

OFFSITE EMERGENCY PLAN FOR DISTRICT NAVSARI OF GUJARAT STATE

EDITION NUMBER: 4.0

EDITION DATE: 01/04/2026

PREPARED BY:

Asst. Director,
Industrial Safety & Health,
Navsari

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Edition History

Table 1 Edition History

EDITION NUMBER	DATE OF EDITION	NAME OF THE DISTRICT COLLECTOR FOR DEA	NAME OF THE FACTORY INSPECTOR IN CHARGE OF THE DISTRICT
01	14/05/2018	SHRI Dr. M.D.Modiya I.A.S. CHAIRMAN- DCG &DISTRICT MAGISTRATE & COLLECTOR, NAVSARI	SHRI K.A.Ravat SECRETARY- DCG, Asst. DIRECTOR- INDUSTRIAL SAFETY AND HEALTH
02	24/03/2023	SHREE A P YADAV CHAIRMAN- DCG &DISTRICT MAGISTRATE & COLLECTOR, NAVSARI	SHRI D K Patel SECRETARY- DCG, Asst. DIRECTOR- INDUSTRIAL SAFETY AND HEALTH
03	15/03/2024	SHREE SHIPRA S AGRE CHAIRMAN- DCG &DISTRICT MAGISTRATE & COLLECTOR, NAVSARI	SHRI D K Patel SECRETARY- DCG, Asst. DIRECTOR- INDUSTRIAL SAFETY AND HEALTH
04	12/12/2024	SHREE SHIPRA S AGRE CHAIRMAN- DCG &DISTRICT MAGISTRATE & COLLECTOR, NAVSARI	SHRI D K Patel SECRETARY- DCG, Asst. DIRECTOR- INDUSTRIAL SAFETY AND HEALTH
05	27/03/2026	SHREE SHIPRA S AGRE CHAIRMAN- DCG &DISTRICT MAGISTRATE & COLLECTOR, NAVSARI	SHRI G.L.DHANKECHA(I/c) SECRETARY- DCG, Asst. DIRECTOR- INDUSTRIAL SAFETY AND HEALTH

Directory of Key Responders in the District

Table 2 Directory of key Responders

SR.	AUTHORITY	NAME OF CURRENT OFFICE HOLDER	ADDRESS (O, R)	TELEPHONE(O, R, M)	EMAIL	REMARKS
1.	DISTRICT COLLECTOR	SHREE KSHIPRA S. AGRE IAS	(O) COLLECTOR OFFICE, KALIYAWADI, NAVSARI	(O) (02637) 244999 (R) (02637) 246000 (M) 99784 06215	Collector-nav@gujarat.gov.in	
2.	DDO (IAS)	SHREE PUSHPA LATA IAS	(O) COLLECTOR OFFICE, KALIYAWADI, NAVSARI	(O) (02637) 243498 (R) (02637) 245333 (M) 9978406240	Ddo-nav@gujarat.gov.in	
3.	SUPERINTENDENT OF POLICE	SHREE SUSHIL KUMAR AGRAVAL IPS	(O) OFFICE OF SUPERINTENDENT OF POLICE	(O) (02637) 233888 (R) (02637) 245333 (M) 9978405075	Sp-nav@gujarat.gov.in	
4.	ALTERNATE	-	-	-	-	
5.	FIRE DEPARTMENT STATION INCHARGE	MR D.R. JADEJA	(O) FIRE BRIGADE NAVSARI	(O) (02637) 259001 / 101 (M) 9925752017		
6.	ALTERNATE	MR. KISHORBHAI T. MANGELA	(O) FIRE BRIGADE NAVSARI	(O) (02637) 259001 / 101 (M) 9879654125		
7.	MEDICAL OFFICER	MR. D.P KANNAR	(O) JILLA PANCHAYAT NAVSARI	(O) (02637) 280143 (M) 727704005		
8.	ALTERNATE	-	-	-	-	
9.	INSPECTOR OF FACTORIES	MR. G L DHANKECHA	(O) 2 ND FLOOR, VISHWAMBHARI Apartment, NEAR SAYAJI LIBRARY, DIGI STREET, WARD NO.8, NAVSARI	(O) (02637) 230745 (M) 8530690529	-astdish-nav@gujarat.gov.in	
10.	POLLUTION CONTROL BOARD	Mr. N. Patel.	(O) C WING, 3rd floor, Old JILLA SEVA SADAN, JUNA THANA, NAVSARI	(O) (02637) 230790 (O) (0261) 2442696 (M) 9099046402	Nav.ro.gpcb@gmail.com	
11.	TECHNICAL EXPERTS					
A	OCCUPIER M/S SWASTIC OIL MANUFACTURING CO. NAVSARI	MR. ANUP R. RATHOD	(O) SWASTIK OIL, UNN VILLAGE, NAVSARI	(O) (02637) 225613 (R) (02637) 225613 (M) 992511613	anup@swastikoil.com	
B	MANAGER GUFIC BIOSCIENCE CHEMICAL LTD.	MR. AVINASH ZANGE	(O) GUFIC BIOSCIENCE CHEMICAL LTD. GREED, KABILPORE, NAVSARI	(O) 6359921204 (M) 9375945218	Bdprd_nvs@guficbio.com	
C	SAFETY OFFICER - WINDSON CHEMICAL PVT LTD	MR. NLESH PATEL	(O) WINDSON CHEMICAL PVT. LTD CHIKHLI VANSDA ROAD, ALIPORE, TA: CHIKHLI, NAVSARI	(O) 9974005824 (M) 9925330263	info@windsonchem.com.in	

D	SAFETY OFFICER GANDEVI SUGAR, GANDEVI	MR. RAKESH B. PATEL	GANDEVI SUGAR, GANDEVI	(O) (2634) 262742 (M) 8200157462	Gandevisu gar56@gm ail.com	
E	SAFETY OFFICER	MR. NILESH PATEL	HLE ENGINEERS PVT.LTD.	(O)(02637)270150 (M)9825115802	pankaj@ya shrasayan. com	
12.	RTO	MR.U.B PANDYA	(O) NH-8,GREED ROAD,NAVSARI	(O)(02637)227525 (M)9825595209	arto-trans nvs@gujar at.gov.in	
13.	MUTUAL AID GROUP CHAMBER OF COMMERCE	MR.PRADIP JAIN CHAMBER OF COMMERCE, NAVASARI	(O) NAVSARI CHAMBER OF COMMERCE	(O)(02637)258718 (M)9825145164		
14.	MEDIA					
A	DISTRICT INFORMATION OFFICER	MR. JAYESH T PATEL	(O) JILLA PANCHAYAT,NAVSARI	(O)(02637)234800 (M)9427105848		
A1	DY.INFORMATION DIRECTOR	MR. Y M GOSAI	(O)JILLA SEVA SANDAN,JUNATHANA,NAC SARI	(O)(02637)244914 (M)9726034321	Navsari.ad i@gmail.co m	
B	A) DIVYA BHASKAR	- BHADRESH NAIK	NAVSARI OFFICE,1st FLOOR,ATALBIHARI BAJPAYI SHOPPING COMPLEX,LUINCIKUI	(O)(02637)231450 (M)9375943999		
C	B) SANDESH	-SOYEB PATHAN	NAVSARIOFFICE	(M)9898697867		
15.	ASISTANTLABOUR COMMISSIONER	MR.G .M. BHOOTKA	(O)JILLASEVASANDAN,JU NATHANA,NACSARI	(O)(02637)259391 (M)8780146954		
16.	DDO	SHREE RIPALBEN CHODHRI	(O) JILLAPANCHAYAT,NAVSAR I	(O)(02637)244399 (M)9978408268		
17.	GUJARAT IND.DEV.COR. NAVSARI	DR.MANOJ T. KHATWANI	(O)BEACONDIGESTIC PVT LTD.	(O)(02637)237590 (M)9825116136		
18.	DGVCL EXECUTIVE ENGINEER (KABILPORE)	MR. D N CHOCHAN	(O)GUJRATELE.BOARD OFFICE,NAVSARI	(O)(02637)258861 (M)9879201076		
19.	D.P.O	MRANKIT PARMAR	(O) JUNATHANA, NAVSARI	(O)(02637)259401 (M)9714343111		
20.	CHIEF ENGINEER (NAVSARINAGARPA LIKA)	MR. KIRAN PATEL	(O)NAVSARI NAGARPALIKA,NAVSARI	(O)(02637)250253 (M)8460477120	Np_navsar i@yahoo.c o.in	
21.	CIVILSURGEON NAVSARI	DR. TUSHAR MEHTA	(O)CIVIL HOSPITAL NAVSARI	(O)(02637)250389 (M)9687685806	Cdmo.heal th.navsari @gmail.co m	
22.	CONTROLLEROF EXPLOSIVE	DEPUTYCHIEF CONTROL OFEXPLOSIVE VADODARA	(O)8 TH FLOOR,YASHKA MALBIL,VADODARA	(O)(0265)2361035,2 225159		
23.	REDCROSS SOCIETY	DR. PARESH G JOSHI	(O)STATIONROAD, NAVSARI	(O)(02637)258283 (M)9727704093	Dlo.health. navsari@g mail.com	
24.	COMMANDER HOMEGUARD	MR. SATISHBHAI P. BODSE	(O)JILLASEVASADAN,JUNA THANA,NAVSARI	(O)(02637)280384 (M)9825539479	navsariho meguard@ gmail.com	
25.	EXECUTIVEENGINE ER(R&B)	MR.NILESH NAIK	(O) JUNATHANA,NAVSARI	(O)(02637)258041 (M)9714991071	rnb.nav@g mail.com	

1. Enforcement of Plan

1.1 Statement by the District Collector (or the DEA)

The Effects of a major accident in an industrial set up are not always restricted to the boundaries of the industrial unit. They may spill over to surrounding and the environment in vicinity. Major accident hazardous unit and transportation of hazardous chemical are posed to major emergency involving release of acutely flammable, explosive, poisonous or toxic chemicals. The efforts towards the awareness, preparedness and responding action are good indication of industrial approach to handle and control the emergency.

The document provides a statutory structure for handling and controlling major emergencies posed by hazardous chemicals. The updating and review of the existing plan is continual process. Therefore, it is decided to update the exiting off site emergency plan to incorporate new information.

I appeal to all members of concerned departments, organisations, agencies etc. to prepare their own action plan by constituting workable task-face to handle & control such industrial emergency by adequate resources at their own level based on this document. It is also mentioned that such resources shall be maintained in working conditions to meet any industrial or transportation emergency at any odd time also.

Thanks all members of committee, who have contributed valuable inputs in preparation of this plan. I express sincere thanks to Mr.G.L.Dhankecha, Asst. Director- Indusial Safety & Health, Navsari District and his colleagues, who put immense efforts in preparation of this document.

“This document has been prepared in close cooperation with the local authorities and with the Support of MAH installations in the area. I, hereby, declare the plan to be effected”.

SHRI SHIPRA S. AGRE IAS
CHAIRMAN
NAVSARI DISTRICT CRISIS GROUP
&
DISTRICT MAGISTRATE & COLLECTOR, NAVSARI

1.2 Statement by the Officer Appointed to Carry Out the Maintenance and Upkeep tasks of the Plan (See Section 6.1 of Part a)

The activities of storage and transportation in huge quantities of hazardous chemicals are increasing day by day. Systematic approach is required to tackle any emergency due to hazardous chemicals. Government authorities and emergency services are required to prepare themselves and be in a state of readiness at all times to limit the consequences of any such emergency to protect the people and the environment. The process of updating and reviewing of existing off-site industrial emergency plan is necessary to incorporate change, amendments, and statutory requirements as well such certain guidelines issued by various authorities.

The various statutory provisions as well as guidelines issued by MOEF- New Delhi in June 2011 and by different authorities as well as information provided by MAH units in the District are considered to prepare this plan.

1. The Factories Act 1948(1987) and The Gujarat Factories Rules 1963 (2004)
2. The Disaster Management Act 2005 and Disaster Management Rules 2006
3. The Gujarat State Disaster Management Act 2003
4. Chemical Accidents (Emergency Planning, Preparedness and Response) Rules-1996 (2000).
5. Manufacture, Storage and Import of Hazardous Chemicals Rules 1989(2000)
6. APELL; Awareness and preparedness for Emergency 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 Off Off-Site Response for Chemical Hazards –Circulated by Environmental and forest Department, New Delhi.
9. Major Hazard Control –I.L.O.Geneva
10. The guideline on the preparation on Off-Side Emergency Plan issues by Director- Industrial Safety & Health, Ahmedabad, Gujarat State.

I am thankfully for extending valuable guidance provided Mr.P.M.SHAH, Director-Industrial Safety & Health; Gujarat State. Further, I am thankfully for positive response extended by Shri R.A.PATEL (Joint Director-Industrial Safety & Health, Surat Region and my colleague, Mr. H.P.Raut Others office staff ,who has put his effort to prepare this document in stipulated time.

“I take responsibility for the maintenance and upkeep of the plan and shall: Possess Master Copy of this Plan and ensure at all times that it is up-to-date

- Ensure distribution of the latest plan copy to the key responders
- Maintain signatures of the responders in the Master Copy of the plan
- Communicate changes in the plan to all the possessors of the plan (see Annex. 3)
- Initiate revision of plan whenever it is due

And perform other tasks that may needed for up-to-date maintenance and sufficiency of this plan”

G.L.Dhankecha (I/c)
Secretary-DCG and
Asst. Director,
Industrial Safety & Health,
NAVSARI

1.3 Commitment of Responders

“I accept to fulfil the roles and responsibilities assigned to me for effective implementation of off site plan”

(See Roles and Responsibilities in Chapter 7)

Table 3 Commitments of Responders

SR.	AUTHORITY DESIGNATION	NAME OF OFFICE HOLDER	REMARKS
1.	DDO		
2.	RESSIDENT ADDITIONAL COLLECTOR		
3.	SUPERINTENDENT OF POLICE		
4.	ALTERNATE		
5.	FIRE DEPARTMENT OFFICER		
6.	ALTERNATE		
7.	MEDICAL OFFICER		
8.	ALTERNATE		
9.	INSPECTOR OF FACTORIES		
10.	POLLUTION CONTROL BOARD		
11.	SAFETY MANAGER - PIDILITE IND.LTD.		
12.	GM (SAFETY) - ATUL LTD.		
13.	EXPERT		
14.	RTO		
15.	MUTUAL AID GROUPVECC VAPI		
16.	DISTRICT INFORMATION OFFICER		

2. Introduction, Use and Control of Off-site Emergency Plan

2.1 Background to Off-site Emergency

Manufacture, storage and use of hazardous substances pose a serious risk to industry, people in the neighbourhood and the environment. Accidental release of hazardous chemicals, which are flammable, explosive or toxic, may lead to emergencies. Depending upon the nature of the substance and magnitude of the release, emergency could either be confined within the industry (On-site Emergency) or could transgress the boundary of the industry and affect the public in the neighbourhood in which case it would be an Off-site Emergency The Off-site emergency Plan is a document detailing how emergencies relating to a possible major accident involving a

hazardous chemical in an industry, which may have ramifications outside the boundary walls of that industry will be dealt with.

The rule 14(1) of MSIHC Rules read with Schedule 5 requires the District Authorities to prepare an Offsite Emergency Plan in consultation with the Chief Inspector of Factories and assistance from the Chief Controller of Explosives.

The details to be furnished in the Off-site Emergency Plan are given in Schedule 12 of the Rules. These are:

- The type of accidents and release to be taken into account.
- Organizations involved including key personnel and responsibilities and liaison arrangements between them.
- Information about the site including likely locations of dangerous substances, personnel and emergency control rooms.
- Technical information such as chemical and physical characteristics and dangers of the substances and plant.
- Identification of the facilities and transport routes.
- Contact for further advice e.g. meteorological information, transport, temporary food and accommodation, first aid and hospital services, water and agricultural authorities.
- Communications links including telephones, radios and standby methods.
- Special equipment including fire fighting materials, damage control and repair items.
- Details of emergency response procedures.
- Notification to the public.
- Evacuation arrangements.
- Arrangements for dealing with the press and other media interests.
- Long term clean up.

Transportation of hazardous chemical by road or pipeline may pose a threat to the population and environment. Such accidents also belong to the category of off-site emergency. The definition of major chemical accident includes accidents during transportation vide rule 2(f) of the CA (EPPR) Rules

2.2 Off-site Emergency

The chemical release, fire, explosion or spillage in an industrial unit including isolated storages that may have ramifications outside the boundary of that particular industrial unit or such a chemical release, fire, explosion or spillage during the transportation of hazardous chemicals by road or by pipeline, all of which may pose a threat to life and property of public at large, is a situation qualifying to be an offsite emergency With the declaration to this effect by the DEA.

