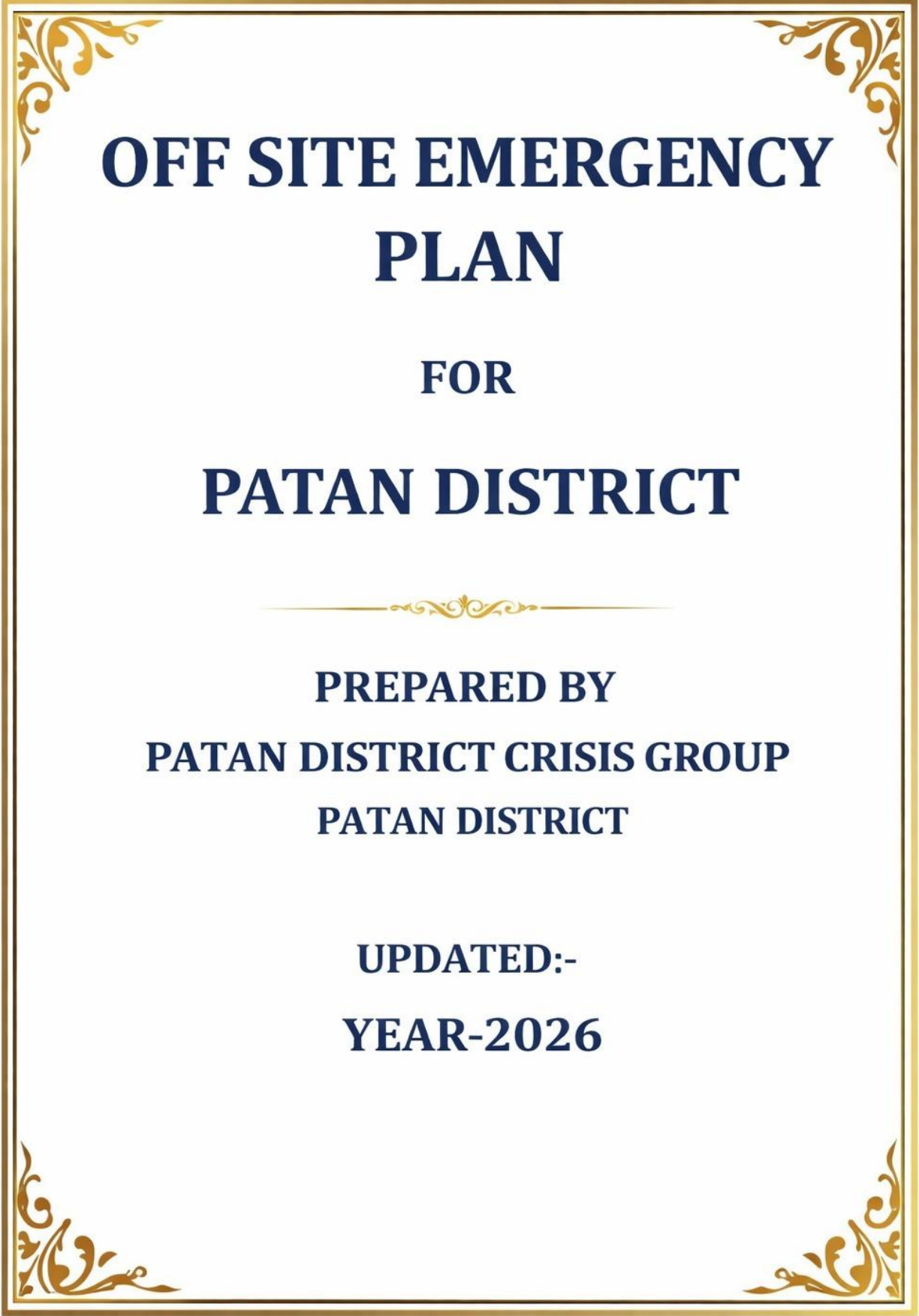




OFF SITE EMERGENCY PLAN FOR PATAN DISTRICT



**PREPARED BY
PATAN DISTRICT CRISIS GROUP
PATAN DISTRICT**

**UPDATED:-
YEAR-2026**

FOREWORD

The increase in chemical activities increase with the development of industries in Patan District, which also posed a threat of emergency involving sudden release of gas, fire, explosion etc. The effects of a major accident in an industrial set up are not always restricted to the boundaries of the industrial installations. They may spill over to the surrounding and environment in vicinity. The several protective measures & efforts are made against such threat of emergency by industries, in spite of that we cannot eliminate occurrence of emergency, which may strike at any time.

To mitigate such type of chemical accident, Patan District Crisis Group has revised & updated Patan District off Site Emergency Plan.

Smt K. D. Modi, Dy. Director, Industrial Safety & Health, Mehsana and Member Secretary, District Crisis Group and his colleague have put efforts in revision of the Document.

I appeal to all the members of the concerned departments, organisations, agencies etc. to prepare own action plan by constituting workable task-force to handle & control such industrial emergency by adequate resources at own level.

I thank all the members of committee, who have contributed valuable inputs in revision of this plan.

Date:- / /2026


(**Dr. Prashant Jilova**), IAS
Chair Person
District Crisis Group,
Patan
&
Collector & District Magistrate,
Patan

PREFACE

Considering the increasing activities on storage and transportation of huge quantity of hazardous chemicals in the industries, the process of updating and reviewing of existing Off-Site industrial emergency plan is necessary. Further, the said plan is also required to incorporate statutory requirements as well as certain guidelines issued by various authorities.

In the preparation of this document, the following various statutory instruction as well as guidelines issued by different authorities, periodicals, documents, chronicle, published books on the subject etc. are referred in good faith. I thankful to all.

1. The Factories Act 1948(1987) and The Gujarat Factories Rules 1963(2004)
2. The Disaster Management Act 2005 and The Gujarat State Disaster Management Act 2003.
3. Chemical Accidents (Emergency Planning, Preparedness and Response) Rules-1996 (2000).
4. Manufacture, Storage and Import of Hazardous Chemical Rules 1989(2000).
5. National Disaster Management Guidelines, Chemical Disasters (Industrial)-2007
6. APELL: Awareness and Preparedness for Emergencies at Local Level – Chemical Emergency Prevention, Preparedness & Response (1995) - National Response Team – National Safety Council, Mumbai.
7. Major Accident Hazards Control and Techniques. CLI-Mumbai.
8. Planning of Off-Site Response for Chemical Hazards – Circulated by Environmental and Forest Department New Delhi.
9. Major Hazard Control – I. L. O. Geneva.
10. Papers, Articles or Techniques as published in periodicals, Chronicles, magazines, books, Journals by experts, authorities, etc.

PREFACE

I, hereby request to all government departments, emergency services and other agencies/organisation, which have involvement in the industrial and transportation emergency, to go through the information and details furnished in the documents and keep and maintain properly equipped with adequate resources at their command and control so as to meet any Chemical emergency in the District. It is also necessary to prepare own working instruction amongst the participating members/persons.

I am thankful to **Shri P. M. Shah**, Director of Industrial Safety & Health, Gujarat State, **Shri C.P.Dholu**, Jt. Director of Industrial Safety & Health, Ahmedabad Region for the guidance and advices in revision of this document.

I am again thankful for the help, co-operation and information provide by M.A.H. installation located in Patan District.



(Smt. K. D. Modi)
Member Secretary,
District Crisis Group, Patan
&
Dy. Director,
Industrial Safety & Health;
Mehsana

OFF-SITE EMERGENCY PLAN - 2026**PATAN DISTRICT CRISIS GROUP**

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OFF-SITE EMERGENCY PLAN - 2026

PATAN DISTRICT CRISIS GROUP

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OFF-SITE EMERGENCY PLAN – 2026

PATAN DISTRICT CRISIS GROUP

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OFF SITE EMERGENCY PLAN

PATAN DISTRICT

MARCH-2026

DESCRIPTION SECTION

PART : 1

**REVISED BY
DISTRICT CRISIS GROUP**

PATAN

March – 2026

INDUSTRIAL EMERGENCY- OFF-SITE EMERGENCY PLAN

CHAPTER - 1

1.1 Introduction

The chemicals are always potential to threat of mishaps, if not properly taken care because of inherent properties of chemicals. Further, activities on storage, process, handling or transportation of large quantities of chemicals are increased, which may turn in to chemical accident or emergency, if not controlled properly.

Presently, different agencies / government departments either, central, State or local self-Government, such as Disaster Management Authority, Department of Industrial Safety & Health, Petroleum & Explosive safety Organisation (PESO), , Environment Pollution Control Board, Transport Authorities, Municipal Corporation, Local Health Authorities etc. which prescribe Rules, regulations or instructions on safety for hazardous chemicals. In spite of strict enforcement of such Regulations & Rules, the possibility of accidents cannot be ignored & such accident leads to damage to life, property and environment also.

However, occurrences of Industrial emergency caused through chemical accidents can be minimised by proper planning on safety.

The primary objectives of Disaster Management Plan are to equip ourselves with necessary & required resources, training and information for prompt implementation and the set of actions to be undertaken in the event of an industrial accident posing hazards to the industries and the public in the vicinity.

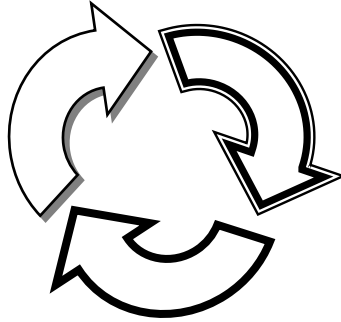
This document seeks to address the wide range of issues that need to be dealt with in order to ensure effective emergency handling with chemical safety, i.e., the actions that should be taken by Government Authorities, organisation, Industries, Agency, Communities and other stakeholders, to minimise 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”.

Emergency Management Cycle

Prevention

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



Preparedness

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

Response

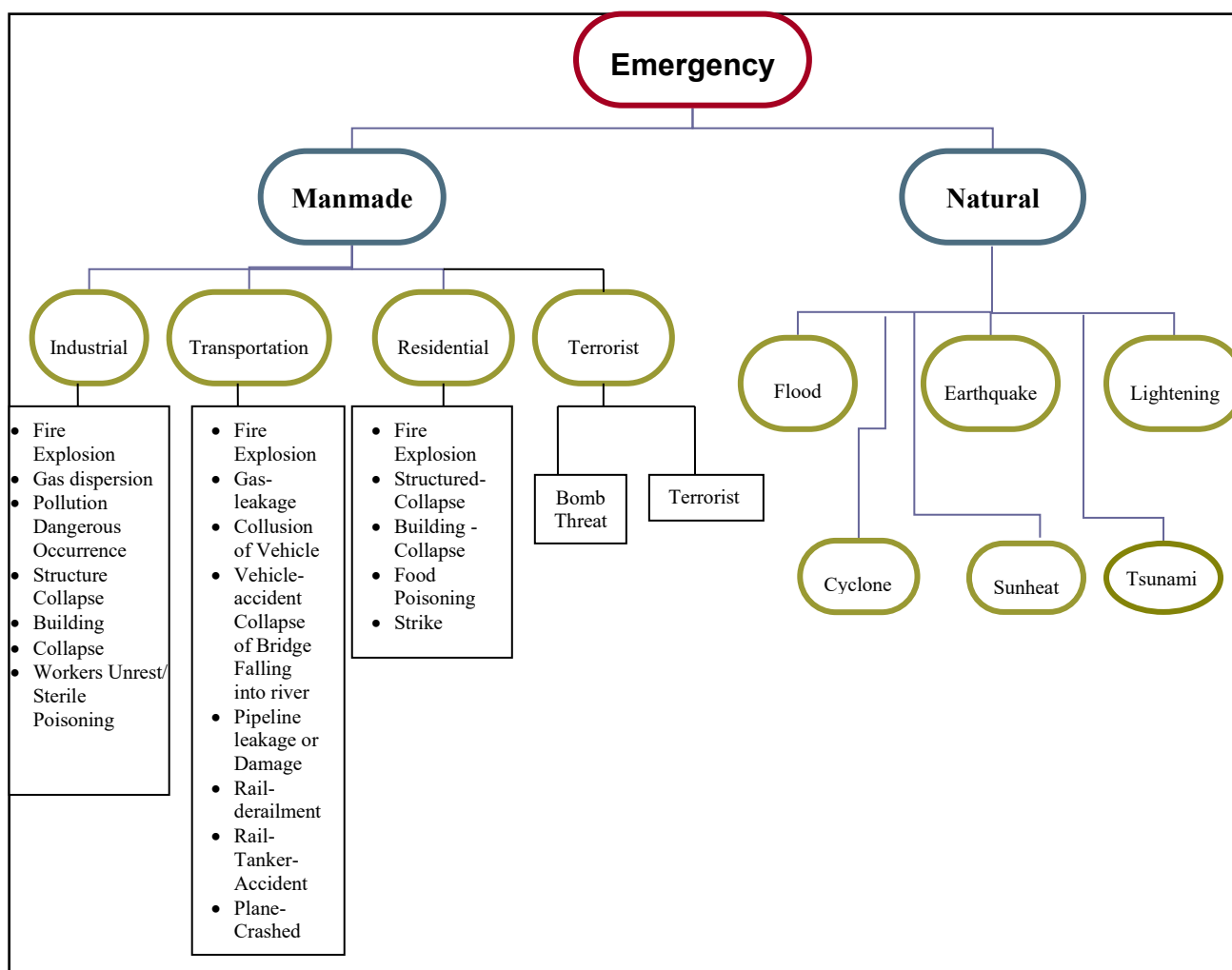
Managing the consequences of an accident and providing immediate relief, as well as taking steps towards restoring and returning to normality

1.2 TYPE OF EMERGENCY

The emergency can be classified broadly in the following manner;

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

Further, Emergency can be classified in the following way;



1.3 INVOLVEMENT OF GOVT. IN CHEMICAL ACCIDENTS

The management of chemical installation has prepared the on-site emergency plan to mitigate any chemical emergency, for the chemicals stored, handled, processed or used at his site. Now, in case chemical emergency strikes and the management could not control by utilising own resources, in the miserable conditions, efforts made by government to provide helps in form of expertise, resources, responding actions etc as per the gravity of situations and control the situation which will save or minimise the damages to life, property and environment. Introduction of C.A.(EPPR) Rules-1996 is direct involvement of government's departments during chemical accidents/emergency.

1.4 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.

1.4.1 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.

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

1.4.3 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 handle the emergency situation. This will term as Level – III.

1.4.4 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.

1.5 LEGAL BACK GROUND

The growth of chemical section has led to increase in manufacture, storage and use of hazardous chemicals resulting in enhanced threat to accident, unlike emergencies caused due to natural disasters, some of which are difficult to prevent. The chemical accidents can be prevented and impacts minimised by better planning, preparedness and response. To achieve this objective, a document, the offsite emergency plan for handling chemical disaster is considered essential.

The regulatory framework on chemical safety could be traced back to the Factories Act, 1948(1987) and chemical class specific regulation lies in the Explosive Act 1884(1963) and Petroleum Act-1934. Later on umbrella act, The Environment (Protection) Act – 1986 was enacted, which also deals with chemical management and safety. Further, Oil Industries Safety Directorate is also issued certain directives on industrial chemical emergency. Similarly, other concerned department/implementing authorities have given certain instructions/guidelines. Expert persons/institutes have published articles on this subject.

In view of the large losses of life and property, the central government has institutionalized the disaster management and focus on prevention, enhanced level of preparedness, prompt and effective responsibility and capacity building. The efforts are illustrated as below:

1.5.1 RESOLUTION OF 1986

After the ‘Bhopal Gas Tragedy’ (MIC release accident at Union Carbide, 1984) the government felt an immediate need to be more cautious about handling of hazardous chemicals. Immediately after the incident, different State Governments in India started improving the emergency preparedness to combat and control the chemical disasters.

Gujarat is one of the highly industrialized states in India and has large numbers of small, medium and large chemical industries spread throughout the state. In response to the preparedness requirement for handling off-site chemical emergencies, Gujarat Government has passed a resolution in 1986, to constitute the District Contingency Plan Committees for Five Districts having large number of MAH installations, viz. Patan, Vadodara, Bharuch, Patan, & Valsad. Legal origin of Off-site Emergency Plan began with this movement.

1.5.2 Chemical Accidents (Emergency Planning, Preparedness and Response) Rules’1996

The Government of India published the “Chemical Accidents (Emergency Planning, Preparedness and Response) Rules-1996 (CA(EPPR) Rules)” under The environment (Protection) Act-1986. The main objectives of the rules are to provide administrative structure at different levels (central, state, district and local) for effective planning, preparedness and response to chemical accidents. Crisis groups at such levels have been defined with their composition and functions under these rules. Further, various definitions; like Hazardous Chemicals, Chemical Accident, MAH installations, Off-site emergency Plan, Transport etc are explained. C.A.(EPPR) Rules-1996 are given at **Annexure-31**.

1.5.3 The Gujarat State Disaster Management Act, 2003

In wake of the massive earthquake in Gujarat, the State Government passed The Gujarat State Disaster Management Act in 2003 (hereinafter referred to as ‘The Act’, for effective management of disasters. The Act covers all types of disasters (natural and man-made).

The Act identifies authorities for disaster management, functions of the state government and its various departments, establishment, constitution and functions of the Authority (Gujarat State Disaster Management Authority — GSDMA, has been formed under these provisions), etc. The functions include collection of data, repository of information, preparation of emergency plans and public awareness for disaster management, relief, rehabilitation and reconstruction, etc.

The Act also defines Powers and Duties of various functionaries in the disaster management activity such as CEO of GSDMA, State Relief Commissioner, District Collector, Local Authorities, Police, Fire, Civil Defence personnel, communities, private sector organizations, private agencies /persons, etc.

The act also defines the authority for declaration of disaster prone or disaster affected area and delegates powers to different authorities for

disaster management activities such as power of entry, power to remove difficulties, etc.

1.5.4 The Disaster Management Act, 2005 & Rules 2006

The Govt. of India has published the ACT and Rules to provide an institutional framework, for drawing up and monitoring the implementation of plans of the disaster management and facilitate the government machinery in mitigating the eventuality of the disaster. Further, it provides constitution, power, and functions of the National Authority, State Authority, and District Authority etc.

1.5.5 National Disaster Management Guidelines (Chemical Disasters) April 2007 (NDMG-CD)

The objectives of the guidelines are to formulate a single national plan integrating existing awareness, prevention, preparedness, response, relief and rehabilitation plans and follow a life cycle approach.

1.6 CRISIS GROUPS

In order to respond a chemical emergency, various co-ordinated efforts are made by Government, constituting crisis groups at various level; i.e. local level, District level, state level or central level.

The following Crisis Alert Systems are constituted as per ‘Chemical Accidents (Emergency Planning, Preparedness and Response) Rules-1996 (2000) under the Environment (Protection) Act 1986.

- (1) Central Crisis Group – The apex body at the Central Level
- (2) State Crisis Group – The apex body at the State Level
- (3) District Crisis Group –The apex body at the District Level
- (4) Local Crisis Group – The apex body at the Local Level

1.7 FUNCTIONS OF CRISIS GROUPS

The functions of crisis alert groups, as per Rule-4 of C.A.(EPPR) Rules-1996; can be summarised as below:

- (1) Set up a functional control room at such place as it deems fit.
- (2) Set up an information networking system with the state and district control rooms.
- (3) Appoint adequate staff and experts’ man to the functional control rooms.
- (4) Publish a list of Major accident Hazardous Installations.
- (5) Publish a list of major chemical accidents in chronological order.
- (6) Publish a list of members of Central, State, and District Crisis Groups.
- (7) Take measures to create awareness amongst the public with a view to prevent chemical accidents.

1.8 EMERGENCY PLAN

The chemical emergency control plans have two separate identities as per gravity of the incidence.

1. On-Site Emergency Plan
2. Off-Site Emergency Plan

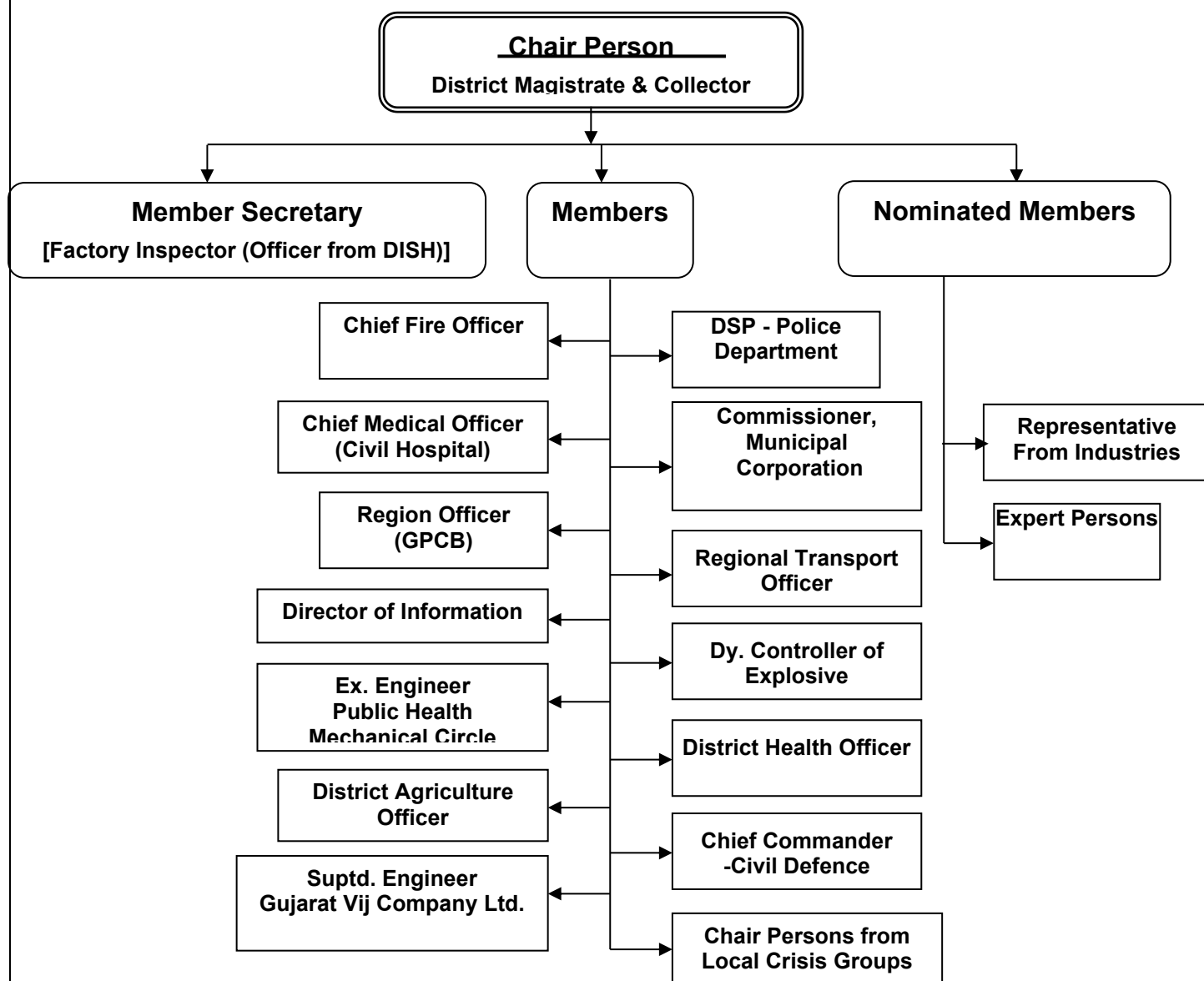
The first is to be prepared by an industrial unit as per provisions under statute

and under the guidance of government & local authorities, while second one is to be prepared by the District Crisis Group with the help of government machinery and other resources; as per Schedule 12 of Rule-14 under MSIHC Rules-1989(2004)

1.9 DISTRICT CRISIS GROUP

It is the direct government participation in handling & controlling the chemical emergency, involving existing government officers in efforts to mitigate chemical accidents/ emergency by constituting the District Crisis Group at District level; as per C.A. (EPPR) Rules-1996. The functions and composition are specified in the said Rules.

The management is multi-stakeholder approach. The Chair Person of the body is District Magistrate. Member Secretary is an Officer from Office of Director of Industrial Safety and Health (Factory Inspectorate). The other members are from emergency services, like, fire; police, medical & health, and other various government officers, NGO, Experts, other organisations, as they are designated. Further, Chair Person can nominate as members from certain suggested categories. The structure of DCG is indicated in the chart as below;



1.10 AID & ASSISTANCE FOR FUNCTIONING OF DISTRICT CRISIS GROUP

As per Rule 12.1 of the Chemical Accident (Emergency, Planning Preparedness and Response) Rule – 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.

1.11 OCCUPIERS OF MAH-UNITS TO PAY

The occupier of M.A.H. Units, as per legal and in principle has to bear the cost of loss of life, property, materials, machineries, pollution & environmental degradation etc. as applicable legal liability and in form of compensation.

1.12 STAGES OF THE EMERGENCY PLAN

There are three basic structures or stages to be considered in preparation of emergency planning, as per below.

1.12.1 STAGE : 1 Pre-emergency Period

It is the normal working period or preparatory stage for preparation, planning, obtaining resources and facilities etc. The member secretary with consent from Chair Person will conduct meetings, collect details on chemical accidents, identify M.A.H. Units, collect on-site emergency plans, their details, M.S.D.S. of hazardous chemicals, assess type of emergency & responding actions, suggest the resources against probable risks and hazards, along with maintaining emergency facilities etc works are carried out by on-behalf of DCG. Further, Member Secretary with approval by Chair Person, is carried out the work of preparation of Off-site Emergency Plan; review and modification of Off-site Emergency Plan time to time. Further, it includes preparedness, awareness, training parts and conduction of massive mock-drill/exercise during the normal working. Other members have to plan & prepare their readiness to mitigate chemical emergency at any time. Thus it is the important stage, which can be evaluated during actual emergency.

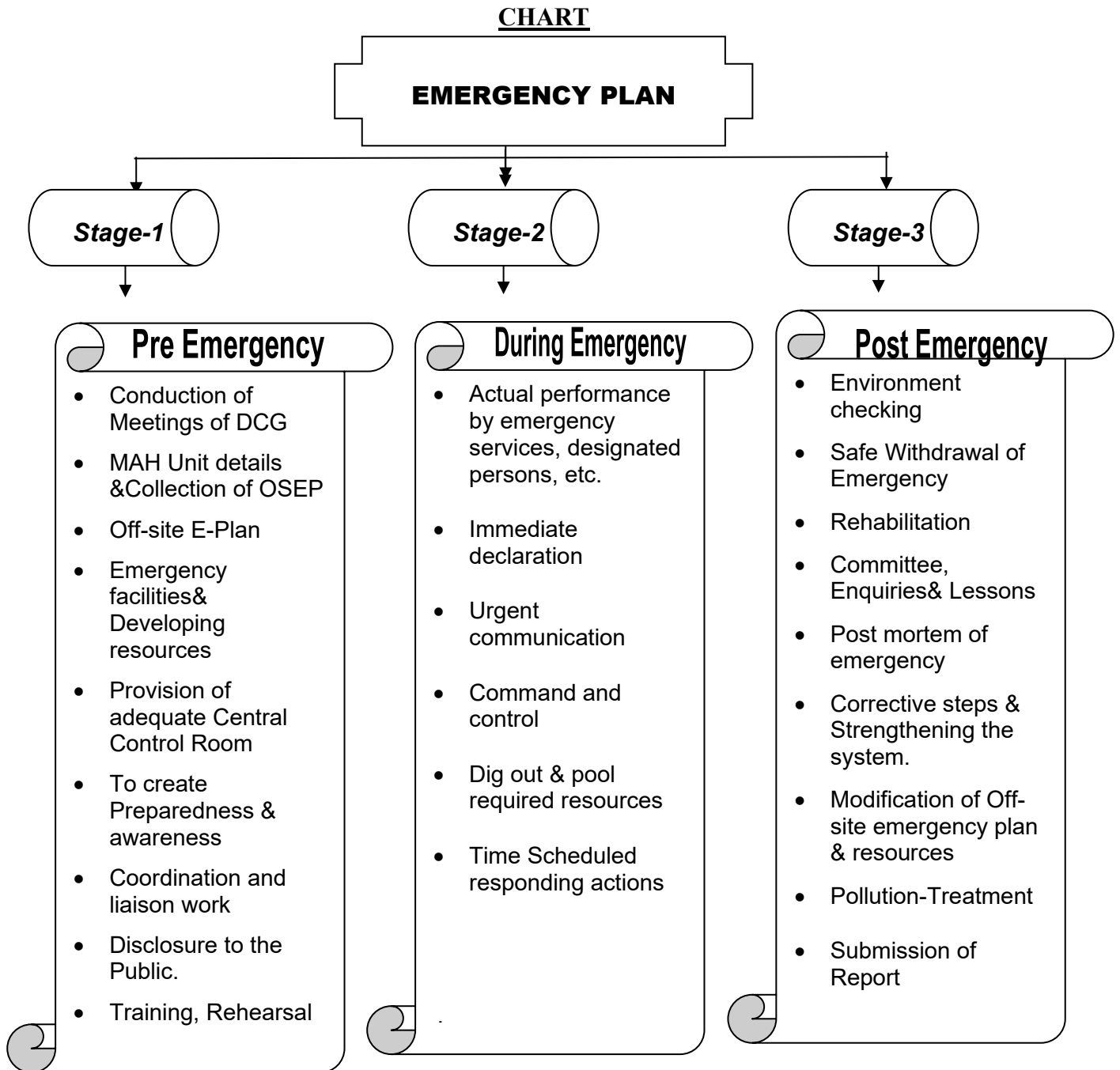
1.12.2 STAGE :2 During Emergency

It is the actual emergency period, performance of the specific duties and responsibility of the emergency services and designated members of DCG, with use of planned resources in systematic ways. Various responding actions carried out by emergency services and other members of DCG to handle and control the industrial emergency in minimum period with coordinated way under command of chairperson of DCG.

