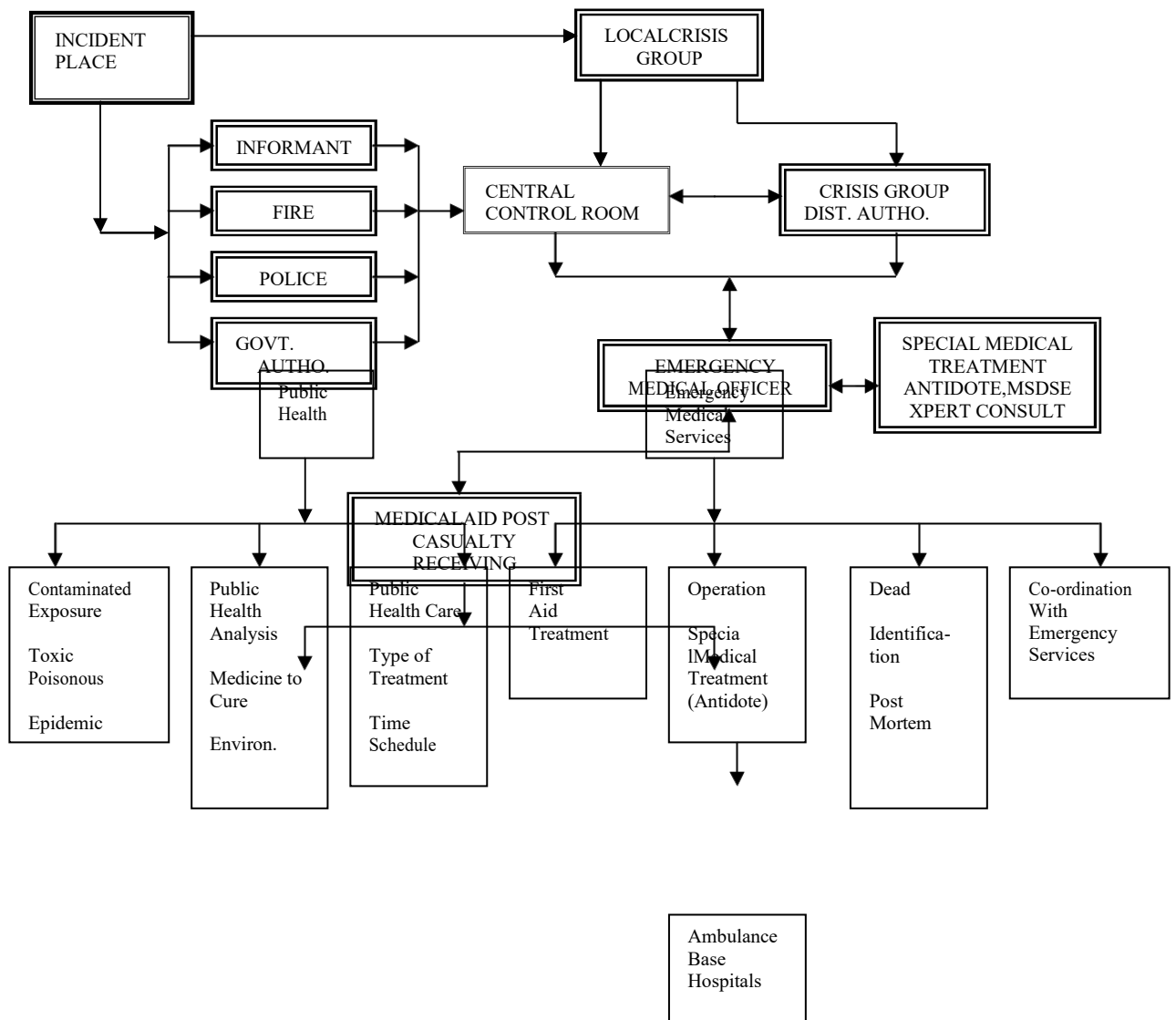
Bando-bast	Warning Declaration of Emergency to public	Movement Control	Removal from Debris, Trap, Injured, Death, Persons	Transport	Cording Area	Fire Medical Transport	Local Crisis
Security	Action by Public	Divert to other Route	Invest. Inform to Relatives	Safe Shelter	No Entry	GEB	Dist. Autho.
Control		Clear to Emergency Vehicles		Food	Law & Order	Ambulance	State Autho.
				Civil Defence		GPCB	News Media.
				Home Guards		Boiler	
				Revenue Dept.		Explosive	
				Civil Supply		Water Works	

OFF-SITE EMERGENCY PLAN

ANAND DISTRICT CRISIS GROUP

ANNEXURE-7

HEALTH & MEDICAL RESPONSE



ANNEXURE-8

ANAND DISTRICT CRISIS GROUP
EMERGENCY TELEPHONE NUMBERS

Sr.No.	Name	Phone	
		Office	Resident
1	2	3	4
	CONTROL ROOM	(02692) 243222	-
A.	COLLECTORATE		
1	District Collector	(02692) 262271	
		M: 9978406203	
2	Dy. Collector, Anand	(02692) 264045	
		M:9978405204	
3	Dy.Collector,Khambhat	(02697) 221021	(02697) 224963
		M : 7567010408	
6	Mamlatdar, Anand (City)	(02692) 260091	-
		M:8235518830	
7	Mamlatdar, Anand (Rural)	(02692) 260276	
		M:7567000466	
8	Mamlatdar,Petlad	(02697) 224373	
		M:9925620603	
9	Mamlatdar, Khambhat	(02698) 221243	-
		M:9274563939	
B	OTHERGOVERNMENT		
1.	District Development Officer	(02692) 241110	-
		M :8460591932	
2.	Dy. District Development Officer (Revenue)		8460289125
3.	Dy. District Development Officer (Panchayat)	(02692) 266319	8849627783
4.	Deputy Director of Information, Anand	(02692) 264994	9825599149
5.	Mr. R. H. Solanki , Asst. Director, Industrial Safety & Health,Anand	(02692) 264396	8980029190
6.	Mr.Ketan Shah SE,MGVCL,Anand	---	9879200740

ANNEXURE-8
Continue...

ANAND DISTRICT CRISIS GROUP
EMERGENCY TELEPHONE NUMBERS

Sr.No.	Name	Phone	
		Office	Resident
1	2	3	4
B	OTHER GOVERNMENT (Continue...)		
7.	Deputy Controller of Explosive, Vadodara	(0265) 2225159	....
8.	Executive Engineer, R&B, Anand	(02692) 260455	9879650171
9.	Regional Officer GPCB, Anand	(02692)266195, 266194	-
		M:9099011681	
10.	Water Supply, Anand	(02692) 242472	M:9978406674
11.	Water Supply, Khambhat	(02698)220240	-
12.	Executive Engineer (Irrigation)	(02692) 262044	8200185628
13.	President, Anand Municipality	(02692) 243942	
14.	S.T. Service, Anand	(02692)253293	6359918644
15.	S.T. Service, Khambhat	(02698)220242	-
16.	S.T. Service, Borsad	(02696)220028	-
C	POLICE DEPARTMENT		
1	DSP, Anand	(02692) 240515	(02692) 261333
		M :9978408879	
2	District Chief, Home Guard Commandant, Anand	(02692) 260956	....

ANNEXURE-8
Continue...

ANANDDISTRICT CRISIS GROUP
EMERGENCY TELEPHONE NUMBERS

Sr.No.	Name	Phone	
		Office	Resident
1	2	3	4
D	FIRE SERVICES		
1	Fire Officer, Anand	(02692) 230408	9375026058
2	Fire Station, Anand Nagarpalika	(02692) 230408	...
3	Fire Station, Petlad Nagarpalika	02697-222222	-
4	Fire Station, Khambhat Nagarpalika	02698-220222	9313306154
5	O.N.G.C. Khambhat	02698-227603, 227605	-
6	G.E.B. Dhuvaran	02698 - 242618	9099959274
7	Jay Chemical Ind. Pvt. Ltd, Khambhat	9601254382	9099918793
E	HOSPITALS		
1.	Civil Hospital, Anand	(02692) 244656	-
2.	Shree Krishna Hospital, Anand	(02692) 222130, 233247, 223479	-
3.	Zaydus Hospital, Anand	(02692) 619501	-
4.	Sai Hospital, Borsad	(02692) 225119	...
5.	Civil Hospital, Khambhat	(02698) 276001	-
6.	Cambay General Hospital, Khambhat	(02698) 220484 220255	-
7.	Candy Hospital, Khambhat	(02698) 220560	-
8.	Shri Krishna Hospital, Karamsad	(02692) 228100	-
9.	Civil Hospital, Petlad	(02697) 224645, 224645	-
10.	General Hospital, Sojitra	(02697) 233244	-
11.	General Hospital, Tarapur	(02698) 255626	-
12.	Santaram mandir Sanchalit B D General Hospital, Umreth	(02692) 276055	-
13.	Madicare Hospital, Borsad	(02696) 220213	-
14.	Thermal Power Station, GEB, Dhuvaran	(02698) 242815	-

ANNEXURE-8
Continue...