2.3 Off-site Emergency Plan and its Use

Off-site Emergency Plan foresees the possible emergency scenarios leading to Off-site Emergency Plan. The following are the use of Off-site Emergency Plan.

2.3.1 Pre-Emergency Use

- The plan identifies the resources required for dealing with likely emergencies and draws attention to additional resources that may be required.

- The plan helps to inform the necessary authorities and stake-holders of their responsibilities during the emergency.

2.3.2 During Emergency Use

The plan gives the procedures to be executed by various roles during the off-site emergency for its control and mitigation. The plan serves as a ready-reckoned for all vital and factual information that is required during emergency.

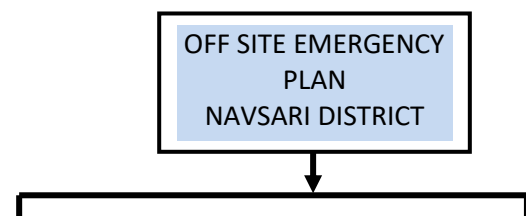
2.3.3 Post-Emergency Use

The plan gives procedures for prevention of damage in the long term that may arise as effect of an emergency.

The plan lays for review of emergency to draw necessary observations and lessons for self-enrichment of plan for future emergencies.

2.4 Scope of Off-site Emergency Plan

The Off-site Emergency Plan applies to the entire district. The Off-site Emergency Plan compiles all the possible emergency scenarios pertaining to industrial or transportation hazards that may arise within the district boundaries and provides for the response mitigation of the same. The inter-relationship Off-site Emergency Plan is depicted in the diagram below



MAJOR ACCIDENT HAZARD UNIT.

- 1) SWASTIK OIL PRODUCTS MFG, NAVSARI.
- 2) SAHKARI UDYOG KHAND MANDLI, GANDEVI.
- 3) WINDSON CHEMICAL PVT.LTD. B.NO:1834/P1 & P2,CHIKHLI VANSDA ROAD,AT &PO : ALIPORE TALUKA:CHIKHLI, DIST: NAVSARI

HAZARDOUS CHEMICAL UNITS (Class A Category)

- 1) M/S HLE ENGINEERS PVT. LTD. (CHEMICALUNIT), MAROLI UDYOGNAGAR.
- 2) M/S GUFIC BIOSCIENCES PVT.LTD. NH8, KABILPORE, NAVSARI.
- 3) M/S THEIS PRECISION STEEL PVT. LTD.NH8, KABILPORE, NAVSARI.
- 4) M/S SHREE SAINATH PHOTO CHEM. SURVEYNO-454, NH8, ALIPOR, CHIKHLI
- 5) M/S VALSAD DISTRICT CO. OP MILK LTD. NH8, ALIPORE, CHIKHLI.
- 6) BIPICO INDUSTRIES TOOLS PVT. LTD. P.O BOX NO. 36, NANDARKHA, BILIMORA.
- 7) M/S N.H.B BALL & ROLLAR LIMITED.ANDHESHWARROAD, AMALSAD, GANDEVI.
- 8) M/S NADOD CHEMICALS PVT. LTD. PLOT NO-C-1,MAROLI UDYOGNAGAR, VILLAGE-NADOD.
- 9) M/S ICE DREAM GLOBAL PVT.LTD 140/A4, MAROLI UDHYOGNAGAR DISTRICT- NAVSARI, GUJARAT

2.5 Declaration of Off-site Emergency and Enforcement of Plan

The responsibility and the power of declaring the off-site emergency in the district vests with the DEA. In his absence, the responsibility and power vests with the authority appointed in lieu of the DEA. The declaration of emergency shall be made via Annexure 1.

2.6 Possessors of the Off-site Emergency Plan& the Maintenance Officer of the Off-site Emergency Plan

The copy of the off-site plan must be possessed by all the responders who contribute in the off-site planning process or in mitigation response. The list of all the possessors of the off-site plan is as following: The District Collector (or the DEA) is responsible for the maintenance and upkeep of the Off-site Emergency Plan. He may designate one officer to carry out the tasks pertaining to this role. This officer should be indicated in the 'Remarks' column of the table above.

Table 4 Possessors of Off-Site Emergency Plan

SR.	AUTHORITY	NAME OF CURRENT OFFICE HOLDER	ADDRESS (O, R)	TELEPHONE(O, R, M)	EMAIL	REMARKS
	DISTRICT COLLECTOR	SHREE KSHIPRA S. AGRE IAS	(O) COLLECTOR OFFICE, KALIYAWADI, NAVSARI	(O) (02637) 244999 (R) (02637) 246000 (M) 99784 06215	Collector-nav@gujarat.gov.in	
2.	DDO (IAS)	SHREE PUSHPA LATA IAS	(O) COLLECTOR OFFICE, KALIYAWADI, NAVSARI	(O) (02637) 243498 (R) (02637) 245333 (M) 9978406240	Ddo-nav@gujarat.gov.in	
3.	SUPERINTENDENT OF POLICE	SHREE SUSHIL KUMAR AGRAVAL IPS	(O) OFFICE OF SUPERINTENDENT OF POLICE	(O) (02637) 233888 (R) (02637) 245333 (M) 9978405075	Sp-nav@gujarat.gov.in	
4.	ALTERNATE	-	-	-	-	
5.	FIRE DEPARTMENT STATION INCHARGE	MR D.R. JADEJA	(O) FIRE BRIGADE NAVSARI	(O) (02637) 259001 / 101 (M) 9925752017		
6.	ALTERNATE	MR. KISHORBHAI T. MANGELA	(O) FIRE BRIGADE NAVSARI	(O) (02637) 259001 / 101 (M) 9879654125		
7.	MEDICAL OFFICER	MR. D.P KANNAR	(O) JILLA PANCHAYAT NAVSARI	(O) (02637) 280143 (M) 727704005		
8.	ALTERNATE	-	-	-	-	
9.	INSPECTOR OF FACTORIES	MR. G L DHANKECHA	(O) 2 ND FLOOR, VISHWAMBHARI Apartment, NEAR SAYAJI LIBRARY, DIGI STREET, WARD NO.8, NAVSARI	(O) (02637) 230745 (M) 8530690529	-astdish-nav@gujarat.gov.in	
10.	POLLUTION CONTROL BOARD	Mr. N. Patel.	(O) C WING, 3rd floor, Old JILLA SEVA SADAN, JUNA THANA, NAVSARI	(O) (02637) 230790 (O) (0261) 2442696 (M) 9099046402	Nav.ro.gpcb@gmail.com	
11.	TECHNICAL EXPERTS					
A	OCCUPIER M/S SWASTIK OIL MANUFACTURING CO. NAVSARI	MR. ANUP R. RATHOD	(O) SWASTIK OIL, UNN VILLAGE, NAVSARI	(O) (02637) 225613 (R) (02637) 225613 (M) 992511613	anup@swastikoil.com	
B	MANAGER GUFIC BIOSCIENCE CHEMICAL LTD.	MR. AVINASH ZANGE	(O) GUFIC BIOSCIENCE CHEMICAL LTD. GREED, KABILPORE, NAVSARI	(O) 6359921204 (M) 9375945218	Bdprd_nvs@guficbio.com	
C	SAFETY OFFICER - WINDSON	MR. NLESH PATEL	(O) WINDSON CHEMICAL PVT. LTD CHIKHLI VANSDA ROAD,	(O) 9974005824 (M) 9925330263	info@windsonchem.c	

	CHEMICAL PVT LTD		ALIPORE, TA: CHIKHLI, NAVSARI		om.in	
D	SAFETY OFFICER GANDEVI SUGAR, GANDEVI	MR. RAKESH B. PATEL	GANDEVI SUGAR, GANDEVI	(O) (2634) 262742 (M) 8200157462	Gandevisu gar56@gm ail.com	
E	SAFETY OFFICER	MR. NILESH PATEL	HLE ENGINEERS PVT.LTD.	(O)(02637)270150 (M)9825115802	pankaj@ya shrasayan. com	
12.	RTO	MR.U.B PANDYA	(O) NH-8,GREED ROAD,NAVSARI	(O)(02637)227525 (M)9825595209	arto-trans nvs@gujar at.gov.in	
13.	MUTUAL AID GROUP CHAMBER OF COMMERCE	MR.PRADIP JAIN CHAMBER OF COMMERCE, NAVASARI	(O) NAVSARI CHAMBER OF COMMERCE	(O)(02637)258718 (M)9825145164		
14.	MEDIA					
A	DISTRICT INFORMATION OFFICER	MR. JAYESH T PATEL	(O) JILLA PANCHAYAT,NAVSARI	(O)(02637)234800 (M)9427105848		
A1	DY.INFORMATION DIRECTOR	MR. Y M GOSAI	(O)JILLA SEVA SANDAN,JUNATHANA,NAC SARI	(O)(02637)244914 (M)9726034321	Navsari.ad i@gmail.co m	
B	A) DIVYA BHASKAR	- BHADRESH NAIK	NAVSARI OFFICE,1st FLOOR,ATALBIHARI BAJPAYI SHOPPING COMPLEX,LUINCIKUI	(O)(02637)231450 (M)9375943999		
C	B) SANDESH	-SOYEB PATHAN	NAVSARIOFFICE	(M)9898697867		
15.	ASISTANTLABOUR COMMISIONER	MR.G .M. BHOOTKA	(O)JILLASEVASANDAN,JU NATHANA,NACSARI	(O)(02637)259391 (M)8780146954		
16.	DDO	SHREE RIPALBEN CHODHRI	(O) JILLAPANCHAYAT,NAVSAR I	(O)(02637)244399 (M)9978408268		
17.	GUJARAT IND.DEV.COR. NAVSARI	DR.MANOJ T. KHATWANI	(O)BEACONDIGESTIC PVT LTD.	(O)(02637)237590 (M)9825116136		
18.	DGVCL EXECUTIVE ENGINEER (KABILPORE)	MR. D N CHOHAN	(O)GUJRATELE.BOARD OFFICE,NAVSARI	(O)(02637)258861 (M)9879201076		
19.	D.P.O	MRANKIT PARMAR	(O) JUNATHANA, NAVSARI	(O)(02637)259401 (M)9714343111		
20.	CHIEF ENGINEER (NAVSARINAGARPA LIKA)	MR. KIRAN PATEL	(O)NAVSARI NAGARPALIKA,NAVSARI	(O)(02637)250253 (M)8460477120	Np_navsar i@yahoo.c o.in	
21.	CIVILSURGEON NAVSARI	DR. TUSHAR MEHTA	(O)CIVIL HOSPITAL NAVSARI	(O)(02637)250389 (M)9687685806	Cdmo.heal th.navsari @gmail.co m	
22.	CONTROLLEROF EXPLOSIVE	DEPUTYCHIEF CONTROL OFEXPLOSIVE VADODARA	(O)8 TH FLOOR,YASHKA MALBIL,VADODARA	(O)(0265)236103 5,2 225159		
23.	REDCROSS SOCIETY	DR. PARESH G JOSHI	(O)STATIONROAD, NAVSARI	(O)(02637)25828 3 (M)9727704093	Dlo.heal th.navs ari@gm ail.com	
24.	COMMANDER HOMEGUARD	MR. SATISHBHAI P. BODSE	(O)JILLASEVASADAN,JUNA THANA,NAVSARI	(O)(02637)28038 4	navsariho meguard@ gmail.com	

				(M)9825539479		
25.	EXECUTIVEENGINE ER(R&B)	MR.NILESH NAIK	(O) JUNATHANA,NAVSARI	(O)(02637)25804 1 (M)9714991071	rmb.nav@g mail.com	

2.7 Review and Amendment of Plan

The Off-site Emergency Plan shall be distributed to all people listed in Annexure 2. It shall be the duty of the District Collector (or the DEA) to ensure distribution of up-to-date copy of this plan to all people listed in Annexure 2. It shall also be the duty of all authorities listed in Annexure 2 to see to it that they receive an up-to-date copy of subsequent versions of the plan. This Off-site Emergency Plan is a dynamic document and must at all times reflect the ground realities by changing when these change. For this purpose, the Off-site Emergency Plan is set-to expire after a period of 2 years from the date on which it is affected. A new version of the plan shall be prepared, released and distributed before the expiry of the current version. Should there be any major changes such as upcoming of new industrial units, identification of new hazards among others or an instance of an off-site emergency the Off-site Emergency Plan shall be revised even before its due expiry. Should there be any minor changes such as changes in person(s) holding particular authorities, changes in phone numbers among others, these shall be communicated to all the possessors of the Off-site Emergency Plan via Annexure 3 by the DEA. The stakeholders of the plan undergoing change in positions or having changed their phone numbers should inform the same to the DEA via Annexure 4.

2.8 Dovetailing of On-site Emergency Plans with this Plan

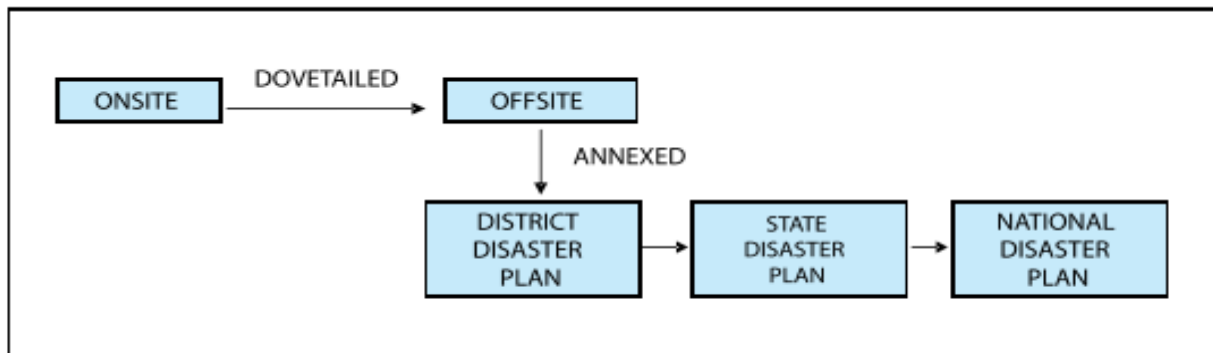
This Off-site Emergency Plan is put use when an industrial on-site emergency is expected to or has already transcended the boundaries of the industrial unit. It is necessary that the actions enlisted in the on-site plan are consistent with the plan of action in this Off-site Emergency Plan. For this purpose, it is necessary for the MAH units to ensure that their plans agree to and is consistent with the Off-site Emergency Plan. The dovetailing to this effect needs to be ensured in the following areas among others:

- Communication to the District Authorities/Agencies (see Chapter 8: Emergency Scenarios)
- Line of command (See Chapter 7: Organisation of Roles)

2.9 Annexing of this Plan with District Disaster Management Plan

The offsite plan should be annexed to the district disaster management plan.

The diagram below shows the relation of offsite plan within the schema of disaster management plans.