1.12.3 STAGE :3 Post Emergency

On controlling the emergency, work on safe withdrawal of emergency, safe rehabilitation, the inquiry, investigation on cause of chemical accident, improvement of resources, modification of Off-site Emergency Plan, corrective steps, Treatment of Pollution etc are processed, the stage is called as post emergency period. A meeting of DCG will be called and discussed the issues. The report will be prepared on the chemical accident & submitted to State Crisis Group.

The above stages are indicated in chart as given below:



1.13 OFF SITE EMERGENCY PLAN

Off-Site Emergency Plan is prepared to provide procedures and other details to mitigate chemical accidents in coordinated way (level-II or Level-III) by crisis group for the industrial pockets. The Crisis Group is composition of officers; selected from Government departments; (either Central or State), Emergency Services, organisations, NGO etc. Emergency services mean external bodies; outside of industrial unit; which are available to handle major accidents and their consequences. E.g. Fire Services, Police Department, Health & Medical

Services etc. Off-site Emergency Plan is developed as per provisions under Schedule-12 of Rule-14(1) of MSIHC Rules-1989(2000) and different directives, various guide lines, instructions, etc issued by various authorities.

Elements of Off-site emergency Plan include as below;

1. **Organisation:** Details of command structures, Governing Body, Planning, warning system, responding procedures, control room, etc.
2. **Communication:** Communication centre, call signs, network, emergency telephone numbers, personnel involvement, message conveying system, etc.
3. **Specialized emergency equipment:** Specified firefighting equipment, JCB, bulldozers, Loaders, Lifting cranes, etc.
4. **Expert Knowledge:** Specialized emergency technique in chemical field, Knowledge of new development.
5. **Resources:** adequate resources and maintenance, trained persons
6. **Facilities :** adequate and suitable facilities.
7. **Meteorological data:** Weather details of area.
8. **Demography:** Population details of surrounding.
9. **Volunteer Organisations:** Volunteer services during & post emergency.
10. **Public Disclosure:** Information on type of emergency, consequences, protective measures, safe shelters, instructions, announcements.
11. **Chemical details:** Fact-sheets of MAH Installations, MSDS of hazardous chemicals, Contact Persons, maximum credible scenarios etc.
12. Assessment of risk and consequences on major Hazardous chemicals.
13. Medical & Health facilities
14. **Training:** Mock drill/exercise, etc

Thus, Off-Site Emergency Plan is important document on preparedness on major chemical accidents providing useful information/details, as mentioned above para, to all members of DCG during periods of pre-emergency, actual emergency and post emergency. Officer from Director, Industrial Safety and Health (Factory Inspector) is initiator in preparation & modification of Off-Site Emergency Plan under guidance of DISH, Gujarat State and Chair Person, Patan District Crisis Group.

PATAN DISTRICT CRISIS GROUP

CHAPTER-2

2.1 INTRODUCTION

“Patan District Crisis Group” is a government initiative committee, as apex body to deal with the major chemical accidents and to provide expert guidance for handling chemical accidents in MAH Factories of Patan District. The committee has coordination with Local crisis Group and State Crisis Group. The members of the District Crisis Group are selected from high rank and experienced senior officers from various government departments, emergency services, non-govt. organisation and private sectors from the Patan District; and committee is re-constituted time to time. The members have to perform the role and responsibilities under District Crisis Group. The members are identified as Designated Persons.

Further, the members have to well prepare for Major Hazardous Accidents during preparatory period and to maintain the adequate resources at their level.

2.2 PATAN DISTRICT

2.2.1 GENERAL

Patan District is divided into 10 Talukas , 464 Panchayats , 524 Villages.

○ **Name of Taluka**

- Patan
- Sidhpur
- Chanasma
- Harij
- Sami
- Shankheswar
- Radhanpur
- Santalpur
- Saraswati
- Patan – City

- **Name of Sub division**
 - Patan Prant
 - Sidhpur Prant
 - Sami Prant
 - Radhanpur Prant
- **Latitude:** 20° 41' to 23° 55'
- **Longitude:** 71° 31' to 72° 20'.
- **Total Area:** 566755 Ha.
- **Urban Area:** 11284 Ha.
- **Rural Area:** 555471 Ha.
- **Agriculture Land:** 459488 Ha.
- **Non Agriculture Land:**107267 Ha.
- **Irrigated Land:** 124800 Ha.
- **Non Irrigated Land:** 334677 Ha.
- **Type of Land :** Salty and Sandy loam
- **Weather :** Dry & Hot
- **Border Area:** 55 Km. Piller No:976 to 986
- **Rivers:** Saraswati, Khari, Pushpavati, Rupen, Banas
- **Talav:** 1303

2.2.2 DEMOGRAPHIC DETAILS

The population of different area/ Villages/Cities are to be collected and to keep separately.

2.2.3 Other Details

Further, other details in respect to the District are given below;

1. Primary School :	1. Hospitals :
2. Secondary School :	2. Primary Health Centre :
3. Higher Secondary Schools :	3. Primary Health Sub Centre :
4. Colleges :	4. Dispensary :
5. Post Offices :	5. Family Planning Centre :
6. Forest Area :	6. Child Welfare Centre :
7. Irrigated Area :	7. Maternity Hospital :

2.2.4 MAP OF THE DISTRICT

The map of the Patan District is given at **Annexure -2**.

2.3 WEATHER DATA

Metrological detail of Patan District is given at **Annexure-19**.

2.4 PATAN District Crisis Group

2.4.1 GENERAL

Patan District Crisis Group is constituted as per C.A. (EPPR) Rules-1996. The members are selected from various Govt. departments, organisation, agencies, industries and other categories to get effective result.

The designated persons have to perform the role and responsibility for the purpose of major chemical accidents / emergency, as apex body in the District; under Schedule VII of Rule 8-b of Chemical Accidents (Emergency, Planning Preparedness and Response) Rules – 1996(2000).

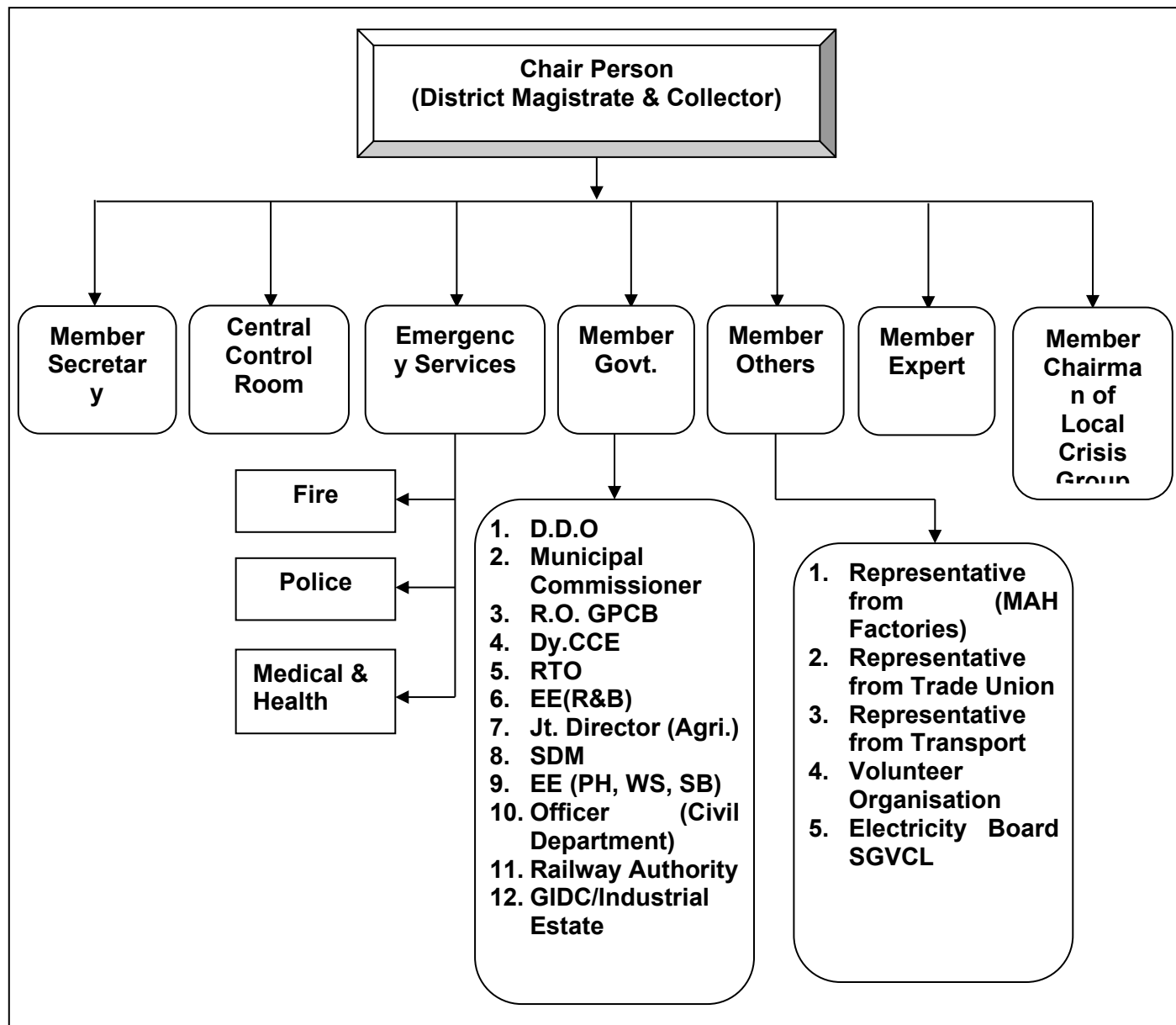
2.4.2 FUNCTIONS

The main functions of the District Crisis Group as per Rule 8 & 9 of C.A. (EPPR) Rules, are;

- (1) DCG is an apex body in the District to deal with Major chemical accidents & to provide expert guidance for handling Chemical accidents.
- (2) To prepare off-site Emergency Plan for the District.
- (3) To review all the on-site emergency plans prepared by the occupiers of MAH Units for the preparation of off-site emergency plan.
- (4) Identification of Off-site emergency situations in the industrial pockets
- (5) Assessment on vulnerability area.
- (6) The management on Major chemical accidents at the site, within the District & setting of response facilities.
- (7) To conduct training programme on emergency preparedness and response procedures.
- (8) Continuous monitor every Major chemical accident.
- (9) To operate the central control room to carry out the functions, duties, plan-proceedings, meetings, record keeping, information, data, computers with requisite staff.
- (10) To forward report on the Major chemical accidents to the State Crisis Group.
- (11) To conduct at least one full scale mock-drill/rehearsal/simulation of a within fifteen days chemical accidents at a site each year and forward a report of the strength and weakness of the plan to the State Crisis Group.
- (12) To modified & update Off-site emergency plan at regular interval with the views of:
 - a. Major Accidents / incidents occurred during the period.
 - b. Addition/alteration of Major Accident Hazardous Units in the District.
 - c. Incorporating the additional resources and facilities created.
 - d. Experience gain during actual emergency.
- (13) The District Crisis Group shall meet every forty five days and send a report to the State Crisis Group.
- (14) To ensure continuous information flow from the District to the Central and State Crisis Groups.

2.4.3 THE STRUCTURE

The structure of Patan District Crisis Group is given; in chart; as below:



2.4.4 COMPOSITION

The present composition of Patan District Crisis Group is appended at Annexure -3.

2.4.5 INDUSTRIAL POCKETS OF PATAN DISTRICT CRISIS GROUP

There are 01 M.A.H. Units in the District as identified by the DISH-Office, Patan; Industrial pockets as identified in the Patan District according to industrial growth and location of M.A.H. Installations.

2.5 INCIDENT REPORTING PROTOCOL

Generally, most major chemical accidents are happened at the odd-time and the

appropriate authorities get the authentic information vary late, so required helps could not reach in time. In this circumstance, first information reaching in time is important factor. If LCG has handled the situation, then; it should report immediately on starting actions to the DCG. Otherwise the Site-Main Controller or responsible person from affected installation/MAH Unit or any other responsible person from neighbouring industries or lay-man will immediately inform to the off- site Authorities, either to Fire, Police, Central Control Room, District Collector, or Directorate of Industrial Safety & Health., with at least following details, if possible:

- (1) Identity himself by name, designation & organization
- (2) Location of incident (Name of factory with location, Plant/Section/ Department)
- (3) Involvement of chemicals(Name of probable chemicals)
- (4) Type of emergency (Fire, Explosion, Toxic Release, along with direction of gas cloud movement, damages etc)
- (5) Time (Probable time of started & reporting)
- (6) The type of help & resumes actual required.(Type of fire equipment, neutralising agent, short route)

It is also possible that any other person who see/ hear the fire/ explosion incident and informs the police or fire, before they receive call from the affected unit.

The information receiving officer/person will verify & confirm the said news and conveying to other emergency services and mobilise to the incident place. This part is said as Incident Reporting Protocol and it is the origin of the activating Off-site Emergency Plan.

Further, the Chair Person; DCG has to communicate report on development of event to State Crisis Group.

2.6 ANATOMY OF EMERGENCY

Important elements of mitigation of major chemical accident are emergency planning, preparedness, recognition and responding actions. The phases of anatomy of chemical emergency are described as;

1. Recognition of type of major chemical incident;
2. Warning phase;
3. Responding phase;
4. Recovery, rehabilitation & reconstruction phase.

MANAGEMENT OF MAJOR CHEMICAL ACCIDENTS CHAPTER-3

3.1 INTRODUCTION

The implementation of accident prevention measures at an industrial installation is an internal function of the unit. It is termed as emergency at on-site. It is called as on- site emergency, level-I. Further, if the gravity of the incidence is very high like, more numbers of injury, fatality, damages, and it develops to off-site consequences, it becomes the responsibility of external authorities to apply counter measure efforts to control such incidence with minimizing the damage to men, materials & environment. It will identified as Off-site emergency, level-II, again, if high toll rate, then, it will identified as level-III or Level-IV Here, the government have come forward and constituted alert group systems at various levels to tackle such chemical emergency. Off-site Emergency Plan for the industrial pockets of the district is prepared to manage the chemical emergency/disaster, involving officers from government and other agency.

3.2 DETAILS TO BE COLLECTED FROM MAH UNITS

The management of M.A.H.Units of the District has to submit their On-site Emergency Plan to the DCG for preparation of Off-site Emergency Plan of the District as per Rule 9 (d) of the C.A. (EPPR) Rules-1996.The following major details shall be required from the management of M.A.H.Units:

1. Type of chemical Accident, involved chemical, with quantities, worst scenarios, effect(which can escalate in to off-site emergency), probable duration, casualties, damaged,
2. Location of Hazardous chemicals with stock, and their M.S.D.S.
3. Resources can be spared by the management of Affected Unit.
4. List of SMC, IC, Key Person, Essential Workers, with their contact numbers.
5. Location of Safe Assembly Point, Emergency Control Point with In-charge Person, Parking Area and Approach route, Medical centre, etc.
6. List of required helps, resources (Type of Fire Fighting materials, Damage Control System, Repair Items etc), Neutralising Agents, Type of emergency equipment, etc.
7. Matter to notify to Public, Evacuation arrangement.
8. Arrangement of disposal of waste, clean up; etc.

3.3 APPROACHES TO CLASSIFYING CHEMICAL ACCIDENTS

When any chemical accident strikes at the industrial units or during transportation, the first step is to identify such incident in common terms, as given below:

1. Type of chemical involved and state (Liquid, Gas, Solid, Powder, Lump, Compressed substance).
2. Type of Incident (Fire, Gas Dispersion, Explosion, Liquid spreading, Collapse of structures, Falling, Bursting of vessel, inhalation of toxic/poisonous gas, etc.)
3. Source of release and maximum storage quantity.
4. Size of area contaminated or to be contaminated
5. Numbers of people exposed to at risk at the site.
6. Routes of exposure/dispersion
7. Medical Consequences
8. Contact person with phone or mobile numbers.

In chemical terms, type of incidence- groups mean;

- (1) Flammable,
- (2) Toxic,
- (3) Corrosive,
- (4) Poisonous,
- (5) Explosive, etc.

3.4 MANAGEMENT

The members of DCG should have proper knowledge and basic details/data on matters of off-site emergency with respect to installations with hazardous chemicals stored or used. Further, it is suggested to entrust responsibility to one of senior and experienced persons/officers from DCG, who will plan to ensure full requirement of infrastructures, equipment, trained persons at the off-site level by preparing in;

1. Short term Plan,(0-2/3 Years);
2. Medium Term Plan, (0-4/5 Years); and
3. Long Term Plan (0-6/7 Years)

For implementation of all identified steps and categorised under Off-site Emergency Plan.

Members of DCG have to manage the chemical accidents. The essential details/information shall be collected and updated during pre-emergency period.

The required details for managing plan are listed as below;

A. MANAGEMENT PLAN:

- (1) The procedure to get information on accidents/emergency.
- (2) Role & Responsibility of members & Emergency Services
- (3) Work-Coordination between Members
- (4) Chart on conveying messages
- (5) Arrangement of Central Control Room & Alarm system

(6) Responding Actions

B. BASIC DETAILS ON CHEMICAL MATTERS:

- (1) List of M.A.H. Installations of the District
- (2) Probable Major Accident Scenarios
- (3) M.S.D.S. & Salient Properties of some chemicals
- (4) Care for safe handling of some chemicals
- (5) Colour Code System for Pipe Lines
- (6) List of Expert Persons
- (7) Special Medical Treatment and Antidots
- (8) A proposed Scale for Grading of chemical disasters.
- (9) Some Major Accidents in India
- (10) List of relevant Statute on hazardous chemicals
- (11) Glossary of Terms and Definitions
- (12) C.A. (EPPR) Rules-1996.

3.5 FIRST INFORMATION

Sometimes, first information may get by Fire-officer / Police department/ Factory Inspector (DISH) / CCR, then it will be communicated to Chair Person for further actions. However, the first response team, who has the knowledge of the area, identification of hazards of storage or transportation of hazardous chemicals in the area, formulation of emergency organizations at different levels, who identified key person for rendering effective response during chemical emergency; is the frontal organization that is responsible to initiate response for all types of off-site emergencies. It should be ensured that messages, in correct method shall be reached to concern persons in time with required type of helps or resources. On getting messages, the concern persons must reach immediately at the place of incident and start responding actions at their level, with communicating to respective authority.

3.6 EMERGENCY SERVICES

The emergency services, who may get first information on chemical accident, they should reach to the incidence site earliest and render their services. They have to communicate the message, with actions taken & required further helps/resources to Chair Person and other members in time. The emergency services means;

- 1) Fire Services
- 2) Police Department
- 3) Medical & Health Services
- 4) Other Supporting Services

3.7 WORK-COORDINATION BETWEEN MEMBERS

The prime requirement during a chemical emergency is well-coordinated & collective efforts for effective management and control. This calls for identification of personnel and resources that will be involved in each function of emergency response such, as firefighting, medical, rescue and combat, communication, etc. These personnel will function as a team for each distinct activity and may or may not be involved in all types of activities.

For effective 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.

3.8 SUB-COMMITTEE OF DCG FOR GRAVE INCIDENT

The separate sub-committee can be constituted as per large scale grave situation of chemical accident, as per suggested as below;

(1) Management Group :

- a. Under Head of Chair Person;
- b. Members; consist of: Commandants from Police, Fire, Medical, Health;
- c. Member Secretary,
- d. Expert persons,
- e. Site Main Controller of the affected unit,
- f. Information Officer,
- g. Municipal Commissioner,
- h. District Development Officer,
- i. I/Central Control Room,
- j. Chair Person of LCG, etc.

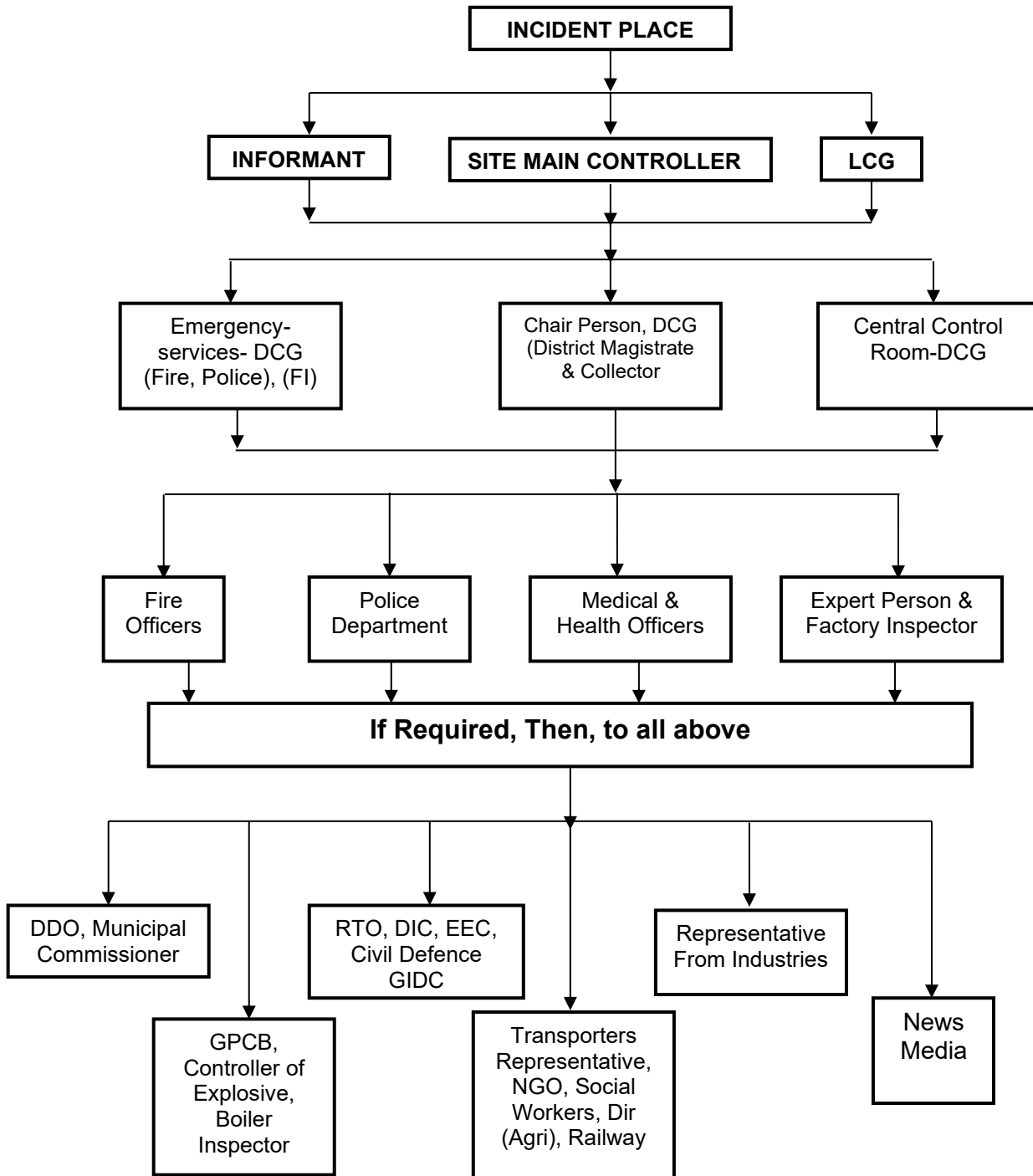
(2) Working Group; consist of:

Task Force, consisting of persons from Police, Fire, Medical and Health Departments/organisations.
RTO, Civil supply, Water, Drainage, Waste Disposal, etc Authority.
GPCB- Officer, Officer from PESO, Boiler-Inspector, etc
Incident Controller from affected unit,
Technical Experts, Volunteer Group, etc.

3.9 CHART ON CONVEYING MESSAGE

The success of the emergency depends on reaching correct message and immediate actions on site by emergency management which includes emergency services and members of DCG. It is the real performance by members during emergency period and post emergency period.

The flow of message/information or directives to each member during chemical emergency is indicated in the chart given as below;



3.10 ROLE & RESPONSIBILITIES OF DESIGNATED PERSONS

The various actions are to be performed by designated persons to handle & control the chemical accidents timely, pre-decided and in coordinated way under the guidance of Chair Person, DCG.

Combating the emergency and minimizing the damage to people, property and environment; depends on the following factors;

1. Lapsed time between striking of emergency and communication to emergency services.
2. Effective, perfect, and immediate communication of emergency messages to the respective designated persons.
3. Response, time-activation & mobilization of resources at appropriate places.
4. Quality of decision making at site and at Central Control Room.
5. Deployment of resources in effective manner.

Generally Members of DCG are engaged in their own routing work and all of sudden getting message on chemical accident, they have to equip immediately and concentrate on emergency situation. In order to achieve higher order of controlling emergency on the site effectively, their roles and responsibilities shall be specifically defined. The involved designated person are requested to prepare own action plan for their Task force with adequate & necessary resources /facilities, keeping in view of risk involve in the chemical accidents; as specified their role & responsibilities. The guidelines for purpose of awareness, alertness & preparedness to tackle such emergency are indicated in forgoing Para.

3.10.1 CHAIR PERSON (DISTRICT MAGISTRATE & COLLECTOR)

Being Chair Person of District Crisis Group, he will be in overall charge & command of DCG & has to assist the members for responding emergency actions to control the chemical accidents effectively and urgently in the industrial pockets of the District; in case of chemical accident/ emergency Level-III. The Member Secretary will coordinate the work with the members during pre-emergency period. Chair-Person has to ensure that participating members should have to perform their assigned roles effectively with adequate resources.

The role and responsibilities of the Chair person, includes:

- A). To call & conduct the meetings.
- B). To assist in preparation or updating of off-site emergency plan for the District by reviewing the on-site emergency plans of MAH Units.
- C). To ensure abilities to perform the role of each involved emergency services and designated members effectively.
- D). To activate and maintain the Central Control Room round the clock with essential facilities.
- E). To assess situation during emergency and have to declare the industrial emergency, call and direct the emergency services & designated persons to respond the industrial emergency by providing reinforcement and support by pooling the required resources from the District.
- F). The arrangement for rescue, evacuation, shelter, food, water, clothing, and transportation to affected area, as per situation. Announcement on

industrial emergency to the public in vicinity of the affected Unit.

- G). If situation could not control even after utilising resources at his command, it should be reported to SCG immediately and then SCG will take charge of situation.
- H). To keep inform to the higher authority time to time.
- I). To declare the withdrawal or termination of emergency.
- J). To look after rehabilitation, restoration, cleanliness etc on post-emergency actions.
- K). To submit the reports on industrial emergency to SCG.
- L). To conduct the mock drill / exercise on industrial emergency.