ANANDDISTRICT CRISIS GROUP
EMERGENCYTELEPHONENUMBERS

Sr.No.	Name	Office	Phone	Resident
1	2	3		4
F	BLOODBANKS			
1.	Rotary Club, Anand Blood Bank	(02692) 269124		9825274796
2.	Indu Blood Bank, Anand	(02692) 259596		992493652
3.	Indian Red Cross Society, Anand	(02692) 243406		9428437123
4.	Indian Red Cross Society, Anklav	(02697) 299529		9033086924
5.	Khambat Blood Bank	(02698) 220516		9428660805

ANNEXURE-9**ANAND DISTRICT CRISIS GROUP****LIST OF FIRE STATION**

Sr. No.	Name	STD Code	Phone
1	Fire Officer, Anand	(02692) 230408	7574831711
2	Fire Station, Anand Nagarpalika	(02692) 230408	7574831711
3	Fire Station, Petlad Nagarpalika	02697-222222	-
4	Fire Station, Khambhat Nagarpalika	02698-227603	9426315902
5	Fire Station, Vallabh Vidyanagar		7574831711
6	O.N.G.C. Khambhat	02698-221105, 221388	.....
7	G.E.B. Dhuvaran	02698-242815, 242623	9099959274
8	Jay Chemical Ind. Pvt. Ltd, Khambhat	9601254382	9099946412

ANNEXURE-10**ANAND DISTRICT CRISIS GROUP****LIST OF POLICE STATIONS**

Sr. No	Name	STD Code	PhoneNo.	
			Office	Residence /Mobile
1	DSP, Anand	02692	240515	261333, M:9978408879
2	Dy Sp, Anand	02629	240515	
3	Dy Sp, Petlad	02697	224332	9978408576
4	Dy Sp, Khambhat	02698	222000	9925033275
5	Police Inspector, Khambhat	02698	221504	
6	Circle Police Inspector, Anand	02692	241440	
7	Police Inspector, Anand Rural	02692	252450	
8	Circle Police Inspector, Tarapur	02698	255333	
9	Police Sub Inspector, Sojitra	02697	233333	
10	Chief, Civil Defense/ Home Guard Commandant, Anand	02692	260956	.....

ANNEXURE-11**ANANDDISTRICT CRISIS GROUP****EMERGENCYMEDICALFACILITIES**

Sr. No.	NameOfTheHospital	Incharge Person	Nos.of AmbulanceVan	Bed Capacity	Phone
1	2	3	4	5	6
1	Shree Krishna Hospital, Anand	Manager (Adm.)	3	Morethan200	(02692) 228411 228412
2	Cambay General Hospital, Khambhat	RMO	1	160	(02698) 220484
3	Candy Hospital, Khambhat	RMO	1	30	(02698) 220560
4	SS Hospital, Petlad	Civilsurgeon	1	60	(02697) 224645
5	Thermal Power Station, GEB, Dhuvaran	Chief M.O. Dhuvaran	1	25	(02698) 242815

Other Medical Facilities

Sr. No.	Name	ContactNo.	
		Office	Res.
A.	GOVERNMENT:		
	Civil Hospital–Khambhat	(02698) 220560	
	Civil Hospital –Petlad	(02697) 224645 224422	
B.	OTHER HOSPITALS:		
1	Zaydus Hospital, Anand	0738305 1447	-
2	Anjali Hospital, Borsad	8460530 700	-
3	Shivam Hospital, Khambhat	(02698) 223385	-
4	Sai Hospital, Borsad	0846038 4012	
5	Arushi Surgical Hospital, Petlad	0794268 5052	
6	Shree Hospital, Ankla	7820040 060	-
7	SS Hospital, Petlad	(898080 3990	-
8	BD Patel Genral Hospital, Umreth	0794713 7663	-

Sr. No.	Name	ContactNo.	
		Office	Res.
9	Unity Hospital, Vasad	9804355 00	-
C.	BLOOD BANK:		
1	Anand Blood Bank	(02692) 269124	
2	Indu Blood Bank, Anand	(02692) 259596	-
3	Indian Red Cross Society, Anand	(02692) 243406	-
4	Indian Red Cross Society, Petlad	(02697) 222251	-
5	Khambhat Blood Bank	(02698) 220516	-
6	Lions Club Blood Bank, Khambhat	(02698) 220516	
7	Rotary Club, Borsad	02696 - 220344	

ANNEXURE-12**ANAND DISTRICT CRISIS GROUP****LIST OF EXPERT PERSONS**

Sr. No.	Name of Hazardous Substance	Name of Expert Person	Designation	Organisation	Telephone No.	
					Factory	Res.
1	Chlorine/ Methanol/ Toluene/ HCL/ Oleum/ Hydrogen/ Aniline/ Ammonia, Etc.	Mr. Harbhajan Sehgal	Safety and Technical Adviser	Shital Chemical Industries, Sokhada	(02698) 221202	9825303 079
		Mr. Parminder Singh	Group Head Health and Safety	Jay Chemical Pvt. Ltd. Kalamsar, Khambhat	9601254 382	
		Mr. Hemantbhai Patel	Manager	Shital Chemical Industries, Group	(02698) 220391 222746	9377928 905
		Mr. Vijaybhai Mujpura	Manager	Bodal Chemical Ltd., Neja, Khambhat	9426939 941	7069046 798
		Mr. Manish Chuahan	Safety Manager	Cambay Organics Pvt. Ltd.. Sokhda	91068258 85	...

ANNEXURE-13**ANAND DISTRICT CRISIS GROUP
LIST OF VOLUNTEER ORGANISATION**

Sr. No.	Name Of Organization	Address	Name Of Authority	PhoneNo.	
				Office	Residence
1.	Anupam Mission	Mogri	Dilipbhai Desai President	(02692) 230483	-
2.	Vithal Udhyanagar nd.Association	Vithal Udhyanagr, V.V.Nagar	Arjun Vyas Executive	(02692) 236186	-
3.	Lions Club	Anand	DR. R L Kathrani	(982527787 5	-
4.	Lions Club	Khambhat	Pradipbhai Thakker	(02698) 220516	942866080 5
5.	Forty Two Gam Kadava Patel Sangh	Press Road Kambhat	Harshadbhai P. Patel President	(02698) 222344	(02698) 221308
6.	Rotary Club KHabhat	Khambhat	President	(02698) 220707	(98790488 35
7	India Red Cross Society	Opp. Municipal Office, Sardargunj Road,Anand	President Nitin M Patel	(02692) 243406	94284371239

ANNEXURE-14**ANAND DISTRICT CRISIS GROUP****A. LIST OF SAFE SHELTER**

Sr. No.	Name of Place	Phone No.
1.	Primary School, Anand	242356, 242342
2.	Primary School, Kalamsar	825532853
3.	Primary School, Dhuvaran	9898610663
4.	Vadva Ashram, Metpur	7016678716
5.	Primary School, khambhat	(02698) 284303,242651
6.	Municipal Community Hall, V.V.Nagar	230408
7.	I.B.Patel Primary School, V.V.Nagar	9228706226

ANNEXURE-15

ANAND DISTRICT CRISIS GROUP

POPULATION OF SURROUNDING VILLAGES

Sr.No.	NAMEOF THE VILLAGE	POPULATION As per Census 2011
1	Paldi	570
2	Sokhada	840
3	Lunej	1835
4	Neja	1981
5	Karamsad	35285
6	Mogri	9851
7	V.V.Nagar	23783
8	Vithal Udhyognagar	5035
9	Kalamsar	11968

ANNEXURE-16**ANAND DISTRICT CRISIS GROUP****METEOROLOGICAL DETAILS**

Month	Max. Temp °C (Avg.)	Min. Temp °C (Avg.)	Wind Velocity M/Sec	Wind Direction		Weather Conditions	Rain Fall mm.
				Day	Night		
January	28	12	5.4	SE/NE	NE/NW	COLD	-
February	30.0	14.0	5.1	SE/NE	W/NW	COLD	-
March	36.0	19.0	7.3	NE/NW	W/NW	DRY	-
April	39.0	23.0	7.8	NW/W	W/NW	DRY	-
May	41.0	26.0	9.5	NW/W	SW/W	HOT	-
June	38.0	27.0	10.8	SW/W	SW/W	HOT+ RAINY	304.1
July	33.0	26.0	10.8	SW/W	SW/W	HOT+ RAINY	346.4
August	32.0	24.0	8.3	SW/W	SW/W	HOT+ RAINY	250.3
September	34.0	24.0	7.00	S/NW	SW/W	HOT+ RAINY	103.8
October	36.0	21.0	4.6	NE/W	NE/NW	MOIST	73.2
November	33.0	16.0	4.1	NE/E	NE/E	COLD	-
December	29.0	13.0	2.6	NE/E	NE/NW	COLD	-