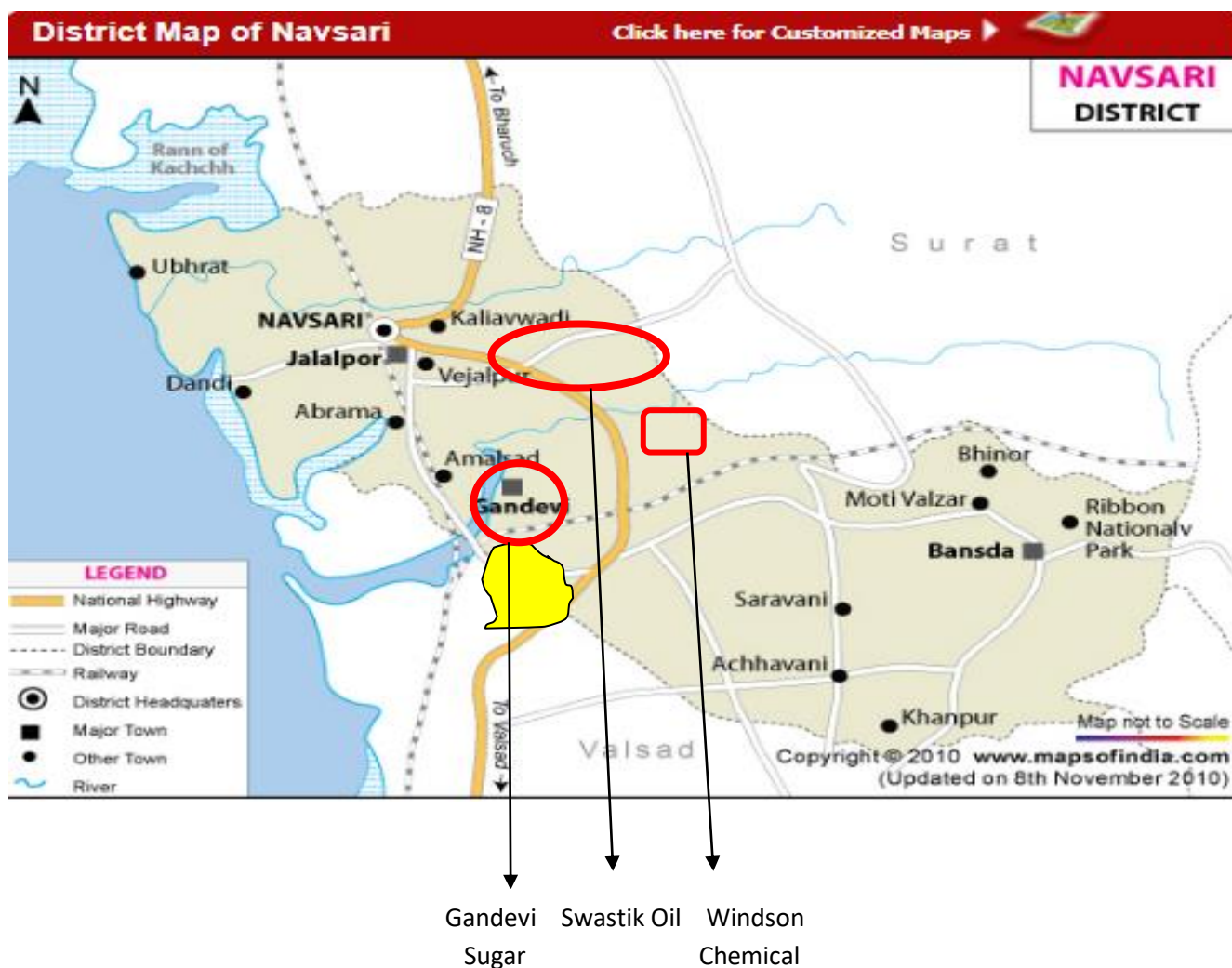
The Onsite Plans and Offsite Plans are chemical disaster plans as stipulated in the MSIHC Rules, 1989. The District Disaster, State Disaster and National Disaster Plans are general disaster plans as stipulated in the Disaster Management Act, 2005.

3. District Profile

3.1 Map of District

The map should be to scale 1:50000. The map should indicate political boundaries with neighbouring districts, talukas, major cities/villages within district, major roads, railways, rivers, wells and other important features. It should indicate the locations of MAH units and other hazardous areas. Police stations, Fire Services, Hospitals shall also be located on the map. Evacuation areas, Schools, Colleges, Community Centres around MAH units shall be identified and indicated on the map. Other resources useful in emergency mitigation such as Emergency Response Centres etc. shall be indicated. The routes of transportation of hazardous chemicals, pipelines transporting hazardous chemicals shall also be shown on the map.

3.2 Description of Map and other Geographic Information



Navsari is Located at Latitude-20.9, Longitude-72.9. Navsari District is sharing border with Surat District to the North, Valsad District to the South. Navsari District occupies an area of approximately 2211 square kilometres.. Its in the 96 meters to 14 meters elevation range. This District belongs to Western India. It is a Coastal district and beaches also there. Navsari District is sharing border with Arabian Sea. It is Hot in summer. Literate people are 13,29,872 among total. Its total area is 2211 sq.km. It is the 22nd largest district in the state by Population. But 17th Largest District in the state By Area. 364th Largest District in the Country By Population. 5th highest District in the State By literacy rate, 83rd highest District in the Country By literacy rate. Its literacy Rate is 84.78.

3.3 Demographic Information

Table 5 Population Distribution

SR.	TALUKA	TOTAL VILLAGES	POPULATION	REMARKS
1.	NAVSARI	1,60,131	1,51,107	
2.	CHIKHLI	1,56,516	1,53,561	
3.	GANDEVI	1,26,527	1,22,737	
4.	BANSDA	1,15,529	1,15,699	
5.	JALALPORE	1,19,462	1,08,603	
6.	NAVSARI (DISTRICT TOTAL)	6,78,165	6,51,707	

3.4 Meteorological Information

The meteorological factors which govern the dispersion of toxic releases are temperature, humidity and wind-speed. It is important to record the indicative values of these for use of dispersion calculations. The maximum and minimum value for the district on whole is recorded. The maximum value of a parameter is the maximum value of that parameter observed anywhere in the district during the past 10 years. Same applies to the minimum value. Should there extreme variations in the above parameters suitable seasonal geographic classifications shall be Made.

Table 6 Meteorological Information

SR.	PARAMETER	MAXIMUM	MINIMUM
1.	TEMPERATURE	41.0 DEG C	15.0 DEG C
2.	HUMIDITY	89%	32%
3.	WIND -VELOCITY	12.33 KM / HR	4.1 KM / HR

The data pertaining to the table 5 may be obtained from the local meteorological department. The meteorological department shall provide the necessary data available for the district.

3.5 Important Activities/Events/Festive Events in District

Table 7 List of important events in the district

SR.	EVENT NAME	DATE	LOCATION	POPULATION INVOLVED	REMARKS
1.	ROAD SAFETY WEEK	1 ST TO 7 TH JANUARY	ENTIRE DISTRICT	LARGE NUMBER OF PEOPLES INVOLVES IN SUCH EVENT	
2.	NEW YEAR'S DAY	1 ST JANUARY	ALL SCHOOLS AND GOVT OFFICES	DO	
3.	REPUBLIC DAY	26 TH JANUARY	ALL SCHOOLS AND GOVT OFFICES	DO	
4.	NATIONAL SAFETY DAY	4 TH MARCH	ALL MAJOR INDUSTRIES	DO	
5.	FIRE DAY	14 TH APRIL	ALL MAJOR INDUSTRIES	DO	
6.	WORLD ENVIRONMENT DAY	5 TH JUNE	ALL MAJOR INDUSTRIES	DO	
7.	INDEPENDENCE DAY	15 TH AUGUST	ALL SCHOOLS AND GOVT OFFICES	DO	
8.	GANDHI JAYANTI	2 ND OCTOBER	ALL SCHOOLS AND COLLEGES	DO	
9.	DIWALI	24 TH OCTOBER	ALL TOWNS AND CITY	DO	

Table 8 Natural Disaster History

sr.	Natural Disaster Name and Location	Description, Magnitude and Effects	Remarks
1	EARTHQUAKE - 2001	THE 2001 GUJARAT EARTHQUAKE OCCURRED ON JANUARY 26, 2001, AT 08:46 AM LOCAL TIME AND LASTED FOR OVER TWO MINUTES. THE EARTHQUAKE REACHED A MAGNITUDE OF BETWEEN 7.6 AND 7.7 ON THE MOMENT MAGNITUDE SCALE. THE EARTHQUAKE KILLED AROUND 20,000 PEOPLE, INJURED ANOTHER 167,000 AND DESTROYED NEARLY 400,000 HOMES. BUT THERE WAS NO MAJOR DAMAGE OR NOTICEABLE REPORTED IN DISTRICT	
2	Flood 2010	THE FLOOD OCCURRED ON SEPTEMBER-8 & 9, 2010 LASTED OVER 3 DAYS. PURNA RIVER IS 21 NEAR TO DANGER MARK OF 24 FOOT MARK ALONG WITH WATER LOGGING IN MANY AREAS LIKE VIJALPORE, KALIYAWADI, SHANTADEVI ROAD. PEOPLE ARE EVACUATED SAFE LOCATION BY DISTRICT AUTHORITY.	

3	Flood 2023	THE FLOOD OCCURRED JULY - 22 & 23, LASTED OVER 2 DAYS. THIS TIME 320MM RAIN FALL RECORDED IN NAVSARI DISTRICT. PURNA RIVER IS 21 NEAR TO DANGER MARK OF 27 FOOT MARK ALONG WITH WATER LOGGING IN MANY AREAS LIKE VIJALPORE, KALIYAWADI, SHANTADEVI ROAD. PEOPLE ARE EVACUATED SAFE LOCATION BY DISTRICT AUTHORITY.	
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3.6 Directory of Responders in the District

Table 9 Responder directory

SR.	AUTHORITY	NAME OF CURRENT OFFICE HOLDER	ADDRESS (O, R)	TELEPHONE(O, R, M)	EMAIL	REMARKS
	DISTRICT COLLECTOR	SHREE KSHIPRA S. AGRE IAS	(O) COLLECTOR OFFICE, KALIYAWADI, NAVSARI	(O) (02637) 244999 (R) (02637) 246000 (M) 99784 06215	Collector-nav@gujarat.gov.in	
2.	DDO (IAS)	SHREE PUSHPA LATA IAS	(O) COLLECTOR OFFICE, KALIYAWADI, NAVSARI	(O) (02637) 243498 (R) (02637) 245333 (M) 9978406240	Ddo-nav@gujarat.gov.in	
3.	SUPERINTENDENT OF POLICE	SHREE SUSHIL KUMAR AGRAVAL IPS	(O) OFFICE OF SUPERINTENDENT OF POLICE	(O) (02637) 233888 (R) (02637) 245333 (M) 9978405075	Sp-nav@gujarat.gov.in	
4.	ALTERNATE	-	-	-	-	
5.	FIRE DEPARTMENT STATION INCHARGE	MR D.R. JADEJA	(O) FIRE BRIGADE NAVSARI	(O) (02637) 259001 / 101 (M) 9925752017		
6.	ALTERNATE	MR. KISHORBHAI T. MANGELA	(O) FIRE BRIGADE NAVSARI	(O) (02637) 259001 / 101 (M) 9879654125		
7.	MEDICAL OFFICER	MR. D.P KANNAR	(O) JILLA PANCHAYAT NAVSARI	(O) (02637) 280143 (M) 727704005		
8.	ALTERNATE	-	-	-	-	
9.	INSPECTOR OF FACTORIES	MR. G L DHANKECHA	(O) 2 ND FLOOR, VISHWAMBHARI Apartment, NEAR SAYAJI LIBRARY, DIGI STREET, WARD NO.8, NAVSARI	(O) (02637) 230745 (M) 8530690529	-astdish-nav@gujarat.gov.in	
10.	POLLUTION CONTROL BOARD	Mr. N. Patel.	(O) C WING, 3rd floor, Old JILLA SEVA SADAN, JUNA THANA, NAVSARI	(O) (02637) 230790 (O) (0261) 2442696 (M) 9099046402	Nav.ro.gpcb@gmail.com	
11.	TECHNICAL EXPERTS					
A	OCCUPIER M/S SWASTIC OIL MANUFACTURING CO. NAVSARI	MR. ANUP R. RATHOD	(O) SWASTIK OIL, UNN VILLAGE, NAVSARI	(O) (02637) 225613 (R) (02637) 225613 (M) 992511613	anup@swastikoil.com	
B	MANAGER GUFIC BIOSCIENCE CHEMICAL LTD.	MR. AVINASH ZANGE	(O) GUFIC BIOSCIENCE CHEMICAL LTD. GREED, KABILPORE, NAVSARI	(O) 6359921204 (M) 9375945218	Bdprd_nvs@guficbio.com	
C	SAFETY OFFICER - WINDSON CHEMICAL PVT LTD	MR. NLESH PATEL	(O) WINDSON CHEMICAL PVT. LTD CHIKHLI VANSADA ROAD, ALIPORE, TA: CHIKHLI, NAVSARI	(O) 9974005824 (M) 9925330263	info@windsonchem.com.in	

D	SAFETY OFFICER GANDEVI SUGAR, GANDEVI	MR. RAKESH B. PATEL	GANDEVI SUGAR, GANDEVI	(O) (2634) 262742 (M) 8200157462	Gandevisu gar56@gm ail.com	
E	SAFETY OFFICER	MR. NILESH PATEL	HLE ENGINEERS PVT.LTD.	(O)(02637)270150 (M)9825115802	pankaj@ya shrasayan. com	
12.	RTO	MR.U.B PANDYA	(O) NH-8,GREED ROAD,NAVSARI	(O)(02637)227525 (M)9825595209	arto-trans nvs@gujar at.gov.in	
13.	MUTUAL AID GROUP CHAMBER OF COMMERCE	MR.PRADIP JAIN CHAMBER OF COMMERCE, NAVASARI	(O) NAVSARI CHAMBER OF COMMERCE	(O)(02637)258718 (M)9825145164		
14.	MEDIA					
A	DISTRICT INFORMATION OFFICER	MR. JAYESH T PATEL	(O) JILLA PANCHAYAT,NAVSARI	(O)(02637)234800 (M)9427105848		
A1	DY.INFORMATION DIRECTOR	MR. Y M GOSAI	(O)JILLA SEVA SANDAN,JUNATHANA,NAC SARI	(O)(02637)244914 (M)9726034321	Navsari.ad i@gmail.co m	
B	A) DIVYA BHASKAR	- BHADRESH NAIK	NAVSARI OFFICE,1st FLOOR,ATALBIHARI BAJPAYI SHOPPING COMPLEX,LUINCIKUI	(O)(02637)231450 (M)9375943999		
C	B) SANDESH	-SOYEB PATHAN	NAVSARIOFFICE	(M)9898697867		
15.	ASISTANTLABOUR COMMISSIONER	MR.G .M. BHOOTKA	(O)JILLASEVASANDAN,JU NATHANA,NACSARI	(O)(02637)259391 (M)8780146954		
16.	DDO	SHREE RIPALBEN CHODHRI	(O) JILLAPANCHAYAT,NAVSAR I	(O)(02637)244399 (M)9978408268		
17.	GUJARAT IND.DEV.COR. NAVSARI	DR.MANOJ T. KHATWANI	(O)BEACONDIGESTIC PVT LTD.	(O)(02637)237590 (M)9825116136		
18.	DGVCL EXECUTIVE ENGINEER (KABILPORE)	MR. D N CHOHAN	(O)GUJRATELE.BOARD OFFICE,NAVSARI	(O)(02637)258861 (M)9879201076		
19.	D.P.O	MRANKIT PARMAR	(O) JUNATHANA, NAVSARI	(O)(02637)259401 (M)9714343111		
20.	CHIEF ENGINEER (NAVSARINAGARPA LIKA)	MR. KIRAN PATEL	(O)NAVSARI NAGARPALIKA,NAVSARI	(O)(02637)250253 (M)8460477120	Np_navsar i@yahoo.c o.in	
21.	CIVILSURGEON NAVSARI	DR. TUSHAR MEHTA	(O)CIVIL HOSPITAL NAVSARI	(O)(02637)250389 (M)9687685806	Cdmo.heal th.navsari @gmail.co m	
22.	CONTROLLEROF EXPLOSIVE	DEPUTYCHIEF CONTROL OFEXPLOSIVE VADODARA	(O)8 TH FLOOR,YASHKA MALBIL,VADODARA	(O)(0265)236103 5,2 225159		
23.	REDCROSS SOCIETY	DR. PARESH G JOSHI	(O)STATIONROAD, NAVSARI	(O)(02637)25828 3 (M)9727704093	Dlo.heal th.navs ari@gm ail.com	
24.	COMMANDER HOMEGUARD	MR. SATISHBHAI P. BODSE	(O)JILLASEVASADAN,JUNA THANA,NAVSARI	(O)(02637)28038 4 (M)9825539479	navsariho meguard@ gmail.com	

25.	EXECUTIVEENGINE ER(R&B)	MR.NILESH NAIK	(O) JUNATHANA,NAVSARI	(O)(02637)25804 1 (M)9714991071	rnb.nav@g mail.com	
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4. Identification of Hazards

4.1 Introduction to Hazards

Hazard is the existence of a situation that can potentially lead to disaster. The offsite emergency plan identifies the hazards that can lead to a chemical disaster. The hazards identified are primarily the MAH installations including isolated storages. However hazards are not restricted to MAH installations alone. Therefore, identification of hazards other than those at MAH installations is important as well. This chapter identifies the hazards in the district.