3.10.2 MEMBER SECRETARY: Dy. Director of Industrial Safety & Health (Factory Inspector)

The major role of Member Secretary has to perform coordination with members of DCG & preparation of Off-site Emergency Plan for District during pre-emergency period i.e. preparatory work. However, as Member Secretary of District Crisis Group, his role includes;

- A). To arrange & attend the meetings of District Crisis Group in consultation with Chair Person, as Member-Secretary of DCG.
- B). To identify Major Accident Hazardous units in industrial pockets & maintain up to date list and submission of details to DCG.
- C). To feed technical & chemical data & information in respect of MAH industrial units situated in the District. To provide technical inputs to ensure safety, health & environment of workers, properties and population in vicinity.
- D). To prepare or update the off-site emergency plan for District Crisis Group. The Off-site emergency plan should dovetail with the on-site emergency plan as prepared by the major accident hazardous units in the industrial pockets.
- E). To advice & guide the proper & effective handling actions as required by emergency services/designated persons during chemical emergency.
- F). To help to conduct the mock drills, post emergency inquiry etc.
- G). Other duties as specified by Chair Person of District Crisis Group.

3.10.3 MEMBER- FIRE SERVICES (FIRE COMMANDANT)

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). To participate the meetings, Mock Drill / Rehearsal & training.
- B). Inspection, Survey & assess the situation during emergency & to report.
- C). Immediate response actions to control the industrial emergency, under intimation to Central Control Room or Chair Person.
- D). Proper training to fight against industrial hazards and knowledge of identification of such hazards.
- E). Rescue, Evacuation, Removal of debris, Pollution control and other emergency work as directed or instructed.

- F). To maintain the proper and adequate firefighting, equipments, neutralizing media, self-breathing apparatus, emergency equipments, personnel protective equipments with maintaining in working order.
- G). 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.
- H). Liaison & coordination with Central Control Room and other emergency services.
- I). To prepare their own details action plan & to ensure the adequate facilities & provisions to handle the industrial emergency.
- J). Other duties as required during actual emergency.

3.10.4 MEMBER- POLICE DEPARTMENT (POLICE COMMANDANT)

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

3.10.5 MEMBER- MEDICAL & HEALTH (COMMANDANT) –

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 participate the meetings & Mock Drill / Rehearsal & Training.
- B). To ensure the adequate arrangement & preparedness for special medical treatment with antidotes and trained doctors, Para-medical staff, as specified in toxicology at the time of industrial emergency in District.

- C). On declaration of emergency or on receiving the message or information, prompt medical facilities shall be set up e.g. first aid post, casualty receiving centre/ 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. To provide Hospital Base services.
- D). Identification of dead bodies and post mortem arrangement.
- E). To maintain up to-date list with telephone nos. of services of doctors, hospitals, ambulance, primary health center, Para-medical staff, vehicle to meet the emergency situation.
- F). Arrangement to inform the up to-date status time to time to Central Control Room, Chair Person, relatives of injured or admitted patients, emergency services etc.
- G). Arrangement to safe guard the public health in case of development of epidemic situation or pollution & announcement on specific safety measures to be taken by public at the time of industrial emergency situation.
- H). To advice & guide the District Crisis Group in respect of medical & health part, time to time.
- I). Provisions for proper and adequate medicines, lifesaving drugs, equipments, antidotes etc. related to chemical accidents.
- J). To prepare own detailed action plan to ensure the effective handling and response during industrial emergency.
- K). Liaison & coordination with Central Control Room, Chair Person, Emergency Services organization, agency and other related person.
- L). Other duties as required during actual emergency.

3.10.6 MEMBER- DISTRICT DEVELOPMENT OFFICER

Being a responsible person of District and member of DCG, he has to ensure all work related to industrial emergency shall be given prime importance and provide all helps with in his command.

- A). To participate meeting, mock drill & training.
- B). Ensure the different authorities, agencies, organization, persons, as specified their role, should participate immediately during industrial emergency in District Pocket area.
- C). To advice & guide to the District Crisis Group.
- D). Liaison & co-ordination with Chair Person, Central Control Room, emergency services, organization, agencies, person etc.
- E). Other duties as specified by District Crisis Group.

3.10.7 MEMBER- MUNICIPAL COMMISSIONER

Being highest authority of the Patan-city & member of DCG, Patan Municipal Commissioner has to provide the facilities, helps & arrangements as required

during industrial emergency. However, his role can be described as below;

1. To participate meetings, mock drill and depute a responsible officer for the industrial emergency purpose.
2. To arrange to receive casualties during an emergency under the control of Corporations' Hospitals.
3. To arrange to mobilize the firefighting equipments and facilities.
4. To arrange to provide medical supplies and equipments to Civil Hospital / Municipal Hospitals.
5. To arrange to check occupational health effects to the citizens and to take actions accordingly.
6. To arrange to make schools and other premises available for shelters.
7. To arrange to blow the city sirens for alarming the public.
8. To arrange to inform the concerned department-heads to provide facilities such as water, sewage, electricity, medical and health, education department etc. Convey them keep ready to provide available facilities during emergencies.
9. To arrange to rehabilitate evacuated population affected during the emergency.
10. To arrange other helps and facilities as required during actual emergency.

3.10.8 MEMBER – REGIONAL OFFICER- GPCB

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

3.10.9 MEMBER- Dy. CONTROLLER OF EXPLOSIVE(PESO)

Dy. Controller, Petroleum & Explosive Safety Organisation, has to attend the meeting, exercise/mock Drill and Training. He has to provide the details /information of the units with in their command. Follow the instruction as directed by the Chair person or DCG.

3.10.10 MEMBER- REGIONAL TRANSPORT OFFICER

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

3.10.11 MEMBER- DIRECTOR, INDUSTRIES CENTRE

He has to attend the meeting, exercise/mock Drill and Training. He has to provide the details /information of the units with in their command. Follow the instruction as directed by the Chair person or DCG.

3.10.12 MEMBER- Jt. DIRECTOR (Agri)

He has to attend the meeting, exercise/mock Drill and Training. He has to provide the details /information on agriculture with in their command. Follow the instruction as directed by the Chair person Or DCG.

3.10.13 MEMBER- DIVISIONAL MANAGER, WESTERN RAILWAY

On getting message at the time of disaster from Chairperson, Emergency Services or Central Control Room, the Divisional Manager, Western Railway, Patan will act as follows:

1. To follow the standing instruction to all railway gates to take actions as asked by 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 or Authority.
6. To attend the meeting, exercise/mock Drill and Training.
7. Follow the instruction as directed by the Chair person or DCG.

3.10.14 MEMBER- CIVIL DEFENSE COMMANDENT

- A). To participate meeting, mock drills & 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.
- F). Follow the instruction as directed by the Chairperson of DCG.

3.10.15 MEMBER- REGIONAL OFFICER,GIDC

He has to attend the meeting, exercise/mock Drill and Training. He has to provide necessary help and other details /information of the units within their command. Follow the instruction as directed by the Chairperson of DCG.

3.10.16 MEMBER- Representatives from MAH Units

The management of major accident hazardous unit has to maintain update on-site emergency plan with necessary details with accurate information and a correct assessment of the situation. The site main controller is responsible to provide report immediately on occurrence of chemical accident at his unit with specific details, development and needed help from District Crisis Group. He will arrange & provide all resources, equipments, manpower, and communication network from his own unit and co-ordinate with District Crisis Group to combat the industrial emergency. He will co-ordinate with chairperson, Central Control Room, emergency services etc. participation in meeting, mock drill etc. Follow the instruction as directed by the Chairperson of DCG.

3.10.17 MEMBER- ELECTRICAL ENGINEER, Electricity Board (CGVCL)

- A). Arrange for un-interrupted power supply, if needed.
- B). Arrange for lighting at temporary medical camps, rallying points and parking yards.
- C). Take care of electrical equipment within damage 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
- G). Follow the instruction as directed by the Chairperson of DCG.

3.10.18 MEMBER- EXPERTS

The chemical manufacturing activities along with large storages of various chemicals are day-to-day increasing. The chemical emergency often gives very short time to respond their containment. Therefore, it requires specific

knowledge of hazards with special treatment and their consequences. This needs chemical & technical expertise in handling of large-scale toxic and hazardous chemical emergency. They will provide careful evacuation of emergency and advise prompt responding actions to control the emergency if required. The planned responding resources will help to control such emergency.) Follow the instruction as directed by the Chairperson of DCG.

3.10.19 MEMBER- CHAIR PERSON (Local Crisis Group)

Being a chairperson of the Local Crisis Group, the member of DCG, has to provide all the information of the units under his command as & when asked for. Further, he has to report, if any chemical accident occurs within his industrial pocket and development. Follow the instruction as directed by the Chairperson of DCG.

3.10.20 MEMBER- 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 shelter timely, in case of such situation happen during Chemical emergency. To save the life of public is more important factor, which will be successfully carried out by the volunteer organization. Follow the instruction as directed by the Chair person Or DCG.

3.11 CENTRAL CONTROL ROOM

3.11.1 INTRODUCTION

The Central Control Room is the place under the control of chairman of District Crisis Group, where the operations to handle the emergency are directed and co-ordinated. It is the centre of mobilisation of information, liaison, communication, coordination, meeting place, etc related to activities on chemical emergency actions.

3.11.2 FUNCTIONS

The Central Control Room should be equipped to receive and transmit the message/information and directives from and to the Chairman; DCG, members, areas of the incident, emergency services, public, mutual aiders, private organizations and other sources.

In addition to the means of communication, the CCR should be equipped with relevant data and equipments. The In-Charge of CCR should be conversant with the developing situation and enable them to plan accordingly. CCR has to work round the clock during all the period.

3.11.3 LOCATION

It should be situated in an area of minimum risk and close to road to allow for ready access, with adequate communication facility.

3.11.4 ROLE OF CCR

There are three phases of activities to meet the emergency:

Phase I	During Normal Circumstances (Pre-emergency Period)
Phase II	During Actual emergency Handling (During Emergency Period)
Phase III	After Emergency (Post Emergency Period)

3.11.4.1 PHASE -I :DURING NORMAL CIRCUMSTANCES

1. The Central Control would be operated on round the clock basis, by a selected staff of 2 or 3 persons to receive any information about the incidents.
2. It should be kept in readiness to meet the emergency role.
3. The prime function of Central Control Room is to get correct information and spread the correct message or details to requisite places/agencies immediately and speedily.
4. To maintain the following at CCR:
 - a. Updated district contingency plan - 10 Copies
 - b. General Situation Map – covering whole area showing Road /Railway crossing, shelters, Factories, Base Hospitals, Casualty Reception Centers etc.
 - c. Suitable information to enable securing of relevant expertise services from other sources, if necessary.
 - d. List of persons required to take over command of specific emergency operations, their residential address with telephone numbers.
 - e. Update the charts displayed at CCR.
5. The In Charge of CCR will also maintain periodic touch with emergency /services and external agencies, with a view to obtain their resource position.
6. In consultation with Member Secretary and chairman, the CCR will arrange to simulate/exercise the emergency plan, then problem areas identified & remedial measures incorporated in the plan.
7. CCR shall co-ordinate to impart training and arrange public awareness programme in the respective areas with the help of voluntary/ industrial organizations.
8. Other work as allotted by Chairperson & District Crisis Group.

3.11.4.2 PHASE II :DURING ACTUAL EMERGENCY

1. On getting information about incident /accident, the station in charge of CCR with consultation of Chairman, DCG and emergency services, should arrange to blow sirens, fixed at various places and calls for all respective agencies /commanders and their team to take up positions at the CCR & place, as decided on duties on declaration of emergency.
2. In charge of CCR has to confirm that the emergency services have reported and started the works to predetermined places and gets the details of the scene of the incident.
3. In the event of emergency, the primary need will be to pull the local resources of the Industrial units into co-ordinated actions, arrange additional resources from city Municipal authority, Govt. Agencies, Voluntary Organizations and if required involve State & National Governmental, Non-Governmental and voluntary/professional/non-

- professional agencies into actions.
4. As per situation of the incident, the following procedure for communication to general public may be adopted:
 - i. To clearly communicate lifesaving information to the trapped in endangered area.
 - ii. Official statement of instructions to the general public regarding general information on emergency situation so that rumours will not spread.
 - iii. Announcement advising people to leave a critical zone & go to pick up points for safe designated shelter.
 - iv. Announcement regarding the extent of potential threats /or danger and what actions are required by them during the evaluation or rescue.

3.11.4.3 AFTER EMERGENCY

1. To continue about the restoration of normalcy to the affected areas & emergency services after getting clearance from environmental authorities & Chairman DCG.
2. Compile the final status of all kinds of information and furnish to Chairman DCG after the emergency.
3. To prepare a report about the activities carried out at CCR & the difficulties faced with the remedial actions to the Chairman, DCG.
4. To preserve relevant records and equipment for the subsequent enquiry into the cause and circumstances of the disaster /emergency.
5. To arrange debriefing meeting to get more details from each agency.

3.11.5 SIREN CODE

- ❖ To establish a warning system for different level of emergencies, it is Important to note that wailing tones of siren for emergency purpose must be distinct from normal usage by the Industries for begin/end of shifts. Suggested modes for emergency purpose are:

- For accident scenarios having off-site consequences — short out bursts of 5 seconds for 2 minutes.



- For All-Clear signal: A long siren of 1 minute duration.



3.12 Formats

DCG is apex body in the District and to keep the certain records of every chemical accident happened in the District as indicated at **Annexure 32**, as per C.A. (EPPR) Rules1996. Further, Format for mock-drill is given at **Annexure-29** and details on conducted mock-drills are given at **Annexure-30**.

CHEMICAL CRUNCH

CHAPTER - 4

4.1 GENERAL

Chemical means a basic structure that used in chemistry or produced by chemistry. Hazard means something that is dangerous (1) a Fire Hazard, (2) a Health Hazard, (3) an Occupational Hazard (4) a something unpleasant that happens to people who do a particular job. Further, Chemicals have different properties like Fire, Explosion, Toxic, Corrosion, Poisonous, Reactive etc.

The large numbers of industrial units are engaged in manufacturing various chemical-products and they are storing, handling, using large & bulk quantities of different hazardous chemicals. It has also resulted into the heavy transportation & movement of hazardous chemicals by vehicles; like tankers, trucks, carriers, lorries, etc. on road/rail.

Chemical accidents/disasters may occur due to process deviations concerning the chemistry of the process, pressure, temperature or other identified parameters with regard to the state of substance i.e. solid, liquid or gas; proximity to other toxic substances and probability of runaway reaction due to the incidental mixing of two or more hazardous chemicals with dissimilar properties.

In addition, it may be due to hardware failure, resulting in large-scale spills of toxic substances (in any form) due to loss of containment, or an explosion. Further, Boiling Liquid Expanding Vapour Explosion may occur due to any source of ignition (like any type of spark, shock, frictional force etc) on the chemicals during transportation.

The effect can be further compounded by micro-meteorology of the area, wind speed and direction, rate of precipitation, toxicity/quantity of chemical released, population in the reach of release, probability of formation of lethal mixtures and other industrial activities being performed in closure vicinity.

It is very important to understand that that the state of the chemical substance (solid, liquid or gas) contributes substantially to the gravity of the accident and affects control measures.

The release of compressed gas gives rise to thermal and cryogenic stresses, which may also impact the surrounding structures or building, compounding the damage.

Any human/mechanical failure may cause large scale spills of liquids or of compressed gases like Chlorine or Liquefied Petroleum Gas (LPG), which can directly affect human lives and the environment.

4.2 **HAZARDOUS CHEMICALS**

The total nos. of Hazardous Chemicals by name are 684 in part-II, and Part – I provides as Indicative Criteria of chemicals by properties of Toxic, Flammable, Explosives; as provided in the “Manufacturer, Storage or Import of Hazardous Chemicals- Rules-1989(2000)”. Similarly, The list of Hazardous Chemicals by name are 432 by name Part –II, and Part-I provides similar indicative criteria of chemicals by properties of Toxic, Flammable, Explosives as provided in the “Gujarat Factories Rules-1963 (2004)”, and “Chemical Accidents(Emergency Planning, Preparedness & Response)-Rules- 1996”. Thus, certain hazardous chemicals; as identified by names as per above Rules, along with United Nations’ Numbers, C.A.S. Nos.; and Hazardous Classification are given in the Table below;

TABLE

Sr. No.	Major Hazardous Chemical	UN NO	CAS No	Hazardous Classification	Schedule-I of MSIHC Rules 1989 (2000)	Schedule-I of Rule 68-J of GFR1963 (2004)	Schedule-I of CA (EPPR) Rules - 1996
1	2	3	4	5	6	7	8
1.	Acetic Acid	2789	64-19-7	C	2	-	-
2.	Acrylonitrile	1093	107-13-1	T,R	12	6	6
3.	Ammonia	1005	7664-41-7	T	31	16	16
4.	Aniline	1547		T	37	21	21
5.	Benzene	1114	71-73-2	T,F	56	32	32
6.	Chlorine	1017	7782-50-5	T	119	88	84
7.	Chloro Sulphonic Acid	1754	7790-94-5	C	136	110	106
8.	Ethyl Acetate	1173	141-78-6	F	247	-	-
9.	Ethylene Oxide	1040	75-21-8	T,F,R	269	200	196
10.	Ethion	3018	563-10-2	T	245	186	182
11.	Motor Spirit (Petrol)	1203	8006-61-9	F	Part I (b) (iv)	Part I (b) (ii)	Part I (b) (ii)
12.	LPG	1075	68476-85-7	F,E	347	243	242
13.	Methyl Alcohol	1230	67-56-1	F	-	259	258
14.	Oleum	1831	8014-95-7	C	444	301	301
15.	Parathion		56-38-2	T	466	315	315
16.	Phorate		298-02-2	T	490	334	333
17.	Sulphuric Acid	1830	7664-93-9	C	591	371	370

18.	Thionyl Chloride	1836	7719-09-7	C	620	387	386
19.	Toluene	1294	108-88-3	F	628	389	388
20.	Xylene	1307	1330-20-7	T,F	-	430	429
21.	Propane	1978	74-98-6	F	347	243	242

C: Corrosive, E: Explosive, F: Flammable, R: Reactive, T: Toxic

4.3 MAJOR CHEMICAL ACCIDENT (Definition)

The definitions of word “Major Chemical Accident” or “Major Accident” are expressed as below:

4.3.1 MAJOR CHEMICAL ACCIDENT

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 delay, inside or outside the installation likely to cause substantial loss of life and property including adverse effects on the environment. –Rule 2(f) of C,A,(EPPR)Rules -1996.

4.3.2 MAJOR ACCIDENT

“MAJOR ACCIDENT” means an incident involving loss of life or outside the site or ten or more injuries inside and /or one or more injuries outside or release of toxic chemical or explosion or fire or spillage of hazardous chemical resulting in “on-site” or “off-site” emergencies or damage to equipment leading to stoppage of process or adverse effects to the environment.

- Rule 68-J (1) (d) of Gujarat Factories Rules-1963 (2004).
- Rule 2(j) of M.S. & I. of H.C. Rules-1989(2000).

4.4 IMPACT OF CHEMICAL ACCIDENTS/DISASTERS

Accidents on chemical which are near missing or minor types, do not much impact or damage, but in case of major accidents, involved large volume of inventories of hazardous chemicals or high toll of injuries, or release of toxic gas or spillage of hazardous chemicals or explosion, called as Major Chemical Accident/Emergency/Disaster; cause extensive loss of life, damage to property and adverse effect on environment. Further, emergency situation arises all of sudden and at most unexpected time with high potential to cause havoc. In addition to above, the major consequences of chemical disaster include impact on livestock, flora and fauna, the environment (air, soil, water) and tremendous losses to the industries.

4.5 MAH CRITERIA

The industrial unit; where the quantity of hazardous chemical used for manufacture, process, store, handle is more than threshold quantity as specified in Schedule 2 or 3 of C.A. (EPPR) Rules-1996, is identified as Major Accident Hazards (MAH) Installation/Unit. Further, it is provided that each MAH Unit has to prepare on-site emergency Plan as prescribed under Schedule 8-A of Rule-68-J of Gujarat Factories Rules-1963(2004). Some of the chemicals indicating their threshold quantity are listed in table given below;

Threshold Quantity

Schedule 3 under Rule 68-J of GFR-1963(2004) and MSIHC – 1989 (2000)

Sr. No.	Group	No.	Chemicals	CAS No.	Threshold Quantity
1.	I	38	Ethion	563-12-2	100 Kg
2.	I	73	Parathion	56-38-2	100 Kg
3.	I	76	Phorate	298-02-2	100 Kg
4.	II	102	Acrylonitrile	107-13-1	20 T
5.	II	105	Ammonia	7664-41-7	50 T
6.	II	108	Chlorine	7782-50-5	10 T
7.	II	121	Sulphur Trioxide	7446-11-9	15 T
8.	III	140	Ethylene Oxide	75-21-8	5 T
9.	V	1	Flammable Gases	-	15 T
10.	V	2	Highly Flammable Liquids F. P <23°C, BP >20°C	-	1000 T

4.6 TYPES OF CHEMICAL ACCIDENT SCENARIOS

Emergency preparedness is structured on maximum credible chemical accidents on chemical properties and maximum storage or process of the chemicals. However, it is pertinent to discuss the type and escalation of chemical emergency situation, which may arise from Liquid Flammable Material release or Toxic Material release.

4.6.1 Flammable Substance Release

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

● **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.

4.6.2 **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.

4.6.3 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.

4.7 Some Failure cases and consequences

Some failure cases and consequences are given in the following table:

Sr. No.	Failure Cause	Consequences
1.	Flammable storage tank e.g. Hydrocarbon, HSD, Petrol, Acrylonitrile, Toluene & Benzene, Xylene, Solvent, Methanol, etc.	Fire, Smoke, Radiation Heat
2.	Toxic gas storage container/ tonner /tank- e.g. Chlorine, Phosgene, Ammonia	Toxic Gas Dispersion
3.	Toxic liquid storage Tank e.g. Sulphuric Acid, Oleum, etc.	Toxic Fumes or liquid spreading
4.	Flammable Gas Tank/ Tanker e.g. LPG, E.O. Propane, Propylene, etc.	Explosion, Blast, UVCE, BLEVE, Fire, Smoke
5.	Toxic Poisonous liquid Tank Acetic Acid, Sodium Cyanide, Carbon di sulphide, Hydrogen Fluoride, Aniline, Bromine, Sulphur Dioxide, Sulphur Trioxide	Poisonous gas Dispersion, Vapour, Fume, Cloud
6.	Tank Explosion containing gas like CO ₂ , N ₂	Deficiency of Oxygen or Asphyxiation.

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

4.8 LEVEL OF EFFECTS

4.8.1 Radiation & Burn

LPG or Hydrocarbon Vapour released accidentally will normally spread out in the direction of the wind. If it finds an ignition source 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 within flash fire are likely to catch fire and a secondary fire may cause various degrees of burn.

The following tables indicate the damage effect due to radiation.

Table – 1 – Damage Due to Radiation Heat Intensity

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

Table – 2- Physiological effect of Radiation

Radiation Intensity [kw/sq.mtr.]	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-coetaneous tissues may also be affected.

4.8.2 Over Pressure & Blast Pressure

Table -1-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 brickwork 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 -2- 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 – 3 – 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.

4.9 TYPICAL GAS DISPERSION

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 also

4.10 M.S.D.S. AND SALIENT PROPERTIES OF SOME CHEMICALS

Material Safety Data Sheets of major chemicals stored, handled, processed or used by the chemical units in the District are produced at **Appendix-F**. The salient chemical properties of certain hazardous chemicals, used in the industrial pockets are indicated at the **Annexure-5**.

4.11 CARE FOR SAFE HANDLING OF SOME CHEMICALS

Procedure for Safe handling of chemical is essential as each chemical has different properties. The said matters are explained in **Annexure-21**.

4.12 COLOUR CODE SYSTEM FOR PIPE LINES

The colour code system for pipe lines for different substances as per Indian Standard-, IS-2379:1990 is given at **Annexure-24**.

4.13 PROBABLE TYPE OF CHEMICAL ACCIDENTS IN DISTRICT

The Survey on probable type chemical accidents based on the existing storages, which may likely to happen in the industrial pockets are indicated at **Annexure-20**.

4.14 A PROPOSED SCALE FOR GRADING OF CHEMICAL DISASTERS

A proposed Scale for grading of chemical disasters; as suggest at **Annexure-25** of National Disaster Management Guidelines- Chemical Disaster, New Delhi; (Augest-2006).

4.15 SPECIAL MEDICAL TREATMENT & ANTIDOTS

Details on special medical treatments & antidotes for some chemicals are given at **Annexure-22**. The details on burns and their treatments are included in the said Annexure.

4.16 LIST OF EXPERT PERSONS

List of expert persons from the district is given at **Annexure- 13.**

4.17 SOME MAJOR ACCIDENT IN INDIA

Some typical major chemical accidents occurred in INDIA in the period from 2000 to 2025

4.18 LIST OF RELEVANT STATUTE ON HAZARDOUS SUBSTANCES

The List of Relevant Statute on Hazardous Substances is given at **Annexure- 27.**

4.19 GLOSSARY OF TERMS AND DEFINATION

The words on chemical accidents and technical terms generally used are explained at the **Annexure-30.**

4.20 CHEMICAL ACCIDENT(EPPR) RULES-1996

The Rules on chemical accidents (Emergency Planning, Preparedness and respond) Rules-1996 is given at **Annexure-31.**

HANDLING OF EMRGENCY DURING TRANSPORTATION

CHAPTER - 5

5.1 MAJOR CORRIDORS FOR TRANSPORTATION OF HAZARDOUS CHEMICALS

The major routes of transport-vehicles by roads in Patan District are considered as below;

- (1) National Highway No. 8
- (2) Approach Roads/village Roads, etc.

5.1.1 Internal Roads In Industrial Estates :

The Internal roads in industrial estates are also in very poor condition. Several chemical carriers have to traverse on these roads and the condition becomes worst during monsoon. Therefore, it is essential to improve the public roads.

2766 MAJOR HAZCHEMS TRANSPORTED

Based on the results of an earlier study conducted by the MOEF, following are the major Hazchem transported through the District,

5.2.1 Potential Hazard In Transportation

As mentioned above, various hazardous chemicals are transported throughout 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 as per the details given at above Table. The purposes of transport of the different chemicals are derived as below;

1. Dispatching the hazardous chemicals by manufactures' units within or outside the District.
2. Receiving the hazardous chemicals to Units/Factories from manufactures located within or outside the District.
3. Receiving hazardous chemicals in Bulk from Bulk- storage terminals through pipelines or dispatching to the users within or outside the District.
4. Transit traffic of hazardous chemicals lorry/ tankers/truck/containers/ carrier passing through the major corridors of the District.
5. Receiving, storing, or dispatching hazardous chemicals by stockist, godown, pump-station, depot, etc for purpose of selling, reselling, repacking, transit-stay, stocking etc.

Thus, transport emergency can happen anywhere in the District, and area and population likely to get affected will depend on the location and prevalent meteorological conditions in the area.

Transport & Accident Scenarios

Sr. No.	Transport Accident Scenario	Area Likely to be Affected
1.	Failure of Chlorine Tonner	1 to 1.4 km downwind
2	Failure of Acid/Alkali tanker	Immediate surroundings and burns to persons coming in direct contact with the substance
3.	Ammonia leak from cylinder	Varying, depending on the capacity of the cylinder but not more than 1 km
4.	Ammonia leak from a tanker	Up to 3 km downwind
5.	Escape of explosive gases from cylinder followed by explosion	Explosion may cause over pressure up to 50 m for a short duration. However, pieces of damaged cylinder may travel up to 100 m from the accident site
Sr. No.	Transport Accident Scenario	Area Likely to be Affected
6.	LPG leak from tanker followed by fire/explosion	Thermal radiation and overpressure effects will be up to 200m for short duration. BLEVE may result first degree burns up to 150m and also cause secondary fires depending on the location of occurrence.
7.	Spill/leak of flammable petroleum products followed by fire	Thermal radiation effects of unconfined pool fire will be felt up to 25 m from the pool edge for the duration of fire
8	Spill leak of CS ₂ followed by fire in a road tanker	Thermal radiation effects of unconfined pool fire will be felt up to 30 m from the pool edge. For the duration of fire. Burning of CS ₂ results in formation of toxic sulphur dioxide, effects of which may be felt up to a distance of 2 km from the accident site.
9.	Spill/leak of solvents and other flammable chemicals such as Toluene, Methanol, Benzene and Xylene 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.