ANNEXURE-17**ANAND DISTRICT CRISIS GROUP****SPECIAL MEDICAL TREATMENTS/ ANTIDOTS FOR HAZARDOUS
CHEMICALS**

Sr. No.	Name of Chemicals	Medical Treatment / Antidotes	Neutralizing /Inactivating Media	TLV ppm	LD ₅₀ mg/kg	Solubility in Water
1	2	3	4	5	6	7
1.	Acetonitril	Very Careful treatment of cobalt E.D.T.A. (calocynor) and if that is not effective give Nitrite / Sodium Thio Sulphate treatment	Alcoholic Sodium Hydroxide & Calcium Hypochlorate	40	6500	Miscible
	Acrylonitril			20	93	Poor
2.	Ammonia	If skin is affected then wash with plenty of water for 15min. and then wash with dilute lactic acid and apply soframycin cream. If eye is affected then wash by eye fountain with plenty of water for 15 min. Put one drop of 0.4% Benzocaine (Novocaine) solution in eye. Boric or lactic acid solution eye drops can also be given. If entered in throat then give smell through cotton dipped in ethanol or ether through nose. Administer oxygen in case of breathing difficulty.	Hydrochloric Acid	50	350 mg/kg	Good
3.	Aniline	Methylene Blue (1% solution), Ascorbic Acid (5% solution) Administer Oxygen in case of breathing difficulty.	Mixture of Sand and Soda Ash	5	450	Poor
4.	Barium & its salt	Magnesium Sulphate (30gm in 250 ml water), Morphine (5 to 10 mg).				Violently Reacts
5.	Benzene	Skin is affected then wash with plenty of water. Administer Oxygen or shift to fresh air. Diazepam 0.1mg/kg.(iv), bedrest.	Incineration	10	3400	Poor
6.	Bromine	Skin is affected then wash with plenty of water. Apply sodium bicarbonate and again wash with water. Eye is affected then flush eye in eye fountain. Put 2-3 drops in eye of Pontocaine 0.5% solution or Benzocaine (Novocain) 0.4% solution. If inhaled then give smell through ethanol or ether dipped cotton. Give milk, buttermilk or lemon water. Give O ₂ in case of breathing difficulty.	Sodium Thiosulphate, Soda Ash	0.1	-	Poor
7.	Carbon Monoxide	Administer Oxygen (100% pure), intravenous injection of 1gm / 1kg of 20% mannitol, or 1mg/ kg of Prednisolone.		50	-	Not Soluble
8.	Carbon Tetra Chloride	N-acetyl-L-cysteine		5	2800	Not Soluble
9.	Chlorine	Skin is affected then wash with plenty of water. Apply sodium bicarbonate and again wash with water. Eye is affected then flush eye in eye fountain. Put 2-3 drops in eye of Pontocaine 0.5% solution or Benzocaine (Novocain) 0.4% solution. If inhaled then give smell through ethanol or ether dipped cotton. Give milk, buttermilk or lemon water. Give O ₂ in case of breathing difficulty.		1	-	Poor
10.	Chromium	Dimercaprol. Give high vitamins, protein and carbohydrates in food. Methylene Blue.		-	-	-

ANNEXURE – 17

Continue...

ANAND DISTRICT CRISIS GROUP**SPECIAL MEDICAL TREATMENTS/ ANTIDOTS FOR HAZARDOUS
CHEMICALS**

Sr. No.	Name of Chemicals	Medical Treatment/Antidotes	Neutralizing /Inactivating Media	TLV ppm	LD50 mg/kg	Solubility in Water
1	2	3	4	5	6	7
11.	Cyanides and Thiocyanate insecticides	Methylene Blue or Calocyanides injection. If inhaled gives smell of amyl nitrite ampule (0.2 ml) every 5 minutes. Intravenous injection of Sodium nitrite (3% solution) and sodium thiosulphate (25% solution) but if blood pressure decreases, then stop it. 4 DMAP (Dimethyl Amino Phenol) 3 mg/kg, iv, along with thiosulphate. Hydroxocobalamine, 4 gm, iv, in 5% dextrose. Dicobalt edentate, 300–600mg.iv, over 1-5 min.		-	-	-
12.	Chloroform	N-acetyl-L-cysteine		10	908	Insoluble
13.	DDT (Halogenated insecticides)	Ipecac syrup, activated charcoal, Saline cathartic, Diazepam (10mg.) by intravenous injection, wash skin with soap and water. In case of breathing difficulty administer		1	113	Insoluble
14.	Dimethyl Sulphate	Skin is affected then apply Magnesium Oxide paste and give injection of Corticosteroid. In case of breathing difficulty administer Oxygen.	Alcoholic Sodium Hydroxide & Calcium	1	440	Poor
15.	Dichloro Methane	Hydro cortisone (200 mg every 4 hours). In case of aspiration pneumonia give antibiotics.	Hydrochloric Acid	-	-	-
16.	Ethyl Alcohol	2 gm of Sodium bicarbonate in 250 ml water, Diazepam 10 mg by intravenous. Skin or eye is affected then wash with plenty of water.		1000	7060	Soluble
17.	Ethylene or Diethylene Glycol	Ethanol, Calcium gluconate Pyridoxine		-	2000	Mixible
18.	Ethylene Oxide	Artificial respiration. Treatment by physician.	Dissolve in Solvent	50	270	Good
19.	Ethylene Dichloride			10	-	Not Soluble
20.	Formaldehyde	Milk, activated charcoal or Water.		3	300	Soluble
21.	Hydrogen Sulphide	Shift in fresh air or administer Oxygen. Give inhalation of ethanol or ether drops. Amyl Nitrite or Sodium nitrite, Pyridoxine 20 mg/ kg or 10% urea 1 gm/ kg by intravenous injection.		10	-	Partially Soluble
22.	Hydrogen Cyanide	Give inhalation of 0.2 ml amyl nitrite dipped cotton. Sodium nitrite (1% solution), Sodium thiosulphate (30% solution), Cromosmon (1% Methylene blue in 25% glucose solution)		4.7	-	Miscible
23.	Iodine and Compositions	Milk, Fine starch Solution, 100 ml of 1% Sodium Thiosulphate by mouth.				Insoluble
24.	Iron Salts	Careful treatment of deferoxamine therapy.		mg/m3		slowly

ANNEXURE-17

Continue...

ANAND DISTRICT CRISIS GROUP**SPECIAL MEDICAL TREATMENTS/ ANTIDOTS FOR HAZARDOUS
CHEMICALS**

Sr. No.	Name of Chemicals	Medical Treatment / Antidotes	Neutralizing /Inactivating Media	TLV ppm	LD ₅₀ mg/kg	Solubility in Water
1	2	3	4	5	6	7
25.	Lead Compounds	CaNa ₂ EDTA, D-Penicillamine (oral), BAL (with CaEDTA), Induce vomiting, then give Magnesium sulphate in water.				
26.	LPG	Wash with water Remove affected person to fresh air.	Safe escaping of gas Prevent source of ignition	1000	-	Floats
27.	Methyl Alcohol	Ethanol (30% solution from inside, 5% solution from outside i.e. by intravenous injection), Epicake Syrup. In case of acidosis give Sodium bicarbonate. In case of delirium give Diazepam 10 mg. by intravenous injection.		200	4100	Good
28.	Magnesium Salt	Intravenous injection of 1ml/kg of Calcium gluconate 10% solution.				Insoluble
29.	Methanol	Move exposed individual to fresh air, If breathing is difficult, give oxygen.			130	
30.	Mercury	Give white of egg in water. Later give milk, then induce vomiting. BAL, D-Penicillamine, n-Acetylcysteine, Dimercaptopropane-1 sulfonate (DMPS)		0.1 mg/m ³		Insoluble
31.	Metals (Heavy Metals, mercury, lead, copper, cobalt, arsenic, nickel)	Unithol (BAL, dimercaprol, 5% solution), Tetacin calcium (10% solution), Penicillamine Dextrose (10%) by Intravenous injection. Chilling agent for Effect of mercury.				Insoluble
32.	Naphthalene	5 gm. Sodium bicarbonate every 4 hrs. and keep urine alkaline. Give 1 ml/kg. furosemide in liquid. Blood transfusion till haemoglobin becomes normal -60 to 80%.		10	1780	Insoluble
33.	Nitrobenzene	Methylene blue, 1-2mg / kg, iv, over 5 min.				
34.	Nitrogen Oxides (NO_x)	Prednisone or Prednisolone 5 mg. every 6 hrs interval.				
35.	Nitric Acid	Administer oxygen, morphine injection for severe aches.	Sodium Carbonate or Soda Ash or Slacked Lime	2	-	Good
36.	Oleum	Wash contaminated area with water and soap. 5% soln of sodium bicarbonate. Artificial respiration	Dry Sand, Earth	1	-	Highly Reactive
37.	Oxalic Acid	Milk, lemon Water, chalk or calcium lactate, calcium chloride or calcium gluconate with liquid. 10% calcium gluconate or chloride 10 ml. by intravenous injection.		1mg/m ³	1000	Soluble
38.	Phenol & Derivatives	Shift in fresh air, activated charcoal and 240 ml. milk. If skin or eye is affected then wash with plenty of water for 15 min. if skin is affected then wash with Polyethylene glycol (PEG).		5	414	Soluble

ANNEXURE-17

Continue...