Transportation of Hazardous Goods

Table 10 Information on Hazardous Transportation by Road

SR.	ROAD NO. FROM-TO	STRETCH	LENGTH KM	DETAILS OF HAZARDOUS CHEMICALS FLOW WITH QUANTITY	VILLAGES / TOWNS ENROUTE	REMARKS
1	NH 53 FROM HAZIRA / MAGDALLA TO NAVSARI	SACHIN, PALSANA	45 km	ETHYLENE OXIDE,	AABHVA, KHAJOD, PALSANA, AAMADPORE, SISODRA	
2	NH 48, FROM CHIKHALI TO J.N. PT MUMBAI	CHIKHALI, VALSAD, VAPI, MUMBAI AND PORT	135 km	ETHANOL & METHANOL	CHIKHALI, VALSAD, VAPI, MUMBAI AND PORT	
3	NH 48, NH - FROM CHIKHALI NAVSARI TO DAHEJ	CHIKHALI, PALSANA, SURAT, ANKLESHWAR, DAHEJ	165 km	ETHANOL & METHANOL	CHIKHALI, PALSANA, SURAT, ANKLESHWAR, DAHEJ	
4	NH 48, NH - 60, FROM CHIKHALI TO HAJIRA PORT,	CHIKHALI, NAVSARI, SURAT AND HAJIRA	98 km	ETHANOL & METHANOL	CHIKHALI, NAVSARI, SURAT AND HAJIRA	
5	NH - 48, DAHEJ, ZAGDIYA, TO MAROLI	DAHEJ, BHARUCH, NH - 48 AND MAROLI	150 km	CHLORINE & SULPHUR	DAHEJ, BHARUCH, NH - 48 AND MAROLI	
6	FROM SURAT TO NAVSARI CHIKHALI	SURAT - NAVSARI CHIKHALI	75 km	AMMONIA - 50KG	SURAT, MAROLI / STATE HIGHWAY / NATIONAL HIGHWAY - 48, NAVSARI CHIKHALI	

Table 11Information on Hazardous transportation by rail

Sr.	Stretch From -to	Length	Details of Hazardous Chemicals Flow With Quantity	Stations enroute	Remarks
			Not Applicable		

Table 12Information on Hazardous transportation by Water

Sr.	Stretch From -to	Length	Details of Hazardous Chemicals flow with Quantity	Coastal Areas Enroute	Remarks
			Not Applicable		

Table 13Information on Hazardous transportation by pipeline

SR.	PIPELINE STRETCH FROM-TO	COMPANYNAMEWITH ADDRESSANDPHONE NUMBER	LENGTH	DETAILSOOF HAZMATFLOW WITHQUANTITY	VILLAGES/TOWNS/ VULNERABLEPOINTS ENROUTE	REMARKS
			Not Applicable			

5 Identification of Emergency Scenarios & Delineation of Vulnerable Zones

5.1 Introduction to Emergency Scenarios and Vulnerable Zones

Emergency Scenarios Major industrial hazards are generally associated with the potential for toxic chemical release, fire or explosion

Events involving release of toxic materials

- Slow or intermittent release of toxic substance from a leaking valve,
- Rapid release for limited duration due to fracture of pipe leading to a toxic cloud which may travel or dissipate,
- Massive release of toxic substance due to failure of large storage or process vessel or uncontrolled chemical reaction.
- Loss of containment for a plant threatened by a fire

Events involving spillage of flammable liquids or loss of containment of flammable gases

- Confined spill
- Unconfined spill

Major fires with no danger of explosion Hazards from high levels of thermal radiation and smoke, for example:

- Pool fire,
- Flash fire,
- Jet fire etc.
- Explosion
- Explosion Events

Hazards from blast waves, flying debris, high level of thermal radiation. Serious emergencies that can be envisaged are

- Confined explosions,
- Unconfined vapour cloud explosion,
- BLEVE

Assessment of possible incidents is to be carried out for each MAH installation, in terms of:

- The quantity of hazardous material which could be released
- The rate of release
- Effects of such a release
- Thermal radiation from a fire at different distances
- Blast over-pressures due to an explosion as function of distance from the incident spot
- Toxic effects affecting the vulnerable zone (circle showing concentrations)
- Number of people likely to be affected

Methodology for Calculation of Vulnerable Zones Prescribed by MOEF

The injury criteria or level of concern is used to determine vulnerable zones. The consequence distances for Toxic Release, Fire and Explosion scenario are worked out as per micro-methodology evolved by the MOEF.

Toxic Exposure

The IDLH (immediately dangerous to life and health) concentration value is taken as the criterion for identifying vulnerability zone. Accidents giving rise to toxic clouds from each of the MAH units in the area need to be considered. The calculations for consequence distances should be done for weather stability class D with wind speed of 3 m/s and also for class F with wind speed of 1 to 2 m/s. The circles with radii equal to the consequence distances should be drawn on maps to indicate vulnerable zones for planning and preparedness purpose. The toxic cloud arrival and departure time should also be indicated on the map for each circle.

Heat Radiation (Pool Fire, Flare, BLEVE)

The heat radiation equal to 10kW/m produces second-degree burns on unprotected parts of the human body. The heat radiation of 5kW/m

2 produce first-degree burns. These intensities of radiation are chosen as the limit value to identify vulnerable zones. The radiation intensity of 10kW/m is taken as a limit value to identify fatality zone and that of 5kW/m is taken for the injury zone.

Explosion 2

It is assumed that everyone inside an area in which the peak over-pressure is greater than 0.1 bars will be wounded. This area is and will be represented by a circle drawn around the explosion centre and having radius equal to the (calculated) distance from explosion centre at which peak over-pressure = 0.1 bar is expected.

In the case of a vapour cloud explosion, the explosion centre, which coincides with the cloud centre, will vary depending upon the prevailing weather conditions and the time when it gets source of ignition.

Use of Vulnerability Templates

The Maps showing the location of likely emergencies and corresponding vulnerable zones are to be included in the Plan. The maps are useful for planning and preparing, in advance, for the likely emergencies. The maps are also useful to identify area under threat in an actual emergency. To assess the impact of toxic release, use of computer software along with the real time input of meteorological data would be an ideal method to identify the area under threat. However, it may not be always possible to have such sophisticated facility available at every place. Under such circumstances, transparent “Templates” can be developed and used to assess the effects of spread of the toxic cloud with concentration levels as function of distance from the point of origin the transparent templates for each scenario which are to be used in the following manner.

Place the transparency on the relevant map with

- The toxic release source on the map and the plume source on the transparency coinciding.
- The X-axis of the plume pointing in the prevailing wind direction.
- Injuries requiring medical attention will extend up to the contours of the transparency superimposed on the area map.

Templates should be developed for the Hazardous Chemicals used, stored or transported in the MAH Units to provide the District Emergency Authority and the Local Crisis Group with a tool for rapid assessment of vulnerable zones.

Templates should be drawn on transparent sheets and indicate the shape and extent of a vulnerable zone. The vulnerable zone in the event of a given toxic release scenario is assessed by using the appropriate template in conjunction with its associated map. The scale of the template needs to be the same as that of the map.

It may be noted that the templates will be useful for identifying the vulnerability zone in case of toxic cloud.

Computer Models

MOEF in association with National Informatics Centre (NIC) is in process of evolving computer software model for calculation of vulnerable zone and its projection on digital maps. Wherever available this computerized model may be used for delineation of vulnerable zones.

Use of specific information

The use of specific information regarding wind velocity, temperature etc. at the site during the actual occurrence of emergency can be made

Wherever the computer software model is in use in its absence the standard calculations of Class D with wind speed of 3 m/s and Class F with wind speed 1 to 2 m/s as prescribed by MOEF shall be used accordingly for delineation of vulnerable zones.

5.2 Emergency Scenarios in MAH Installations

- L1 : A district level disaster within the capabilities of the district administration to deal with.
- L2 : A state level disaster within the capabilities of the state government to deal with.
- L3 : A National level disaster requiring major direct intervention of the Central Government.

Also, the guidelines define fourth category 'LO' as 'No disaster situation. This is a level at which surveillance, preparedness and mitigation activities must be carried out.' Since the off-site plan is a district-level plan, the possible emergencies within a district of higher magnitude (L2, L3) should get identified in the off-site plan.

Table 14 Emergency Scenarios in MAH Installations

SR.	MAH UNIT NAME	HAZARDOUS CHEMICALS HANDLED	DISASTER SCENARIOS#	(L1/L2/L3)*	VULNERABLE ZONEDIA. WITH DISTINCT FEATURES SUCH AS SCHOOL SET C	POPULATION IN VULNERABLE ZONE	REMARKS
1.	M/S SWASTIK OIL PRODUCTS MFG. COMPANY LTD. PLOT NO-256, KHAD SUPA BOARDING, VILLAGE-UNN, NAVSARI.	ETHYLENE OXIDE	FIRE, EXPLOSION	L2	UNN, ITI SCHOOL	100	
2.	M/S SAHAKARI KHAND UDYOG MANDAL LTD. GANDEVI. AT & PO- SUGAR FACTORY, GANDEVI-396360, DIST: NAVSARI	ETHANOL	FIRE & EXPLOSION	L2	Own Colony	100	
3.	M/S WINDSON CHEMICAL PVT. LTD., CHIKHLI NAVSARI	METHANOL	FIRE & EXPLOSION	L2	Own Colony	100	

Domino Effect Emergency Scenarios

Table 15 Domino Effects of Emergency Scenarios

SR.	DISASTER SCENARIO (TABLE NO., SR. AND DESCRIPTION)	TRIGGERED SCENARIO 1	TRIGGERED SCENARIO 2	TRIGGERED SCENARIO 3	REMARKS
1	FIRE	EMISSION OF BLACK SMOKE IN THE DOWNWIND DIRECTION	EXECUTING STARTS IN THE DOWNWIND DIRECTION	SAFE SHUTDOWN OF THE PLANT AND RESPONSE ACTIONS START TO MITIGATE	

5.3 Other Emergency Scenarios Including Fall-Outs of Natural Disasters

Table 16 Emergency Scenarios arising out of Natural Disasters

S R.	NATURAL DISASTERS LIKELY	VULNERABLE MAH UNIT, DISASTER SCENARIO	REMARKS
1	2	3	4
1	FLOOD	SWASTIK OIL & SAHAKARI KHAND UDYOG MANDAL GANDEVI MAY CAUSE SPILLAGE. M/S WINDSON CHEMICAL PVT. LTD, THE COMPANY WAS CLOSED FOR TWO TO THREE DAYS BECAUSE OF FLOOD	
2	CYCLONE	SWASTIK OIL & SAHAKARI KHAND UDYOG MANDAL GANDEVI MAY CAUSE FIRE & EXPLOSION EMERGENCY	
3	STORM / CYCLONE	SWASTIK OIL & SAHAKARI KHAND UDYOG MANDAL GANDEVI MAY CAUSE FIRE & EXPLOSION EMERGENCY	
4	EARTHQUAKE	SWASTIK OIL & SAHAKARI KHAND UDYOG MANDAL GANDEVI, MAY CAUSE FIRE & EXPLOSION EMERGENCY	
5	TSUNAMI	HIGHLY UNLIKELY	
6	LIGHTNING	SWASTIK OIL & SAHAKARI KHAND UDYOG MANDAL GANDEVI MAY CAUSE FIRE & EXPLOSION EMERGENCY	

5.4 Development of Vulnerability Templates

Table 17 Vulnerability Template Catalogue

SR.	MAH UNIT DISASTER SCENARIO REF NO: AND DESCRIPTION	VULNERABILITY TEMPLATE IDENTIFICATION NO:	MAP IDENTIFICATION NO.	REMARKS
1.	SWASTIK OIL MANUFACTURING	TEMPLATE-1	ETHYLENE OXIDE 15T, MAP-1	
2.	SAHAKARI KHAND UDYOG MANDAL, GANDEVI	TEMPLATE-2	ETHANOL 4080 KL MAP-2	
3.	WINDSON CHEMICAL PVT LTD	TEMPLATE-2	METHANOL 790KL, FORMALDEHYDE 1000MT	

6 Notification of Emergency Resources

6.1 Introduction to Emergency Resources

Prompt availability of emergency resources is vital to mitigating an offsite emergency. The emergency resources required should be identified with the sources of their availability and the means to call for them. The emergency resources and their sources are identified in this chapter.

6.2 Police

Table 18 Police Information

SR.	POLICE STATION WITH ADDRESS AND PHONE NUMBER	DESIGNATED CONTACT PERSON WITH ADDRESS AND PHONE NUMBERS(O,R,M)	NUMBER OF #PI,SI,ASI,HC,PC, TOTAL	NUMBER OF VEHICLE VAN,JEEP,,M., CYCLE	REMARKS
1	SUPERINTENDENT OF POLICE NAVSARI DISTRICT	MR. SHREE SUSHIL AGRAWAL (O) (02637) 245334 (M) 9978405075	INFORMATION NOT AVAILABLE	ADEQUATE NUMBER OF VEHICLES AVAILABLE	
2	DY. SP (HQ)	(O) (02637) 247502 (M) 9978408268	INFORMATION NOT AVAILABLE	-DO-	
4	CITY POLICE, NAVSARI	(O) (02637) 247501	INFORMATION NOT AVAILABLE	-DO-	
5	MR. L.P PATHAN C.P.I, NAVSARI	(O) (02634) 247504	INFORMATION NOT AVAILABLE	-DO-	
6	MR. M.H SHEIKH C.P.I BILIMORA	(O) (02634) 284485	INFORMATION NOT AVAILABLE	-DO-	
7	LCB VALSAD	(O) (02637) 247508	INFORMATION NOT AVAILABLE	-DO-	
8	DY.S.P. (SCST)	(O) (02637) 2434491 (M) 9825188380	INFORMATION NOT AVAILABLE	-DO-	
9	POLICE STATION, BILIMORA	(O) (02634) 285333	INFORMATION NOT AVAILABLE	-DO-	
10	POLICE STATION, CHIKHLI	(O) (02637) 232708	INFORMATION NOT AVAILABLE	-DO-	
12	POLICE STATION, NAVSARI RURAL	(O) (02637) 242410	INFORMATION NOT AVAILABLE	-DO-	
13	POLICE STATION, VIJALPORE	(O) (02637) 255400	INFORMATION NOT AVAILABLE	-DO-	
14	POLICE STATION, MARINE	(O) (02637) 297777	INFORMATION	-DO-	

			NOT AVAILABLE		
15	POLICE STATION, GANDEVI	(O) (02634) 262233	INFORMATION NOT AVAILABLE	-DO-	
16	POLICE STATION, BANSDA	(O) (02630) 222333	INFORMATION NOT AVAILABLE	-DO-	
17	POLICE STATION CONTROL ROOM NAVSARI	02637 - 246303, 280803, 258254	INFORMATION NOT AVAILABLE	-DO-	
18	LADIES POLICE STATION	02637 - 280305	INFORMATION NOT AVAILABLE	-DO-	

6.3 Fire

Table 19 Fire Department Information

SR.	FIRE STATION WITH ADDRESS AND PHONE NO.	DESIGNATED CONTACT PERSON WITH ADDRESS (O,R)AND PHONE NO.	TYPE AND NUMBER OF FIRE TENDERS (WATER, FOAM, MIST,TENDERS)	OTHER EQUIPMENT AND MATERIALS (SCBA, PPE, DRY CHEMICAL POWDER ETC.)	NO. OF FIRE MAN	REMARKS
1	FIRE BRIGADE STATION, NAGARPALIK A, NAVSARI	FIRE BRIGADE, SANDHKUVA. (O) (02637) 259001 / 101 (M) 9879654125	1. FIRETENDER - 12KL - 2 NOS 2. FIRETENDER - 4KL - 1 NOS 3. FIRETENDER - 3KL - 1 NOS 4. FIRETENDER - 2KL - 2 NOS 5. AMBULANCE - 1 NOS 6. SUB VAHINI - 1 NOS	500 LTR. FOAM TANK, 2 NOS. DCP FIRE EXTINGUISHER 2 NOS. 3600 LTR. CAP. DOUBLE PUMP, 105 WATER JET RANGE, ROPE, 42 EXTENSION LADDER, 13 HOCK LADDER, CO2 CARBON DIOXIDE FIRE EXTINGUISHERS, BOWSER - 12KL, YODHHA FOAM TROLLY - 1 NOS, 1 NO. 600 GAL. WITH SINGLE STAGE PUMP	FIREMAN - 10, DRIVER - 9	
2	FIRE STATION OPP. GOHIL HOSPITAL	FIRE BRIGADE, DUDHIYA TALAV (O) (02637) 259001 (M) 9925752017	1. FIRETENDER - 2 NOS	DCP FIRE EXTINGUISHER	FIREMAN - 9, DRIVER - 11	
3	FIRE STATION, JALALPORE	FIRE STATION, FIRE BRIGADE (O) (02637) 286086	FIRE TENDERS - 1 NOS - 3KL	10KG DCP FIRE EXTINGUISHER - 4 NOS	FIREMAN - 3, FIREMAN & 2 DRIVER	
4	COASTGUARD DAMAN	COASTGUARD DAMAN (O) (02637)	2 FIRE TENDERS	NIL	FIREMAN - 8	