Other factors that will have bearing on the extent of damage are:

- Rate of chemical release –As per the guidelines of the MoEF, we have considered catastrophic failure of container. However, it seldom happens in actual incidents and the material escapes from the container at a much lesser rate. Lower rates pose lesser risks.–Unfavourable
- Location : high population density – Unfavourable
- First response by the driver, if possible – Favourable
- Prompt action by response agencies – Favourable

5.3 RAIL TRANSPORTATION

In addition to the Hazchem transportation by road trucks/tankers, some of such materials, particularly petroleum products, are also transported by rail tankers. The largest refinery of Indian Oil Corporation Ltd. Is located very close to Patan. Bulk transportation of refinery products, such as Motor Spirit, Diesel, Kerosene, Aviation Turbine Fuel, Furnace Oil, Mineral Turpentine Oil LPG, etc to different parts of the country is also undertaken by rail tankers. The typical capacities for different petroleum products along with the damage distances under worst case scenario are tabulated below:

Sr. No.	Product	Rail Tank Wagon Capacity (MT)	Scenario	Damage Distance (m)
1	Motor Spirit	47	Pool Fire	142
2	Diesel/LSHS	53	Pool Fire	112
3	Kerosene	51	Pool Fire	121
4	Naphtha	47	Pool Fire	142
5	Aviation Turbine Fuel	51	Pool Fire	121
6	Mineral Turpentine Oil	52	Pool Fire	105
7	Furnace Oil	52	Spill	--
8	Liquefied Petroleum Gas	35	BLEVE	515

BLEVE: Boiling Liquid Expanding Vapour Explosion

Damage Distance Is calculated for Injury zone radius corresponding to first degree burns. Furnace oil needs an initiator to burn, will not catch in presence of spark.

5.4 MOTOR VEHICLE ACT- 1988

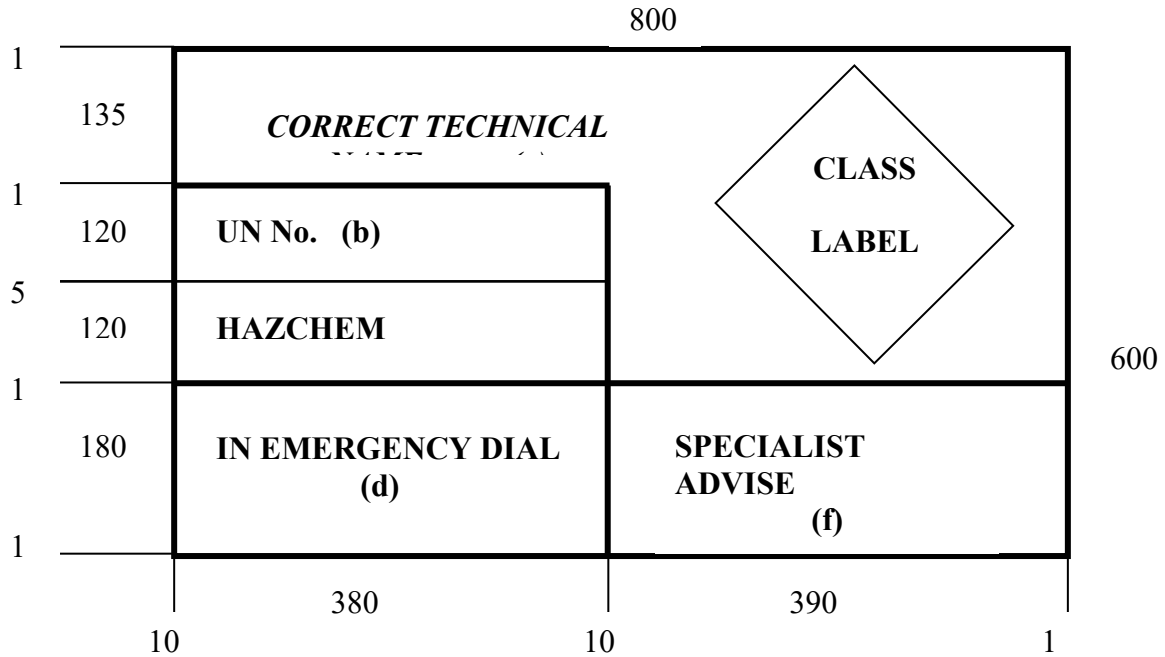
Under the provisions of the Central Motor Vehicles Rules-1989(2000), every Motor Vehicle carrying hazardous substances should comply with certain regulations. Such as,

1. Emergency Information Panel
2. Trem Card
3. Emergency Kit
4. Trained Driver
5. Spark Arrester.

2767 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) UN Number

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	Petrol	=	1203
Chlorine	=	1017	Ethylene Oxide	=	1040
LPG	=	1075	Kerosene	=	1223
Methanol	=	1230			

2768 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	Petrol	=	3YE
Chlorine	=	2XE	Ethylene Oxide	=	2PE
LPG	=	2WE	Kerosene	=	3Y
Methanol	=	2PE			

Hazchem Code

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

P	V	Full Body Protective Clothing with	Dilute
R		BA	
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.

(c) In Emergency Dial

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

Class Label

Chemicals have been grouped into nine basic classes depending on the nature of the hazard. Shaped label bearing 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	Hazard Type
Orange	Explosives
Red	Flammable
Blue	Water Reactive
Yellow	Oxidizing Substance
White	Toxic / Infections
Yellow & White	Radio Active
Black & White	Corrosive

(d) **Special Advice**

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

5.5.2. **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;

- The nature of the danger presented by the dangerous substances carried and the necessary safety measures that must be taken to avert that danger
- 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;
- 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.
- 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.

5.6 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 keep with the vehicle during transportation of hazardous chemicals.

5.7 TRAINED DRIVER

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.

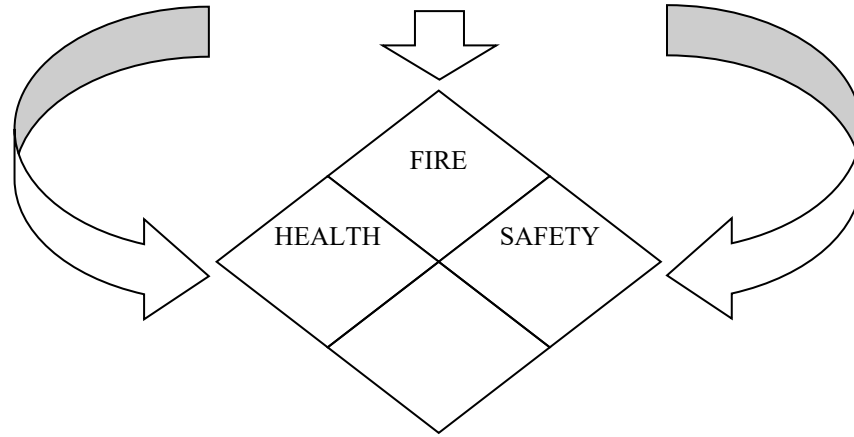
Driver has to maintain vehicle, accessories, protective clothing, safety equipments, and Emergency kit in good condition and he should be trained to handle all these equipments effectively. The drivers must be fully conversant with the product they carry. They must be conversant with the Trem Card and get accordingly in an emergency. They should keep the Trem 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.

5.8 TRANSPORTATION SIGNALS

Following Systems adopted for hazardous goods 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
<i>Signal</i>	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 almost all ambient temperature conditions.	Materials that are capable or 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.



MAJOR ACCIDENT RESPONSE PROCEDURE

CHAPTER - 6

6.1 Introduction

The most important part of response is prompt and well prepared actions by emergency services & designated persons (Members) of the DCG, so that the incident can be control immediately and casualties or damages will be minimum or remain under control.

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, because of the different situation in each chemical accident. 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. Sometimes, 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 objectives of the plan should successfully comply with.

Further, response time will differ for different chemical accident of industries depending upon many factors like, quantity, lethality, meteorology of the region, handling and controlling methods etc.

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 liaison and coordination with all working groups are important factors during response time.

6.2 TEAM COORDINATION

Designated persons/Members (Response teams including emergency services)of DCG have to work out detailed response procedures on their role & responsibilities with existing infrastructures, manpower, resources, prevailing practices etc.

Further, certain thumb practices shall be adopted during response period, as some of illustrated below:

- (1) A senior and expert person from each services is to be made responsible for inter/intra agency coordination.
- (2) First assess the situation/type of incident- scale for Grading of chemical grading(as per **Annexure-25**), then arrange minimum time taken for responding actions by physical presence and operation of the designated mobile hardware, equipments, manpower, resources etc.
- (3) Proper communication facilities between different designated persons for proper flow of information and review/ improvement.
- (4) Police-officer will take overall charge at the site/off-site situation, until arrival of the District Collector or his representative at the scene.
- (5) RTO has to make promptly transport arrangement, if evacuation necessary.

6.3 MESSAGES

Generally, most chemical accidents are happened at the odd-time and the appropriate authorities get the authentic information vary late, so required helps could not reach in time. In this circumstance, first information reaching in time is important factor. The Site-Main Controller or responsible person from affected installation/MAH Unit or any other responsible person from neighbouring industries or Chair Person of LCG, OR lay-man will immediately inform to the DCG Authorities, either to Fire, Central Control Room, District Collector, Police, or Directorate of Industrial Safety & Health., with at least following details, if possible:

- a. Identify himself by name, designation & organization
- b. Location of incident (Plant, Section Department)
- c. Involvement of chemical(Name of probable chemical)
- d. Provide the type of chemical emergency (Fire, Gas leakage, Liquids spreading, Explosion, etc)
- e. The type of actual help & resources required.

It is also possible that any other person who see/ hear the fire/ explosion incident and informs the police or fire, before they receive call from the affected unit.

If Local Crisis Group involved and if incident could not be controlled by them, chairman/responsible persons from LCG will communicate immediately to the DCG-Authority.

The information receiving officer/person will confirm the said news and communicate to Chair Person-DCG & other emergency services and mobilise to the incident place. This part is said as message-protocol and it is the origin of the activating Off-site Emergency Plan.

6.4 DECLARATION OF EMERGENCY & Immediate Response

On receiving information on chemical accident, the first respondent (Fire/Police) will immediately deploy first batch of response team to the location. On assessing situation and after discussing with SMC, Emergency Services, Expert persons, Dy, DISH etc Chairperson of DCG (District Collector) will declare EMERGENCY PERIOD for particular area, accordingly announcement will follow.

On assessing situation, they will further reinforce their teams by deploying additional resources pooling from surrounding area so that effective first response can be redial at site. In the meantime, they will keep inform with details, to the District Collector; DCG, Central Control Room, and other authorities, and along with asking additional requirement of resources in terms of manpower and equipment etc.

6.5 ACTIVATION OF OFF-SITE EMERGENCY PLAN

On declaration of chemical emergency for particular industrial pocket, Off-site emergency plan of DCG put in operation.

The Members of DCG including emergency services along with designated persons will start functioning to control incidence as pre-decided way or according to the prevailing situation under intimation to Chair Person and Central Control Room and report development of incidence time to time to Chair Person and C.C.R.

6.6 RESPONSE BY DESIGNATED MEMBERS OF DCG

On recognising the type of Chemical accident, the responding actions or line of actions follow by command structures according to the procedures as laid down. The major active parts on handling & controlling of emergency are soldier by emergency services with consent by Chair Person of DCG. The passive actions supported by various members of DCG as directed by Chair Person of DCG. The suggested responding actions by different key designated persons are explained as below.

6.7 CHAIR PERSON, DCG (DISTRICT MAGISTRATE & COLLECTOR)

On receipt of information on the chemical accident, the Chair Person (DC) will rush to the site, if grave serious incident, otherwise, get further details from CCR/Emergency Services on the incident. The DC will confirm the news with SMC/Chair Person of LCG / Dy.DISH, then consulting with SMC, experts, Dy.DISH, emergency services and others, after assessing situation, he will declare “industrial emergency” & put in operation Off-site Emergency plan, and order to start response actions to the emergency services/designated persons etc and report immediately. Ask central control room to get details time to time & report immediately. As development of situation and based on

the inputs from the Emergency Services, and opinion by experts, SMC, members identify the requirement of additional and more resources, then DC will arrange to pool and mobilize such resources.

- In case of grave serious incident, on visiting site, discussing with SMC/Dy DISH/ Expert / emergency Services etc, and assessing situation, he is authorised to declare the emergency. He summon to all emergency services & designated persons to respond by use of their available resources at site, DC will report to higher authority asking more resources to control such emergency if required .
- Further, if evacuation required, then order to emergency services & transport and evacuation coordinators to carry out accordingly.

Please refer the chart at **Annexure-6**.

6.8 POLICE DEPARTMENT: EMERGENCY SERVICES

On getting information from responsible person/lay man/Fire/CCR/LCG on the chemical accident, and as a first respondent and as part of emergency services, the Police officer will get confirm and deploy first team to start initial responding actions & assess the situation and report to the DC, CCR, Other Emergency Services. On getting further instruction, depute more persons for further necessary responding actions to the incident place under intimation to DCG/CCR.

In other case, on declaration of Emergency by DCG, put adequate staff for responding actions with coordinating the activities as per prevailing situation; as per role & responsibilities; under intimation to District Collector, CCR, Fire and other authorities. However, primarily immediate actions have to arrange by team as suggested as below;

- ★ Controlling traffic near the affected areas.
- ★ Arrangement for emergency vehicles to move without obstruction to the incident site at the earliest.
- ★ Ensuring law and order at the incident site during emergency.

As explosion scenarios seldom give time for a structured response, however, areas that may get affected due to possibility of secondary explosions, only need to be evacuated.

- ★ Report the situation, time to time to the authorities, DC, CCR, etc.
- ★ The duty/work as directed by Chair Person / CCR

Please refer the chart at **Annexure-8**.

6.9 Fire Department: EMERGENCY SERVICES

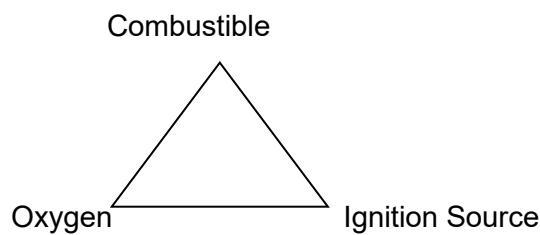
As getting information from responsible person/lay man/Police/CCR/LCG on the chemical accident, and as first respondent as part of emergency services, the Fire service commandant will reach the site & assess the situation and report to the DC, CCR, Other Emergency Services and simultaneously start the necessary responding actions immediately under intimation to DCG/CCR.

In other case, on declaration of Emergency by DCG, put adequate staff for responding actions with coordinating the activities as per prevailing situation; as per role & responsibilities; under intimation to District Collector, CCR, Police and other authorities.

However, the following general points on chemical accident are illustrated which shall be carefully considered before starting actions.

a) **Fire Components**

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 of more of these components.

b) **Removing the Source of Ignition**

Water is the far 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.

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) **Provide Rescue and Evacuation Services**

As fire department personnel are adequately trained to rescue trapped people from collapsed structures. The fire response team will help the industry-personnel in rescuing the people, till the time rescue team arrives. In case of evacuation, fire response team will coordinate the work with other emergency services.

Please refer the chart at **Annexure-7**.

6.10 MEDICAL & HEALTH SERVICES: EMERGENCY SERVICES

On receipt of information from the DCG (District Collector) or Central Control Room (CCR), the District Medical Commandant shall dispatch medical teams to the incident site under intimation to DCG, CCR, and other authorities. On reaching the emergency site, the medical teams will start the emergency activities, as per gravity of incident like:

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 the base hospitals. Medical team will categorize the victims in the following manner at triage station:-

- **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. Further, he can give status of the victims to their relatives.
- **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.

The registers shall be maintained separately for each type.

b) Medical Support for Response Personnel

It is presumed necessary, properly equipped medical personnel with one or more ambulances shall be made available to treat injured personnel as necessary. A register shall be maintained separately for such persons.

c) Base Hospital

Treatment, operation etc to the seriously injured person shall be carried out at the base hospital, as declared. Post mortem of dead body will be conducted at this hospital. Further, the arrangement of proper treatment on occupational disease as per toxicology shall be made. The register shall be maintained separately for such treated persons.

d) 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. Please refer the **Annexure-9**.

6.11 MEMBER SECRETARY : FACTORY INSPECTOR(DISH)

Being a Member Secretary (DY. DISH); he is involved in preparatory activities during pre-emergency period, like as; arrangement of meeting of DCG, identify MAH Units and their details, preparation of Off-Site Emergency Plan & Updation, Arrangement of mock-drill/rehearsal & training, chemical accidents and investigation etc. Further, Member Secretary will provide details in respect of development of chemical scenarios, chemical reaction, type of neutralising agents, M.S.D.S. of involved chemicals, etc with chemicals and Factory's information during emergency period.

6.12 EXPERTS GROUP

Large quantities of various chemicals are stored, handled and transported the District. These chemicals have different properties. If these chemicals go beyond control & resulted into chemical emergency, the special and specific responding actions/tricks are to be required to control such chemicals. Therefore, chemical-experts can advise specific control measures on this occasion. The list of expert persons is given at **Annexure-13**.

6.13 TRANSPORT COORDINATOR

The arrangement of shifting people like, school children, old age, residents of hospitals/nursing homes and public who do not own vehicles, are required to safe shelters/ places by buses / trucks / vans / ambulances and other vehicles during emergency or evacuation. The transport coordinators/RTO has to make arrangement for the adequate numbers of vehicles of to shift.

The prime responsibility rests with the local transport coordinator who, on receipt of information about the emergency from District Central Control Room (CCR), will direct the fleet (drivers) and coordinate the following transport activities during an emergency :-

- 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.
- Arrange for the fleet of vehicles at a pre-designated location so that they can shift the affected population to safer areas (Shelter/Rehabilitation Centres),
- 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 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.

6.14 LIAISON & PUBLIC RELATIONS COORDINATOR

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.

- Compile a list of telephone numbers of local radio and television station personnel who can initiate special “on air” announcements.
- Establish a firm policy among all local officials and response personnel as to who should or should not speak to media personnel.

6.15 OTHER MEMBERS

The other members have to perform their duties as on need base or as order by Chair Person or DCG.

6.16 CENTRAL CONTROL ROOM

Functioning of Central Control Room (CCR)

Central Control Room has to perform duties on urgent basis during emergency period. Major part of work is effective communication to Chair Person, members of DCG and other persons as directed by Chair Person and members. CCR has to maintain emergency telephone numbers (updated), Off-Site Emergency Plan, maps, Toxicology details, chemical details emergency equipment providers’ contact numbers, and these should be readily available at the CCR. Further, CCR has to maintain the all required records, registers, messages etc.

6.17 WARNING SIREN

➤ Public Warning

Public warning can be done by:

- Clarion bell (Domed Brass bell) mounted on Jeep
- Public address system mounted Jeeps; Pre-recorded cassettes/CD can also be used. It should address the type of emergency, what they should do and where they should reach (Safe location).
- Siren installed in the city area should be blown.

➤ SIREN CODE

1.	“One” long blow of “One” minute duration	Alert Siren
2.	Continuous wailing high-pitched blow for “5 minutes”	Evacuation Siren
3.	Continuous blow for “5 minutes”	All Clear

POST EMERGENCY ACTIONS

CHAPTER - 7

7.1 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.

7.2 INSPECTION AFTER FIRE OR EXPLOSION

The large fires can have major effects over a vast area. Similarly major explosion could damage or destroy numerous buildings and any nearby bridges or tunnels. In either case, residents of partially damaged buildings will want to know, if the structures are safe to occupy or they await 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 and 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.

7.3 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 homes, stored foods, crops, water (ground & surface) 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.

7.4 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 of in accordance with the above mentioned Rules.

7.5 WASTE GENERATION

Different hazards are evaluated as describe above. It is also necessary to lay down of waste generated due to chemical emergency related to transport accidents or industrial events, Further, it should be evaluated associated risks and evolved mechanisms to handle such hazardous wastes. The proper procedures and adequate equipment shall be considered during actual chemical emergency.

7.6 CLEANUP OF DEAD OR CONTAMINATED LIVESTOCK OR WILDLIFE

Contaminated animals must be sent to veterinary hospital for decontamination & treatment. A large number of animal carcasses, 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.

7.7 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, and ground water from neighbouring villages/towns/agricultural areas where possibility of ground water pollution due to spillage of contaminants is minimum.

7.8 RE-ENTRY INTO EVACUATED AREAS

Based on the assessment of the situation at the site, the DCG would take decision on the termination of emergency. Before this, however, several issues need to be resolved by the members of DCG. 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.

7.9 CHECK LIST FOR POST EMERGENCY

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 as illustration and only those, which are essential for return of the normalcy. However, as the last item suggests, regular training 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
Arrange for providing interim relief to the affected people	District Collector
Undertake accident investigation and documentation	Technical coordinator
Arrange further relief to the affected people based on claim applications	District Collector
Plan updating, if so required	DCG
Provide training to community and staff	DCG

7.10 CAPACITY BUILDING

Creation of proper infrastructure for Off-site Emergency Plan will serve as a strong back-up for management of chemical accidents. Latest safety hardware, software & instrument, dedicated transportation services, HAZCHEM van, information networking system, proper chemical casualty treatment kits, poison control centre, prompt and effective mechanisms with dedicated operatives, Critical detection system, Protection PPE, monitoring instruments, Adequate resources & neutralising agents etc are major influence factors for management of chemical accidents.

EMERGENCY INSTRUCTION TO THE GENERAL PUBLIC

CHAPTER - 8

8.1 THE NOTIFICATION OF EMERGENCY

The systems of declaration of emergency are illustrated to announce /alert/warn the public as any one of below;

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/ Satellite Truncking/ Public address System
5. Sending messages through a messengers
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.

8.2 CATEGORY OF ALARM SYSTEMS

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

8.2.1 First Level Warning (FIRE ALARM)

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

8.2.2 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

8.2.3 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

8.3 GENERAL INSTRUCTION TO THE PUBLIC

In case of a major chemical emergency may affect areas outside the works/factory-premises, the surrounding public will be alerted with public address system/other way by Police or Government Authorities or nearby industrial concerns. The siren / hooter will blow, to indicate arising the emergency situation.

Announcement will indicate type of emergency arise, if possible, to hear or start the Radio / TV for further instruction & act accordingly. The public have to take prompt actions to protect them-selves and rush to the safe shelter as instructed by the authority.

First of all to ascertain/confirm which type of emergency arise:

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

In case of Gas Leakage/dispersion type chemical incidence, then to know the type 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;

8.3.2 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.

8.3.3 Toxic or Poisonous Gas

1. Cover your nose with wet hand kerchief / cloth and breathe 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.

8.3.4 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 enquiry, 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.

REHEARSAL / EXERCISE / MOCK DRILL

CHAPTER - 9

9.1 SUBJECT

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

9.2 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:

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

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

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

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

9.3 AUTHORITY OF EXERCISE / REHEARSAL

The chair person is hold to assume responsibilities & make decisions as per legitimate. The member-secretary will work as co-ordinators for mock drill purpose.

9.4 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. Care should be taken as the mock drill shall not create any panicky to any

person or injury to any person.

9.5 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.

9.6 CODE-NAME FOR REHEARSAL

The code name shall be given 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 arise, then there will be no code-name. Further, the code name will be announced to conveying the message to authority, operative persons, etc.

9.7 NATURE

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

9.8 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.

9.9 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.

9.10 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.

9.11 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. 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 immediate admission 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.

9.12 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.

9.13 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.

9.14 DE-BRIEF MEETING

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

9.15 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.

9.16 FORMAT FOR REHEARSAL / EXERCISE / MOCK DRILL

A format for rehearsal / exercise / mock drill is given in **Annexure-28**.

9.17 CONDUCTED EXERCISE / MOCK DRILL

A detail on conducted exercise / mock drill by DCG, Patan, is given at in **Annexure-29**.

ANNEXURE SECTION

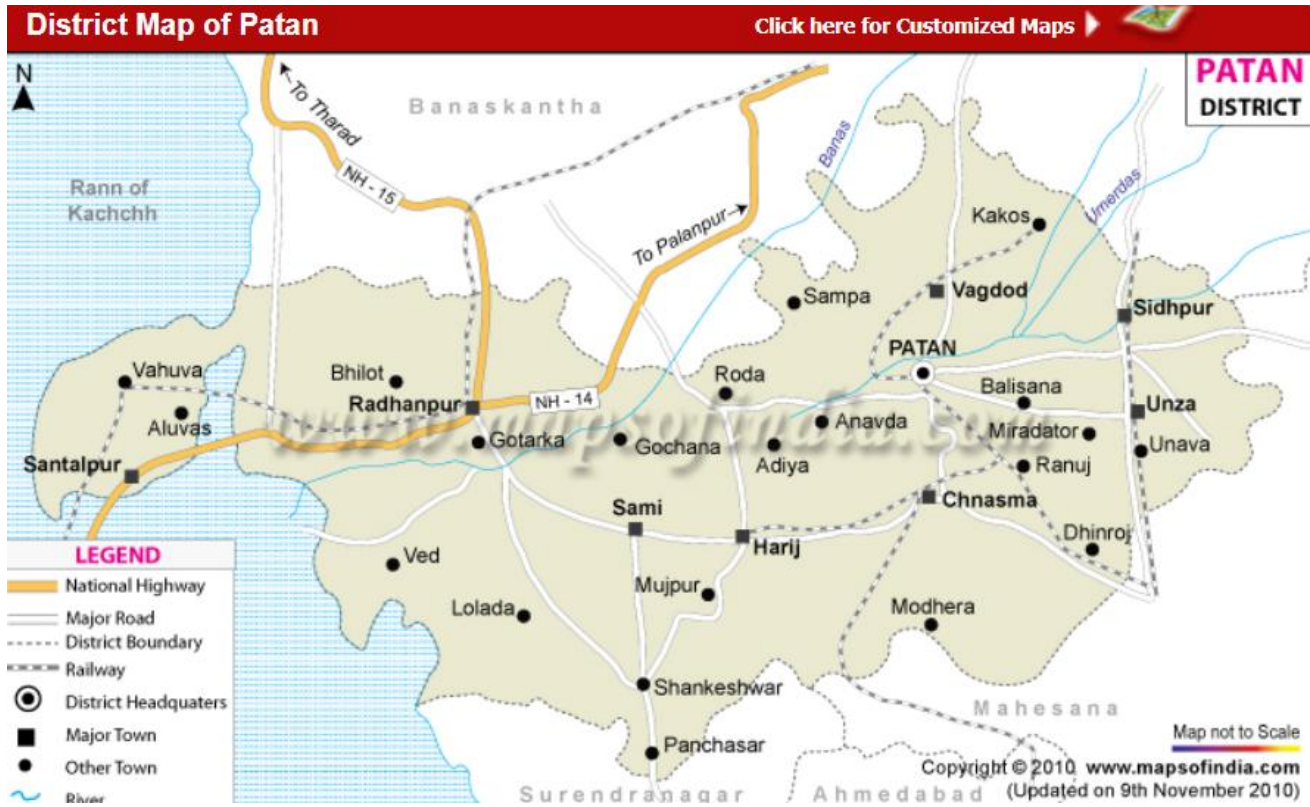
REVISED BY
DISTRICT CRISIS GROUP
PATAN
MARCH-2026

*ANNEXURE –1*EMERGENCY TELEPHONE NUMBERS

<i>Sr.No.</i>	<i>Designation</i>	<i>Contact No.</i>
1	Collector, Patan	02766-233301
2	Emergencies District Helpline-Patan	+91-27661077
3	Mamlatdar-Chanasma	02734-222021
4	Sami Control room	02733-244333
5	Santalpur-Control room	02738-224125
6	<i>Dy. Collector, Stamps, Harshidaben Parmar</i>	02766-224997
7	<i>Mamlatdar Sidhpur</i>	02767-220071
8	<i>Mamlatdar Chanasma-Angajibhai Chaudhary</i>	02734-222021
9	<i>Mamlatdar Harij</i>	02733-222076
10	<i>Mamlatdar Sami</i>	02733-244333