ANAND DISTRICT CRISIS GROUP**SPECIAL MEDICAL TREATMENTS/ ANTIDOTS FOR HAZARDOUS
CHEMICALS**

Sr. No.	Name of Chemicals	Medical Treatment / Antidotes	Neutralizing /Inactivating Media	TLV ppm	LD ₅₀ mg/kg	Solubility in Water
1	2	3	4	5	6	7
39.	Phosgene	Cortisone acetate 1 mg/kg by mouth–thrice a day.In case of breathing difficulty Administer Oxygen.		0.1	-	Hydrolyzed
40.	Phosphorus	10 ml calcium gluconate (10%) by intravenous injection, 5% glucose in water. Travert (10% invert sugar) by intravenous injection.		0.1	3030	Insoluble
41.	Organics Phosphorous Insecticides (e.g. Malathion, Parathion, Monocrotophos, Phorate)	Atropine injection, Atropine (0.1% solution), Nalorphine hydrochloride (0.5 % solution), Trimedoxim bromide (15% solution), Pyridine Aldoxy Methyodate, Diperoxim, Biodexim and Isonitrocin (40% solution), Pralidoxi, PAM, TOXOGONIN.				
42.	Silver Nitrate & other Salts	10% Salt (Sodium Chloride) solution, milk and for reducing pain Demrol or Codeine.			50	Soluble
43.	Sulphur Dioxide	Treat burns as usual. Oxygen with intermittent positive pressure breathing apparatus.	Cover with ash or sodium bicarbonate And Calcium	2	-	Sinks & Boils
44.	Sulphuric Acid	Was hthoroughly with water followed by 5% soln of sodium bicarbonate.	Cover with Sodium Carbonate or Soda Ash or Slacked Lime	1 mg/m ³	2140	Reactive
45.	Toluene	Wash Completely with. Remove exposed Person to Fresh Air, Artificial Respiration.		100	1640	Poor
46.	Thionyl Chloride	Administer oxygen. 5% soln of sodium bicarbonate may be used.	Cover with sodium bicarbonate	5	-	Decomposes (Hydrolyses)
47.	Tobacco & Nicotine	Induce vomiting, Atropine (large dose) In case of difficulty in breathing, administer oxygen		-	-	-
48.	Vinyl Chloride	Skin is affected, wash with plenty of water. Eye is affected then keep eye open and allow material to vaporise. Don't apply any eye drops. In case of breathing difficulty, administer oxygen. If injected then include vomiting. Give one spoon mineral oil and after that give sodium/ magnesium sulphate (one Spoon) in a glass of water. Give strong tea or coffee of feeling exhausted.		1	500	Slightly Soluble
49.	Zink fumes & Metal fume Fever	Prednisolone, Aspirin, Bed rest.		-	-	-
50.	Xylene	Skin is affected then wash with plenty of water. Administer Oxygen or shift to fresh air. Diazepam 0.1mg/kg.(iv), bed rest.		100	4300	Not Soluble

ANNEXURE-18**ANAND DISTRICT CRISIS GROUP****LIST OF TRAINED FIRST RESPONDERS FOR SEARCH, RESCUE & MEDICARE**

Sr. No.	Corporation/Organisation	Name of Trainee	Designation	Team Number
A.	FIREMEN/FIRE OFFICERS:			
1.	AMC	Mr. Dharmesh Gaur	Fire Officer	Team One
2.	AMC	Mr. Jigar Patel	Fireman	Team One
3.	AMC	Mr. Pradip Paramar	Operator	Team One
4.	AMC	Mr. Vishalsinh Dod	Fireman	Team One
5.	AMC	Mr. Jaykumar R Patel	Fireman	Team One
6.	AMC	Mr. Varu bhavesh	Fireman	Team One
7.	AMC	Mr. BHuriya Himmad	Fireman	Team One
8.	AMC	Mr. Abdul	Fireman	Team One
9.	VMC		RFO VADODARA	0265 -2466101, 83470 33611
10.	SMS		RFO SURAT	9974335667
11.	GHANDHINAGAR		RFO GANDHINAGAR	9427955551
12.	AHMEDABAD		RFO AHMEDABAD	9724002424
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				

ANNEXURE-19**ANAND DISTRICT CRISIS GROUP****SALIENT PROPERTIES OF SOME HAZARDOUS CHEMICALS**

Sr. No.	Name of Chemicals	State	Colour	Odour	Sp. Gravity	Vapour Density	Melting Point °C	Boiling Point °C	Flash Point °C	Explosive limit		TLV ppm	Solubility in Water	Hazchem	NFPA Code			Hazards
										LEL	UEL							
										%	%				H	F	R	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	17	16	18	19
1.	Chlorine	Liquified Compr.Gas	Greenish Yellow	Irriting, Bleach like Choking	1.47	2.49	-101	-34	-	-	-	1	Slight Soluble	2XE	4	0	0	Toxic
2.	Ethylene Oxide	Liquified Gas	Colourless	Sweet	0.87	1.52	-111.3	10.7	-20	3	100	1	Soluble	2PE	3	4	3	Flammable, Combustible & Explosive
3.	Methanol	Liquid	Colourless, watery.	Alcoholic Odour	0.79	1.1	-97.8	64.5	16.1	6	36.5	200	Soluble	2PE	1	3	0	Flammable & Poison
4.	Oleum	Hygroscopic Viscous Solution	Colourless to cloudy	Sharp Choking Odour	1.9-1.97	3.39	-	Decomposes	-	-	-	1	Highly Reactive	4WE	3	0	2	Corrosive & Oxidiser
5.	Sulphuric Acid (H ₂ SO ₄)	Liquid	Colourless, Oily	Odourless	1.84	-	10.49	290	-	-	-	-	Miscible	2P	3	0	2	Corrosive & Oxidiser
6.	Toluene	Liquid	Colourless	Pleasant	0.817	3.14	-95to -94.5	110.4	12.7	1.2	7	100	Slightly soluble	3Y*E	2	3	0	Flammable, Toxic

ANNEXURE-20**ANAND DISTRICT CRISIS GROUP****LIST OF WATER RESOURCES**

Sr. No.	LOCATION OF WATER STORAGE TANKS	STORAGE CAPACITY IN LITERS
1	GIDC–Vithal Udhyog Nagar	2,50,000
2	GIDC–Vithal Udhyog Nagar	2,00,000
3	GIDC–Vithal Udhyog Nagar	1,50,000
4	V.V.Nagar	1.00.000
5	V.V.Nagar	1,50,000
6	V.V.Nagar	1,50,000s
7	Nagarpalika Office Khambhat	9,00,000
8	Near Ranmukteshwar Khambhat	12.00.000
9	Near Lalbaug Khambhat	4,50,000
10	Neja Ta.Khambhat	2,00,000
11	NejaTa.Khambhat	40,000

ANNEXURE-21

**ANAND DISTRICT CRISIS GROUP
FORMAT FOR EXERCISE/ MOCKDRILL/ REHEARSAL**

1	AIM / PURPOSE	:	
2	AUTHORIZED BY	:	
3	PARTICIPANTS	:	1. ☐ Original Industry 2. ☐ Surrounding Factories 3. ☐ Mutual Aidders 4. ☐ Emergency Services 5. ☐ Government Departments 6. ☐ Experts / Observers / Umpires / Invitees 7. ☐ Surrounding Public 8. ☐ N.G.O./ Volunteer Organizations 9. ☐ Other Essential Persons / Teams
4	CODE NAME	:	
5	NATURE	:	1. ☐ Origin 2. ☐ Date& TimeofCommencement 3. ☐ Locations / Site.
6	DATE, TIME AND DURATION OF EXERCISE	:	
7	CO-ORDINATION COMMITTEE (APEX CRISIS GROUP)	:	1. ☐ Chair Person—Collector & D. M. 2. ☐ Member Secretary – Factory Inspector 3. ☐ Member Fire Fighting Commandant 4. ☐ Member Police Commandant 5. ☐ Member Medical & Health Commandment 6. ☐ Member Expert Panel 7. ☐ Member Representation from Industries 8. ☐ Member I/C Off site Control Room
8	WORKING COMMITTEE	:	1. ☐ Chair Person District Development Officer (District Panchayat) 2. ☐ Member: Fire Brigade Services 3. ☐ Member: Police Force, Civil Defence + Home Guard 4. ☐ Member: Medical Services, Health Department, Hospitals, Private Doctors 5. ☐ Member: Incident Controllers from MAH Units Safety Officers 6. ☐ Member: Safe Shelters—Activities, Govt. Officials, N.G.O., Volunteer Organisations, Public Relations 7. ☐ Members: Transport Activities: RTO, S.T. Services, Emergency Equipment Suppliers, Pvt. Transporters, Telephone Departments, GIDC Authorities

ANNEXURE-21

Contd...