		2261005, 2260468				
5	FIRE STATION, VIJALPORE	FIRE BRIGADE, VIJALPORE (O) (02637) 283100 (M) 9558255644	2 FIRE TENDERS - 2KL WATER TANKER - 5.5KL SUB VAHINI - 2 AMBULANCE - 1 NOS	10KG DCP FIRE EXTINGUISHER - 02 NOS 5KG DCP FIRE EXTINGUISHER - 4 NOS FOAM TYPE FIRE EXTINGUISHER - 2 NOS CO2 TYPE FIRE EXTINGUISHER - 6 NOS	FIREMAN - 04, DRIVER - 6	
6	FIRE STATION, BILIMORA	FIRE BRIGADE, BILIMORA (O) (02634) 285637 (M) 9726120101	1. 1 FIRE TENDERS - 2.5KL 2. BOWSER - 12KL 3. WATER TANKER - 3KL	6KG DCP FIRE EXTINGUISHER - 2 NOS SUB VAHINI - 1 AMBULANCE - 1 NOS	FIREMAN - 15, DRIVER - 6	
7	FIRE STATION, GANDEVI	FIRE BRIGADE, GANDEVI (M) 8140984101	1. 2 NOS FIRE TENDERS - 12KL & 2.5KL (FOAM TYPE NOZZLE) 2. BOWSER - 12KL 3. 12000 LTR FOAM TYPE FIRE EXTINGUISHER - 1 4. WATER TANKER - 4KL	-	FIREMAN - 2, & DRIVER - 2	
8	FIRE FIGHTING STATION VALSAD MUNICIPALITY BUILDING, VALSAD	FIRE OFFICER VALSAD B.G. RATHOD (O) (02637) 244222, 242703 (O) (02637) 244222, 242703	1. NO. OF 800 GAL. CAPACITY WITH DOUBLE STAGE PUMP, 60 WATER JET RANGE CAPACITY WITH 25 LADDER	3 NOS. FIRE EXTINGUISHERS 500 WATER HOSE PIPE	FIREMAN - 12	

Table 20 Resources with MAH units forming part of Mutual Aid Resources

SR	MAH UNIT NAME WITH ADDRESS AND PHONE NUMBER	DESIGNATED CONTACT PERSONS NAME AND PHONE NUMBERS (O, R, M)	TYPE AND NUMBER OF FIRE TENDERS (WATER, FOAM, MIST TENDERS)	OTHER EQUIPMENTS AND MATERIALS (SCBA, PPE, FIRE EXTINGUISHER SETC)	REMARKS
1.	SWASTIK OIL PRODUCTS MANUFACTURING CO. LTD. PLOT NO. 256, KHADSUPA BOARDING VILLAGE, UNN, NAVSARI. GUJARAT - 396445, INDIA.	MR. ANUP RATHOD (O) (02637) 225613 (M) 9909913461	NOT AVAILABLE	SCBA - 02 FFE - 40 NOS	
2.	SAHAKARI KHAND UDYOG MANDAL LTD. GANDEVI. AT & PO SUGAR FACTORY, GANDEVI	MR. RAJIV GUPTA (O) (02634) 262346 (M) 9879114175	NOT AVAILABLE	SCBA - 1 FFE - 50	

	- 396360 VIA-BILIMORA, VIA-BILIMORA.				
3.	WINDSON CHEMICAL PVT LTD. AT & PO ALIPORE, CHIKHLI, DIST - NAVSARI GUJARAT - 396409, INDIA.	MR. VINOD T PATEL MR. ALKESH DUBE (O) 9974005350 (M) 9974005350	NOT AVAILABLE	SCBA - 1 FFE - 38 MECHANICAL FOAM TYPE TROLLY - 04 NOS	

6.4 Medical Aid

Table 21 Medical Aid Information

Sr.No.	Name of Hospital	Name of Responsible Person & address	No. of Beds	No. of doctors
1	CIVIL HOSPITAL NAVSARI CITY	RMO _ DR. BIRENDRA K SINGH & DR. AARATI D PAREKH (O) CIVIL HOSPITAL, NAVSARI (O) (02637) 250389 (M) 9687685811	330	ADEQUATE
2	R.F. DABOO HOSPITAL FUVARA NAVSARI, (O) (02637) 250266	Dr. JIGNESH PATEL (O) (02637) 250266 (M) -	50	102
3	D.N. MEHTA SARVAJANIK HOSPITAL, LUINCI KUI. (O) (02637) 235082	Dr. HARIVADAN C GHANDHI (O) (02637) 258021	50	ADEQUATE
4	ALIPORE HOSPITAL CHIKHLI. (O) (02634) 233146	DR. SHESH MULTANI (O) (02637) - 296 147 & 296 146 (M) 9484941006	50	DO
5	ORANGE HOSPITAL NAVSARI (O) (02637) 242200	DR. NIRAJ MEHTA (SURGEON) (M) 9099948833 DR. HIMANSHU GAMI (M) 9030548536 DR. PRIYANK GHANDHI (M) 9099017345	80	150
6	PARMAR ORTHOPEDIC HOSPITAL (O) (02637) 250006	DR. PARMAR (O) (02637) 250006	18	DO
7	RED CROSS	DR. ATUL V. DESAI	-	DO

	SOCIETY (O) (02637) 257452	(O) (02637) 257452 (M) -		
8	AARADHANA HOSPITAL BILIMORA (O) (02637) 257394	Dr. BHADRESH NAIK (O) (02637) 257394 (M) 9825093165	10	10
9	E.S.I. HOSPITAL CHANOD NAGAR, VAPI	(O) (02632) 2421802	-	-

6.5 Other Emergency Infrastructure

Table 22 Emergency Response Vehicles

SR.	EMERGENCY RESPONSE VEHICLE DESCRIPTION AND FACILITIES AVAILABLE	LOCATION	CONTACT AUTHORITIES NAME, ADDRESS AND PHONE NO.(O,R,M)	REMARKS
1.	JCB, POCKLAIN, DUMPER	NAVSARI	PANARA CONSTRUCTION_ MUNNABHAI (M) 9825115849	
2.	POCKLAIN, EXAVATOR	NAVSARI	EARTH MOVER_ NISARBHAI (M) 98866798560	
3.	HITACHI, JCB, POCKLAIN, DUMPER	NAVSARI	EKBALBHAI (M) 98250 78405	
4.	TRAILER/JCB/DUMPER	NAVSARI	KRISHNA EARTH MOVERS SATHISBHAI (M) 98256 72226	
5.	TRAILER/JCB/DUMPER	NAVSARI	MAGANBHAI (M) 98250 98823	
6.	JCB / POKLAND	CHIKHLI	SHRI PRATAPSIKH RAJPUT NILKANTH QUERRY (O)(02634)232249 / 232717	
7.	POCKLAN	CHIKHLI	SHRI ARVINDBHAI SHIVAM STONE, CHIKHLI (O)(02634)232926	
8.	DUMPERLOADER	CHIKHLI	SHRI AMITBHAI VIKRAM STONE QUARRY, CHIKHLI (O)(02634)232320	

Table 23 Emergency Response Centre (ERC), Poison Control Centre (PCC)

SR.	ERC/PCC DESCRIPTION AND FACILITIES AVAILABLE	LOCATION	CONTACT AUTHORITIES NAME, ADDRESS AND PHONE NO.(O,R,M)	REMARKS
1.	NAVSARI EMERGENCY CONTROL CENTRE - FIRE	NAVSARI	(O) (2637) 259001 (M) 9925752017	
2.	DISTRICT EMERGENCY RESPONSE CENTER	NAVSARI	(O) (2637) 1077	
3.	POLICE CONTROL ROOM NAVSARI	NAVSARI	(O) (02637) 246303, 280803, 258254 (FAX) 247510	
4.	(DISASTER) COLLECTOR OFFICE	NAVSARI	(O) (02637) 259401 (M) 9974620222	
5.	DGVCL CONTROL ROOM	NAVSARI	(O) (02637) 258861 WEST ZONE / 258344 EST ZONE / 236157 SISODARA / 237157 GRID / 283975 VILALPORE	
6.	RAILWAY CONTROL ROOM	NAVSARI	(O) (02637) 250289 / 250523	

7.	STATE CONTROL ROOM - GANDHINAGAR	GANDHINAGAR	(O) 079-23251902, 23251904	
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6.6 Evacuation – Transport and Sheltering

Table 24 Evacuation Information – Transport

SR.	TRANSPORT COMPANY	FLEET (NO. OF BUSES AND TRUCKS)	CONTACT AUTHORITIES NAME, ADDRESS AND PHONE NO.(O,R,M)	REMARKS
1.	STATE TRANSPORT CO.	SUFFICIENT NUMBERS OF BUSES AVAILABLE	SHRI R.A. PANDYA (O) 227934 (R) 227211 (F) 254184 (M) 9998953110	
2.	S.T. DEPOT, NAVSARI	SUFFICIENT NUMBERS OF BUSES AVAILABLE	SHR K S GANDHI (O) (02637) 258976 (M) 6359918794	
3.	RTO-NAVSARI	TRUCK, TEMPO INSUFFICIENT NUMBERS AVAILABLE	RTO-NAVSARI (O) (02637) 248003 (R) (02637) 253463 (M) 9825321107	

Table 25 Evacuation Information – Sheltering

SR.	EVACUATION AREA LOCATION	CAPACITY (NO. OF PEOPLE)	CONTACT AUTHORITIES NAME, ADDRESS AND PHONE NO.(O,R,M)	REMARKS
1.	KEJAL HIGH SCHOOL, KABILPORE	100	MR. KIRITBHAI R. MEHTA (O) (02637) 2401322 (R) (022) 26184301 (M) 9375979059	
2.	PRIMARY HEALTH CENTER, GANDEVI	100	MR. D.M. KAPADIA (O) (02634) 262344	
3.	KEJAL HOSPITAL	50	SARPANCH - (02637) 236101	
4.	LUINCI KUI GROUND - NAVSARI	100	NAVSARI NAGARPALIKA PRAMUKH (O) (02637) 258029	

6.7 Technical Resources

6.7.1 Experts Directory Technical

Table 26 Technical Experts Directors

SR.	EXPERT NAME	EXPERTISE DETAILS, QUALIFICATION, DESIGNATION	ADDRESS(O,R)	PHONE NO.(O,R,M)	REMARKS
1.	MR. ANUPBHAI RATHOD	ETHYLENE OXIDE / FACTORY MANAGER	(O) SWASTIK OIL MANUFACTURING CO. NAVSARI	(O) (02637) 225013 (R) (02637) 259625 (M) 9909913641	
2.	MR. AVINASH ZANJE	METHANOL / TOLUENE MANAGER	(O) GUFIC BIOSCIENCE CHEMICAL LTD. KABILPORE, NAVSARI	(O) (02637) 239946 (M) 9601306140	
3.	MR. B.N. BILI MORIYA	L.P.G / MANAGER	(O) NHB BEARINGS LTD. AMALSAD	(O) (02637) 272250 (M) 9377051582	
4.	MR. D.M. KAPADIA	ETHANOL / D.M. KAPADIA	(O) SAHAKARI KHAND UDYOG MANDAL LTD., GANDEVI	(O) (02634) 262344 (M) 9879112486	
5.	MR. VISHAL RANA	AMMONIA / LPG GENERAL MANAGER	(O) THE ISSTEEL LTD., GRID ROAD, NAVSARI	(O) 9081737773 (M) 7069074166	
6.	MR. NILESH PATEL	ROAD TRANSPORT / ON SAFETY / MANAGER	(O) HLE ENGINEERS LTD. NADOID GAM, UMBHARAT ROAD, MAROLI.	(O) (02637) 270150 TO 53 (M) 9825115810	
7.	MR. NILESH K. PATEL	AMMONIA / SULPHUR DIOXIDE	(O) HINI INDIGO PVT. LTD. NADOID GAM, UMBHARAT ROAD, MAROLI.	(O) (02637) 270150 (M) 9825115802	

6.7.2 Emergency Response Data Sheets (ERDS)

PRESTELS recommends maintenance of Emergency Response Data Sheets (analogous to Material Safety Data Sheets - MSDS) for all the hazardous chemicals handled in the district. The ERDS should contain all the information required by the District Authorities and Agencies to take appropriate emergency response measures. The sample ERDS sheet for MIC is attached in Annexure 9.

ERDS for following chemicals are prepared and kept as Annexure- 10

1. Ethylene Oxide
2. Oleum 65%
3. Sulphur Trioxide
4. Liquidities Petroleum Gas (LPG)
5. Iso-Butane
6. Methanol
7. Ammonia
8. Sulphur Dioxide
9. Phosgene
10. Acrylonitrile

6.8 Media Resources

Table 27Media Resources Information

SR.	AGENCY (RADIO, TELEVISION, MOBILE PUBLIC ANNOUNCEMENT, MASS-SMS) WITH ADDRESS AND PHONE NO.	CONTACT PERSON NAME, ADDRESS AND PHONE NO.(O,R,M)	REMARKS
1.	DISTRICT INFORMATION COMMISSIONER/	(O)(02637)227525 (M)9825595209	
2.	DIVYA BHASKAR	(O)(02637)241240 (R)(02637)249300 (M)972775782	
3.	SANDESH	(O)(02637)252265 (R)(02637)237099 (M)9427715392	
4.	NAVGUJARAT TIMES	(O)(02637)259285 (R)(02637)259285	
5.	GUJARAT SAMACHAR NAVSARI	(O)(02637)256786 (R)(02637)253783	
6.	LOKPRAHRI	(O)(02637)234440 (M)9228310669	
7.	GUJARAT NEWS CHANNEL	(O)9427515671 (M)9424141075	

6.9 Other Emergency Resources

Table 28 Other Emergency Resources – Earthmoving Equipment

SR.	MAH UNITS NAME	NUMBERS OF EARTHMOVING EQUIPMENTS AVAILABLE WITH NAME	REMARKS
1.	SWASTIK OIL MANUFACTURING CO.	NIL	
2.	SAHAKARI KHAND UDYOG MANDAL LTD. GANDEVI	NIL	
3.	WINDSON CHEMICAL PVT LTD	NIL	

SR.	EARTH MOVER SUPPLIER NAME	SUPPLIER ITEMS	REMARKS
1.	EXECUTIVE ENGINEER, R&B NAVSARI, JUNATHANA, NAVSARI (O)(02637)258041 (M)9825171117	DUMPER SUPPLIER	
2.	METRO CRANE SERVICES (M)9825117168	CRANE SUPPLIER	
3.	BABUBHAI CRANE SERVICES (M)9824144777	CRANE SUPPLIER	
4.	BHARAT CRANE SERVICES (M)9825466786	CRANE SUPPLIER	
5.	CHAUDHARI CRANE SERVICES (M)9924369690 (M)9824144690	CRANE SUPPLIER	
6.	MUNNABHAI PANARA CONSTRUCTION (M)9825115849	JCB SUPPLIER	
7.	SHREE GANESH CRANE LIFTERS (M)9152808756	CRANE SUPPLIER	

Table 29 Other Emergency Resources – Antidote Suppliers

SR.	TOXICCHEMICALSHANDLED INDISTRICT(ESP.INMAH UNITS)	ANTIDOTES REQUIRED	ANTIDOTESUPPLIER*NAME WITHADDRESSANDPHONE NUMBERS,CONTACTPERSONS	QUANTITYOFANTIDOTES AVAILABLE	REMARKS
1.	CHLORINE	DEXONA 0.5MG,	DR. MEHUL DESAI - 9824184015 DERIPHYLLIN, H.NO.31, AMAJHITAR RANGPOEAST SIKKIM, DEXASONE, KADILA PHARMA, INDUSTRIAL GROWTH CENTRE SAMBA STATE J & K	SUFFICIENT	
2.	ANILINE	METHYLENE BLUE INJ USP 10ML	ORANGE HOSPITAL, NAVSARI (STATION ROAD, NAVSARI) (O)(02637)242200 TROIKA PHARMACEUTICALS LTD, OM TOWER, SATELLITE ROAD, AHMEDABAD. PH 079 26856242/43/44/4	10 NOS OF METHYLENE BLUE AVAILABLE AT HLE ENGINEERS PVT. LTD. (CHEMICAL UNIT) MAROLI, NAVSARI. (9825115810)	

Table 30 Other Emergency Resources – NGOs

SR.	NGO NAME WITH ADDRESS AND PHONE NO.	CONTACT PERSON NAME, ADDRESS AND PHONE NO. (O,R,M)	REMARKS
1	NAIK FOUNDATION ANDHEL VILLAGE, NH8, NAVSARI PHONE NO. 990994 5584	MR. DIPEN NAIK PHONE NO. 02637-253148	
2	GRAM SEVA TRUST, KHAREL, NAVSARI PHONE NO. (02634)246248	DR. ASHVIN SHAH PHONE NO. (02634)246248 (M) 9824191139	