ANNEXURE –2

MAP OF PATAN DISTRICT



Patan District Off Site Emergency Plan-2026

ANNEXURE-3

COMPOSITION OF PATAN DISTRICT CRISIS GROUP

No	Name	Designation	Position in DCG	Office	Contact Number
1.		District Collector	Chairman	Collector Office, Jilla Seva Sadan, University Road, Patan – 384265	02666-233301 +91 9978406243
2.	Shri C. L. Patel I.A.S.	District Development Officer	Materials Coordinator	DDO Office - District Panchayat Office, Patan	02666-232936 +91 9978406243
3.	Shri V. K. Nai, IPS	S P	Member	SP Office, Patan	+91 9978405078 02666-230104
4.	Shri Mahendrasinh	DSP	Security Co-ordinary	D.S.P. Office, Patan	+91 9978408249 02666-230103
5.	Shri Hiren Chauhan	RAC	Member	Collector Office – Patan	02666-233400 +91 9978405190
6.	Shri A N Chaudhari	DEO	Member	Prant office- Patan	02666- 230025 +91 9909970222
7.	Shri Vishal J P Wala	Disaster Mamlatdar	Collector control room	Disaster Management cell, Emergency Response Center,	02766-224830 +91 9925180155
8.	Smt. K. D. Modi	Deputy Director I.S.&H.	Member Secretary	2 nd floor, Sakar Point, Near college, Nagalpur, Mehsana	079 – 23233231 +91 9173380108
9.	Shri Y. V. Patel	Assistant Director, I.S.&H.	Associate Member	2 nd floor, Sakar Point, Near college, Nagalpur, Mehsana	+91 7227891095
10.	Shri A. B. Bhutka	Industrial Safety and Health Officer	Member	2 nd floor, Sakar Point, Near college, Nagalpur, Mehsana	+91 9723175963
11.	Shri Bharat Prajapati	Regional Officer	Associate Member	Gujarat Pollution Control Board, Banaskantha	+91 9825959640
12.	Shri Nehal Modi	Chief Fire officer	Fire Service Coordinator	Fire Station, Patan Nagarpalika	+91 98793164141 Landline-101
13.	Shri Rajukumar Sinh	Representative of HPCL, Santalpur	Member	HPCL, Santalpur	+91- 9996624224

Patan District Off Site Emergency Plan-2026

14.	Shri C. B. Prasannakumar	Chief operations Manager	Member	IOCL Marketing Division, Sidhpur	+91 94880 69073
15.	Prassankumar-IOCL	Urban Health center, Sidhpur	Medical Coordinator	B/H Anupam Prathamichcoll, 7 Nr. Taluka Health hoisptal, Sifhour	+91- 2767222220
16.	Medical Officer	Community Health center, Sander	Medical Coordinator	Opposite Mahadev Mandir, Sander	+91 9979843361
17.	Medical Officer	General Hopsital, Patan	Medical Coordinator	Bagvada Darwaja Road, Near bus station, Patan	9727778759
18.	Shri Shailesh Patel	Distt. Agricultural Officer	Associate Utilities Coordinator	Jilla Panchayat Office, (Agricultural Branch), Patan	+91 9427006352 02766-224489
19.	Officer	Chief Officer Hiralben Thaker	Evacuation & Rehabilitation Coordinator	Patan Nagar palika, Patan	02766233232
20.	Shri D L Rathod	Executive Engg	Public Work Coordinator	Executive engineering office, R & B	+91 9427683276 02766-233777
21.	Shri Nitin Bodat	Chief Officer, Nagarpalika, Patan	Member	Patan Nagar palika, Patan	02766-230333 +91 9979879369
22.	Shri Kuldip Parmar	Dy. Director Information	Member	o/o Director Information, Patan	+91- 9898463636
23.	Shri S K Gamit	Representative of ARTO	Member	RTO office, Patan	+91 9726847442 02766223100
24.	Shri Kiran Patel	Safety Officer	Member	Royal Castor pvt. Ltd.-Sidhpur	+91 9825068363
25.	Shri Baldevbhai	Representaitive of Gokul agriinternational	Member	Gokul agriinternational	+91 9879010586

*ANNEXURE – 4***LIST OF MAH UNITS**

Sr. No	Factory Name	Address	Major Hazardous Chemical	Telephone Number
1	2	3	4	5
1.	INDIAN OIL CORPORATION LIMITED	(IOCL(MD) Sidhpur Terminal, Sujanpur State Highway Sidhpur Di- Patan Gujarat -384151)	SKO, MS & HSD	8758803033

SR. NO.	NAME OF FACTORY AND ADDRESSES	DISTRICT	HAZARDOUS CHEMICALS	GROUP NO. MSIHC RULE (Sch-2 & 3)	MAX. STORAGE CAPACITY IN TONES	Threshold Qty. (MSIHC rule) MAH Gen.Re q. (Ton)	Threshold Qty. for SAFETY REPORT (Ton)	SECTOR	SIZE	ON SITE EMERGENCY PLAN DATE	SAFETY AUDIT (GFR-68J,9-2) DATE
1	I.O.C. LTD. MARKETING DIVISION SIDHPUR PATAN	PATAN	SKO HSD MS	Sch-2(28)	48000 kl	7000	7000	PUBLIC	LARGE	YES	YES

ANNEXURE – 5

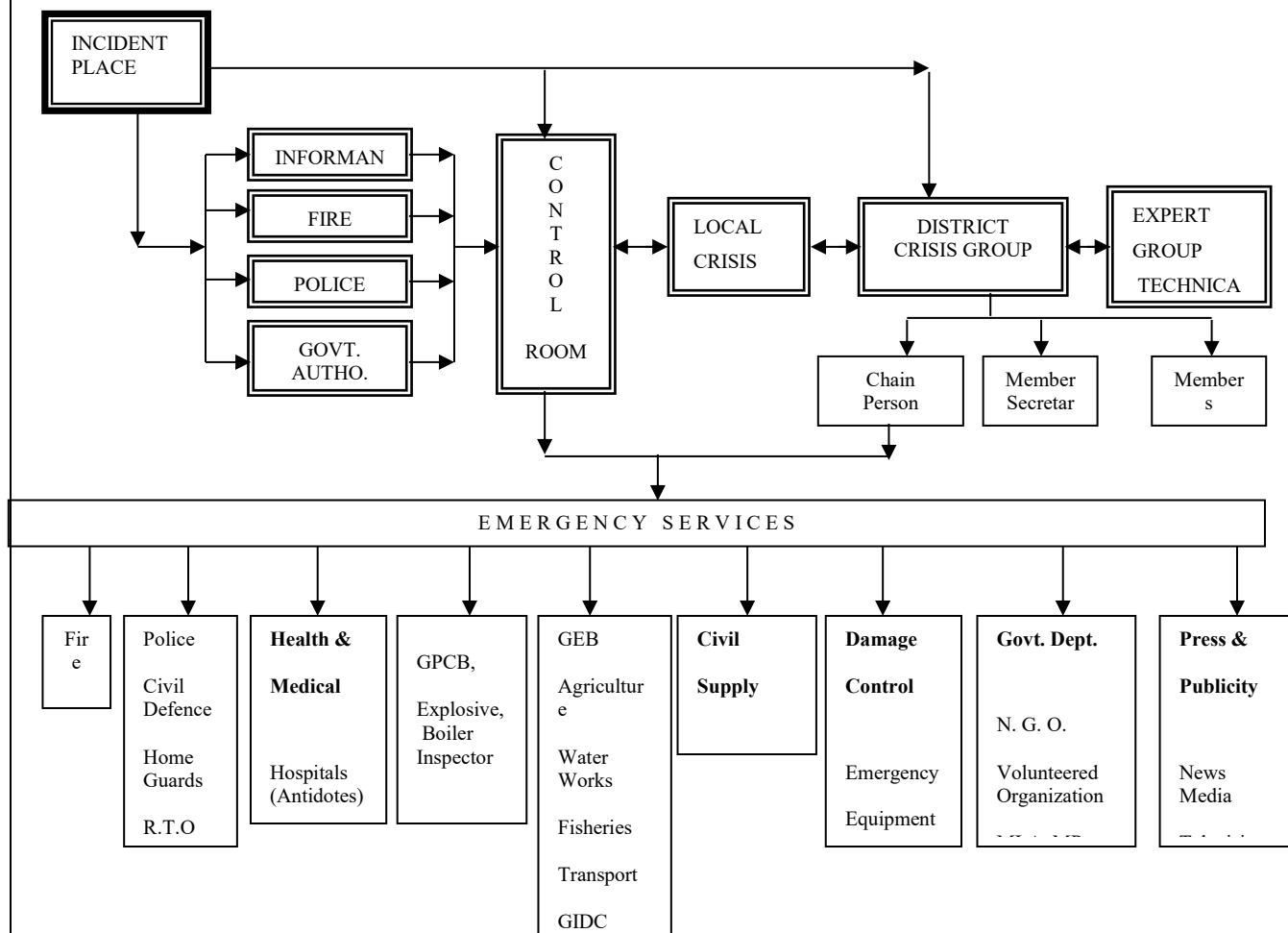
SALIENT PROPERTIES OF SOME HAZARDOUS CHEMICALS

Sr. No	Name of Chemicals	State	Colour	Odour	Sp. Gravity	Vapour Density	Melting Point °C	Boiling Point °C	Flash Point °C	Exposure limit		TLV ppm	Solubility in Water	Haz chem	Hazards	Hazardous Combustion Products
										LEL	UEL					
										%	%					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1.	Acrylonitrile	Liquid	Clear Colourless liquid	Pungent	0.807	1.83	-83.6	77.3	0.55	3.1	17	2	Slightly Soluble	3 W E	F	Emits Toxic fumes of NOX & CN
2.	Acetic Acid	Liquid	Colour-less	Pungent Odour	1.05	2.07	16.7	118.1	44.44	5.4	16	10	Miscible	2 Y E	T, F	Emits highly toxic fumes of Sox
3.	Chlorine	Liquefied Gas	Greenish Yellow	Irritating	1.47	2.98	-101	-34	-	-	-	1	Slight Soluble	2 X E	T	Toxic products generated when combustible burn in Cl ₂
4.	Chlorosuphonic Acid	Liquid	Light Yellow	Sharp Choking Odour	1.76	4.02	-80	151	-	-	-	-	Violent Reaction	4 W E	T	Burning in open flame can form toxic phosgene gas
5.	Ethylene Oxide	Liquified Gas	Colourless	Sweet	0.87	1.52	-111.3	10.7	-20	3	100	1	Soluble	2 P E	C,F,E	Emits acrid smoke & irritating fumes.
6.	Liquified Petroleum Gas [LPG]	Gas	Colourless	Mercaptan added for Odour Warning	.51-.58	1.5	-	-40	104.4,-60	1.9	9.5	1000	Floats	-	F & E	Emits CO, CO ₂
7.	HSD	Liquid	Yellowish Brown	Perceptible odour	0.90	-	-	215	35	0.6	6	800	Floats	3Z	F	CO / CO ₂ / SO ₂ / NO _x
8.	Ethanol	Liquid	colourless	Alcohol like	0.79	-	-114	78	13	3.1	27.7	1000	Floats	2YE	F	CO / CO ₂ / SO ₂ / NO _x
9.	Motor Spirit [MS]	Liquid	Orange (Octane 87), Red (Octane 93)	Aromatic Odour	Insoluble in water, Floats on water.	3-4	-45	25-215	-30	1.4	7.4	300	Insoluble in water, Floats on water.	3 Y E	F	CO / CO ₂ / SO ₂ / NO _x
10.	Toluene	Liquid	Colourless	Pleasant	0.817	3.14	-95 – -94.5	110.4	12.7	1.2	7	100	Slightly soluble	3 Y E	Fl	Emits Acrid Smoke & irritating fumes
11.	Sulphuric Acid	Liquid	Colourless	Pungent	1.84	-	10.49	315	-	-		5	Mixable	2 R E	T,C	Emits Toxic Fumes of SO ₂
12.	Propane Gas	Gas	Colourless	Irritant	1.5219	1.56	-	-42C	-104C	2.2	9.5	2500	Slight Soluble	2F	F	Emit CO, CO ₂

F: Fire, T: Toxic, E: Explosion, CB: Combustible, C: Corrosive, P: Poisonous

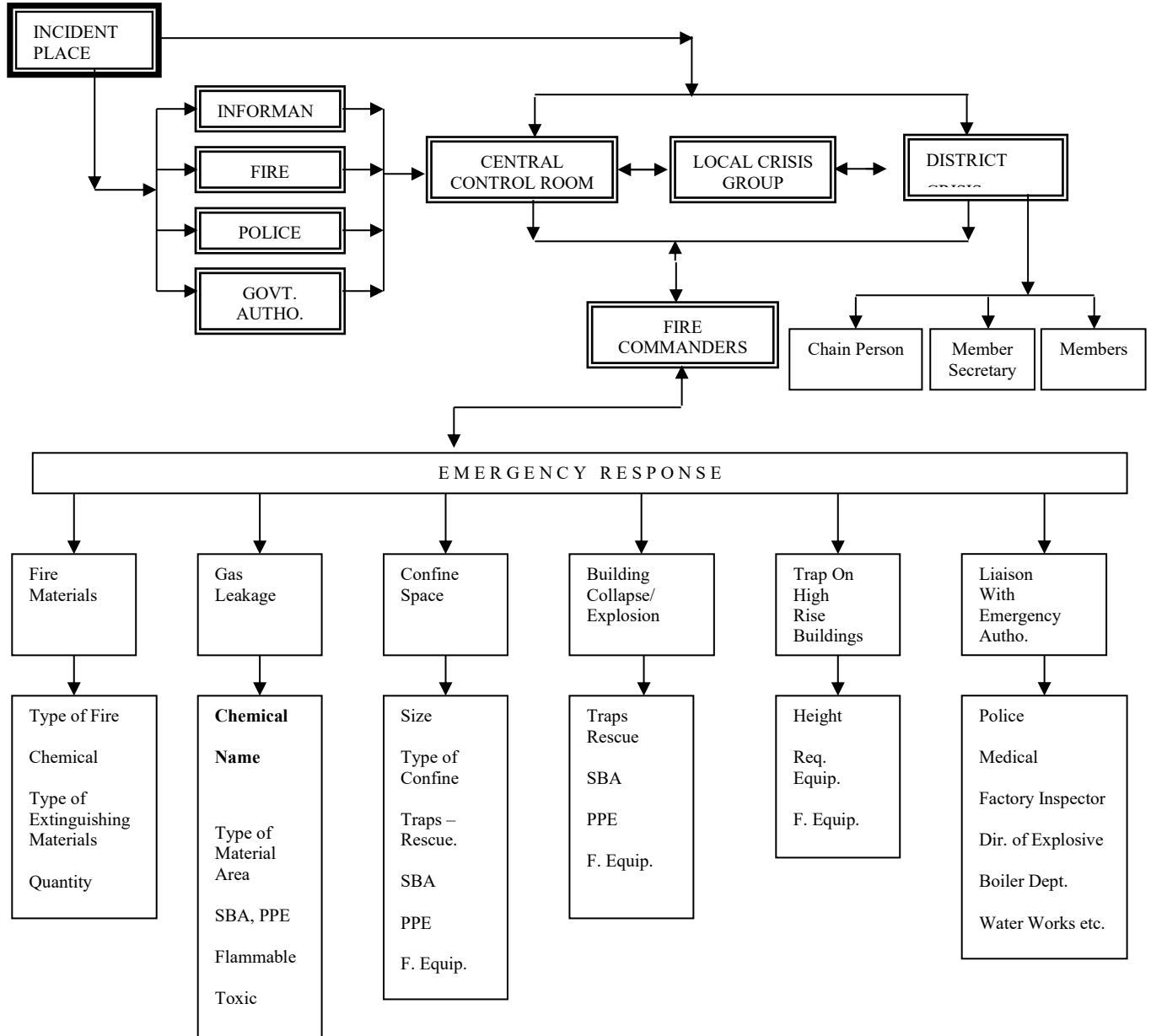
ANNEXURE – 6

COLLECTORATE COMMAND & CONTROL



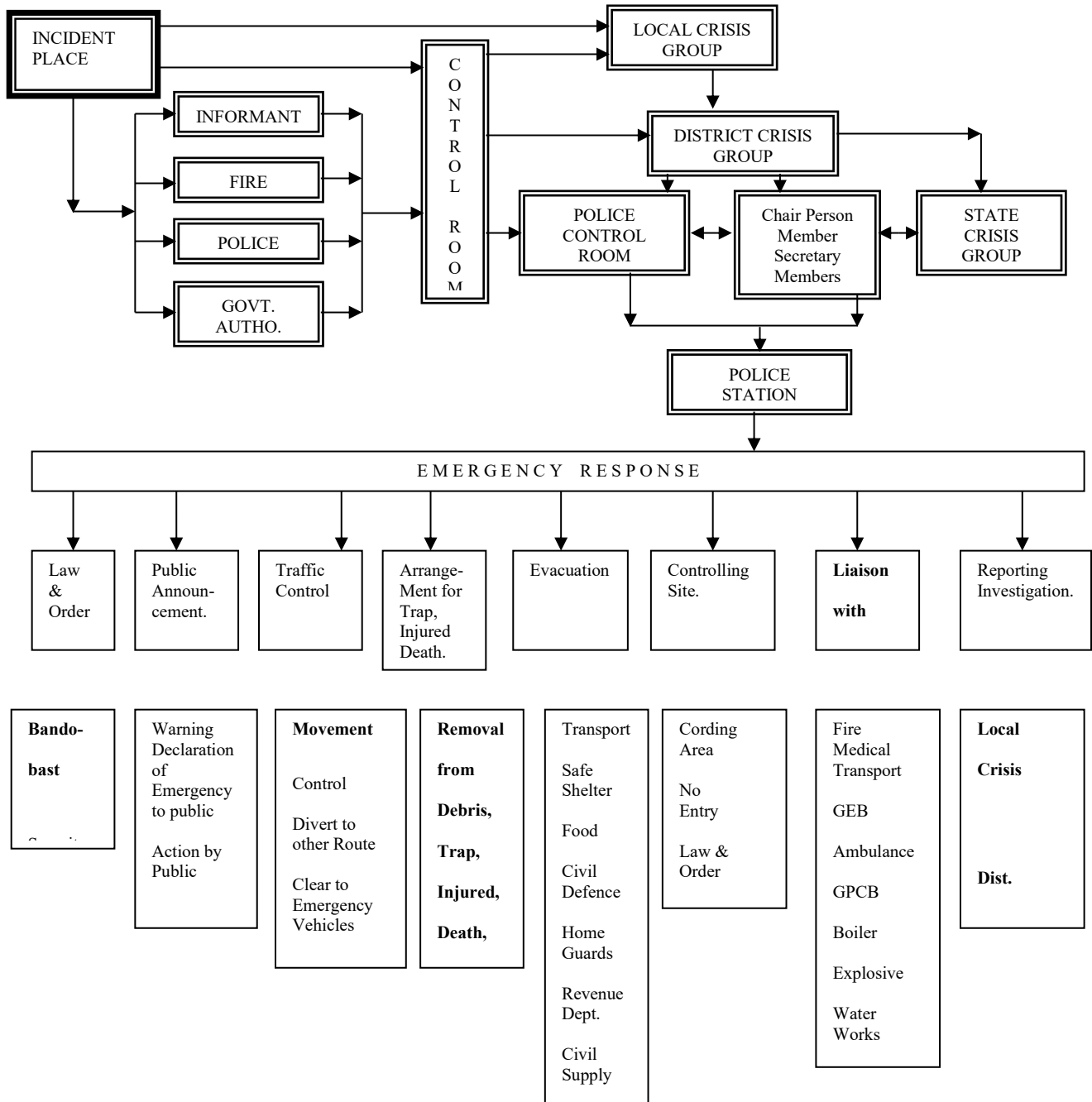
ANNEXURE – 7

FIRE – SERVICES – RESPONSE



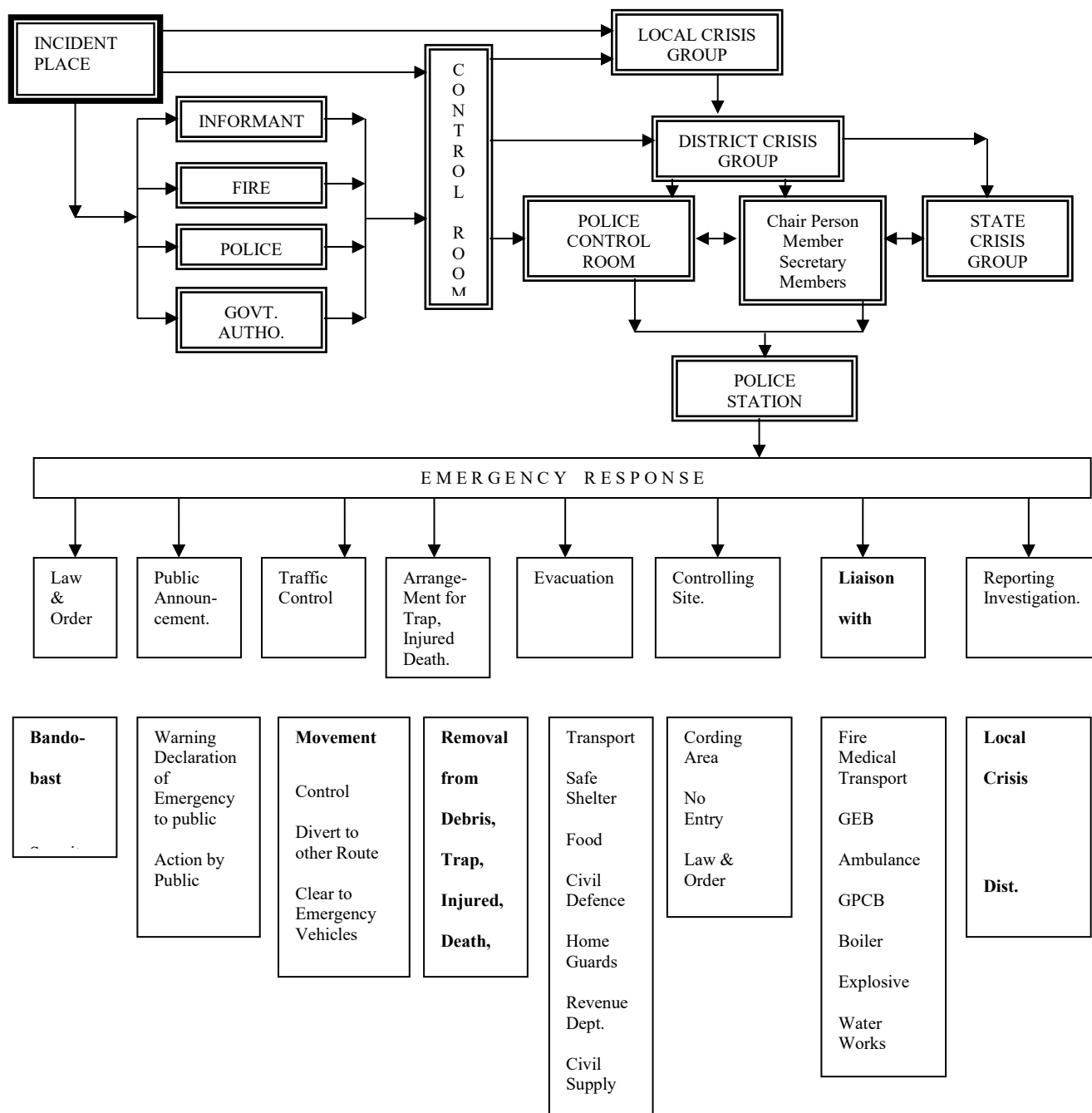
ANNEXURE – 8

POLICE DEPARTMENT (RESPONSE)



ANNEXURE – 9

HEALTH & MEDICAL RESPONSE



*ANNEXURE – 10*FIRE STATIONS DETAILS

Sr. No.	Name	Location	Contact Number
1	Shri Snehal Modi	Fire Station, Patan Nagarpalika	101,9879316414,,9879316414, 9106865993
2	Fire Incharge Upendrakumar Rawal	Radhnapur Nagarpalika	02746-277283,277148 9558687388
3	Fire Officer	Harij Nagarpalika	9409246328
4	Fire Officer	patan Nagarpalika	02766233232
5	Shri Krupesh Patel Fire Officer	Sidhpur Nagarpalika	9313236374

ANNEXURE – 11

PATAN DISTRICT CRISIS GROUP

POLICE STATIONS

Sr. No.	Taluka	Name of Police station	Police Inspector	Contact Number
1	Patan	LCB Branch	Shri R G Unagar	9904625112
2	Patan	LIB Branch	Shri J G Solanki	8000661199
3	Patan	SOG Branch	Shri J G Solanki	8000661199
4	Patan	IUCAW	Shri R D Chauhan	8780264494
5	Patan	AHTU.Cell	Shri D R Vasava	9909811133
6	Patan	Head Quarter	Shri N D Patel	9909430381
7	Sidhpur	Sidhpur Police station	Shri M K Zala	9974362789
8	Saraswati	Saraswati Police station	Shri J R Chaudhari	9426447015
9	Patan	Balisana Police station	Shrimati A N Patel	9727612989
10	Saraswati	Vagdod Police station	Shri A V Desai	8238087974
11	Shankeshwar	Shankeshwar Police station	Shri P V Vasava	8980116294
12	Randhanpur	Radhanpur Police station	Shri R B Vaghiya	9313606014
13	Sami	Sami Police station	Shrimati R R Modiya	8799510907

Patan District Off Site Emergency Plan-2026

Sr. No.	Name of Police Station	Address	Landline No.
1	Patan City A-Division	Patan City A Division Police Station Near New Mamlatdar Office Patan Ta-Patan Dist-Patan	02766-230599
2	Sami	Shankheswar Road Sami Police Station Sami Ta-Sami Dist-Patan Pin-384245	02733-244323
3	Patan Taluka	Patan Taluka Police Station Golapur Ta-Patan Dist-Patan Pin-384265	02766-230699
4	Balisana	Balisana Police Station At-Balisana Ta & Dist. Patan Pin-384110	02766-285536
5	Sidhpur	Siddhpur Police Station, Siddhpur New Court Behind Ta-Sidhpur Dist-Patan Pin-384151	02767-220057
6	Vagdod	Vagdod Police Station Near Mazid Vagdod Ta-Saraswati Dist-Patan Pin-384285	02766-261254
7	Kakoshi	Near Sagar Hotel, Kakoshi Police Station Ta-Sidhapur Dist-Patan Pin-384190	02767-287435
8	Radhanpur	Radhnapur Police Station, New Court Ta-Radhanpur Dist-Patan Pin-385340	02746-277222
9	Varahi	Varahi Police Station, Behind Varahi Taluka Panchayat Ta-Santalpur Dist-Patan Pin-385360	02738-224123
10	Mahila Police Station	Mahila Police Station Near, Sidhapur Char Rasta, SP Office Compound Ta & Dist. Patan Pin-384265	02766-220030

ANNEXURE – 12**PATAN DISTRICT CRISIS GROUP****MEDICAL & HEALTH, AMBULANCE, BLOOD BANK , MEDICAL SHOPS (24 HOURS)****A. MAJOR HOSPITALS**

Sr. No.	Name of Hospital	Address	Landline No.
1	Community Health Center – Chanasma	B /H CHANASMA POLICE STATION Chanasma City Road Chanasma- 384220	02734222166
2	Community Health Center – Harij	Harij Hospital At & Post Harij 384240	9986342748
3	Community Health Center – Jangral	At & Po Jangral – 384285	9427665249
4	Community Health Center – Kunvara	At & Post Khunvara Kunvara – 384265	9979843468
5	General Hospital Patan	agwada Darwaja Road Near Bus Station, Patan-384265	9727778759
6	Community Health Center – Shankheshwar	At & Po, Shankheshwar – 384246 Taluka. Shankheshwar	9726017030

ANNEXURE – 12

Continue...