ANAND DISTRICT CRISIS GROUP**FORMAT FOR EXERCISE/ MOCK DRILL/ REHEARSAL**

8	WORKING COMMITTEE	:	8. ☐ Members: Monitoring Services: GPCB Authorities, Explosive Authorities, Boiler Inspectorate, Technical Persons
			9. ☐ Members: Observers / Reporters
9.	AFFECTED ZONES	:	1. ☐ Critical Zone (Max.Damage Area) 2. ☐ Semi-Critical Zone (Moderately Affected Area) 3. ☐ Alert Zone (Warn Area)
10.	CONTROL ROOM	:	1. ☐ Off Site Control Room 2. ☐ Shadow Control Room 3. ☐ Emergency Control Centre
11.	SEQUENTIAL ACTIONS	:	1. ☐ Meeting of Apex Crisis Group 2. ☐ Meeting of Working Group / Industries 3. ☐ Public Education 4. ☐ Table-Exercise 5. ☐ Preparation Stage 6. ☐ Actual Exercise / Stimulation 7. ☐ De-brief Meeting 8. ☐ Conclusion Report
12.	FACILITIES	:	1. ☐ Communication System and Arrangements. 2. ☐ Transport Arrangement / Vehicles. 3. ☐ Identification Badges / Passes / Uniforms. 4. ☐ Mass - Education Arrangements. 5. ☐ Selection of Event / Place & Training 6. ☐ Training / Preparedness to all participants 7. ☐ Maps / Charts / Stationary / Banners 8. ☐ Arrangement of Various Meetings 9. ☐ Photographs / Video 10. ☐ Arrangement for Tea,Refreshment,Lunch etc. 11. ☐ Manpower/Vehicles/Telephones /Equipments 12. ☐ Off-Site Emergency Action Plan /On-Site Emergency Action Plan / Technical Details /M.S.D.S.,etc.
			13. ☐ Pen, Pencils,Papers,Folders, Files,Pins, etc. Stationaries.
			14. ☐ Tables, Chairsetc.furniture
13.	RECOMMENDATIONS	:	

ANAND DISTRICT CRISIS GROUP**C.A.(EPPR) RULES-1996**

THE GAZETTE OF INDIA EXTRA ORDINARY
PART-II SECTION- 3 (1)

**Ministry of Environment & Forests
Notification**

New Delhi, the 01st August, 1996

**Rules on Emergency planning,
Preparedness and Response for
Chemical Accidents**

G.S.R. 347 (E). – In exercise of the powers conferred by Sections 6, 8 and 25 of the Environment (Protection) Act, 1986 (29 of 1986), the Central Government hereby makes the following rules, namely :-

1. Short Title and Commencement.

a. These rules may be called the Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996.

b. They shall come into force on the date of their publication in the Official Gazette.

2. Definitions. – In these rules unless the context otherwise requires, –

a. "Chemical accident" means an accident involving a fortuitous or sudden or unintended occurrence while handling any hazardous chemicals resulting in continuous, intermittent or repeated exposure to death, or injury to, any person or damage to any property but does not include an accident by reason only of war or radio-activity.

b. "Hazardous chemical" means, –

1. any chemical which satisfies any of the criteria laid down in Part 1 of Schedule 1 or is listed in Part 2 of the said schedule;
2. any chemical listed in Column 2 or Schedule 2;
3. any chemical listed in Column 2 of Schedule 3.

c. "Industrial activity" includes an operation or process, –

1. carried out in an industrial installation referred to in Schedule-4 involving or likely to involve one or more hazardous chemicals;
2. On-site storage or on-site transport, which is associated with that operation or process as the case may be;
3. Isolated storage;
4. Pipeline.

d. "Industrial pocket" means any industrial zone earmarked by the Industrial Development Corporation of the State Government of by the State Government.

f. "Isolated storage" means storage of a hazardous chemical other than storage associated with an installation on the same

site specified in Schedule – 4 where that storage involves at least the quantities of that chemical set out in Schedule-2;

g. "Major chemical accident" means, – 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 industrial activity or transportation or due to natural events leading to serious effects both immediate or delayed, inside or outside the installation likely to cause substantial loss of life and property including adverse effects on the environment;

f. "Major Accident Hazards (MAH) Installations", – means, isolated storage and industrial activity at a site, handling (including transport through carrier or pipeline) of hazardous chemicals equal to or, in excess of the threshold quantities specified in column 3 of Schedules 2 and 3 respectively;

h. "Manufacture, Storage and Import of Hazardous Chemicals Rules" means – the Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989, published in the notification of Government of India in the Ministry of Environment & Forests No. S.O.966 (E) dated 27th November, 1989.

i. "Off-site emergency plan" means, – the off-site emergency plan prepared under rule 14 of the Manufacture, Storage and Import of Hazardous Chemicals Rules;

j. "Pipeline" means, – a pipe (together with any apparatus and works associated therewith) or system of pipes (together with any apparatus and works associated therewith) for the conveyance of a hazardous chemical other than a flammable gas as set out in column 2 of Part II of Schedule 1, at a pressure of less than 8 bars absolute;

k. "Site" means, – any location where hazardous chemicals are manufactured or processed, stored, handled, used, disposed of and includes the whole of an area under the control of an occupier and includes pier, jetty or similar structure whether floating or not;

i. "Transport" means, – movement of hazardous chemicals by any means over land, water or air.

3. Constitution of Central Crisis Group:

a. The Central Government shall constitute a Central Crisis Group for management of Chemical accidents and set up a Crisis Alert system in accordance with the provisions of Rule-4 within thirty days from the date of commencement of these rules.

- b. The composition of the Central Crisis Group shall be as specified in Schedule-5.
- c. The Central Crisis Group shall meet at least once in six months and follow such procedure of transaction of business as it deems fit.
- d. Notwithstanding anything contained in sub-rule (2) the Central Crisis Group may co-opt any person whose assistance or advice is considered useful in performing any of its functions to participate in the deliberations of any of its meetings.
- 4. Constitution of Crisis Alert System**:- the Central Government shall,
- setup a functional control room at such place as it deems fit.
 - set up an information networking system with the state and district control rooms.
 - appoint adequate staff and experts to man the functional control room.
 - publish a list of Major Accident Hazardous installations;
 - publish a list of major chemical accidents in chronological order;
 - publish a list of members of the Central State and District Crisis Groups;
 - take measures to create a wariness among the public with a view to preventing chemical accidents.
- 5. Functions of the Central Crisis Group**:-
- The Central Crisis Group shall be the apex body to deal with major chemical accidents and to provide expert guidance for handling major chemical accidents.
 - Without prejudice to the functions specified under sub-rule (1), the Central Crisis Group shall—
 - continuously monitor the post-accident situation arising out of a major chemical accident and suggest measures for prevention and to check recurrence of such accidents;
 - conduct post-accident analysis of such major chemical accidents and evaluate responses;
 - review district off-site emergency plans with a view to examine its adequacy in accordance with the manufacture, storage, and import of hazardous chemicals, rules and suggest measures to reduce risks in the Industrial pockets;
 - review the progress reports submitted by the State Crisis Groups;
 - respond to queries addressed to it by the State Crisis Groups and the District Crisis Groups;
 - publish a state-wise list of experts and officials who are concerned with the handling of chemical accidents;
7. render, in the event of a chemical accident in a State all functional and infrastructural help as may be necessary.
- 6. Constitution of State Crisis Group**:-
- The State Government shall constitute a State Crisis Group for management of chemical accidents within thirty days from the date of commencement of these rules.
 - The composition of the State Crisis Group shall be as specified in Schedule 6.
 - The State Crisis Group shall meet at least once in three months and follow such procedure for transaction of business as it deems fit.
 - Notwithstanding anything contained in sub-rule (2) the State Crisis Group may co-opt any person whose assistance or advice is considered useful in performing any of its functions, to participate in the deliberation of any of its meetings.
- 7. Functions of the State Crisis Group**:-
- The State Crisis Group shall be the apex body in the State to deal with major chemical accidents and to provide expert guidance for handling major chemical accidents.
 - Without prejudice to the functions specified under sub-rule (1), the State Crisis Group shall,—
 - review all district off-site emergency plans in the State with a view to examine its adequacy in accordance with the manufacture, storage and import of Hazardous chemicals, Rules and forward a report to the Central Crisis Group once in three months.
 - assist the State Government in managing chemical accidents at a site.
 - assist the State Government in the planning, preparedness and mitigation of major chemical accidents at a site in the State;
 - continuously monitor the post accident situation arising out of a major chemical accident in the State and forward a report to the Central Crisis Group;
 - review the progress report submitted by the District Crisis Groups;
 - respond to queries addressed to it by the District Crisis Groups;
 - publish a list of experts and officials in the State who are concerned with the management of chemical accidents.