Table 31 Assembly Points

SR.	MAHUNITNAME	ASSEMBLY POINT (SCHOOL, HALL AND, GROUND)	CONTACT PERSON NAME ADDRESS AND PHONE NO.(O,R,M)	REMARKS
1	SWASTIK OIL PRODUCTS MANUFACTURING CO. LTD.	MAINGATE-01	FACTORY MANAGER MR. ANUP RATHOD (O)(02637)-225613 (R) 9925116136	
2	SAHAKARI KHAND UDYOG MANDAL LTD. GANDEVI	MAINGATE-01	FACTORY MANAGER MR. K.N KAPADIYA (O)(02637)262344 (M)9825146591	
3	M/S WINDSON CHEMICAL PVT LTD	MAINGATE-01	FACTORY MANAGER MR. ALKESH DUBE (O) 9974005350 (M) 9974005350	

Table 32 MAH Unit Statutory Compliance Status

SR.	MAH UNIT NAME WITH ADDRESS AND PHONE NO.	ON- SITE PLAN STATUS	PLI STATUS	REMARKS
1.	SWASTIK OIL PRODUCTS MANUFACTURING CO. LTD. PLOT NO. 256, KHADSUPA BOARDING, VILLAGE NO. KHADSUPA BOARDING, VILLAGE - UNN, GUJARAT 02637-225613/225013	LAST UPDATED ON FEBRUARY- 2023	AVAILABLE	
2.	SAHAKARI KHAND UDYOG MANDAL LTD. GANDEVI PLOT NO. 256, KHADSUPA BOARDING NO. KHADSUPA BOARDING, VILLAGE - UNN, GUJARAT	LAST UPDATED ON APRIL-2024	AVAILABLE	
3.	WINDSON CHEMICAL PRIVATE LIMITED CHIKHALI VANSDA RD. ALIPORE NAVSARI GUJARAT	LAST UPDATED ON APRIL-2022	AVAILABLE	

7 Roles and Responsibilities

7.1 Introduction

Meticulous role playing and effective discharging of responsibilities is crucial to management of off-site emergency. The responsibilities of various authorities and agencies are provided in this chapter. It is important that the concerned authorities and agencies know, understand and accept their responsibilities. The issues pertaining thereof should be resolved in peace times. Apart from the assigned responsibilities, the specifics of situation may call for prudent action. It is how ever envisaged to foresee various tasks and assign the respective responsibilities. The list of responders to off-site emergency is provided in Chapter 4 of Part A of this guideline document. The responsibilities of the responders listed therein are provided below.

7.2 Responsibilities of Authorities and Agencies

The general responsibilities of the various authorities and agencies involved in mitigation of off-site emergency are listed below. In addition, the authorities and agencies should perform all such tasks as per the demands of emergency situation at hand.

7.2.1 District emergency Authority (DEA – District Collector)

- Take overall responsibility for combating the Off-site emergency
- Ensure the Police and Fire, personnel combat the emergency
- Arrange, if necessary, for warning and evacuating the public, through the Department of Police
- Communicate with Media to disseminate vital information to public
- Arrange for dispensing vital information to public using arrangements like mass-sms, public announcement using pre-recorded tapes
- Direct the team of Doctors headed by the Medical Officer
- Direct the local chief of State Transport Corporation to arrange for transport of victims and evacuation of people trapped within the hazard zone, if necessary
- Direct the Electricity Board officials to give uninterrupted power supply
- Direct the official in-charge to provide uninterrupted water supply as required
- If evacuation of population is necessary direct the Revenue officer and the Supply officer to provide safe shelters, food and other life sustaining requirements for the evacuees, if required
- Co-ordinate with the media
- Arrange for, release and provide necessary funds at various stages of disaster mitigation
- Direct railways to stop train, if required

7.2.2 Police

Communicate and co-ordinate with

- MAH unit
- DEA
- Fire Services
- Transport authorities
- Medical Department
- Media
- Civil Defence and Home Guards
- Local Army establishment as required
- Warn and advice the people in the affected area
- Regulate and divert traffic
- Arrange for evacuation
- Maintain law and order in the area
- Ensure protection of life and property of evacuees
- Deal sternly with people exploiting opportunism in wake of a disaster

7.2.3 Fire Service Department

- Perform fire-fighting operations by deploying men and appliances
- Perform rescue operation in the affected area.
- Communicate and co-ordinate with Police, Medical Department of necessary information
- Keep knowledge on appropriate response to different chemical emergency scenarios
- Keep adequate stock and resource information on necessary means, material, appliances required to deal with particular emergency situations with updated details of suppliers and stockists

7.2.4 Medical Department

- Arrange for preparing casualties to be sent to government/private hospitals
- Set up temporary medical camp and ensure medical facilities at affected location and neighbourhood
- Keep knowledge on appropriate response to different cases of toxic consumption and injuries
- Set up temporary mortuary, identification of dead bodies and post-mortem

7.2.5 Factory Inspectorate Department

- Provide necessary direction to MAH unit and assistance to DEA, Fire Department, Medical Department among others
- Seek help from and involve assistance of Technical Experts of relevant and appropriate expertise and specialization
- Initiate, facilitate and provide for investigation into the accident

7.2.6 Occupier of MAH Unit

- Possess up-to-date copy of Off-site Emergency Plan
- Communicate promptly, any foreseeable disaster, to the DEA, Police, Fire Service and Inspector of Factories in-charge of the District
- Communicate changes within the factory that may require inclusion or suitable modification in the off-site plan to the DEA (Maintenance Officer) of the Plan

7.2.7 Technical Experts

- Promptly respond to provide the necessary technical advice to MAH unit, DEA, Factory Inspectors, Fire Department, Medical Department among others
- Provide on-phone help after properly understanding and assessing the situation
- Make visit to the site in co-ordination with DEA, Factory Inspector(s) to provide for appropriate technical assistance

7.2.8 Mutual AID Groups

- To quickly mobilize the resources required to emergency mitigation at the site or wherever required

7.2.9 Pollution Control Board

- Project likely areas to be polluted.
- Carry out pollution assessment at suspected locations including soil, river and air assessment
- Ensure controlling of long-term pollution damage
- Identify unidentified substances, chemical releases, if any

7.2.10 Transport Fleet Owners Including State Transport

- Act on the direction of DEA or Police
- Ascertain the extent of transport required with pick-points, routes and destinations to transport people
- Promptly arrange for dispatch of vehicles with sufficient fuel for evacuation purposes
- Arrange vehicles to transport water and other provision to camps set up

7.2.11 Media

- Disseminate vital information to public on direction of DEA, Police and other Authorities
- Act responsibly in disseminating vital information and dispel rumours, if any

7.2.12 Railway

- Act as per the direction of DEA to stop incoming trains, if required
- Arrange for evacuation, if required

7.2.13 Transporters of Hazardous Chemical

- Possess up-to-date copy of Off-site Emergency Plan
- Communicate promptly, any foreseeable disaster during transportation to the DEA, Police, Fire Service and Inspector of Factories in-charge of the District
- Communicate new assignments, newly added routes or other changes that may require inclusion or suitable modification in the off-site plan to the DEA (Maintenance Officer) of the Plan

7.2.14 Electricity Board

- Arrange for uninterrupted power supply to the plant, as required
- Arrange for lighting; at temporary medical camps etc
- Arrange for switching off power supply on request from District Authorities
- Take care of electrical equipment within the damaged zone

7.2.15 Telecommunication Department

- Ensure working of communication lines to enable effective communication between various responder agencies

7.2.16 Aviation Department

- Mobilise resources such as helicopters for knocking down vapour clouds etc

7.2.17 Civil Defence

- Co-ordinate with Police authorities
- Extend help in evacuation
- Arrange for round the clock security arrangements in the affected and evacuation areas
- Safeguard the properties and belongings of evacuees

7.2.18 Home Guards

- Co-ordinate with Police authorities.
- Extend help in evacuation.
- Arrange for round the clock security arrangements in the affected and evacuation areas.
- Safeguard the properties and belongings of evacuees

7.2.19 National Disaster Response Force

- Carry out tasks for disaster mitigation as required

7.2.20 Local Government Bodies

- Mobilise necessary resources in emergency mitigation
- Provide for community halls, town halls for evacuees

7.2.21 NGOs

- Act as per the direction of DEA, Police and other District Authorities
- Aid and assist the district authorities in emergency mitigation

7.2.22 Public Works Department

- Ensure adequate water supply for fire- fighting
- Arrange for drinking water for evacuated person sat rallying posts, parking yards and evacuation centres Arrange water for cattle.

7.2.23 Water Supply Board

- Arrange for supply of water to evacuees and all others involved in emergency control operations

7.2.24 Civil Supplies Department

- Arrangement to provide food and clothing as necessary, to the evacuees and all others involved in emergency controlling operations

7.2.25 Animal Husbandry Department

- Arrange for taking care of cattle - especially milk animals living in affected zone
- If evacuation of cattle is required, identify the evacuation area and shelter
- Transport arrangements for evacuation
- Fodder, drinking water arrangements for cattle.
- Arrange for veterinary doctor

7.2.26 Agriculture Department

- Arrange for protection of food grains and standing crops in the vulnerable zone. Give instructions, to farmers, if any

7.2.27 Regional Transport Authority

- To investigate into the cause of road accident involving hazardous goods carrier and take necessary action

7.2.28 Other Members of DCG

- Assist and act as per directions of the District Collector

7.2.29 Coasts Guards and Port Trusts (in case of emergency situation in coastal areas)

- Co-ordinate with Police authorities.
- Provide necessary help in emergency mitigation

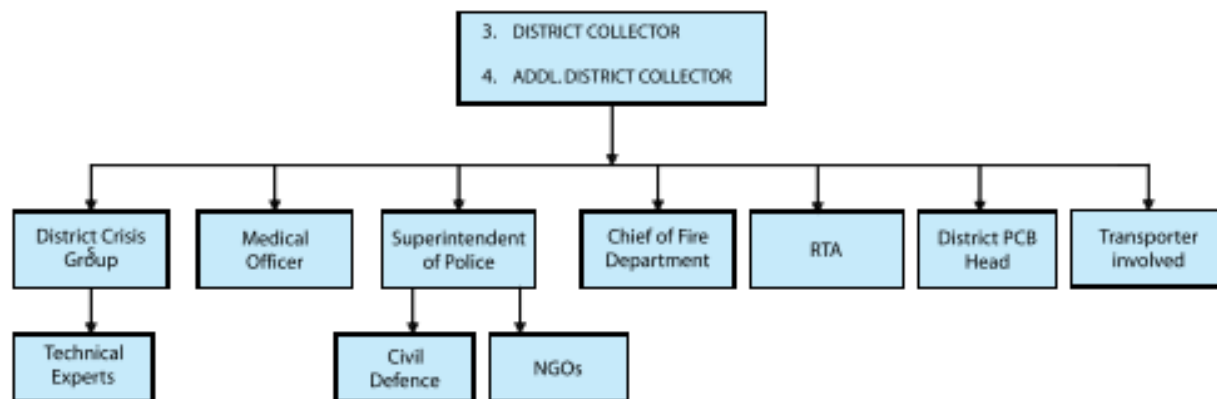
7.3 Emergency Organisation Chart of Roles

The emergency organization chart of roles must be clearly defined. The emergency organization and line of command may differ from the operational line of command during peace times.

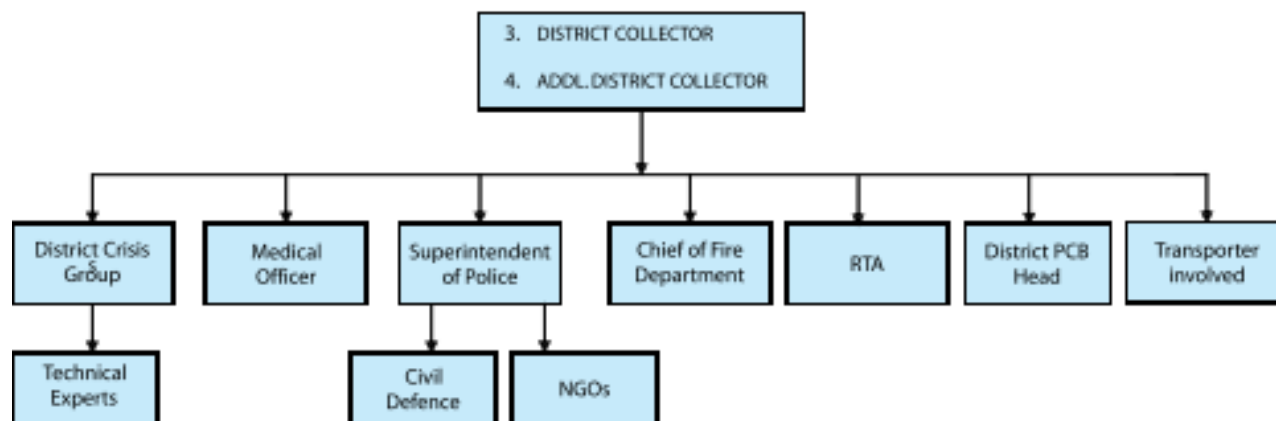
A sample emergency organization of roles is attached here for reference:

The emergency organization chart of roles must be clearly defined. The emergency organization and line of command may differ from the operational line of command during peace times.

EMERGENCY ORGANISATION FOR INDUSTRIAL DISASTER



EMERGENCY ORGANISATION FOR ROAD TRANSPORT DISASTER



7.4 Emergency Behaviour of Public at Large

The extent of damage control in an emergency situation can improve greatly if the public at large conducts itself in a responsible and intelligent manner. The possible reason for disadvantageous behaviour by the public is Panic Curiosity or Excitement Purposeful exploitation of the situation. The following are the ways and means of addressing the above causes of disadvantageous behaviour

1. Panic

Panic arises out of sense of urgency coupled with lack of knowledge and information to deal with the situation. Panic can be dealt with effectively by dissemination of important knowledge, information and instructions on response behaviour. A toxic gas leak may require people to stay confined than run out in helter-skelter. Such useful response instruction can be disseminated to public at large through mass education campaigns. Such campaigns shall be periodically conducted by vulnerable industrial units. Educational syllabus for schools shall include lesson on response behaviour in case of emergency. Chemistry lessons shall include simple tips on responding to various gases. For instance, in case of MIC leak at Bhopal, the magnitude of toxic consumption could have greatly reduced had people put a wet handkerchief on their nose since MIC dissolves in water.

2. Curiosity or Excitement

Uproar, noise, mass gatherings bring curiosity to the mind of people who add to the number of on-lookers. Police should play an active role in cordoning off the emergency area and judiciously allow volunteers who are willing to act to mitigate the disaster.

3. Purposeful Exploitation of situation

Unfortunately, some people seek opportunism for themselves in wake of a disaster. Such people contribute only to the reducing the efficacy of mitigation effort. Such people should be identified and dealt sternly with by the Police and other authorities involved in mitigation.

7.5 Specific Actions Required by Public at Large and Communication to them

An emergency situation may call for the public at large to act on information such as evacuation to a particular area or confinement of themselves in their houses with all windows closed. The dissemination of such information shall be made using media such as Radio, Television, Mass-SMS, and Mobile Public Announcement System.

8 Emergency Response Plan

8.1 Introduction

The emergency response plan is the detailed plan to be executed in case of an emergency. The emergency response plan is drawn for the emergency scenario under consideration. No two emergency scenarios are alike and as such the possible emergency scenarios at any given time can be infinite. Laying down a common emergency response plan is not possible and also not advisable as different scenarios will call for different plans. It is therefore prudent to begin with emergency response planning for most critical emergency scenarios. The emergency response planning can be put to test during the mock drill. This should ensure preparation of an emergency response plan for a new emergency scenario every time a mock drill is conducted. PRESTELS has developed PAC analysis for emergency response planning, which is attached and explained in Part C of this document. The PAC analysis yields an emergency response plan for the emergency scenario under consideration.

8.2 Enforcement and Implementation of Plan

The responsibility for enforcement and implementation of the plan rests with the DEA. In event of an off-site emergency, the DEA will declare the emergency via Annexure 1 and communicate the same to the authorities and agencies listed there under along with other responders. The various authorities and agencies shall discharge their responsibility and carry out all such tasks that the situation on hand may call for.