PATAN DISTRICT CRISIS GROUP

Other Important Number

Helpline
District Collector Office
Near North Gujarat University,
Patan,
Gujarat – 384265
Call: +91 2766 233301 Fax:+91 2766 233055
email:collector-pat@gujarat[dot]gov[dot]in
Woman Helpline: 1091
Child Helpline :1098
Ambulance helpline: +912766-233311
Fire & Rescue:101
Commissioner of Rescue & Relief : 1070
Emergencies District Helpline: +9127661077
District EOCs Helpline: +912766224830

Municipalities
Chanasma Nagarpalika
Main Road, Chanasma
Email : np[dot]92adhanpu[at]yahoo[dot]com[dot]in
Phone : 02734222018
Harij Nagarpalika
Main Road, Harij
Email : np[dot]harij[at]gmail[dot]com
Phone : 9409246328
Patan Nagarpalika
Bhadra, Near Mamladar Office Patan
Email : np_patan[at]yahoo[dot]co[dot]in
Phone : 02766233232
Category/Type: Public

Pincode: 384265
Radhanpur Nagarpalika
Main Road, Radhanpur
Email : np_radhanpur[at]yahoo[dot]co[dot]in
Phone : 02746277283
Sidhpur Nagarpalika
Main Road, Sidhpur
Email : np_sidhpur[at]yahoo[dot]co[dot]in
Phone : 02767220010

<i>Electricity</i>
<i>UGVCL Patan Division</i>
<i>UGVCL Division – Patan Near Gandhibag Patan</i>
<i>Email : eepatando[at]ugvcl[dot]com</i>
<i>Phone : 02766230439</i>
<i>Website Link : http://ugvcl.com/</i>
<i>UGVCL Radhanpur Division</i>
<i>Near Rajgadhi Radhanpur</i>
<i>Email : eernddo[at]ugvcl[dot]com</i>
<i>Phone : 02746277354</i>
<i>Website Link : http://ugvcl.com/</i>
<i>UGVCL Sidhpur Division</i>
<i>Palanpur – Mehsana Highway Opp. 132 KVA Sub Station, Sidhpur</i>
<i>Email : eesiddo[at]ugvcl[dot]com</i>
<i>Phone : 02767220347</i>
<i>Website Link : http://ugvcl.com/</i>

ANNEXURE – 13**LIST OF EXPERT PERSONS*****PATAN DISTRICT CRISIS GROUP***

Sr No	Designation	Technical Expert	Address	Phone No
1	Mr. Ashwin Dafda	Chief Operations Manager-IOCL	IOCL Pipeline Div.-Radhanpur	6357468292
2	Mr. Atulkumar Prajapati	Safety Officer-BPCL	BPCL, Sidhpur, Patan	8370979563

ANNEXURE – 14**PATAN DISTRICT CRISIS GROUP****EMERGENCY RESQUE EQUIPMENT WITH DISTRICT AUTHORITIES**

No.	Muni./Taluka/ Name of Govt. or Semi Govt. Organization	Fire Fighter	Water Tanker	Tractor Trailer	Dumper / Bulldozer	Ambulance	J.C.B	Road Roller	Four Wheeler	D G Set	Boat	Rain measuring instrument
1.	BPCL	Yes	-	-	-	-	-	-	Yes	Yes	-	-
2.	Patan Nagarpalika Fire station	Yes	Yes	-	-	-	-	-	-	-	yes	-
3.	IOCL	Yes	-	-	-	-	-	-	Yes	Yes	-	-

Sr. No.	Department	Incharge name	Conctant number	Available vehicle
1	Road & housing dept. - Engineering, Patan	Shri R B Panchal	9879571863	Bolero-01 No.
2	Road & housing dept. - Patan	Shri N N Patel	9662019790	Bolero-01 No.
3	Road & housing dept. - Engineering, Harij	Shri P B Patel	9825121691	Bolero-01 No.
4	Road & housing dept. - Engineering, Sidhour	Shri Virendrasinh Rajpurohit	7405699825	Bolero-01 No.
5	Road & housing dept. - Engineering, Radhanpur	Shri M I Saiyad	9664533787	Bolero-01 No.

ANNEXURE – 15***PATAN DISTRICT CRISIS GROUP***

Sr No	Name	Addrres	Contact Number
1	Balchand & Sons	Patan	07947113868

PORTABLE DG SET SUPPLIERS

ANNEXURE – 16**PATAN DISTRICT CRISIS GROUP****KEY CONTACTS – NATIONAL LEVEL AUTHORITIES**

Sr. No.	Agency	Contact Information	
		STD Code	Telephone Numbers
1.	Integrated control room-Emergency contact number		011-23438252/3
2.	Asst. Director (S), Inspectorate of Dock Safety, Near Bunder Gate, New Kandla Shri Manojbhai Kansula	02836	270249, 8655775051 9619599512
3.	Dy. Controller of Explosives (PESO), Raopura, Vadodara	0265	2225159, 2361035
4.	Director, National Institute of Occupational Health, Ahmedabad	079	22688700, 22686351

ANNEXURE – 19

PATAN DISTRICT CRISIS GROUP

METEOROLOGICAL DETAILS

Sr. No.	Month	Temperature		Rainfall Monthly Total (in mm)	Max. % R H	Wind Data				
		Max. °C	Min. °C			No. of Days for 1-19 Kmph	Wind Direction for % No. of Days* from			
							NE	SW	W	NW
1.	January	28.7	11.9	3.9	55	27	27	1	2	8
2.	February	31.0	14.5	0.3	52	24	24	2	6	16
3.	March	35.7	18.5	0.9	47	26	26	3	11	29
4.	April	39.7	23.0	1.9	49	26	26	9	20	38
5.	May	40.7	26.3	4.5	68	27	27	31	31	22
6.	June	38.0	27.4	100.0	77	28	28	43	31	7
7.	July	33.2	25.7	316.3	86	28	28	49	28	5
8.	August	31.8	24.6	213.3	84	28	28	44	32	8
9.	September	33.1	24.2	162.8	80	27	27	23	33	24
10.	October	35.6	21.2	13.1	64	24	24	2	6	15
11.	November	33.0	16.1	5.4	52	27	27	0	0	2
12.	December	29.6	12.6	0.7	56	27	27	0	0	5

Source : Indian Meteorology Department

* Calm weather prevailed during the remaining days

*ANNEXURE –20***PATAN DISTRICT CRISIS GROUP****SURVEY OF PROBABLE TYPES OF CHEMICAL ACCIDENTS IN INDUSTRIAL POCKET**
PATAN

Sr. No.	Probable Type of Chemical Accidents	Name of Chemical Involved	Name of MAH Unit
1.	Fire	ETHANOL, MS & HSD	INDIAN OIL CORPORATION LIMITED (M.D) (IOCL(MD) Sidhpur Terminal, Sujanpur State Highway Sidhpur Di-Patan Gujarat -384151)
2.	Flammable Liquid Spillage		
3.	Toxic Liquid Spillage		
4.	Flammable Gas Leakage/ Dispersion		
5.	Poisonous Substance Spreading		
6.	Explosion		

ANNEXURE –21

CARE FOR SAFE HANDLING OF SOME CHEMICALS

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. FIRE EXTINGUISHERS

Fires are classified in Five Groups. The portable fire extinguishers of various types as explained below are being installed. Sand buckets also have been installed. They are used to extinguish fires as soon as they are detected. The type of each extinguishers to be used in each class of fires have been described below Using the wrong kind of fire extinguishers could be dangerous. For example, using water on some solvents or odour can actually spread the fire or flames. Even if you have the right extinguisher, you must use it correctly to be effective.

Class of Fire	Description	Extinguishing Media	I. S. No.
A	Fires involving ordinary combustible materials like wood, paper, textiles etc. The quenching and cooling effect of water or of solutions containing larger percentage of water are of first importance in extinguishing these fires.	Water Water (Gas Pressure) Water (Constant air pressure) Water – Soda – Acid type	--- 940 6234 934
B	Fires occur in the vapour-air mixture over the surface of flammable liquids such as petrol, oil, grease, naphtha, paints, thinners, varnishes etc. They are controlled by limiting the supply of air (Oxygen), blanketing effect is essential.	Dry Chemical Powder Carbon-di-oxide Foam	2171 4308 2878 933
C	Fires involving gaseous substances under pressure, where it is necessary to dilute the burning gas at a very fast rate with an inert gas or powder.	Dry Chemical Powder Carbon-di-oxide	2178 4308 2878
D	They occur in combustible metals such as magnesium, titanium, sodium, aluminum, zinc, potassium etc. where the burning metal is reactive to water.	Dry chemical Powder special dry powder for metal fire	2171 4861
E	Fires involving electrical equipments where the electrical non-conductivity of extinguishing media is of first important	Carbon-di-oxide Dry Chemical Powder	2171 4308

3. 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.

ANNEXURE – 21

Continue...

CARE FOR SAFE HANDLING OF SOME CHEMICALS

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. Lightening Strokes
14. Mobile Vehicles
15. Mobile Phone

4. 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 electrical equipment.
- 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 flammable vapour concentration attains its explosive limits easily. Further hazards increases doubly when the doors and windows of the building where such flammable substances are used, are kept closed in order to conserve heat for human comfort during cold weather.

2 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, fresh air mask like personnel protective equipment are to be used.

ANNEXURE – 21

Continue...

CARE FOR SAFE HANDLING OF SOME CHEMICALS

3 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.

4 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, vortexes 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.

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.

ANNEXURE – 21

Continue...

h) **Instrumentation / Safety Equipment:**

A wide range of safety equipment in the form of breathing equipment, protective clothing, 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 cleanup operation.

ANNEXURE – 21

Continue...

CARE FOR SAFE HANDLING OF SOME CHEMICALS

5 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:**

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

3. **Chlorosulfonic Acid:**

In moist air HCL and H₂SO₄ are formed. Avoid breathing in fumes. In Spillage area spray lime solution instead of water.

4. **Cyanides and Nitrides:**

Toxic, if inhaled, swallowed or absorbed through skin. Liquid nitrides and HCN are flammable. Use CO₂ extinguishers. Clean up cyanide spills with water. Flush small amounts down the sink the copious quantities of water.

5. **Peroxides:**

70% H₂O₂ may spontaneously explode. Organic peroxides such as benzoyl 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.

ANNEXURE – 21

Continue...

PATAN DISTRICT CRISIS GROUP**CARE FOR SAFE HANDLING OF SOME CHEMICALS****6 Leak Detection, Neutralisation & Disposal**

Sr. No.	Leak Detection	Neutralisation & Disposal
1.	HSD thorough sensor & physical	It may run into process drains if greatly diluted with water. It may be removed to open atmosphere for dispellation of vapours. May absorb in vermiculite or dry sand, and then dispose in licensed special waste site. Dispose of in accordance with Local Authority requirements.
2.	MS thorough sensor & physical	Disposal should be carried out by incineration or as required under local authority regulations. Under no circumstances should spirit be discharged into the public drainage system or marine and inland waterways
3.	Ethanol thorough sensor & physical	It may run into process drains if greatly diluted with water. It may be removed to open atmosphere for dispellation of vapours. May absorb in vermiculite or dry sand, and then dispose in licensed special waste site. Dispose of in accordance with Local Authority requirements.

ANNEXURE-22

PATAN DISTRICT CRISIS GROUP

A. SPECIAL MEDICAL TREATMENTS & ANTIDOTS

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.	Acetonitrile	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 20	6500 93	Miscible Poor
2.	Ammonia	If skin is affected then wash with plenty of water for 15 min. 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.	Benzene	Skin is affected then wash with plenty of water. Administer Oxygen or shift to fresh air. Diazepam 0.1 mg/kg.(iv), bed rest.	Incineration	10	3400	Poor
5.	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
6.	Carbon Tetra Chloride	N-acetyl-L-cysteine		5	2800	Not Soluble
7.	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
8.	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 Hypochlorate	1	440	Poor
9.	Dichloro Methane	Hydro cortisone (200 mg every 4 hours). In case of aspiration pneumonia give antibiotics.	Hydrochloric Acid	-	-	-
10.	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
11.	Ethylene Oxide	Artificial respiration. Treatment by physician.	Dissolve in Solvent	50	270	Good
12.	Ethylene Dichloride			10	-	Not Soluble
13.	Formaldehyde	Milk, activated charcoal or Water.		3	300	Soluble
14.	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
15.	Iodine and Compositions	Milk, Fine starch Solution, 100 ml of 1% Sodium Thiosulphate by mouth.				Insoluble
16.	Lead Compounds	CaNa ₂ EDTA, D-Penicillamine (oral), BAL (with CaEDTA), Induce vomiting, then give Magnesium sulphate in water.				
17.	LPG	Wash with water Remove affected person to fresh air.	Prevent source of ignition	1000	-	Floats
18.	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. Folinic acid (Leucovorin), 1 mg/kg, iv, 4 hourly.	200	4100	Good	

ANNEXURE-22

Continue...

PATAN DISTRICT CRISIS GROUP

A. SPECIAL MEDICAL TREATMENTS & ANTIDOTS

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
19	Mercury	Give white of egg in water. Later give milk, then include vomiting. BAL, D-Penicillamine, n-Acetylcysteine, Dimercaptopropane-1 sulfonate (DMPS)		0.1 mg/m ³		Insoluble
20.	Nitrobenzene	Methylene blue, 1-2 mg/kg, iv, over 5 min.				
21.	Nitrogen Oxides (NO _x)	Prednisone or Prednisolone 5 mg. every 6 hrs interval.				
22.	Nitric Acid	Administer oxygen, morphine injection for severe aches.	Sodium Carbonate or Soda Ash or Slacked Lime	2	-	Good
23.	Oleum	Wash contaminated area with water and soap. 5% soln of sodium bicarbonate. Artificial respiration	Dry Sand, Earth	1	-	Highly Reactive
24.	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
25.	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
26.	Phosgene	Cortisone acetate 1 mg/kg by mouth – thrice a day. In case of breathing difficulty administer Oxygen.		0.1	-	Hydrolyzed
27.	Phosphorus	10 ml calcium gluconate (10%) by intravenous injection, 5% glucose in water. Travert (10% invert sugar) by intravenous injection.		0.1	3030	Insoluble
28.	Organics Phosphorous Insecticides (e.g. Malathion, Parathion, Monocrotophos, Phorate)	Atropine injection, Atropine (0.1% solution), Néalphine hydrochorie (0.5 %solution), Trimedoxim bromide (15%solution), Pyridine Aldoxy Methyodate, Diperoxim, Biodexim and Isonitrocin (40%solution), Pralidoxi, PAM, TOXOGONIN.				
29.	Sulphur Dioxide	Treat burns as usual. Oxygen with intermittent positive pressure breathing apparatus.	Cover with ash or sodium bicarbonate and Calcium Hydrochlorite	2	-	Sinks & Boils
30.	Sulphuric Acid	Wash thoroughly with water followed by 5% soln of sodium bicarbonate.	Cover with Sodium Carbonate or Soda Ash or Slacked Line	1 mg/m ³	2140	Reactive
31.	Toluene	Wash Completely with. Remove exposed Person to Fresh Air, Artificial Respiration.		100	1640	Poor
32.	Thionyl Chloride	Administer oxygen. 5% soln of sodium bicarbonate may be used.	Cover with sodium bicarbonate	5	-	Decomposes (Hydrolyses)
33.	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
34.	Xylene	Skin is affected then wash with plenty of water. Administer Oxygen or shift to fresh air. Diazepam 0.1 mg/kg.(iv), bed rest.		100	4300	Not Soluble
35	Propane	Wash with water Remove affected person to fresh air	Prevent sources of ignition	2500	-	Slightly Soluble

ANNEXURE-22

Continue...

PATAN DISTRICT CRISIS GROUP

B. DETAILS ON BURNS AND THEIR TREATMENT

1. CAUSES OF BURNS

Under the category of burns, several environmental injuries are included. They are: thermal burns, burns from electrical current, chemical burns, burns resulting from radiant energy and systemic reactions to heat.

2. SEVERITY OF THERMAL BURNS

The seriousness of the thermal burns depends upon the degree of the burn (depth of the skin Injured) and the amount of body surface involved.

2.1 Degree of Burns:

Burns can be classified in degrees from one through six. A first-degree burn is limited to the most superficial layer of the epidermis and results only in erythema (reddening) of the skin. A second-degree burn causes damage into but not through the dermis and characteristically results in the appearance of vesicles (blisters) in the skin. A third degree burn is one in which the full thickness of the skin is destroyed down to the subcutaneous fat. In this burn the skin may appear pale, dry and white; it may even be brown or charred. Clotted blood vessels may be seen through the skin as though one were looking at them through parchment. A fourth degree burn Involves destruction of the skin and the subcutaneous fat. A fifth degree burn involves destruction of the skin, the fat and the underlying muscle. A sixth degree burn Involves destruction through all the structures, including the supporting bone.

With bums more serious than second degree, there is destruction of the sensory nerve endings of the skin. The burned area is consequently insensitive. However, the area surrounding the burn will not have all nerve endings destroyed and may frequently be extremely painful.

2.2 Body Surface Involved:

The amount of body surface that is burned is very important in determining the seriousness of the Injury. A very rough but reasonably accurate estimate of the amount of body surface burned is determined by the rule of nine. This rule, which applies specifically in adults and older children, divides the body into sections, each of which constitutes approximately 9 % of the total area. The body sections and the respective percentage assigned to them are:

Head, Face, I.e. area involving neck and above	9%
Each arm	9%
Front torso	18%
Each leg	18%
Back	18%
Genitals	1%

By knowing the degree of burn, the approximate percentage of the body that has been burn, accompanying complications, and the age of the patient, one can classify the severity of thermal burns as critical, moderate, or minor. Such classification is essential In a disaster where

many injured patients are involved and where the triage separates the patients into emergency cases and cases for whom treatment may be delayed. A summary of the three classes follows.

2.3 Critical (Severe) Burns:

This category includes:

- ❖ All burn of whatever degree and extent if they are complicated by respiratory tract Injury and other major injuries or fractures
- ❖ Third degree burns Involving critical areas such as face hands or feet
- ❖ Third degree burns which Involve more than 10% of the body surface
- ❖ Second degree burns which Involve more than 30% of the body surface

2.4 Moderate Burns:

This category includes:

- ❖ Third degree burns of 2 to 10 percent of the body surface which do not involve the face, hands or feet
- ❖ Second degree burns which involve 15 to 30 percent of the body surface
- ❖ First degree burns Involving 50 to 75 percent of the body surface

2.5 Minor Burns:

This category includes:

- ❖ Third degree burns of less than 2 percent of the body surface if no critical areas are involved
- ❖ Second degree burns involving less than 15 percent of the body surface
- ❖ First degree burns of less than 20 percent of the body surface

In evaluating a patient who has sustained a burn, age and general condition must also be considered. A moderate burn In an aged patient who is chronically ill should be classified as critical in terms of the immediate treatment required because of the patient's general condition apart from the burns.

3. THE CARE OF THERMAL BURNS

The care of thermal burns depends on the percentage of burned body surface involved. In no instance should grease (butter, lard, Vaseline, mineral oil or other ointments) be applied to a burn. For the first or second-degree burns, the emergency medical treatment should be to:

- ❖ Remove any burning/smouldering clothing as necessary
- ❖ Immerse the burned part in ice water for five to ten minutes and periodically continue to add ice to keep the temperature low. If area cannot be immersed, cover with clean, porous cloth of any kind and keep continuously wet with ice water (or the coldest water available)
- ❖ Use cool wet applications for relief of pain.
- ❖ Transport the patient to the emergency department, continuing cool applications en- route.

For extensive first or second degree burns and for all third degree burns the procedure set forth below should be followed.

- ❖ Examine for and relieve any respiratory distress. Always anticipate respiratory difficulty when there are burns around the face and neck

- ❖ or when the patient has been exposed to hot gases or smoke.
- ❖ Clothing that adheres to the skin should be cut around and left in place.
- ❖ Cover the burned area with a sterile dressing or a clean sheet. Use cool wet applications for pain relief.
- ❖ Treat the patient for shock if it is apparent.
- ❖ Transport the patient to the emergency department, continuing cool applications en- route.

Severe pain, which may accompany first or second degree burns or may exist at the edges of third degree burns, is best relieved by injected analgesic medication. These drugs must be given by a qualified person or on doctor's order.

Local treatment with cool compress remains the best emergency treatment for burn pain. Third degree burns, which destroy nerve endings, are often not painful enough to require such treatment before the patient reaches the hospital. In burns of this degree and increasing severity, initial efforts are best directed at general support and resuscitation of the patient.

*ANNEXURE-23***PATAN DISTRICT CRISIS GROUP****GENERAL RESPONSE ACTIONS IN CASE OF CHLORINE LEAKAGE/ DISPERSION****1. Symptoms:**

Being Irritant causes conjunctivitis and damage to cornea. Asphyxia. Affection of respiratory tract, may lead to Bronchitis, Bronchospasm, Pulmonary Oedema.

2. First Aid:

Prompt treatment is essential. Remove the patient to the area where fresh air is available. DO NOT give anything to an unconscious patient by mouth, It may choke him.

a. If chlorine gas inhalation is mild and the patient is only coughing, the following line of treatment may be given:

- Loosen the clothes and remove the shoes. Give ammonia by Inhalation.
- Place the patient on his back with head and back elevated. Keep the patient warm with blanket to avoid chilling.
- Rest Is a must.
- Milk, buttermilk, coffee can be given for relief from throat irritation.
- Cough syrups like Hitadrine, Coughrol, Linctus, Codeine, etc., and common throat lozenges such as Vox, Vicks tablets, Halls, etc., can also be given to soothen the throat Irritation.
- If gas inhalation Is severe but breathing has not ceased start oxygen immediately. Phlebotomy (500 - 700 ml), Caffeine and Sodium Benzoate 0.5 - 1.0 gm/mm. may also be given.
- In case breathing has ceased start artificial respiration.

b. If Gaseous or Liquid Chlorine has come in contact with eyes:

- Flush eyes immediately with running water or normal saline water for about 15 minutes.
- Hold eyelids apart to ensure complete neutralization with water.
- Do not try to neutralize with chemicals.
- Administer 2 - 3 drops of 0.5 % solution of Pontocaine or other effective topical anesthetic in the eyes.
- Do not use oils or oily ointments in the eyes.

c. If Gaseous or Liquid Chlorine has come into contact with the skin:

- Remove contaminated clothes.
- Flush the affected portion with copious amount of running water. a Wash skin with copious amount of soap and water.
- Do not apply greases.

d. If liquid chlorine is by chance swallowed:

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

- Ask the patient to drink copious quantity of limewater, ammonia water (1 ml in 60 ml of water), milk of magnesia or fresh water.
- No attempt should be made to induce vomiting.
- Keep the patient under observation and call for immediate medical help.

3. Treatment

a. Pulmonary Oedema

- Administer 60 to 100 % oxygen at 6 Lit/mm.
- Intermittent positive pressure breathing apparatus, set to deliver

positive pressures of 5 - 15 cm of water in the inspiratory cycle, is valuable In reducing the formation of edema

- Symptomatic treatment. Lasyx is suggestive.
- Administer Aminophyllene intravenously.

b. Bronchospasm

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

ANNEXURE –24

PATAN DISTRICT CRISIS GROUP COLOUR CODE SYSTEM FOR PIPE LINES 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 15 kg/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	Canary Yellow	-
19.	Instrument Air	Sky Blue	French Blue	-
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	-

INDUSTRIAL GASES (For Pipelines)					HYDROCARBON AND NAPHTHA (PETROLEUM PRODUCTS)				
Sr. No.	Contents	Ground Colour	First Colour Band	Second Colour Band	Sr. No.	Contents	Ground Colour	First Colour Band	Second Colour Band
1.	Acetylene	Canary Yellow	Service Brown	-	1.	Acetone	Dark Admiralty Grey	Black	Canary Yellow
2.	Ammonia	Canary Yellow	Dark Violet	-	2.	Benzene	Dark Admiralty Grey	Canary Yellow	-
3.	Butane	Canary Yellow	Signal Red	-	3.	Butadiene	Dark Admiralty Grey	Black	-
4.	Chlorine	Canary Yellow	Dark Violet	Light Orange	4.	Ethylene Di-Chloride	Dark Admiralty Grey	Gulf Red	-
5.	Ethylene Oxide	Canary Yellow	Dark Violet	Brilliant Green	5.	Methanol	Dark Admiralty Grey	Deep Bull	-
6.	Hydrogen	Canary Yellow	Signal Red	French Blue	6.	Naphtha	Dark Admiralty Grey	Light Brown	Black
7.	Hydrogen Sulphide	Canary Yellow	Gulf Red	-	ACIDS :				
8.	Methane	Canary Yellow	Signal Red	Light Brown	1.	Hydrochloric Acid	Dark Violet	Silver Grey	-
9.	Methyl bromide	Canary Yellow	Fresh Blue	Black	2.	Hydrofluoric Acid	Dark Violet	Signal Red	French Blue
10.	Nitrogen	Canary Yellow	Black	-	3.	Nitric Acid	Dark Violet	French Blue	Light Orange
11.	Oxygen	Canary Yellow	White	-	4.	Phosphoric Acid	Dark Violet	Silver Grey	-
12.	Phenol	Canary Yellow	Dark Violet	Smoke Grey	5.	Sulphuric Acid	Dark Violet	Brilliant Green	Light Orange
13.	Phosgene	Canary Yellow	Black	White	CHEMICAL & ALLIED PRODUCTS				
14.	Propane	Canary Yellow	Signal Red	Black	1.	Brine	Black	White	-
15.	Sulphur Dioxide	Canary Yellow	Dark Violet	Golden Brown	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

ANNEXURE –25

PATAN DISTRICT CRISIS GROUP

A PROPOSED SCALE FOR GRADING OF CHEMICAL DISASTERS

<i>Grades</i>	<i>Qualitative Severity Consequences Criteria</i>
<i>1</i>	▪ <i>Injuries requiring first –aid only</i> ▪ <i>Contained release with local environmental effect and pollution problem</i>
<i>2</i>	▪ <i>Injuries requiring a physician’s care</i> ▪ <i>Uncontained release with potential for minor environment effects</i> ▪ <i>Chances of fire and Explosion</i>
<i>3</i>	▪ <i>Severe injuries or potential for a fatality</i> ▪ <i>Uncontained release with potential for moderate environment effects</i>
<i>4</i>	▪ <i>Multiple life threatening injuries and /or fatality</i> ▪ <i>Uncontained release with potential for major environment effects</i>

ANNEXURE – 26

PATAN DISTRICT CRISIS GROUP

PROPOSE REGISTER FOR CHEMICAL ACCIDENT OCCURRED IN THE INDUSTRIAL POCKET

Sr. No.	Place of Chemical Accident	Type of Chemical Accident (like fire, Explosion, Gas Dispersion etc.)	Date & Time of Accident	Chemical Involved	Duration	Accident Effect					Reported/ non Reported	Informant with date	Remarks
						Nos. of Affected Person	Nos. of Injured Person	Nos. of Death	Properties Damage	Environmental Damage			
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.													
2.													
3.													
4.													
5.													

ANNEXURE – 27

PATAN DISTRICT CRISIS GROUP

LIST OF RELEVANT STATUTE ON HAZARDOUS SUBSTANCES

Sr. No.	Statute	
1.	<i>The Factories Act, 1948(1987) and The Gujarat Factories Rules 1963(2004)</i>	
2.	<i>The Petroleum Act, 1934</i>	
3.	<i>The Explosive Act, 1984(1983)</i>	
4.	<i>The Motor Vehicles Act 1988(2001)</i>	
5.	<i>The Gas Cylinder Rules 2004</i>	
6.	<i>The Static & Mobile Pressure Vessels (Unfired) Rules 1981</i>	
7.	<i>The Indian Boilers Act 1923 & Rules 1961, Gujarat Boiler Rules 1966</i>	
8.	<i>The Mines Act 1952 & Rules 1955</i>	
9.	<i>The Insecticide Act, 1968(2000)</i>	
10.	<i>The Disaster Management Act -2005 & Rules 2006</i>	
11.	<i>National Disaster Management guide lines – Chemical Disaster (NDMG-CD)</i>	
12.	<i>The Gujarat State Disaster Management Act -2005 & Rules 2006</i>	
13.	<i>The Environment (Protection) Act, 1986(1991) and following Rules there under</i>	
	13.1	<i>The Environment (Protection) Rules, 1986 (2004)</i>
	13.2	<i>The Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989 (1994, 2000)</i>
	13.3	<i>The Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996</i>
	13.4	<i>The Hazardous Wastes (Management and Handling) Rules, 1989 (2003)</i>
	13.5	<i>Environment Impact Assessment Notification 1994</i>
	13.6	<i>Bio-Medical Wastes (Management & Handling) Rules, 1989</i>
	13.7	<i>The national Environment Tribunal Act, 1995</i>
14.	<i>Weapons of mass Destruction and their Delivery Systems (Prohibition of Unlawful Activities) Act, 2005</i>	
15.	<i>The Public liability insurance act, 1991(1992)</i>	
16.	<i>The Workman's Compensation Act 1923 & Rules 1924</i>	
17.	<i>Employees state Insurance Act 1948 & Rules 1950</i>	

ANNEXURE – 29***Patan DISTRICT CRISIS GROUP*****DETAILS OF CONDUCTED MOCK DRILL**

Sr. No	Dt. of Mock Drill	Chemical Involved	Scenario	Place
1.	25/03/2026	Fuel	Chemical/Fuel Leakage in TT loading shed & Fire occurred	IOCL Marketing Terminal-Sidhpur, Patan

ANNEXURE – 30

PATAN DISTRICT CRISIS GROUP
GLOSSARY OF TERMS AND DEFINITIONS

1. **ACCIDENT**
An accident may be defined as “an undesirable and unplanned event with or without or major or minor damage consequence to life and/or property.”
2. **ACGIH**
American conference of governmental Industrial Hygienists
3. **ACUTE**
SEVERE but of the short duration. ACUTE health effects are those that occur immediately after exposure to hazardous chemical.
4. **AEROSOL**
Particles (Solid or Liquid) that remain suspended in air for a period of time. (Mists, Smokes, Fumes, Dusts etc.)
5. **AIRBORNE RELEASE**
Release off any chemical into the air.
6. **AMBIENT**
Ambient temperature is temperature of the surrounding area.
7. **AMORPHOUS**
Non-crystalline, having no definite form or shape.
8. **AN INCIDENT**
An incident is emergent situation of any critical deviation in the process control or otherwise that may lead to a major accident / potential emergency and disaster.
9. **ANEMOMETER**
A device used to measure speed of wind or any other moving gas.
10. **ANSI**
American National Standards Institute
11. **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 sometimes A-G)

Neutral stability occurs typically, when there is total cloud cover and is designed by category D (The temperature gradient = adiabatic lapse rate) Unstable conditions occur when the sun is shining. 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.