8. Constitution of the District and Local Crisis Group,--

- a. The state Government shall cause to be constituted within thirty days from the date of commencement of these rules,--
 1. District Crisis Group,
 2. Local Crisis Group,
- b. The composition of the District Crisis Group and the Local Crisis Groups shall be as specified in Schedules 7 & 8 respectively.
- c. The District Crises Group shall meet every forty five days and send a report to the State Crisis Group.
- d. The local Crisis Group shall meet every month and forward a copy of the proceedings to the District Crisis Group.

9. Functions of the District Crisis Group,--

- a. The District Crisis Group shall be the apex body in the district to deal with major chemical accidents and to provide expert guidance for handling chemical accidents;
- b. Without prejudice to the functions specified under rule (1) the District Crisis Group shall, --
- c. assist in the preparation of the district off-site emergency plan.
- d. review all the on-site emergency plans prepared by the occupier of Major Accident Hazards installation for the preparation of the district off-site emergency plan;
- e. assist the district administration in the management of chemical accidents at a site lying within the district.
- f. continuously monitor every chemical accident;
- g. ensure continuous information flow from the district to the Center and State Crisis Group,
- h. forward a report of the chemical accident within fifteen days to the state crisis group;
- i. 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.

10. Functions of the Local Crisis Group,--

The Local Crisis Group shall be the body in the industrial pocket to deal with chemical accidents and co-ordinate efforts in planning, preparedness and mitigation of a chemical accident;

- a. Without prejudice to the functions specified under sub-rule (1) the Local Crisis Group shall,--
 1. prepare local emergency plan for the industrial pocket.

ANNEXURE-22

Continue..

2. ensure dovetailing of the local emergency plan with the district off-site emergency plan;
3. train personnel involved in chemical accident management;
4. educate the population likely to be affected in a chemical accident about the remedies and existing preparedness in the area;
5. conduct at least one full scale mock-drill of a chemical accident at a site every six months and forward a report to the District Crisis Group;
6. respond to all public inquiries on the subject

11. Powers of the Members of the Central, State and District Crisis Groups,--

The Members of the Central Crisis Group, State Crisis Groups and District Crisis Groups shall be deemed to be persons empowered by the Central Government in this behalf under sub-section (1) of section 10 of the Environment (Protection) Act, 1986.

12. Aid and assistance for the functioning of the District and Local Crisis Groups,--

- a. The Major accident Hazard installations in the industrial pockets in the district shall aid, assist and facilitate functioning of the District Crisis Group,
- b. The Major Accident Hazard installations in the industrial pockets shall also aid, assist and facilitate the functioning of the Local Crisis Group.

13. Information to the public,--

- a. The Central Crisis Group shall provide information on request regarding chemical accident prevention, preparedness and mitigation in the country.
- b. The State Crisis Group shall provide information on request regarding chemical accident prevention, preparedness and mitigation to the public in the State.
- c. The Local Crisis Group shall provide information regarding possible chemical accident at a site in the industrial pocket and related information to the public on request;
- d. The Local Crisis Group shall assist the Major Accident Hazard installations in the industrial pocket in taking appropriate steps to inform persons likely to be affected by a chemical accident

Schedule-I

[Seerule3 (b) & 2 (j)]

Part-I

- a. Toxic Chemicals: Chemicals having the following values of acute toxicity and which owing to their physical and chemical properties, are capable of producing major accident hazards:

Sr. no.	Degree of toxicity	Oraltotoxicity LD50 (mg/kg)	Dermal toxicity (Dermal LD50) (mg/kg)	Inhalation toxicity By dust & mists (mg/l)
1.	Extremely toxic	<5	<40	<0.5
2.	Highly toxic	>5-50	>4-200	>0.5-2.0
3.	Toxic	>50-200	>200-1000	>2-10

- b. Flammable Chemicals:-

1. Flammable gases chemicals which in the gaseous state at normal pressure and mixed with air become flammable and the boiling point of which at normal pressure is 20° C or below.
2. Highly flammable liquids chemicals which have a flash point lower than 23°C and the boiling point of which at normal pressure is above 20°C.
3. Flammable liquids chemical which have a flash point lower than 65° C and which remain liquids under pressure, where particular processing conditions, such as high pressure and high temperature, may

create major accident hazards.

- c. Explosion Chemicals which may explode under the effect of flame, heat or petro-chemical conditions or which are more sensitive to shocks or friction than dinitro-benzene.

Part-II

List of Hazardous and Toxic Chemicals

Sr.no	Name of the Chemical
1	Acetaldehyde
2	Acetic Acid
4	Acetone
12	Acrylonitrile
31	Ammonia
37	Aniline
56	Benzene
84	Bromine
88	Butadiene
109	Carbon Tetrachloride
110	Carbon Di-sulphide
119	Chloride
161	Cyclohexane
248	Ethyl Alcohol
261	Ethylene
285	Formaldehyde
306	Hexane
314	Hydrogen
315	Hydrogen Bromide
323	Iodine
334	Isopropyl Alcohol
347	Liquified Petroleum Gas.
368	Methane
377	Methyl Alcohol
423	Nitric Acid

ANNEXURE-22

Continue..

425	Nitro Benzene
429	Nitrogen
444	Oleum
428	Oxygen
462	Paraffin
481	Phenol
583	Styrene
591	Sulphuric Acid
628	Toluene
666	Turpentine
684	Zirconium & Compounds

*As per MSIHC Rules-2000

Schedule - II & III

List of Chemicals with Threshold Quantity under rule 2(b), 2(c), 2(g).

Schedule-IV

List of Installation includes an operation or processes under rule2(c),2(e).

Schedule-V

[Seerule 3 (2)]

Composition of Central Crisis Group

	Secretary	Chair
1.	Govt. of India Ministry of Environment & Forests	Person
2.	Joint Secretary (Environment & Forests)	Member Secretary
3.	Joint Secretary (Labour)	Member
4.	Joint Secretary / Advisor (Chemicals&Petrochemicals)	Member
5.	Director General, Civil Defence	Member
6.	Fire Advisor, Directorate General, Civil Defence	Member
7.	Chief Controller of Explosives	Member
8.	Joint Secretary (Dept. of Industries)	Member
9.	Director General, Indian Council of Medical Research	Member
10.	Joint Secretary (Health)	Member
11.	Chairman, Central Pollution Control Board	Member
12.	Director General, Indian Council of Agriculture Research	Member
13.	Director General, Council of Scientific & Industrial Research	Member
14.	4 Experts (Industrial Safety and Health)	Member
15.	Joint Secretary (Fertilizers)	Member
16.	Director General (Telecom)	Member
17.	2 Representatives of Industries to be nominated by the Central Govt.	Member
18.	Joint Secretary (surface transport)	Member
19.	General Manager (Rail Safety)	Member
20.	Advisor, Centre for environment and explosive safety	Member
21.	One Representative of Indian Chemical Manufacturers Association to be nominated by the Central Govt.	Member

Schedule–VI

[Seerule 6 (2)]

Composition of the State Crisis Group

1.	Chief Secretary	Chair Person
2.	Secretary (Labour)	Member Secretary
3.	Secretary (Environment)	Member
4.	Secretary (Health)	Member
5.	Secretary (Industries)	Member
6.	Member Secretary (Public Health Engg.)	Chairman,
7.	State Pollution Control Board	
8.	4 Experts (Industrial Safety & Member Health) to be nominated by the State Govt.	
9.	Secretary / Commissioner	Member
10.	Director (Transport) / Director (Industrial Safety / Fire Chief)	Member
11.	Chief Inspector of Factories)	Member
12.	Commissioner of Police	Member
13.	One Representative from the Member industry to be nominated by the State Govt.	

Schedule–VII

[Seerule 8]

Composition of the District Crisis Group

1.	District Collector	Chair person
2.	Inspector of Factories	Member secretary
3.	District Energy Officer	Member
4.	Chief Fire Officer	Member
5.	District information Officer	Member
6.	Controller of Explosives	Member
7.	Chief Civil Defence	Member
8.	One Rep. Of Trade Unions to be nominated by the Dist.Collector	Member
9.	Deputy Sup.Of Police	Member
10.	District Health Officer/ Chief Medical Officer	Member
11.	Commissioner, Municipal Corporation	Member
12.	Rep.Of the Dept.of Public Health Engg.	Member
13.	Rep.Of Pollution Control Board	Member
14.	District Agricultural Officer	Member
15.	4 Experts (Industrial Safety & Health) to be nominated by the Dist. Collector	Member
16.	Commissioner(Transport)	Member
17.	One rep. Of Industry to be nominated by the Dist.Collector	Member
18.	Chair persons member secretary of Local Crisis Group	Member

ANNEXURE–22

Continue...