8.3 Marriage of Chapter 5, 6, 7

- Chapter 5 deals with projection of emergency scenarios
- Chapter 6 deals with identification of resources
- Chapter 7 deals with roles and responsibilities

An emergency scenario is an undesired event that may occur. Resources both material and intellectual are required to mitigate the possible effect of an emergency scenario. The people involved in applying the resources for mitigation should discharge their expected roles and responsibilities intelligently and faithfully. Thus, we must in advance keep the resources and roles-responsibilities mapped to the emergency scenario. This mapping is determinedly referred to as the 'Marriage of Chapter 5, 6 and 7'. PRESTELS recommends PAC analysis for developing a complete course of response in case of an emergency.

(See information on PAC analysis attached in Part C)

8.4 Discharging and Co-Ordination of Roles and Responsibilities

It is of utmost importance that all authorities and stakeholders involved in disaster mitigation discharge their roles and responsibilities in letter and spirit. It is for this purpose necessary to ensure that the authorities and stakeholders know with full awareness their roles and responsibilities.

9 Post-Emergency Restoration

9.1 Calling off Emergency

Having satisfied himself that the emergency is over, the DEA shall call off the emergency via Annexure 5. The calling off of emergency shall restore life to normalcy and curtail the spread of misinformation, rumours giving opportunism for exploitation of the situation. The emergency camps set up shall continue to function after calling off of emergency till they provide all the needed support to the aggrieved.

9.2 Controlling Long-Term Damage

The emergency may affect natural resources of soil, water and air. The PCB unit shall make assessment of the areas adjoining the emergency scene where such damage may take place. The PCB shall submit their report to the DEA via Annexure 6. The DEA shall act on the information and recommendation provided by the PCB.

9.3 Investigation Studies and Reporting

The DEA shall appoint a committee constituting the necessary stakeholders who may be necessary to carry out thorough investigation into the emergency as well as introspection of the response actions and measures. The investigation reporting shall be via Annexure 7. The investigation report shall become a part of Chapter 10 of this report. The lessons drawn from the investigation shall be incorporated in to this plan in the appropriate chapters.

9.4 Compensation and Settlements

The compensation and settlements shall be carried out by the DEA. The DEA shall process compensations as claimed under the PLIA.

10 Past Accidents in the District

The investigation reports of offsite emergencies made via Annexure 7 shall be filed in this chapter. The notes of changes made in the plan drawing lessons from the off-site emergency shall be recorded in this plan

Table 33 Lessons from Past Accidents

Sr.	Off Site Emergency Reference with investigation report number	Notes of changes made in plan	Remarks

11 Mock Drills

Mock drills are exercises to test the effectiveness of plan. Mock drills must be carried out at periodic intervals as specified in the MSIHC rules (i.e. once in a year). The lessons drawn from Mock drills must be used to improve the plan. The Mock drill reports via Annexure 8 shall be filed in this chapter. The notes of changes made in the plan drawing lessons from the mock drills shall be recorded in this plan

Table 34 Lessons from Mock Drills

Sr.	Off Site Emergency Reference with investigation report number	Notes of changes made in plan	Remarks

ANNEXURE 1 Declaration of Off-site Emergency

I declare Off-site Emergency in the district of Gujarat starting at this _____ hour on this day of _____.

DEA:[NAME, SIGNATURE AND SEAL]

Date:

Information to the following be made via phone followed by written communication

SR.	AUTHORITY	NAME OF CURRENT OFFICE HOLDER	ADDRESS (O, R)	TELEPHONE(O, R, M)	EMAIL	REMARKS
	DISTRICT COLLECTOR	SHREE KSHIPRA S. AGRE IAS	(O) COLLECTOR OFFICE, KALIYAWADI, NAVSARI	(O) (02637) 244999 (R) (02637) 246000 (M) 99784 06215	Collector-nav@gujarat.gov.in	
2.	DDO (IAS)	SHREE PUSHPA LATA IAS	(O) COLLECTOR OFFICE, KALIYAWADI, NAVSARI	(O) (02637) 243498 (R) (02637) 245333 (M) 9978406240	Ddo-nav@gujarat.gov.in	
3.	SUPERINTENDENT OF POLICE	SHREE SUSHIL KUMAR AGRAVAL IPS	(O) OFFICE OF SUPERINTENDENT OF POLICE	(O) (02637) 233888 (R) (02637) 245333 (M) 9978405075	Sp-nav@gujarat.gov.in	
4.	ALTERNATE	-	-	-	-	
5.	FIRE DEPARTMENT STATION INCHARGE	MR D.R. JADEJA	(O) FIRE BRIGADE NAVSARI	(O) (02637) 259001 / 101 (M) 9925752017		
6.	ALTERNATE	MR. KISHORBHAI T. MANGELA	(O) FIRE BRIGADE NAVSARI	(O) (02637) 259001 / 101 (M) 9879654125		
7.	MEDICAL OFFICER	MR. D.P KANNAR	(O) JILLA PANCHAYAT NAVSARI	(O) (02637) 280143 (M) 727704005		
8.	ALTERNATE	-	-	-	-	
9.	INSPECTOR OF FACTORIES	MR. G L DHANKECHA	(O) 2 ND FLOOR, VISHWAMBHARI Apartment, NEAR SAYAJI LIBRARY, DIGI STREET, WARD NO.8, NAVSARI	(O) (02637) 230745 (M) 8530690529	-astdish-nav@gujarat.gov.in	
10.	POLLUTION CONTROL BOARD	Mr. N. Patel.	(O) C WING, 3rd floor, Old JILLA SEVA SADAN, JUNA THANA, NAVSARI	(O) (02637) 230790 (O) (0261) 2442696 (M) 9099046402	Nav.ro.gpcb@gmail.com	
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C	SAFETY OFFICER - WINDSON CHEMICAL PVT LTD	MR. NLESH PATEL	(O) WINDSON CHEMICAL PVT. LTD CHIKHLI VANSDA ROAD, ALIPORE, TA: CHIKHLI, NAVSARI	(O) 9974005824 (M) 9925330263	info@wind sonchem.c om.in	
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13.	MUTUAL AID GROUP CHAMBER OF COMMERCE	MR.PRADIP JAIN CHAMBER OF COMMERCE, NAVASARI	(O) NAVSARI CHAMBER OF COMMERCE	(O)(02637)258718 (M)9825145164		
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A1	DY.INFORMATION DIRECTOR	MR. Y M GOSAI	(O)JILLA SEVA SANDAN,JUNATHANA,NAC SARI	(O)(02637)244914 (M)9726034321	Navsari.ad i@gmail.co m	
B	A) DIVYA BHASKAR	- BHADRESH NAIK	NAVSARI OFFICE,1st FIOOR,ATALBIHARI BAJPAYI SHOPPING COMPLEX,LUINCIKUI	(O)(02637)231450 (M)9375943999		
C	B) SANDESH	-SOYEB PATHAN	NAVSARIOFFICE	(M)9898697867		
15.	ASISTANTLABOUR COMMISSIONER	MR.G .M. BHOTKA	(O)JILLASEVASANDAN,JU NATHANA,NACSARI	(O)(02637)259391 (M)8780146954		
16.	DDO	SHREE RIPALBEN CHODHRI	(O) JILLAPANCHAYAT,NAVSAR I	(O)(02637)244399 (M)9978408268		
17.	GUJARAT IND.DEV.COR. NAVSARI	DR.MANOJ T. KHATWANI	(O)BEACONDIGESTIC PVT LTD.	(O)(02637)237590 (M)9825116136		
18.	DGVCL EXECUTIVE ENGINEER (KABILPORE)	MR. D N CHOHAN	(O)GUJRATELE.BOARD OFFICE,NAVSARI	(O)(02637)258861 (M)9879201076		
19.	D.P.O	MRANKIT PARMAR	(O) JUNATHANA, NAVSARI	(O)(02637)259401 (M)9714343111		
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				(M)9727704093	th.navsari@gmail.com	
24.	COMMANDER HOMEGUARD	MR. SATISHBHAI P. BODSE	(O)JILLASEVASADAN,JUNATHANA,NAVSARI	(O)(02637)280384 (M)9825539479	navsarihomeguard@gmail.com	
25.	EXECUTIVEENGINEER(R&B)	MR.NILESH NAIK	(O) JUNATHANA,NAVSARI	(O)(02637)258041 (M)9714991071	rnb.nav@gmail.com	

ANNEXURE 2 Possessors of the Copy of Off-site Emergency Plan

SR.	AUTHORITY	NAME OF CURRENT OFFICE HOLDER	ADDRESS (O, R)	TELEPHONE(O, R, M)	EMAIL	REMARKS
	DISTRICT COLLECTOR	SHREE KSHIPRA S. AGRE IAS	(O) COLLECTOR OFFICE, KALIYAWADI, NAVSARI	(O) (02637) 244999 (R) (02637) 246000 (M) 99784 06215	Collector-nav@gujarat.gov.in	
2.	DDO (IAS)	SHREE PUSHPA LATA IAS	(O) COLLECTOR OFFICE, KALIYAWADI, NAVSARI	(O) (02637) 243498 (R) (02637) 245333 (M) 9978406240	Ddo-nav@gujarat.gov.in	
3.	SUPERINTENDENT OF POLICE	SHREE SUSHIL KUMAR AGRAVAL IPS	(O) OFFICE OF SUPERINTENDENT OF POLICE	(O) (02637) 233888 (R) (02637) 245333 (M) 9978405075	Sp-nav@gujarat.gov.in	
4.	ALTERNATE	-	-	-	-	
5.	FIRE DEPARTMENT STATION INCHARGE	MR D.R. JADEJA	(O) FIRE BRIGADE NAVSARI	(O) (02637) 259001 / 101 (M) 9925752017		
6.	ALTERNATE	MR. KISHORBHAI T. MANGELA	(O) FIRE BRIGADE NAVSARI	(O) (02637) 259001 / 101 (M) 9879654125		
7.	MEDICAL OFFICER	MR. D.P KANNAR	(O) JILLA PANCHAYAT NAVSARI	(O) (02637) 280143 (M) 727704005		
8.	ALTERNATE	-	-	-	-	
9.	INSPECTOR OF FACTORIES	MR. G L DHANKECHA	(O) 2 ND FLOOR, VISHWAMBHARI Apartment, NEAR SAYAJI LIBRARY, DIGI STREET, WARD NO.8, NAVSARI	(O) (02637) 230745 (M) 8530690529	-astdish-nav@gujarat.gov.in	
10.	POLLUTION CONTROL BOARD	Mr. N. Patel.	(O) C WING, 3rd floor, Old JILLA SEVA SADAN, JUNATHANA, NAVSARI	(O) (02637) 230790 (O) (0261) 2442696 (M) 9099046402	Nav.ro.gpcb@gmail.com	
11.	TECHNICAL EXPERTS					
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	CO. NAVSARI			(M) 992511613		
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D	SAFETY OFFICER GANDEVI SUGAR, GANDEVI	MR. RAKESH B. PATEL	GANDEVI SUGAR, GANDEVI	(O) (2634) 262742 (M) 8200157462	Gandevisu gar56@gm ail.com	
E	SAFETY OFFICER	MR. NILESH PATEL	HLE ENGINEERS PVT.LTD.	(O)(02637)270150 (M)9825115802	pankaj@ya shrasayan. com	
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19.	D.P.O	MRANKIT PARMAR	(O) JUNATHANA, NAVSARI	(O)(02637)259401 (M)9714343111		
20.	CHIEF ENGINEER (NAVSARINAGARPA LIKA)	MR. KIRAN PATEL	(O)NAVSARI NAGARPALIKA,NAVSARI	(O)(02637)250253 (M)8460477120	Np_navsar i@yahoo.c o.in	
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22.	CONTROLLEROF EXPLOSIVE	DEPUTYCHIEF CONTROL OFEXPLOSIVE VADODARA	(O)8 TH FLOOR,YASHKA MALBIL,VADODARA	(O)(0265)236103 5,2 225159		

23.	REDCROSS SOCIETY	DR. PARESH G JOSHI	(O)STATIONROAD, NAVSARI	(O)(02637)258283 (M)9727704093	Dlo.heal th.navs ari@gm ail.com	
24.	COMMANDER HOMEGUARD	MR. SATISHBHAI P. BODSE	(O)JILLASEVASADAN,,JUNA THANA,NAVSARI	(O)(02637)280384 (M)9825539479	navsariho meguard@ gmail.com	
25.	EXECUTIVEENGINEER(R&B)	MR.NILESH NAIK	(O) JUNATHANA,NAVSARI	(O)(02637)258041 (M)9714991071	rmb.nav@g mail.com	

ANNEXURE 3 Communication of Change in Copy of this Plan to all Possessors

The following change(s) are made to the version _____ of the Off-site Emergency Plan dated _____.

SR. NO.	PAGE NUMBER	EXITING INFORMATION	CHANGE(S) MADE

Communication to the following:

SR.	AUTHORITY	NAME OF CURRENT OFFICE HOLDER	ADDRESS (O, R)	TELEPHONE(O, R, M)	EMAIL	REMARKS
	DISTRICT COLLECTOR	SHREE KSHIPRA S. AGRE IAS	(O) COLLECTOR OFFICE, KALIYAWADI, NAVSARI	(O) (02637) 244999 (R) (02637) 246000 (M) 99784 06215	Collector- nav@gujar at.gov.in	
2.	DDO (IAS)	SHREE PUSHPA LATA IAS	(O) COLLECTOR OFFICE, KALIYAWADI, NAVSARI	(O) (02637) 243498 (R) (02637) 245333 (M) 9978406240	Ddo- nav@gujar at.gov.in	
3.	SUPERINTENDENT OF POLICE	SHREE SUSHIL KUMAR AGRAVAL IPS	(O) OFFICE OF SUPERINTENDENT OF POLICE	(O) (02637) 233888 (R) (02637) 245333 (M) 9978405075	Sp- nav@gujar at.gov.in	

4.	ALTERNATE	-	-	-	-	
5.	FIRE DEPARTMENT STATION INCHARGE	MR D.R. JADEJA	(O) FIRE BRIGADE NAVSARI	(O) (02637) 259001 / 101 (M) 9925752017		
6.	ALTERNATE	MR. KISHORBHAI T. MANGELA	(O) FIRE BRIGADE NAVSARI	(O) (02637) 259001 / 101 (M) 9879654125		
7.	MEDICAL OFFICER	MR. D.P KANNAR	(O) JILLA PANCHAYAT NAVSARI	(O) (02637) 280143 (M) 727704005		
8.	ALTERNATE	-	-	-	-	
9.	INSPECTOR OF FATORIES	MR. G L DHANKECHA	(O) 2 ND FLOOR, VISHWAMBHARI Apartment, NEAR SAYAJI LIBRARY, DIGI STREET, WARD NO.8, NAVSARI	(O) (02637) 230745 (M) 8530690529	-astdish- nav@gujar at.gov.in	
10.	POLLUTION CONTROL BOARD	Mr. N. Patel.	(O) C WING, 3rd floor, Old JILLA SEVA SADAN, JUNA THANA, NAVSARI	(O) (02637) 230790 (O) (0261) 2442696 (M) 9099046402	Nav.ro.gpc b@gmail.c om	
11.	TECHNICAL EXPERTS					
A	OCCUPIER M/S SWASTIC OIL MANUFACTURING CO. NAVSARI	MR. ANUP R. RATHOD	(O) SWASTIK OIL, UNN VILLAGE, NAVSARI	(O) (02637) 225613 (R) (02637) 225613 (M) 992511613	anup@swa stikoil.com	
B	MANAGER GUFIC BIOSCIENCE CHEMICAL LTD.	MR. AVINASH ZANGE	(O) GUFIC BIOSCIENCE CHEMICAL LTD. GREED, KABILPORE, NAVSARI	(O) 6359921204 (M) 9375945218	Bdprd_nvs @guficbio. com	
C	SAFETY OFFICER - WINDSON CHEMICAL PVT LTD	MR. NLESH PATEL	(O) WINDSON CHEMICAL PVT. LTD CHIKHLI VANSDA ROAD, ALIPORE, TA: CHIKHLI, NAVSARI	(O) 9974005824 (M) 9925330263	info@wind sonchem.c om.in	
D	SAFETY OFFICER GANDEVI SUGAR, GANDEVI	MR. RAKESH B. PATEL	GANDEVI SUGAR, GANDEVI	(O) (2634) 262742 (M) 8200157462	Gandevisu gar56@gm ail.com	
E	SAFETY OFFICER	MR. NILESH PATEL	HLE ENGINEERS PVT.LTD.	(O)(02637)270150 (M)9825115802	pankaj@ya shrasayan. com	
12.	RTO	MR.U.B PANDYA	(O) NH-8,GREED ROAD,NAVSARI	(O)(02637)227525 (M)9825595209	arto-trans nvs@gujar at.gov.in	
13.	MUTUAL AID GROUP CHAMBER OF COMMERCE	MR.PRADIP JAIN CHAMBER OF COMMERCE, NAVASARI	(O) NAVSARI CHAMBER OF COMMERCE	(O)(02637)258718 (M)9825145164		
14.	MEDIA					
A	DISTRICT INFORMATION OFFICER	MR. JAYESH T PATEL	(O) JILLA PANCHAYAT,NAVSARI	(O)(02637)234800 (M)9427105848		
A1	DY.INFORMATION DIRECTOR	MR. Y M GOSAI	(O)JILLA SEVA SANDAN,JUNATHANA,NAC SARI	(O)(02637)244914 (M)9726034321	Navsari.ad i@gmail.co m	
B	A) DIVYA BHASKAR	- BHADRESH NAIK	NAVSARI OFFICE,1st FIOOR,ATALBIHARI BAJPAYI SHOPPING	(O)(02637)231450 (M)9375943999		