Sometimes 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.

12. BLEVE (BOILING LIQUID EXPANDING VAPOUR CLOUD EXPLOSION)

The event may have two folds, one; flammable liquid under pressure rapidly spread in to the open area in form of vapour cloud, two; if this spreading vapour cloud gets any source of ignition, then violently explosion took place produce missiles effect with secondary fires and create heavy damages to the surrounding area. The phenomena are called as BLEVE.

13. BUND/DYKE

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

14. BURNING RATE

The value is the rate (in millimetres per minute) at which the depth of a pool of liquid decreases as the liquid burns.

15. CAS (CHEMICAL ABSTRACT SERVICE REGISTRY NUMBER):

The unique identification number assigned each compound/chemicals registered with the Chemical Abstract Service (CAS) is listed to aid in quick identification of the compound.

16. CARCINOGEN

A substance capable of producing cancer (carcinoma).

17. 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.

18. COMBUSTION PRODUCT

Material produced or; generated during the burning or oxidation of a material.

19. CONTAMINANT

A harmful, irritating or moisture material that is foreign to the normal atmosphere.

20. DANGEROUS OCCURRENCE

Dangerous Occurrences include bursting of vessel collapse of crane, derrick, hoist, explosion, fire, leakage, escape of any molten metal / hot liquid, explosion of receiver /container, collapse of building/ structure, as specified under schedule of Rule 103 of GFR 1995 and provision under section 88-A of the Factories Act 1948, where in a factory any dangerous occurrence as specified occurs whether causing any bodily injury or disability or not.

21. DENSITY

The mass of Unit Volume of a substance e.g. kg/M³

22. DISASTER

A disaster is catastrophic consequence of a major emergency / accident that leads to, not only extensive damage to life and property but also disrupts all normal human activity for a pretty long time and requires a major national and international effort for rescue and rehabilitation of those affected.

23. DISTRICT CRISIS GROUP(DCG)

“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.

Ref; Schedule 7 of Rule 8 of Chemical Accidents (Emergency Planning, Preparedness & Response) Rule, 1996.

24. DOMINO EFFECT

An effect by which a small hazardous incidence in a unit can escalate to surrounding area causing heavy damages to man, properties & environment.

25. DOW Index

Dow index is system of indexing fire, explosion & toxicity level so as to categorized plant/ section into different hazard zones involving fire, explosion & toxicity hazards.

26. EMERGENCY

Emergency means a situation leading to a circumstance or set of circumstances in which there is danger to the life or health of persons or which could result in big fire or explosion or pollution to the work and outside environment, affecting the workers or neighbourhood in a serious manner, demanding immediate action. (Ref. Para 2(j) of Part I of Schedule XIX of Gujarat Factories Rules 1963(1995).

27. EMERGENCY INFORMATION PANEL

Every Goods carriage used for transporting any dangerous or hazardous goods shall be legibly and conspicuously marked with an emergency information panel in each of three places of the carriage.

28. ENDOTHERMIC PROCESS

A process accompanied by the absorption of heat.

29. EVACUATION

Removal of residents and other persons from an area of danger.

30. EXOTHERMIC PROCESS

A process, in which energy in the form of heat is released.

31. 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.

32. 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 (LFL)

33. FLASH FIRE

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

34. FLASH POINT

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 10o to 15oF higher than the closed cup value.

35. HAZARD

Hazard may be defined as “the potential of an accident.” Hazard exists in man and the system of materials and machines.

36. 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 or combustible liquids, flammable solids substance, toxic, corrosives,

oxidizing substance, poisonous and insecticides substances.

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

37. HAZARDOUS PROCESS

Any process or activity in relation to an industry specified in the First Schedule under the Section 2(cb) of the Factories Act 1948 (1987).

38. HAZCHEM CODES

The HAZCHEM code system was developed by the British Fire Service for use on vehicles transporting dangerous substances. It consists of either two or three characters. The first character is a numeral in the range of 1 to 4.

1 – Jets, 2 – Fog, 3 – Foam, 4 – Dry Agent

The second character is a letter selected from the range P, R, S, T, W, X, Y, Z. Personal Protection – 1. The letter P, R, W or X indicate that a full chemical suit and breathing apparatus should be worn. 2. The letters S, T, Y & Z indicate that breathing apparatus need only be worn if the substances are involved in a fire.

Contain or Dilute – The letters P, R, S, & T indicate dilution while W, X, Y & Z indicate containment.

The third character when appearing is E indicates that evacuation of persons in the neighbouring areas must be taken into consideration.

39. IC (INCIDENT CONTROLLER)

He has to tackle the situation of operations on process/storage/event/occurrence by taking technical decisions to control the emergency by responding to the requisite experienced persons.

40. 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.

ANNEXURE – 30

Continue...

GLOSSARY OF TERMS AND DEFINITIONS

Industrial activities are given in following;

- 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.

41. IDLH (IMMEDIATELY DANGEROUS TO LIFE AND HEALTH)

The level of concentration immediately dangerous to life or health from which a worker could escape without any impairing symptoms or any irreversible health effect (NIOSH/OSHA). The concentrations are reported either parts per million (ppm) or milligrams per cubic meter (mg/m³).

42. 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”.

43. LC₅₀ (LETHAL CONCENTRATION)

Lethal Concentration level for air Borne toxic substance.

44. LD₅₀ (LETHAL DOSE)

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 50 mg/kg) the toxic dose for 50% of animals weighting 70 kgs (150 lb) is $70 \times 50 = 3,500$ mg = 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 15 g/kg) the LD₅₀ would be between a pint and a quart for a 150 lb man.

45. LOCAL CRISIS GROUP (LCG)

“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.

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

46. MAJOR ACCIDENT

Major Accident means an incident involving loss of the life inside or outside the site or ten or more injuries inside and/or one or more injuries outside or release of toxic chemical or explosion or fire of spillage of hazardous chemical result in ‘On Site’ or ‘Off Site’ emergencies or damage too equipments leading to stoppage of process or adverse effects to the

environment. (Ref. 1. Rule 68(J)(1)(d) of Gujarat Factories Rules 1963(2004), 2. Rule 2(j) of Manufacture, Storage and Import of Hazardous Chemical Rules, 1989. 3. Rule 2(f) of Chemical Accidents (Emergency Planning, Preparedness & Response) Rule, 1996).

47. MAJOR ACCIDENT HAZARDOUS (MAH) INSTALLION

“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.

Ref: Rule 2(g) of Chemical Accidents (Emergency Planning, Preparedness & Response) Rule 1996.

48. MANOMETER

An instrument that measures gaseous pressure, especially, it is a U-tube partially filled with water / mercury / light oil. The difference in level of the liquid between two sides of tubes indicates the pressure.

49. MORBIDITY

Ability to cause illness of diseases.

50. NFPA

National Fire Protection Association-USA

51. 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.

52. NIOSH

National Institute for Occupational Safety & Health-USA

53. ODOUR THRESHOLD

The lowest concentration of an air contaminant that can be detected by smell.

54. OFF-SITE EMERGENCY PLAN

The objective of an Off Site Emergency Plan is to protect the life and property of the neighbourhood areas of the industrial unit. Off Site Emergency Plan shall be prepared by Government Authorities as per Rule 14 of MSIHC Rules 1989 and follow the instruction under provision of CA (EPPR) Rules 1996.

55. ON SITE EMERGENCY PLAN

On Site Emergency Plan is to be prepared by occupier of industrial Units as per Schedule 8A under Rule 68(J)(12) of Gujarat Factories Rules 1963(2004). Ref: Section 41(B)(4) of The Factories Act 1948, Schedule XI under Rule 13 of MSHIC Rules 1989, and Rule 5,7, & 9 of CA(EPPR) Rules 1996.

56. OSHA

Occupational Safety and Health Administration – U. S. Federal Agency

57. OVER PRESSURE

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

58. PLUME

Hazardous gas / vapour / cloud resulting from a continuous source release.

59. PUFF

Plum is instantaneous release of a gas / vapour from the source.

60. POLYMERIZATION

A few chemicals can undergo rapid polymerization to form sticky, resinous materials, with the liberation of much heat. The containers may explode.

61. POOL FIRE

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

62. PPM (PARTS PER MILLION)**63. PYROLYSIS**

Chemical decomposition by the action of heat.

64. QRA (QUANTITATIVE RISK ASSESSMENT)

QRA is identifying, quantifying & computer modelling of all the potential emergency scenarios.

65. 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”.

66. RISK

Risk of an accident may be defined as “the chance or probability or likelihood of an accident being caused in a given man-material-machine system.

67. 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).

68. SPILL

Spill is large liquid releases from a bulk storage tank/process vessel.

69. SEVERITY RATING

1. The Severity rating of 1 would be termed as most sever which would call for complete evacuation of public at large and would hold potential for sever damage both to life as well as property.
2. The severity rating of 2 would be terms 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 terms as moderate i.e. would call for partial evacuation as well as activation of material aid.
5. The severity rating of 5 would be terms as low. This would have both localized effect mostly in terms of property damage and would call for declaration of local emergency.

70. SMC : SITE MAN CONTROLLER

He is overall responsible for directing operations & decides the actions, consulting with incident controller & seniors, and handle & control the emergency.

71. SHORT – TERM INHALATION LIMIT (STEL)

The parts of vapour (gas) per million parts of contaminated air by volume at 25oC (77oF) 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.

72. 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 4oC (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.

73. TLV (THRESHOLD LIMIT VALUE)

TLV refer to airborne 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/vapour/million parts of air) mg/m³: milligram/cubic meter.

74. Toxic Cloud

Air borne mass of gases, vapours, fumes, dust or aerosols of toxic materials.

75. Toxicity

The ability of a substance to cause damage to living tissue, impairment of the central nervous system, serve illness or death when ingested, inhaled or absorbed by the skin.

76. VAPOUR CLOUD

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

77. VULNERABILITY

It can be defined as “the zone of influence of an emergency in and around the facility concerned.

78. WATER FOG

A finely divided mist produced by either a high or low velocity fog nozzle. It is used for knocking down flames and cooling hot surfaces.

ANNEXURE-31

PATAN DISTRICT CRISIS GROUP

CHEMICAL ACCIDENTS (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 of 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 or by the State Government.

ANNEXURE – 31

Continue...

- e. “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;
 - f. “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 of delays, 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.

ANNEXURE – 31

Continue...

- 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,

- a. set up a functional control room at such place as it deems fit.
- b. set up an information networking system with the state and district control rooms.
- c. appoint adequate staff and experts to man the functional control room.
- d. publish a list of Major Accident Hazardous installations;
- e. publish a list of major chemical accidents in chronological order;
- f. publish a list of members of the Central State and District Crisis Groups;
- g. take measures to create awareness amongst the public with a view to preventing chemical accidents.

5. Functions of the Central Crisis Group, -

- a. 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.
- b. Without prejudice to the functions specified under sub-rule(1), the Central Crisis Group shall –
 - 1. 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;
 - 2. conduct post-accident analysis of such major chemical accidents and evaluate responses;
 - 3. 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;
 - 4. Review the progress reports submitted by the State Crisis Groups;
 - 5. Respond to queries addressed to it by the State Crisis Groups and the District Crisis Groups;
 - 6. 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.

ANNEXURE – 31

Continue...

6. Constitution of State Crisis Group, --

- a. 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.
- b. The composition of the State Crisis Group shall be as specified in Schedule 6.
- c. The State Crisis Group shall meet at least once in three months and follow such procedure for transaction of business as it deems fit.
- d. 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, --

- a. 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.
- b. Without prejudice to the functions specified under sub-rule(1), the State Crises Group shall, --
- c. 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.
- d. assist the State Government in managing chemical accidents at a site.
- e. assist the State Government in the planning, preparedness and mitigation of major chemical accidents at a site in the State;
- f. 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;
- g. review the progress report submitted by the District Crisis Groups;
- h. respond to queries addressed to it by the District Crisis Groups;
- i. 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.

ANNEXURE – 31

Continue...

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.

6. 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.
 2. Ensure dovetailing of the local emergency plan with the district off-site emergency plan;
 3. Train personnel involved in chemical accident management;
2. educate the population likely to be affected in a chemical accident about the remedies and existing preparedness in the area;

ANNEXURE – 31

Continue...

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

7. **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.

8. **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 facilities the functioning of the Local Crisis Group.

13. **Information in 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

[See rule 3(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	Oral toxicity 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 chemicals 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
425	Nitro Benzene
429	Nitrogen
444	Oleum
428	Oxygen
462	Parafin
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 rule 2(c), 2(e).

Schedule – V

[See rule 3(2)]

Composition of Central Crisis Group

1.	Secretary Govt. of India Ministry of Environment & Forests	Chair Person
2.	Joint Secretary Adviser (Environment & Forests)	Member Secretary
3.	Joint Secretary (Labour)	Member
4.	Joint Secretary / Adviser (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

[See rule 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.	Secretary (Public Health Engg.)	Member
7.	Chairman, State Pollution Control Board	Member
8.	4 Experts (Industrial Safety & Health) to be nominated by the State Govt.	Member
9.	Secretary / Commissioner (Transport)	Member
10.	Director (Industrial Safety / Chief Inspector of Factories)	Member
11.	Fire Chief	Member
12.	Commissioner of Police	Member
13.	One Representative from the industry to be nominated by the State Govt.	Member

Schedule – VII

[See rule 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 – 31

Continue...

Schedule – VIII

[See rule 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 (2 nos.)	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 / village pradhan nominated by Chair Person	Member
12.	One rep. Of non-government organization to be nominated by the Chair person	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

**DESCRIPTION
SECTION**

PART : 2

REVISED BY
DISTRICT CRISIS GROUP
PATAN
MARCH-2026

PROFILE OF MAH UNITS

CHAPTER - 10

10.1 LIST of MAH UNITS - Industrial Pocket wise

TABLE-1 (PATAN)

INDUSTRIAL POCKET – PATAN				
Sr. No	Factory Name	Address	Major Hazardous Chemical	Telephone Number
1	2	3	4	5
1.	INDIAN OIL CORPORATION LIMITED	(M .D) (IOCL(MD) Sidhpur Terminal, Sujanpur State Highway Sidhpur Di- Patan Gujarat -384151)	SKO, MS & HSD	8758803033

10.2**FACT SHEETS**

The details in respect of name, address, products, storage of major hazardous chemicals, work force, emergency contact persons' Name, Telephone Numbers, etc. of each MAH units are given in form of FACT SHEET, as follows.

FACT SHEET OF IOCL.

INFORMATION OF CHEMICAL FACTORIES REQUIRED FOR PREPARING OF OFF-SITE ACTION PLAN OF DCG-PATAN					
FACTS SHEET					
(1)	NAME & ADDRESS OF FACTORY	INDIAN OIL CORPORATION LIMITED (M.D) (IOCL(MD) Sidhpur Terminal, Sujanpur State Highway Sidhpur Di- Patan Gujarat -384151)			
	PHONE NO	8758803033			
	FAX NO	-			
	E-MAIL ID	-			
(2)	OFFICE ADDRESS OF FACTORY	IOCL(MD) Sidhpur Terminal, Sujanpur State Highway Sidhpur Di- Patan Gujarat -384151			
(3)	NAME & ADDRESS OF OCCUPIER	Mr. C B PRASANNA KUMAR			
	PHONE NO(OFFICE)	-			
	PHONE NO(RESIDENCE)	-			
	MOBILE NO	8488069073			
	E-MAIL ID	cprasannakumar@indianoil.in			
(4)	NAME & ADDRESS OF MANAGER	-			
	PHONE NO(OFFICE)	-			
	PHONE NO(RESIDENCE)	-			
	MOBILE NO	-			
	E-MAIL ID	-			
(5)	NAME & ADDRESS OF KEY PERSON (SAFETY INCHARGE)	Nirvit Sareen			
	PHONE NO(OFFICE)	-			
	PHONE NO(RESIDENCE)	-			
	MOBILE NO	7016577347			
	E-MAIL ID	sareennh@indianoil.in			
(6)	MAXIMUM NO. OF WORKERS INCLUDING ALL	SHIFT	COMPANY	CONTRACTOR	TOTAL
		GEN.	16	30	46
		1 ST	2	7	9
		2 ND	2	7	9
		3 RD	2	7	9
		TOTAL	22	51	73
(7)	AREA OF THE FACTORY (IN SQ. MET)	214,483.39 square meters.			
(8)	TOTAL AREA LIKELY TO BE AFFECTED IN CASE OF EXTREME EMERGENCY CASE	214,483.39 square meters.			
(9)	TOTAL PERSONS LIKELY TO BE AFFECTED INCLUDING SURROUNDING POPULATION	Immediate Vicinity (0-500m): Nil. The terminal is located in an industrial/agricultural zone with no residential dwellings within the immediate safety "exclusion zone." Surrounding Population (1 km radius): Minimal. Small clusters of agricultural workers; approximately 200-500 persons sporadically present. Wider Influence Zone (5 km radius): Approximately 15,000 – 20,000 persons. This includes the outskirts of Sidhpur town and the nearby village of Sujanpur.			
(10)	DETAILS OF TRAINEED PERSONS	NO OF TRAINED PERSONS AVAILABLE	NO OF TRAINED PERSONS THAT CAN BE SPARED		

	(a) SAFETY OFFICER	1	1					
	(b) FIRE PERSONNEL	0	0					
	(c) MEDICAL STAFF	0	0					
	DOCTOR	0	0					
	FIRST AID TRAINED	10	2					
	NURSE	0	0					
	(d) OTHERS							
	SECURITY	10	2					
	P.R.O	0	0					
	EVACUATION	0	0					
	ALERTING & WARNING	0	0					
	COMMUNICATION	0	0					
	NAME OF TECHNICAL EXPERT FOR CHLORINE	0	0					
	SOLVENTS	0	0					
	OLEUM	0	0					
	AMMONIA	0	0					
	ETHYLENE OXIDE	0	0					
	OTHERS.....	0	0					
(11)	DETAILS OF HAZARDOUS CHEMICAL – STORAGE OF RAW MATERIAL, INTERMIDATES, BY PRODUCT & FINISH PRODUCTS							
	SN	NAME OF CHEMICAL	TYPE OF STORAGE	CAPACITY	PARAMETER	NATURE OF HAZARD	CONTROL MEASURES	
					TEMP	PRESSURE		
	1	MS& HSD	Above Ground Vertical Tanks	Total 45440KL	Atmospheric	Atmospheric	fire	HVLR, Rim Seal Fire Protection, Cooling Water Sprinklers and foam monitor
12	DETAILS OF MANUFACTURING PROCESS (ATTACH SHEET)				Only storage			
13	TYPE OF PROBABLE HAZARDS BY STORAGE, PROCESS, VESSELS, HANDLING, NATURAL, TECHNOLOGICAL, CIVIL DISORDER, TRADE WASTE ETC. (specify with "√")							
	TYPE OF HAZARD	STORAGE	PROCESS	VESSELS	HANDLING	NATURAL		
	EXPLOSIVE							
	TOXIC RELEASE							
	CORROSIVE							
	FIRE							
	EXOTHERMIC							
	RUN AWAY REACTION							
	PRESSURE RELEASE							
	SPILLAGE							
	OTHERS							
14	IF ON-SITE, OFF-SITE EMERGENCY POSSIBLE GIVE BRIEF ONLINE MEASURES TO BE TAKEN BY COMPANY: Personnel Safety: - Sound the L-1 (On-Site) Siren (a rising and falling tone for 2 minutes). - Roll call at designated Assembly Points (upwind of the incident). Off-Site Emergency Measures <i>Goal: To protect the public and coordinate with District Authorities (Dist. Patan).</i> Declaration & Warning: - The Terminal Manager (Site Controller) informs the District Collector/District Magistrate.							

	○ Sound the L-2 (Off-Site) Siren (a continuous tone for 2 minutes) to alert the Sujapur/Sidhpur area. • Mutual Aid: Contact neighboring industrial units (Mutual Aid Partners) for additional firefighting resources or medical support.	
15	BRIEF STATEMENT OF MEASURES/KIND OF HELP REQUIRED FROM LOCAL CRISIS GROUP, DISTRICT CRISIS GROUP AND OTHER OFF-SITE RESOURCES SUCH AS POLICE, FIRE BRIGADE, ENVIRONMENT PROTECTION AGENCY, DEPARTMENT OF TRANSPORT, PWD, WATER SUPPLY, PORT AUTHORITY, RESCUE SQUAD, PUBLIC HEALTH HOSPITALS, AMBULANCE, UTILITIES, COMMUNITY OFFICERS, RED CROSS ARMY, NAVY, AIRFORCE, DEPARTMENT OF AGRICULTURE, RAILWAY, GEB, METEOROLOGICAL DEPARTMENT ETC HELP FROM FIRE BRIGADE, POLICE & DISTRICT AUTHORITIES WILL BE REQUIRED As per Emergency Disaster Management Plan in case of Level – 3 emergencies (Offsite), the emergency has to be handled with District Administration. YES, IT MAY REQUIRE	
16	ALARM/SIREN PROVIDED	Yes
	TYPE	MANUAL : YES PROVIDED ELECTRIC : YES PROVIDED
17	EMERGENCY ORGANISATION CHART AS PER ATTACHED	
18	EMERGENCY CONTROL CENTRE	
	(a) TELEPHONE NO (1) INTERNAL	8758803033
	(2) EXTERNAL	NA
	(3) MOBILE	8758803033
	(b) FACILITY PROVIDED (specify with capacity & quantity)	
	(1) FIRE EXTINGUISHERS - DCP TYPE	9kg, 25kg and 75kg
	FOAM TYPE	ARAFF
	CO2 TYPE	2 kg and 4.5 kg
	BC DCP	-na
	OTHER F.E.	-na
	(2) SELF BREATHING APPARATUS	1
	(3) CHLORINE KIT	Na
	(4) SAFETY BELT	Na
	(5) LIFE JACKET	Na
	(6) FIRE SUIT	1
	(7) DIESEL OPERATED FIRE PUMP	5
	(8) CONFINED SPACE KIT	1
	(9) EXPLOSIVE METER	2
	(10) OXYGEN METER	2
	(11) GAS DETECTION SYSTEM	2
	(12) AIR LINE RESPIRATOR	1
	(13) HELMET, HAND GLOVES, SAFETY GOGGLES	20 each
	(14) SAFETY SHOES, FACE SHIELD, EAR PLUG	20 each
	(15) FIRE PROXIMITY SUIT	1
19	FIRE FIGHTING ARRANGEMENTS	
	(a) FIRE TENDER - FOAM TENDER	FROM FIRE BRIGADE OR MUTUAL AID
	- WATER TENDER	FROM FIRE BRIGADE OR MUTUAL AID
	(b) DETAILS OF HYDRANT NETWORK	
	MAIN FIRE PUMP	
	DIESEL OPERATED FIRE PUMP	5 no of 540 hp pump
	JOCKY PUMP	2nos of 50 hp pump
	FIX WATER MONITOR	25
	FIX FOAM MONITOR	25

	FIRE HOSE REEEL	70
	FIRE HYDRANT VALVE	35
	DELIVERY HOSE	0
	NOZZLE/BRANCH	20
	4-WAY FIRE BRIGADE INLET	2
	(c) FIRE WATER RESERVOIR (CAPACITY IN LT)	Yes
	- UNDER GROUND	Na
	- GROUND LEVEL	Na
	- OVER HEAD	3 AG tank (2600+2600+5000)
	TOTAL CAPACITY	10200
20	MEDICAL FACILITY	Yes
	(a) OCCUPATION HEALTH CENTER	NA
	FACTORY MEDICAL OFFICER NAME, ADDRESS, CONTACT NUMBER	NA
	- NO OF BEDS	NA
	- NO. OF DOCTORS	NA
	- NO. OF NURSE	NA
	- ANTI DOTS	NA
	- STRETCHER	2
	- FIRST AID BOX	5
	- OXYGEN MASK & CYLINDER	0
	(b) AMBULANCE WITH STAFF	0
	- AT SITE	0
	- AT TOWN SHIP	0
21	DETAILS OF VEHICLE AVAILABLE AT SITE	0
	- JCB	0
	- BUS	0
	- CAR	1
	- CRNAE	0
	- TRUCK	0
22	WIND INDICATOR	YES
23	ASSEMBLY POINT	YES
24	PUBLIC ANNOUNCING SYSTEM	NA
25	GAS SPILLAGE CONTROL ARRANGEMENT	
	- SCRUBBER	YES
	- SPRINKLER	YES
	- FLAME ARRESTER	
	- DYKE WALL	YES
	EMERGENCY TRANSFER ARRANGEMENT	BY CALLING AMBULANCE, IT CAN BE DONE
26	DETAILS OF EMERGENCY RESCUE TEAM (TRAINED)	COMPANY EMPLOYEE ARE TRAINED
	FIRE & RESCUE TEAM	COMPANY EMPLOYEE ARE TRAINED
	FIRST AID TEAM	Available
	SECURITY TEAM	Security Guard Are Available
	MAINTENANCE TEAM	YES
27	DETAILS OF SECURITY ARRANGEMENTS	Security Guard are Available
28	DETAILS OF EXPERT TRAINED PERSON FOR PROCESS WITH NAME, CONTACT NUMBER	NA
29	DETAILS OF MUTUAL AID AGREEMENT (NAME OF ORGANISATION)	Yes
30	ON- SITE EMERGENCY PLAN PREPARED	Yes
31	DETAILS OF SURROUNDING VILLAGES	

	(a) DISTANCE FROM THE FACTORY	
	(b) POPULATION	
	(c) NAME & CONTACT NO. OF SARPANCH	
	(d) NAME & CONTACT NO. OF PRINCIPAL OF SCHOOL	
32	DETAILS OF HOSPITAL	
	(a) PRIVATE	
	(b) PUBLIC HEALTH CENTER	
	(c) COMMUNITY HEALTH CENTER	
33	DETAILS OF SHELTER	
	(a) SCHOOL/COLLEGE	
	(b) OTHER BUILDING	
34	DETAILS OF NGO/HELPING AGENCY	
35	DETAILS OF MSDS(ATTACH COPY)	
36	GENERAL LAYOUT-DRAWING OF PLANT (ATTACH COPY)	

PREPAREDNESS OF M.A.H. UNITS

CHAPTER - 11

INTRODUCTION

The major potential risks of MAH Units are maximum storage quantities of the Hazardous Chemicals. However, transportation, processes and handling pose to various hazards. The failure scenarios can be obtained from Risk Assessment and HAZOP. Further, on-site emergency plans of the M.A.H. Units provide the Maximum Credible Scenarios. These worst maximum scenarios are to be considered to be creation of probable chemical emergency in the industrial pockets. However, the management of M.A.H. Units are well prepared to mitigate chemical emergency at their level at certain limit. The details on preparedness by them are described in the as following.