Schedule–VIII

[Seerule 8]

Composition of the Local Crisis Group

1.	Sub-divisional Magistrate / District Emergency Authority	Chair person
2.	Inspector of Factories	Member Secretary
3.	Industries in the District Industrial area/Industrial Pocket	Member
4.	Transporters of Hazardous Chemicals (2nos.)	Member
5.	Fire Officer	Member
6.	Station House Officer (Police)	Member
7.	Block Development Officer	Member
8.	One rep.Of Civil Defence	Member
9.	Primary Health Officer	Member
10.	Editor of Local News Paper	Member
11.	Community leader/ sarpanch/ Member village pradhan nominated by Chair Person	
12.	One rep.Of non-government organization to be nominated by the Chairperson	Member
13.	Two Doctors eminent in the Local area to be nominated by Chair person	Member
14.	Two social workers to be nominated by the chair person	Member

ANAND DISTRICT CRISIS GROUP**GLOSSARY OF TERMS AND DEFINITIONS****A. DEFINITIONS:****1. HAZARDOUS CHEMICALS:**

Any substance or material in a quantity or form which may be harmful to humans, animals, crops, water systems, or other elements of the environment if accidentally released. Hazardous chemicals include, explosives, gases (compressed, liquefied or dissolved), flammable and contributable liquids, flammable solids or substance, oxidizing substance, poisonous and inflections substances and corrosives.

"Hazardous Chemicals" means

- a. Any Chemical, which satisfies any of the criteria, laid down in Part I of Schedule I and is listed in column 2 of Part II of the schedule.
- b. Any Chemical listed in Column 2 of Schedule 2.
- c. Any Chemical listed in Column 2 of Schedule 3.

The definition of "Hazard Chemicals" is given in the various statutes. The details of schedule as given statute are not reproduce here for brevity.

- a. Rule 68 J 1 (a) of GUJARAT FACTORIES RULES 1963 (Amended-1995)
- b. Rule 2 (e) of MANUFACTURE, STORAGE AND IMPORT OF HAZARDOUS CHEMICAL RULES, 1989.
- c. Rule 2 (b) of Chemical Accidents (Emergency Planning, Preparedness & Response) Rule, 1996.

2. INDUSTRIAL ACTIVITY:

"Industrial Activity" means

- i. An operation of process carried out in an industrial installation referred to in Schedule 4 involving or likely to involve one or more hazardous chemicals and includes on-site storage or on-site transport which is associated with that operation or process, as the case may be, or
- ii. Isolated Storage, or
- iii. Pipeline.

The definition of "Industrial Activities" is given in the various statutes. The details of schedule as given statute are not reproduce here for sake of brevity.

- a. Rule 68 (J) (1) (b) of GUJARAT FACTORIES RULES 1963 (Amended-1995)
- b. Rule 2 (h) of MANUFACTURE, STORAGE AND IMPORT OF HAZARDOUS CHEMICAL RULES, 1989.
- c. Rule 2 (c) of Chemical Accidents (Emergency Planning, Preparedness & Response) Rule, 1996.

3. ON SITE EMERGENCY: An emergency, the effect of which can be contained within the site premises. The step of emergency is unlikely to pose any threat to the neighboring environment/ population and the situation can be adequately handled by the emergency services on their own resources. In some cases, helps from neighboring units may also be sought to tackle on site emergencies, which serve the purpose of mutualaid.**4. OFF SITE EMERGENCY:**

Emergency planning for on-site and off-site are different but they should be dovetailed each other. On-site emergency planning is the responsibility of the site management while off-site planning is for the whole district having responsibility casts to district authorities like District Magistrate & Collector, Factory Inspector, Police Department, Fire Brigade, Health & Medical Services, Pollution Control Board, Explosive Department, etc.

An Emergency affecting several parts of an unit with considerable damage and injury to equipment / personnel and is likely to affect neighbouring population environment. This type of situation requires the help of outside agencies, like government authorities, also to tackle it, because of it can not be controlled from own available resources.

For example, a major LPG gas release will affect the immediate environment or even a major fire or an explosion at site may have off-site implications like debris falling, gases spreading etc. The situation of on-site emergency, if uncontrolled runs into as off-site emergency. Hence a quick assessment of the scale of an on-site emergency is of paramount importance in order to trigger of the off-site emergency action procedure in time.

ANAND DISTRICT CRISIS GROUP

GLOSSARY OF TERMS AND DEFINITIONS

5. MAJOR ACCIDENT:

"Major Accident" means

A major emission, fire or explosion involving one or more hazardous chemicals and resulting from uncontrolled development in the course of an industrial activity or due to natural events, leading to a serious damage to persons, with immediate or delayed, inside or outside the installation or damage to property or adverse effects on the environments.

The definition of "Major Accident" is given below along with the provision under various statutes.

- i. Rule 68 (J) (I) (d) of GUJARAT FACTORIES RULES 1963 (Amended-1995)
- ii. Rule 2 (j) of Manufacture, Storage and Import of Hazardous Chemical Rules, 1989.
- iii. Rule 2 (f) of Chemical Accidents (Emergency Planning, Preparedness & Response) Rule, 1996.

6. SITE:

"Site" means

Any location or processed, stored, handled, used, disposed of and includes the whole of an area under the control of occupier.

The "Site" as provided in the rules is given below:

- a. Rule 68 (J) (1) (g) of GUJARAT FACTORIES RULES 1963 (Amended-1995)
- b. Rule 2 (m) of MANUFACTURE, STORAGE AND IMPORT OF HAZARDOUS CHEMICAL RULES, 1989.
- c. Rule 2 (k) of Chemical Accidents (Emergency Planning, Preparedness & Response) Rule, 1996.

7. ON-SITE EMERGENCY ACTION PLAN (PREPARATION):

"On-site Emergency" means

- i. The on site emergency plan deals with measures to prevent and control emergency within the premises and not affecting out side public or environment.
- ii. The Off-site emergency plan will deal with measure to prevent & control emergency affecting public and environment outside the premises. The manufacture should provide the necessary information/ details on the nature, extent and likely effects of such incidents. The emergency plan of the district will be developed by the district authority based on on-site emergency plan of individual units in the district.

The preparations of On-site Emergency Plan have been explain in the different authorities.

- a. Guide lines issued by Chief inspector of Factories, Gujarat State, Dt.27.4.1989
- b. Schedule II under Rule13 (1) of MANUFACTURE, STORAGE AND IMPORT OF HAZARDOUS CHEMICAL RULES, 1989.
- c. Rule 9 (2) (b) of Chemical Accidents (Emergency Planning, Preparedness & Response) Rule, 1996.

8. LOCAL CRISIS GROUP:

"Local Crisis Group" means

- a. It is body constituted by Government, in the industrial pocked to deal with chemical accidents and co-ordinate efforts in planning, preparedness and mitigation of chemical accidents.

Recently New rules come in force, where the provision of local crisis group is made applicable.

1. Schedule 8 of Rule 8 of Chemical Accidents (Emergency Planning, Preparedness & Response) Rule 1996.

9. DISTRICT CRISIS GROUP:

"District Crisis Group" means

- a. The District Crisis Group is the apex body in the district to deal with major chemical accidents and to provide expert guidance for handling chemical accidents.
 1. Schedule 7 of Rule 8 of Chemical Accidents (Emergency Planning, Preparedness & Response) Rule, 1996.

10. MAJORACCIDENTHAZARDS(MAH)INSTALLATIONS:

"MAH installation" means

- a. Isolated storage and industrial activity at a site, handling (including transport through carrier or pipeline) of hazardous chemicals equal to or in excess of the threshold quantities specified in column 3 of Schedule 2 and 3 respectively.
 1. Rule 2 (g) of Chemical Accidents (Emergency Planning, Preparedness & Response) Rule 1996.

ANAND DISTRICT CRISIS GROUP**GLOSSARY OF TERMS AND DEFINITIONS****B. GLOSSARY TERMS:**

Some glossary terms being used with LPG - materials, are expressed below.

a. Atmospheric Stability:

Atmospheric Stability is defined in terms of vertical temperature gradient in the atmosphere. It is usually described using the system of categories developed by Pasquill. The categories of stability class are identified by the letter A to F (or some times A-G)

Neutral stability occurs typically, when there is total cloud cover and is designated by category D (The temperature gradient= adiabatic lapse rate) Unstable conditions occur when the sun is shining. Because the warming of the ground increases convective turbulence. The unstable conditions are designated by the letters A-C with A is the least stable condition stable conditions occur on clear, calm nights, when the air near the ground is stratified and free from turbulence and are designated by the letter E & f. Some times an additional category G is used for exceptionally stable conditions. Neutral conditions correspond to a rate of decrease in temperature with height of about 1 Deg C per meters, vertically. For the dispersion study D & C stability class has been considered.

1. BLEVE (Boiling Liquid Expanding Vapour Cloud Explosion):

This even may occur when a pressurized liquid/ gas vessel is engulfed in fire. Heat from the fire boils the liquid and raises the tank pressure. Although a relief valve may prevent tank exceeding its design pressure for normal conditions, the tank metal above the liquid level will become over-heated and weaken. Eventually the tank ruptures and the contents are explosively dispersed.

2. BUND / DYKE:

Raised ground or a wall built around a tank or tank farm, to retain spills and prevent their spread, thus reducing hazards.