11.1 PRIMARY ASSESSMENT

The location of incidence is most significant factor. Further, the availability of required resources is to be considered as prime important to control such emergency. Worst scenario can be decided based on the involved hazardous chemicals, their properties & quantities. On assessing the situation, immediately appropriate responding actions can be started. Emergency services should have such details on hands, so that emergency handling and controlling measures can be decided in time. Primary Assessment of hazards on basis of maximum storages of major hazardous chemicals are given in **Appendix – A.**

11.2 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 – B.**

11.3 Personal protective equipment Held by MAH units

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

11.4 MEDICAL FACILITY Held by MAH Units

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

11.5 VEHICLES FACILITIES HELD BY MAH UNITS

The Details on vehicles & communication facilities held by MAH is given at **Appendix – D.**

11.6 Material Safety Data Sheets

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

APPENDIX SECTION

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DISTRICT CRISIS GROUP
PATAN
MARCH-2026

Appendix-A**PATAN DISTRICT CRISIS GROUP****PRIMARY ASSESSMENT OF HAZARDOUS CHEMICALS**

Sr. No	Name of the Unit	Chemical	Storage Quantity (MT)		Damage Distance (m)								
					Pool Fire		BLEVE		UVCE			Toxic Dispersion	
			Largest	Total	FZR	IZR	FZR	IZR	FZR	IZR	D- LFL	D-3	F- 1.5
1	IOCL	MS/PETROL	1158	2416	90	180	250	400	300	600	800	-	-
2		HSD	2557	5258	100	200	300	450	250	500	700	-	-
3		ETHANOL	1392	3084	85	170	220	380	280	550	750	900	1200

Appendix-B**PATAN DISTRICT CRISIS GROUP****FIRE PROTECTION SYSTEM HELD BY MAH UNITS**

S r. N o	Name of MAH Unit	Water Tank			D.G Set		Fire Pump Set		Bucket		Fire Extinguisher						HOSE REEL	
		O/H	U/G	A/G	No.	KVA	No.	LPM	Kg	No	CO ₂	N o	DCP	No	FOAM	N o.	m tr	No
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	INDIAN OIL CORPORATION LIMITED (M.D) (IOCL(MD) Sidhpur Terminal, Sujanpur State Highway Sidhpur Di- Patan Gujarat - 384151)	Yes	--	--	Yes	-	Yes	-	Yes	-	Yes	-	Yes	-	Yes	-	Yes	-

Appendix-C**PATAN DISTRICT CRISIS GROUP****PERSONAL PROTECTIVE EQUIPMENTS HELD BY MAH UNITS**

Sr. No	Name of MAH Unit	Helmet	Hand Gloves	Safety Goggles	Safety Shoes	Face Shield	Ear Plug	Gum Boots	Canister Mask	Chemical Suit	Fire Suit	SBA		Air Line Respirator	Safety Belt	Chlorine Kit	Ammonia Kit	Explosive Meter	Oxygen Meter
												Duration	Nos						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	INDIAN OIL CORPORATION LIMITED (M.D) (IOCL(MD) Sidhpur Terminal, Sujanpur State Highway Sidhpur Di-Patan Gujarat -384151)	20	4	10	20	5	10	10	0	2	2	15	2	0	2	0	0	2	2

Appendix-D**PATAN DISTRICT CRISIS GROUP****EMERGENCY VEHICLES FACILITIES HELD BY MAH UNITS**

Sr · N o.	Name of Factories	Emergency Vehicles / Equipments						Car
		Bus	Truck	Dumper	JCB	Tractor	Crane	
1	2	3	4	5	6	7	8	9
1.	INDIAN OIL CORPORATION LIMITED (M .D) (IOCL(MD) Sidhpur Terminal, Sujanpur State Highway Sidhpur Di-Patan Gujarat -384151)	-	-	-	-	-	-	1

Appendix-E**PATAN DISTRICT CRISIS GROUP****MEDICAL FACILITIES AT MAJOR INDUSTRIES**

Sr. No.	Name of Factories	Name of Factory Medical Officer	First Aid Box	No. of Ambulance	No. of Beds in OHC	Stretcher	Other Equipments
1	2	3	4	5	6	7	8
1.	INDIAN OIL CORPORATION LIMITED (M.D) (IOCL(MD) Sidhpur Terminal, Sujanpur State Highway Sidhpur Di- Patan Gujarat -384151)	-	1	-	-	2	-

APPENDIX – F**LIST OF M.S.D.S.****LIST OF MATERIAL SAFETY DATA SHEET (M.S.D.S)**

SR NO.	NAME OF CHEMICAL
1.	ETHANOL
2.	MS
3.	HSD

MATERIAL SAFETY DATA SHEET (MSDS)

**SCHEDULE-5, RULE-68-J2(2),3(3)
OF GFR 1963 (1995)
SCHEDULE-9, RULE 17 OF MSIHC
RULE 1989 (2000)**



Health	2
Fire	3
Reactivity	0
Personal Protection	E

Material Safety Data Sheet

Ethyl alcohol 200 Proof MSDS

Section 1: Chemical Product and Company Identification

Product Name: Ethyl alcohol 200 Proof

Catalog Codes: SLE2248, SLE1357

CAS#: 64-17-5

RTECS: KQ6300000

TSCA: TSCA 8(b) inventory: Ethyl alcohol 200 Proof

CI#: Not applicable.

Synonym: Ethanol; Absolute Ethanol; Alcohol; Ethanol 200 proof; Ethyl Alcohol, Anhydrous; Ethanol, undenatured; Dehydrated Alcohol; Alcohol

Chemical Name: Ethyl Alcohol

Chemical Formula: CH₃CH₂OH

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: 1-800-901-7247

International Sales: 1-281-441-4400

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Ethyl alcohol 200 Proof	64-17-5	100

Toxicological Data on Ingredients: Ethyl alcohol 200 Proof: ORAL (LD50): Acute: 7060 mg/kg [Rat]. 3450 mg/kg [Mouse]. VAPOR (LC50): Acute: 20000 ppm 8 hours [Rat]. 39000 mg/m 4 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of skin contact (irritant), of eye contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator), of ingestion.

Potential Chronic Health Effects:

Slightly hazardous in case of skin contact (sensitizer). CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Classified PROVEN for human. DEVELOPMENTAL TOXICITY: Classified Development toxin [PROVEN]. Classified Reproductive system/toxin/female, Reproductive system/toxin/male [POSSIBLE]. The substance is toxic to blood, the reproductive system, liver, upper respiratory tract, skin, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Get medical attention.

Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 363°C (685.4°F)

Flash Points: CLOSED CUP: 12.78°C (55°F). OPEN CUP: 17.78°C (64°F) (Cleveland).

Flammable Limits: LOWER: 3.3% UPPER: 19%

Products of Combustion: These products are carbon oxides (CO, CO₂).

Fire Hazards in Presence of Various Substances:

Highly flammable in presence of open flames and sparks, of heat. Slightly flammable to flammable in presence of oxidizing materials.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Slightly explosive in presence of open flames and sparks, of heat, of oxidizing materials, of acids.

Fire Fighting Media and Instructions:

Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards:

Containers should be grounded. CAUTION: MAY BURN WITH NEAR INVISIBLE FLAME Vapor may travel considerable distance to source of ignition and flash back. May form explosive mixtures with air. Contact with Bromine pentafluoride is likely to cause fire or explosion. Ethanol ignites on contact with chromyl chloride. Ethanol ignites on contact with iodine heptafluoride gas. It ignites than explodes upon contact with nitrosyl perchlorate. Addition of platinum black catalyst caused ignition.

Special Remarks on Explosion Hazards:

Ethanol has an explosive reaction with the oxidized coating around potassium metal. Ethanol ignites and then explodes on contact with acetic anhydride + sodium hydrosulfate (ignites and may explode), disulfuric acid + nitric acid, phosphorous(III) oxide platinum, potassium-tert-butoxide+ acids. Ethanol forms explosive products in reaction with the following compound :

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Get medical attention.

Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 363°C (685.4°F)

Flash Points: CLOSED CUP: 12.78°C (55°F). OPEN CUP: 17.78°C (64°F) (Cleveland).

Flammable Limits: LOWER: 3.3% UPPER: 19%

Products of Combustion: These products are carbon oxides (CO, CO₂).

Fire Hazards in Presence of Various Substances:

Highly flammable in presence of open flames and sparks, of heat. Slightly flammable to flammable in presence of oxidizing materials.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Slightly explosive in presence of open flames and sparks, of heat, of oxidizing materials, of acids.

Fire Fighting Media and Instructions:

Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards:

Containers should be grounded. CAUTION: MAY BURN WITH NEAR INVISIBLE FLAME Vapor may travel considerable distance to source of ignition and flash back. May form explosive mixtures with air. Contact with Bromine pentafluoride is likely to cause fire or explosion. Ethanol ignites on contact with chromyl chloride. Ethanol ignites on contact with iodine heptafluoride gas. It ignites then explodes upon contact with nitrosyl perchlorate. Addition of platinum black catalyst caused ignition.

Special Remarks on Explosion Hazards:

Ethanol has an explosive reaction with the oxidized coating around potassium metal. Ethanol ignites and then explodes on contact with acetic anhydride + sodium hydrosulfate (ignites and may explode), disulfuric acid + nitric acid, phosphorous(III) oxide platinum, potassium-tert-butoxide+ acids. Ethanol forms explosive products in reaction with the following compound :

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Get medical attention.

Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

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Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 3450 mg/kg [Mouse]. Acute toxicity of the vapor (LC50): 39000 mg/m³ 4 hours [Mouse].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH. **MUTAGENIC EFFECTS:** Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. **TERATOGENIC EFFECTS:** Classified PROVEN for human. **DEVELOPMENTAL TOXICITY:** Classified Development toxin [PROVEN]. Classified Reproductive system/toxin/female, Reproductive system/toxin/male [POSSIBLE]. Causes damage to the following organs: blood, the reproductive system, liver, upper respiratory tract, skin, central nervous system (CNS).

Other Toxic Effects on Humans:

Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator), of ingestion.

Special Remarks on Toxicity to Animals:

Lowest Published Dose/Conc: LDL[Human] - Route: Oral; Dose: 1400 mg/kg LDL[Human child] - Route: Oral; Dose: 2000 mg/kg LDL[Rabbit] - Route: Skin; Dose: 20000 mg/kg

Special Remarks on Chronic Effects on Humans:

May affect genetic material (mutagenic) Causes adverse reproductive effects and birth defects (teratogenic) , based on moderate to heavy consumption. May cause cancer based on animal data. Human: passes through the placenta, excreted in maternal milk.

Special Remarks on other Toxic Effects on Humans:

Acute potential health effects: Skin: causes skin irritation Eyes: causes eye irritation Ingestion: May cause gastrointestinal tract irritation with nausea, vomiting, diarrhea, and alterations in gastric secretions. May affect behavior/central nervous system (central nervous system depression - amnesia, headache, muscular incoordination, excitation, mild euphoria, slurred speech, drowsiness, staggering gait, fatigue, changes in mood/personality, excessive talking, dizziness, ataxia, somnolence, coma/ narcosis, hallucinations, distorted perceptions, general anesthetic), peripheral nervous system (spastic paralysis)vision (diplopia). Moderately toxic and narcotic in high concentrations. May also affect metabolism, blood, liver, respiration (dyspnea), and endocrine system. May affect respiratory tract, cardiovascular(cardiac arrhythmias, hypotension), and urinary systems. Inhalation: May cause irritation of the respiratory tract and affect behavior/central nervous system with symptoms similar to ingestion. Chronic Potential Health Effects: Skin: Prolonged or repeated skin contact may cause dermatitis, an allergic reaction. Ingestion: Prolonged or repeated ingestion will have similar effects as acute ingestion. It may also affect the brain.

Section 12: Ecological Information

Ecotoxicity: Ecotoxicity in water (LC50): 14000 mg/l 96 hours [Rainbow trout]. 11200 mg/l 24 hours [fingerling trout].

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

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Identification: : Ethanol UNNA: 1170 PG: II
Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Ethyl alcohol 200 Proof (in alcoholic beverages) California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Ethyl alcohol 200 Proof (in alcoholic beverages) Connecticut hazardous material survey.: Ethyl alcohol 200 Proof Illinois toxic substances disclosure to employee act: Ethyl alcohol 200 Proof Rhode Island RTK hazardous substances: Ethyl alcohol 200 Proof Pennsylvania RTK: Ethyl alcohol 200 Proof Florida: Ethyl alcohol 200 Proof Minnesota: Ethyl alcohol 200 Proof Massachusetts RTK: Ethyl alcohol 200 Proof Massachusetts spill list: Ethyl alcohol 200 Proof New Jersey: Ethyl alcohol 200 Proof Tennessee: Ethyl alcohol 200 Proof California - Directors List of Hazardous Substances (8 CCR 339): Ethyl alcohol 200 Proof TSCA 8(b) inventory: Ethyl alcohol 200 Proof

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R11- Highly flammable. S7- Keep container tightly closed. S16- Keep away from sources of ignition - No smoking.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References:

-SAX, N.I. Dangerous Properties of Industrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984. -Material safety data sheet emitted by: la Commission de la Santé et de la Sécurité du Travail du Québec. -Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. HSDB, RTECS, and LOLI databases.

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Other Special Considerations: Not available.

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MATERIAL SAFETY DATA SHEET (MSDS)

MOTOR SPIRT

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

SUBSTANCE OR PREPARATION TRADE NAME	Motor spirit (gasoline/petrol)
CHEMICAL CLASSIFICATION	Hydrocarbon mixture
COMPANY/ UNDERTAKING NAME AND ADDRESS	Haldia Petrochemicals Limited, PO Box No 12, Haldia Plant PO Durgachak, Dist Midnapore West Bengal, India PIN 721 602
TELEPHONE	091-3224-274384 / 274400
EMERGENCY TELEPHONE NUMBER	091-3224-275916

2. COMPOSITION AND INFORMATION ON INGREDIENTS

CHEMICAL NAME	% CONTENT	CAS NUMBER	EXPOSURE LIMITS IN AIR (ppm)		
			ACGIH TLV-TWA	ACGIH TLV-STEL	IDLH
Hydro treated distillate blend	100	86290-81-5	300	500	DNA
The above listed CAS number and product is composed of the following components.					
Benzene	1	71-43-2	0.5	2.5	
Ethyl benzene	7-10	100-41-4	100	125	
Toulene	19-20	108-88-3	50	150	
Xylene	3-5	1330-20-7	100	150	
C ₉ Aromatics	3-4	Mixture			
C ₆ naphthenes	18-20	Mixture			
C ₉ /C ₆ Paraffin	40	Mixture			

3. HAZARD CLASSIFICATION

EMERGENCY OVERVIEW		It is an extremely flammable. The vapour is heavier than air and explosive mixtures can accumulate in low spots. It may be ignited at some distance away from exposed motor spirit resulting in flashbacks. Aspiration into lungs caused by vomiting is harmful and can be fatal.			
POTENTIAL HEALTH HAZARDS					
	EYE	SKIN	INHALATION	INGESTION	OTHERS
ACUTE	Short-term irritation with redness and stinging	Unlikely to cause irritation on single contact. Prolonged or repeated contact may cause short-term irritation, defatting of skin and could result in dermatitis	High vapour concentrations can cause irritation to eyes and mucous membranes, and drowsiness leading to loss of consciousness	The swallowing of small amounts may cause nausea and diarrhoea, larger amounts may cause irritation and drowsiness with vomiting	Inhalation of vapours /mists may cause respiratory system irritation

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MSDS	N Sathyamoorthy	Mrityumjoy Sil	Utpal chatterjee	1	1

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 MATERIAL SAFETY DATA SHEET (MSDS)				
CHRONIC	No chronic health effects occur at exposure levels encountered in the distribution and use of petrol as a motor fuel. Case reports of chronic petrol abuse have reported a range of neurological effects, sudden death from cardiac arrest, hematologic changes and leukaemia.			
NFPA HAZARD SIGNALS	HEALTH 1	FLAMMABILITY 3	REACTIVITY 0	SPECIAL
HAZCHEM CODE	3 Y E			

4. FIRST AID MEASURES

SKIN CONTACT	Wash skin as soon as possible with soap and water. Change contaminated clothing and launder before reuse. Red medical advice if irritation persists
EYE CONTACT	Wash out thoroughly with large amounts of water. If redness and/or irritation continuous get medical advice.
INHALATION	If inhalation of vapour irritation or drowsiness remove to fresh air. Get medical advice if the symptoms continue.
INGESTION	Wash mouth out with water and give water to drink. (Milk if available). Get medical advice
OTHER INSTRUCTIONS	Do not induce vomiting because of danger of aspiration

5. FIRE FIGHTING MEASURES

FLASH POINT	-42.7°C
AUTO IGNITION TEMP	280 °C
FLAMMABLE LIMITS IN AIR BY VOL%	LEL % 1.4, UEL % 7.8.
FIRE EXTINGUISHING AGENTS AND SPECIAL PROCEDURES	Dry powder, foam, carbon dioxide
UNUSUAL FIRE AND EXPLOSION HAZARDS	Do not use water jets, waterfog should be left to experienced personnel
SPECIAL PROTECTIVE EQUIPMENT FOR FIREFIGHTERS	Fires in confined space should be dealt with by trained personnel wearing approved breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS	Treat any spillage as a major fire hazard
ENVIRONMENTAL PRECAUTIONS	Vapour heavier than air and collect in sumps and drainage systems
METHOD OF CLEANING	Contain spillage; do not wash spillage down drain. Absorb using absorbent clay, diatomaceous clay or other suitable absorbent.

7. HANDLING AND STORAGE



MATERIAL SAFETY DATA SHEET (MSDS)

HANDLING	Where exposure is likely protective clothing must be worn including impervious gloves and eye protection. Ensure good ventilation at all times classified extremely flammable.
STORAGE	Keep away from the sparks, flame and other sources of ignition. Protect container against static electricity, lighting and physical damage. Hot work (e.g./ cutting and welding) must not be carried out on or near any container used for storage of this product unless it has been made safe by pugging or other suitable means. Drums should not be stored on their sides on racks preferably under cover, out of direct sunlight in well-ventilated conditions. Other types of container should be stored under cover out of direct sunlight, in well-ventilated conditions. Care should be taken to avoid over stacking

8. EXPOSURE CONTROLS-PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROL		Use in well ventilated area with local exhaust ventilation. Ventilation required and equipment must be explosion proof. Use away from all ignition sources.	
OTHER CONTROL PARAMETERS			
PERSONAL PROTECTION EQUIPMENT			
EYE/ FACE PROTECTION	RESPIRATORY PROTECTION	HAND PROTECTION	BODY PROTECTION
Goggles giving complete protection to eyes	In case of insufficient ventilation wear suitable respiratory protection	PVC or other plastic material gloves	Chemical resistant apron/flame retardant antistatic protective clothing, heavy duty work shoes

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE	ODOUR	PHYSICAL STATE	BOILING POINT
Colourless to light orange liquid	Gasoline like	Liquid	46.5–190°C
MELTING / FREEZING POINT	SPECIFIC GRAVITY (AT20°C) (WATER=1)	PH	SOLUBILITY IN WATER (AT 30°C)
N/A	0.767-0.775	NA	Insoluble
VAPOUR PRESSURE (AT 20°C) IN kPa	VAPOUR DENSITY (AIR=1)	OTHER INFORMATION	VISCOSITY
46-60	3-4	Motor spirit contains hydrocarbons (mainly aromatics) from C5 to C8	

10. STABILITY AND REACTIVITY

CONDITIONS TO AVOID		Keep away from heat and sources of ignition.			
MATERIALS WITH WHICH SUBSTANCE		May react with strong oxidisers like liquid oxygen.			
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MATERIAL SAFETY DATA SHEET (MSDS)

IS INCOMPATIBLE	Cl ₂
HAZARDOUS DECOMPOSITION PRODUCTS	Carbon monoxide, hazardous fumes and gases, Carbon Dioxide etc.
HAZARDOUS POLYMERIZATION	Hazardous polymerisation reaction will not occur.

11. TOXICOLOGICAL INFORMATION

ANIMAL TOXICITY DATA	
ORAL: LD50 IN (rat) g/kg : >2000 mg/kg	DERMAL: LD50 (rabbit) g/kg: >2000 mg/kg
REPRODUCTIVE TOXICITY INFORMATION	
REPRODUCTIVE TOXICITY	No adverse reproductive effects
MUTAGENICITY	No mutagenic effects
EMBRYOTOXICITY	No adverse effects
TERATOGENICITY	No mutagenic effects

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL STABILITY	Expected to biodegrade slowly
EFFECT OF MATERIAL ON PLANTS OR ANIMALS	There is no evidence to suggest bioaccumulation will occur. Spillage may penetrate the soil causing ground water contamination.
EFFECT OF CHEMICAL ON AQUATIC LIFE	Likely to harm aquatic organism, may cause long-term adverse effects in the aquatic environment. Likely to evaporate rapidly, but any films formed on water may affect oxygen transfer and damage organism

13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHODS	Disposal should be carried out by incineration or as required under local authority regulations. Under no circumstances should spirit be discharged into the public drainage system or marine and inland waterways
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14. TRANSPORT INFORMATION

	PROPER SHIPPING NAME	HAZARD CLASS	IDENTIFICATION NUMBER	PACKING GROUP	LABEL REQUIRED
DOT	Motor spirit	3	1203	II	Flammable liquid
TDG	Motor spirit	3	1203	II	Flammable liquid
IMDG	Motor spirit	3.1	1203	II	Flammable liquid
IATA/ICAO	Motor spirit	3	1203	II	Flammable liquid

15. REGULATORY INFORMATION

INDIAN REGULATION			Manufacture Import & Storage of hazardous chemical rules. Amended as on 2000		
INTERNATIONAL REGULATIONS					
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 MATERIAL SAFETY DATA SHEET (MSDS)		
EU CLASSIFICATION	RISK PHRASES	R12: Extremely flammable, R20/R21/R22: Harmful by inhalation, in contact with the skin and if swallowed. R33: danger of cumulative effects. R38: Irritation to Skin. R65: Harmful: May cause lung damage if swallowed.
	SAFETY PHRASES	S23: Do not breath spray. S24: Avoid contact with skin. S16: Keep away from source of ignition- No smoking. S43: In case of fire, use foam /dry powder/ CO2. Never use water jets. S62: If swallowed do not induce vomiting: Seek medical advice immediately and show this container & level.
WHMIS CLASSIFICATION		
SARA CLASSIFICATION		This product contains no "Extremely Hazardous Substances". SARA (311 /312) Reportable hazard categories: Fire, Chronic, and Acute. This product contains no chemicals reportable under SARA (313) toxic release program.

16. OTHER INFORMATION

DISCLAIMER	Information contained in this material safety data sheet is believed to be reliable but no representation, guarantee or warranties of any kind are made as to its accuracy, suitability for a particular application or results to be obtained from them. It is upto the user/ distributor to ensure that the information contained in the material safety data sheet is relevant to the product manufactured/ handled or sold by him as the case may be. HPL makes no warranties, expressed or implied, in respect of the adequacy of this document for any particular purpose.
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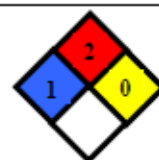
MATERIAL SAFETY DATA SHEET

HIGH SPEED DIESEL



Section 1 – Chemical Product and Company Identification

Chemical Name:	High Speed Diesel
Chemical Formula:	Complex mixture of hydrocarbons
CAS Number:	
Synonyms:	Diesel, Gas oil, High Flash HSD (HF HSD)
General Use:	Motor Fuel and in Defence aircrafts
Manufacture's Name:	Bharat Petroleum Corporation Limited
Address:	Refinery, Mahul, Chembur, Mumbai 400074
Telephone Number for Info:	25533888 / 25533999 / 25524888 / 25524999
MSDS No. :	
Date Prepared:	June 2020
Revision:	2



NFPA 704 (Sec 16)

Section 2 – Composition / Information on Ingredients

Composition:	Complex mixture of hydrocarbons
Hazardous Components:	
ACIGH TLV TWA:	Not listed
There are two basic types of HSD depending on the flash points - the Normal HSD and the High Flash HSD	

Section 3 – Hazards Identification

Primary Entry Routes:	Ingestion, inhalation, skin and eyes
Acute Effects:	Inhalation can cause dizziness, headache and nausea, depresses central nervous system and has an anesthetic effect. Breathing of liquid droplets may lead to chemical pneumonia. Ingestion can lead to nausea, diarrhea and affect central nervous system. Skin irritant. Prolonged contact can result in skin drying and dermatitis. Eye irritant.
Carcinogenicity :	Not listed as carcinogenic
Chronic Effects :	No data available

Section 4 – First Aid Measures

Eyes:	Flush with water for 15 min. Get medical attention.
Skin:	Wash with warm water & soap.
Inhalation:	Remove to fresh air. Consult a physician if irritation persists.
Ingestion:	Do not induce vomiting. Do not give liquids. Get medical help at once.

Section 5 – Fire Fighting Measures

Flash Point:	> 35 °C and > 66°C for HF HSD
Flash Point Method:	Abel / Pensky Marten
Auto ignition Temperature:	230 °C to 250 °C (highly variable)
LEL:	0.5 %
UEL:	5.0 %
Flammability Classification:	Flammable
Extinguishing Media:	Foam, Dry Chemical Powder, CO2
Unusual Fire or Explosion:	Heat produces vapours and can cause violent rupture of containers.
Hazards:	Carbon di oxide, carbon mono oxide, benzene
Hazardous Combustion Products:	
Fire-Fighting Instructions:	Small fires can be extinguished by hand held extinguishers. Major fires may require withdrawal and allowing the tank to burn. Fire fighters should wear self breathing apparatus while fighting fire

Section 6 – Accidental Release Measures

Small Spills:	Shut off leaks without risk. Absorb on sand or earth.
Containment:	Prevent spillage from entering drains or water sources
Cleanup:	After spills wash area with soap and water preventing runoff from entering drains.

Section 7 – Handling and Storage

Handling Precautions:	Do not use/store near heat/open flame. Use gumboots, gloves while handling the product. Do not inhale. Stay upwind while handling the product. Product should never be used to remove oil or grease from skin. It should not be siphoned by mouth. It should be stored in closed containers away from heat & source of ignition. Avoid contact with skin and eyes. Wash thoroughly after handling
Storage Requirements:	Do not use/store near heat/open flame/water/acids

Section 8 – Exposure Controls / Personal Protection

Engineering Controls:	Provide proper ventilation for environment to be below TWA
Respiratory Protection:	Use respiratory protection if ventilation is improper
Protective Clothing / Equipment:	Use face shield, PVC gloves, safety boots while handling. Contaminated clothing to be immediately removed

Section 9 – Protection Physical and Chemical Properties

Physical State:	Liquid
Appearance and Odour:	Straw yellow or dark yellow liquid. Characteristic hydrocarbon like odour
Vapor Pressure:	0.5 mm of Hg at 38 °C (RVP)
Specific Gravity:	0.82 to 0.86 gm / cc
Water Solubility:	Insoluble
Boiling Point:	110 °C to 375 °C

Freezing Point:	< 15 °C
Vapour Density:	3 to 5 (Air = 1)
Sulphur content :	10 ppm max.

Section 10 – Stability and Reactivity

Stability:	Chemically stable.
Chemical Incompatibilities:	Incompatible with oxidizing agents & chlorine. Reacts vigorously with oxidising materials.
Conditions to Avoid:	
Hazardous Decomposition Products:	Carbon di oxide, carbon mono oxide

Section 11 – Toxicological Information

ACIGH TLV TWA:	Data not available
Toxicity Data:	Data not available
Acute Inhalation Effects:	

Section 12 – Ecological Information

Prevent spillage from entering drains or water sources. After spills wash area with soap and water preventing runoff from entering drains. Can burn with lot of heat producing CO₂ and CO.

Section 13 – Disposal Considerations

Disposal: Waste must be disposed of in accordance with federal, state and local environmental control regulations

Section 14 – Transport Information

Shipping Name:	High Speed Diesel, High Flash Diesel
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Section 15 – Regulatory Information

Non - Toxic/Flammable Substance

Section 16 – Other Information

Prepared by: Process Safety Section, BPCL- Mumbai Refinery

Disclaimer: This M.S.D.S and the information it contains is offered to you in good faith as accurate. We believe that information to be correct but cannot guarantee its accuracy or completeness. Health and safety precautions in this data sheet may not be adequate for all individuals and/or situations. It is the user's obligation to evaluate and use this product safely and to comply with all applicable laws and regulations. No statement made in this data sheet shall be construed as a permission or recommendation for the use of any product in a manner that might infringe existing patents.