3. FLAMMABILITY LIMITS (UFL- LFL):

In fuel-air system a range of composition exists outside which a flame will not propagate a substantial distance from an ignition source. The limiting fuel concentration are termed the upper flammable limit (UFL) and lower Flammable Limit (LEL)

4. FLASH FIRE:

A burning of a flammable vapour could at very low flame propagation speed.

5. FLASH FIRE:

This is defined as the lowest temperature at which vapours above a combustible substance will ignite in air when exposed to a flame.

Depending on the test method used, the values given are either Tag closed cup (C.C.) or Cleveland open cup (O.C.) The values, along with those in 6.2 and 6.5 give an indication of the relative flammability of the chemical. In general, the open cup value is about 10° to 15° F higher than the closed cup value.

6. FIRE BALL:

The burning of a flammable gas cloud, the bulk of which is initially over-rich i.e. (U.F.L.). The whole cloud appears to be on fire as combustion is taking place at eddy boundaries, when air is entrained.

7. OVER PRESSURE:

Maximum pressure above atmosphere pressure experienced during the passage of a blast wave from an explosion.

8. POOL FIRE:

A pool of flammable liquid burning with a stationary diffusion flame.

9. VAPOUR CLOUD:

Air borne dispersing hazardous vapours, which may or may not be visible as a "Cloud"

10. Acute:

SEVERE but of the short duration. ACUTE health effects are those that occur immediately after explosion to hazardous chemical.

11. Air borne Release:

Release of any chemical into the air.

ANAND DISTRICT CRISIS GROUP

GLOSSARY OF TERMS AND DEFINITIONS

12. **BurningRate:**
The value is the rate (in millimeters per minute) at which the depth of a pool of liquid decreases as the liquid burns.
13. **Chemical Abstracts Services Registry Number:**
The unique identification number assigned each compound registered with the Chemical Abstract Service (CAS) is listed to aid in quick identification of the compound.
14. **Ambient:**
Sounding ambient temperature are temperature of the surrounding area.
15. **By-Product:**
Material, other than the principal product, that is produced or generated as a constituent of an industrial process.
16. **Chronic:**
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.
17. **Combustion Product:**
Material produced or generated during the burning or oxidation of a material.
18. **Domino Effect:**
An effect by which a small hazardous incident in one unit can escalate to a neighboring unit causing a major hazardous incidents. The two affected units can be within the same unit or indifferent units.
19. **Ignition Temperature:**
This is the minimum temperature at which the material will ignite without a spark or flame being present. Along with the values in 6.1 and 6.2 above, it gives an indication of the relative flammability of the chemical. It is sometimes called "auto ignition temperature".
20. **IDLH Value:**
This concentration represents a maximum, level from which one could escape within 30 minutes without experiencing any impairing symptoms or any irreversible health effects. The concentrations are reported either parts per million (ppm) or milligrams per cubic meter (mg/m³).
21. **Emergency:**
A situation created by an accidental release or spill of hazardous chemicals, which poses a threat to the safety of workers, communities, the environment or property.
22. **Evacuation:**
Removal of residents and other persons from an area of danger.
23. **IDLH (Immediately Dangerous to Life and Health):**
The maximum level to which a healthy workers can be exposed for 30 minutes and escape without suffering irreversible health effects of escape impairing symptoms.
24. **Lethal:**
Causing or capable of causing death.
25. **LC₅₀ (LETHAL CONCENTRATION):**
Concentration level at which 50% of the test animals died when exposed by inhalation for a specified time period.
26. **LC₅₀ (TOXICITY BY INGESTION):**
The term LD₅₀ signifies that about 50% of the animals given the specified dose by mouth will die. Thus for a grade 4 chemical (below 50mg/kg) the toxic dose for 50% of animals weighting 70 kgs (150 lb) is 70 50=3, 500mg=3.5 gr or less than 1 tea spoonful, it might be as little as a few drops. For a Grade 1 chemical (5 to 15g/ kg) the LD₅₀ would be between a pint and a quart for a 150 lb man.
27. **Poly merization:**
A few chemicals can undergo rapid polymerization to form sticky, resinous materials, with the liberation of much heat. The containers may explode.

ANAND DISTRICT CRISIS GROUP**GLOSSARY OF TERMS AND DEFINITIONS**

- 28 . **LD₅₀ (LETHAL DOSE)**
Dose at which 50% of test animals died following exposure. Dose is usually given in milligrams per Kg. of body weight of the test animal.
- 29 . **Morbidity**
Ability to cause illness of diseases.
- 30 . **NGO (Non Government Organizations):**
Voluntary and social services agencies such as Salvation Army, Red Cross society, Social worker groups, Church Group etc., who provide community support services particularly during emergencies and natural calamities.
- 31 . (a) **Thres hold Limit Values (TLV):**
"First-Aid" procedures are recommended. They deal with exposure of the vapour (gas), liquid or solid and include in halation, ingestion (swallowing) and contact with eyes or skin. The instruction 'DO NOT INDUCE VOMITING' is given if a nunusual hazard is associated with the chemical being sucked in to the lungs (aspiration) while the patient is vomiting" Seek medical attention" or "Call a Doctor" is recommended in those cases where only competent medical personnel can treat the injury properly. In all cases of human exposure, seek medical assistance as soon as possible.
- (b) **Short-Term Inhalation Limit (STEL):**
The parts of vapour (gas) per million parts of contaminated air by volume at 25°C (77°F) and at one atmosphere of pressure is given. The limits are given in milligrams per cubic meter for chemical that form a fine mist or dust. The values given are the maximum permissible average exposures for the time periods specified.
- (c) **Specific Gravity:**
The specific Gravity of a chemicals is the ratio of the weight of the solid or liquid to the weight of an equal volume of water at 4°C (or at some other specified temperature) If the specific gravity is less than 1.0 (or less than 1.03 in sea water) the chemical will float, if higher it will sink.
- 32 . **Plume:**
Effluent cloud resulting from a continuous source release.
- 33 . **Response:**
The efforts to minimize the risks created in an emergency by protecting the people, the environment and the property, and the efforts to return the scene to normal pre-emergency conditions. Persons who perform the various response functions are termed "RESPONDERS".
- 34 . **Sensitive Populations:**
Groups of people that may be more susceptible than the general population to the toxic effects of the release due to pre-existing health condition (patients in hospitals, pregnant women etc.) or age (elderly people infants, handicaps).
- 35 . **Severity Rating:**
1. The Severity rating of 1, would be termed as most severe which would call for complete evacuation of public at large and would hold potential for severe damage both to life as well as property.
2. The severity rating of 2, would be termed as grave for it would have potential to cause damage to life and a portion of property.
3. The severity rating of 3, would be termed as high i.e. it has potential effect on life and extensive damage in terms of property.
4. The severity rating of 4, would be termed as moderate i.e. would call for partial evacuation as well as activation of material aid.
5. The severity rating of 5, would be termed as low. This would have both localized effect mostly in terms of property damage and would call for declaration of local emergency.
- 36 . **Toxic Cloud:**
Air borne mass of gases, vapors, fumes, dust or aerosols of toxic materials.
- 37 . **Toxicity:**
The ability of a substance to cause damage to living tissue, impairment of the central nervous system, severe illness or death when ingested, inhaled or absorbed by the skin.

ANAND DISTRICT CRISIS GROUP

GLOSSARY OF TERMS AND DEFINITIONS

- 38 . **Vapour Dispersion:**
The movement of vapour clouds or plums in air due to wind, gravity spreading and mixing
- 39 . **Vulnerable Zone:**
An area over which the airborne concentration of a chemical involved in an accidental release could reach the level of concentration (LOC).
- 40 . **Flash Point:**
The lowest temperature of a liquid/ material at which a flame can be propagated across the surface of the liquid when a standard ignition source is applied.
- 41 . **TLV (Thres hold Limit Value):**
TLV refer to air borne concentration of substances. There are three categories of TLV.
TLV-TWA-Time Weighted Average.
TLV - STEL- Short term Exposure limit.
TLV - for gases and vapour is usually expressed in PPM. (Part of the gas/ vapor/ million parts of air) mg/m³: milli gram / cubic meter.
- 42 . **PPM (PARTS PER MILLION)**
- 43 . **Special Hazards of Combustion Products:**
Some chemicals decompose or burn to give off toxic and irritating gases. Such gases may also be given off by chemicals that vapourise in the heat of fire without either decomposing or burning. If no entry appears, the combustion products are thought to be similar to those formed by the burning of oil, gasoline, or alcohol, they include carbon monoxide (poisonous), carbondioxide, and water vapour. The specific combustion products are usually not well known over the wide variety of conditions existing in fires, some may be hazardous.
- 44 . **Density**– The mass of Unit Volume of a substance e.g. kg / M³.

ANAND DISTRICT CRISIS GROUP**LIST OF M.S.D.S.**

Sr. No.	Subject	Page no.
1.	Chlorine	192
2.	Methanol	198
3.	Sulphuric Acid	201
4.	Oleum	207
5.	Toluene	218
6.	Ethylene Oxide	222