			COMPLEX,LUINCIKUI			
C	B) SANDESH	-SOYEB PATHAN	NAVSARIOFFICE	(M)9898697867		
15.	ASISTANTLABOUR COMMISIONER	MR.G .M. BHOOTKA	(O)JILLASEVASANDAN,JU NATHANA,NACSARI	(O)(02637)259391 (M)8780146954		
16.	DDO	SHREE RIPALBEN CHODHRI	(O) JILLAPANCHAYAT,NAVSAR I	(O)(02637)244399 (M)9978408268		
17.	GUJARAT IND.DEV.COR. NAVSARI	DR.MANOJ T. KHATWANI	(O)BEACONDIGESTIC PVT LTD.	(O)(02637)237590 (M)9825116136		
18.	DGVCL EXECUTIVE ENGINEER (KABILPORE)	MR. D N CHOHAN	(O)GUJRATELE.BOARD OFFICE,NAVSARI	(O)(02637)258861 (M)9879201076		
19.	D.P.O	MRANKIT PARMAR	(O) JUNATHANA, NAVSARI	(O)(02637)259401 (M)9714343111		
20.	CHIEF ENGINEER (NAVSARINAGARPA LIKA)	MR. KIRAN PATEL	(O)NAVSARI NAGARPALIKA,NAVSARI	(O)(02637)250253 (M)8460477120	Np_navsar i@yahoo.c o.in	
21.	CIVILSURGEON NAVSARI	DR. TUSHAR MEHTA	(O)CIVIL HOSPITAL NAVSARI	(O)(02637)250389 (M)9687685806	Cdmo.heal th.navsari @gmail.co m	
22.	CONTROLLEROF EXPLOSIVE	DEPUTYCHIEF CONTROL OFEXPLOSIVE VADODARA	(O)8 TH FLOOR,YASHKA MALBIL,VADODARA	(O)(0265)236103 5,2 225159		
23.	REDCROSS SOCIETY	DR. PARESH G JOSHI	(O)STATIONROAD, NAVSARI	(O)(02637)25828 3 (M)9727704093	Dlo.heal th.navs ari@gm ail.com	
24.	COMMANDER HOMEGUARD	MR. SATISHBHAI P. BODSE	(O)JILLASEVASADAN,JUNA THANA,NAVSARI	(O)(02637)28038 4 (M)9825539479	navsariho meguard@ gmail.com	
25.	EXECUTIVEENGINE ER(R&B)	MR.NILESH NAIK	(O) JUNATHANA,NAVSARI	(O)(02637)25804 1 (M)9714991071	rnb.nav@g mail.com	

ANNEXURE 4 Communication of Change in Positions, Address and Phone Numbers to the Maintenance Officer of the Plan

To,
The DEA,
(The Maintenance Officer)
Off-site Emergency Plan,

[NAME AND ADDRESS]

Date:_____

Sub: Change information for updating Off-site Emergency Plan

Dear Sir/Madam,

Please note the following change(s) in the Off-site Emergency Plan:

Please incorporate the above changes in the plan with effect from

(Date): _____

Thanking you,

Yours Faithfully,

[NAME, SIGNATURE AND SEAL OF THE AUTHORITY AND DATE]

ANNEXURE 5 Calling off the Declared Off-site Emergency

I **call off** the declared Off-site Emergency in the district of *[NAME OF THE DISTRICT]* starting at this _____ hour on this day of _____.

DEA:*[NAME, SIGNATURE AND SEAL]*

Date: *[DATE]*

Information to the following be made via phone followed by telegram

SR.	AUTHORITY	NAME OF CURRENT OFFICE HOLDER	ADDRESS (O, R)	TELEPHONE(O, R, M)	EMAIL	REMARKS
	DISTRICT COLLECTOR	SHREE KSHIPRA S. AGRE IAS	(O) COLLECTOR OFFICE, KALIYAWADI, NAVSARI	(O) (02637) 244999 (R) (02637) 246000 (M) 99784 06215	Collector-nav@gujarat.gov.in	
2.	DDO (IAS)	SHREE PUSHPA LATA IAS	(O) COLLECTOR OFFICE, KALIYAWADI, NAVSARI	(O) (02637) 243498 (R) (02637) 245333 (M) 9978406240	Ddo-nav@gujarat.gov.in	
3.	SUPERINTENDENT OF POLICE	SHREE SUSHIL KUMAR AGRAVAL IPS	(O) OFFICE OF SUPERINTENDENT OF POLICE	(O) (02637) 233888 (R) (02637) 245333 (M) 9978405075	Sp-nav@gujarat.gov.in	
4.	ALTERNATE	-	-	-	-	
5.	FIRE DEPARTMENT STATION INCHARGE	MR D.R. JADEJA	(O) FIRE BRIGADE NAVSARI	(O) (02637) 259001 / 101 (M) 9925752017		
6.	ALTERNATE	MR. KISHORBHAI T. MANGELA	(O) FIRE BRIGADE NAVSARI	(O) (02637) 259001 / 101 (M) 9879654125		
7.	MEDICAL OFFICER	MR. D.P KANNAR	(O) JILLA PANCHAYAT NAVSARI	(O) (02637) 280143 (M) 727704005		
8.	ALTERNATE	-	-	-	-	
9.	INSPECTOR OF FACTORIES	MR. G L DHANKECHA	(O) 2 ND FLOOR, VISHWAMBHARI Apartment, NEAR SAYAJI LIBRARY, DIGI STREET, WARD NO.8, NAVSARI	(O) (02637) 230745 (M) 8530690529	-astdish-nav@gujarat.gov.in	
10.	POLLUTION CONTROL BOARD	Mr. N. Patel.	(O) C WING, 3rd floor, Old JILLA SEVA SADAN, JUNA THANA, NAVSARI	(O) (02637) 230790 (O) (0261) 2442696 (M) 9099046402	Nav.ro.gpcb@gmail.com	
11.	TECHNICAL EXPERTS					
A	OCCUPIER M/S SWASTIC OIL MANUFACTURING CO. NAVSARI	MR. ANUP R. RATHOD	(O) SWASTIK OIL, UNN VILLAGE, NAVSARI	(O) (02637) 225613 (R) (02637) 225613 (M) 992511613	anup@swastikoil.com	

B	MANAGER GUFIC BIOSCIENCE CHEMICAL LTD.	MR. AVINASH ZANGE	(O) GUFIC BIOSCIENCE CHEMICAL LTD. GREED, KABILPORE, NAVSARI	(O) 6359921204 (M) 9375945218	Bdprd_nvs @guficbio. com	
C	SAFETY OFFICER - WINDSON CHEMICAL PVT LTD	MR. NLESH PATEL	(O) WINDSON CHEMICAL PVT. LTD CHIKHLI VANSDA ROAD, ALIPORE, TA: CHIKHLI, NAVSARI	(O) 9974005824 (M) 9925330263	info@wind sonchem.c om.in	
D	SAFETY OFFICER GANDEVI SUGAR, GANDEVI	MR. RAKESH B. PATEL	GANDEVI SUGAR, GANDEVI	(O) (2634) 262742 (M) 8200157462	Gandevisu gar56@gm ail.com	
E	SAFETY OFFICER	MR. NILESH PATEL	HLE ENGINEERS PVT.LTD.	(O)(02637)270150 (M)9825115802	pankaj@ya shrasayan. com	
12.	RTO	MR.U.B PANDYA	(O) NH-8,GREED ROAD,NAVSARI	(O)(02637)227525 (M)9825595209	arto-trans nvs@gujar at.gov.in	
13.	MUTUAL AID GROUP CHAMBER OF COMMERCE	MR.PRADIP JAIN CHAMBER OF COMMERCE, NAVASARI	(O) NAVSARI CHAMBER OF COMMERCE	(O)(02637)258718 (M)9825145164		
14.	MEDIA					
A	DISTRICT INFORMATION OFFICER	MR. JAYESH T PATEL	(O) JILLA PANCHAYAT,NAVSARI	(O)(02637)234800 (M)9427105848		
A1	DY.INFORMATION DIRECTOR	MR. Y M GOSAI	(O)JILLA SEVA SANDAN,JUNATHANA,NAC SARI	(O)(02637)244914 (M)9726034321	Navsari.ad i@gmail.co m	
B	A) DIVYA BHASKAR	- BHADRESH NAIK	NAVSARI OFFICE,1st FIOOR,ATALBIHARI BAJPAYI SHOPPING COMPLEX,LUINCIKUI	(O)(02637)231450 (M)9375943999		
C	B) SANDESH	-SOYEB PATHAN	NAVSARIOFFICE	(M)9898697867		
15.	ASISTANTLABOUR COMMISSIONER	MR.G .M. BHOTKA	(O)JILLASEVASANDAN,JU NATHANA,NACSARI	(O)(02637)259391 (M)8780146954		
16.	DDO	SHREE RIPALBEN CHODHRI	(O) JILLAPANCHAYAT,NAVSAR I	(O)(02637)244399 (M)9978408268		
17.	GUJARAT IND.DEV.COR. NAVSARI	DR.MANOJ T. KHATWANI	(O)BEACONDIGESTIC PVT LTD.	(O)(02637)237590 (M)9825116136		
18.	DGVCL EXECUTIVE ENGINEER (KABILPORE)	MR. D N CHOHAN	(O)GUJRATELE.BOARD OFFICE,NAVSARI	(O)(02637)258861 (M)9879201076		
19.	D.P.O	MRANKIT PARMAR	(O) JUNATHANA, NAVSARI	(O)(02637)259401 (M)9714343111		
20.	CHIEF ENGINEER (NAVSARINAGARPA LIKA)	MR. KIRAN PATEL	(O)NAVSARI NAGARPALIKA,NAVSARI	(O)(02637)250253 (M)8460477120	Np_navsar i@yahoo.c o.in	
21.	CIVILSURGEON NAVSARI	DR. TUSHAR MEHTA	(O)CIVIL HOSPITAL NAVSARI	(O)(02637)250389 (M)9687685806	Cdmo.heal th.navsari @gmail.co m	
22.	CONTROLLEROF EXPLOSIVE	DEPUTYCHIEF CONTROL OFEXPLOSIVE VADODARA	(O)8 TH FLOOR,YASHKA MALBIL,VADODARA	(O)(0265)236103 5,2 225159		
23.	REDCROSS SOCIETY	DR. PARESH G JOSHI	(O)STATIONROAD, NAVSARI	(O)(02637)25828 3	Dlo.heal	

				(M)9727704093	th.navsari@gmail.com	
24.	COMMANDER HOMEGUARD	MR. SATISHBHAI P. BODSE	(O)JILLASEVASADAN,JUNATHANA,NAVSARI	(O)(02637)280384 (M)9825539479	navsarihomeguard@gmail.com	
25.	EXECUTIVEENGINEER(R&B)	MR.NILESH NAIK	(O) JUNATHANA,NAVSARI	(O)(02637)258041 (M)9714991071	rnb.nav@gmail.com	

ANNEXURE 6 Submission of Report on Long Term Damage or its Possibility

To
DEA

cc: Factory Inspector

SR.	AREA AFFECTED	DESCRIPTION	REQUIRED ACTIONS	REMARKS

Sd/- Pollution Control Board

ANNEXURE 7 Investigation Reporting

Investigation Report No:

- Name of Event
- Accident Description
- Cause of Accident
- Effects of Accident

a1. No. of people dead

a2. No. of people injured

b. Property damage(s)

c. Pollution (short-term)

d. Pollution (long-term)

- Lessons to be drawn from the event
- Resource Gap:
- Communication Gap:
- Others:
- Response measures taken

SR.	AGENCY	RESPONSE(S)	REMARKS

ANNEXURE 8 Mock Drill Reporting

- Mock Drill No:
- Mock Drill Scenario Description:
- Observations:

SR.	RESPONSE AGENCY	RESPONSE	OBSERVATION AND COMMENTS	REMARKS

- Lessons to be drawn from the event
 - Resource Gap:
 - Communication Gap:
 - Others:
- Response measures taken

SR.	AGENCY	RESPONSE	REMARKS

ANNEXURE 9 SAMPLE ERDS FOR CHLORINE

ERDS FOR CHLORINE

Formula: Cl₂

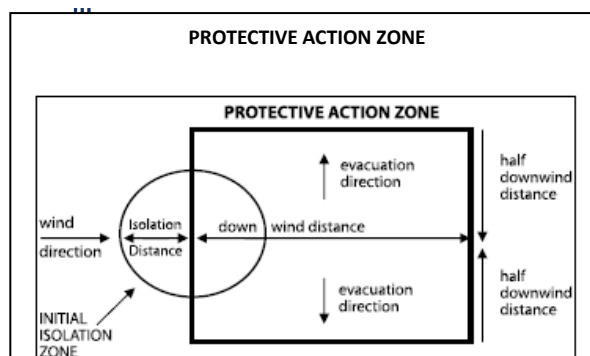
Yellow/ Green Colour, Gas, Pungent Door, Corrosive (Chlorine gas is heavier than air and Dispersion is slow)

Flammable:	NO
Flash Point:	N/A
LEL- UEL:	N/A
Toxic:	Yes
IDLH:	10 PPM
TLV:	01 PPM

I. General Response Action

- On-SITE: Stop Chlorine Leakage, if possible safely
- Wear self contained Breathing Apparatus (SCBA) and use Chlorine emergency kit
- INFORM people to stay confined indoor with door & window tightly shut and ventilators & ACs off.
- SHELTER AND CONFINE un-housed people to an indoor area outside likely cloud travel path.
- Use water spray / fog to disperse and dilute vapours
- Collect runoff for disposal as potential hazardous waste.

II. Evacuation Zone Dimensions



Sr.No	Mass of Release (Tonners)	Approx. Valnerable Distance (m) (in the direction of wind)	Approx. time to reach Max. Vulnerable Dist. (Min)
1	0.5	622	4
2	0.9	3100	18

V. Fire

- Chlorine is non flammable, so the cascading effects in case of fire explosion is absent. Hence no Domino Effect.
- However, It may ignite or explode on contact with comustible materials.

Suggested Action:

- Use water spray / fog as extinguishing medium.
- Do not use dry chemicals, carbon dioxide or Halogenated extinguishing agents
- For Large Fires- Flood with fine water spray.

VI. Medical ::

Danger

- Poisonous if inhaled. Fatality may be caused due to inhalation when concentration in air is greater than 10 PPM (IDLH)
- Low level exposure to chlorine in air will cause eye/ skin / airway irritation, sore throat, and cough.
- At higher levels of exposure, sign and symptoms may progress to chest tightness, wheezing, dyspnoea, and bronchospasm.
- Low level exposures to chlorine gas will cause eye and skin irritation. Higher exposures may result in severe chemical burns or ulcerations. Exposure to compressed liquid chlorine may cause frostbite of the skin and eyes.

Suggested Action:

- Inhalational chlorine poisoning can be treated with supportive care and can include administration of humidified oxygen, bronchodilators, and airway management.
- Pulmonary edema may be delayed and therefore patients should be monitored for up to 24 hours following severe inhalation exposures.

Antidotes: explained in plan .

I. Pollution ::

- A leak of chlorine vapours poses a significant air pollution hazards
- Chlorine is heavier than air and dispersion is slow. Hence state of emergency will last longer.

I. Chemical Information ::

A) Chemical Reactivity:

Reactivity with Water:

Chlorine is sparingly soluble in water. The Water solubility of chlorine is 0.7% @ 20 > C.

B) Reactivity with Common Material:

Chlorine is aggressive to certain non metallic material like natural rubber and many plastics, therefore equipment and hoses must be suitable for chlorine.

Chlorine is chemically stable. It is incompatible with Strong oxidizers.

It does not react with common material but may react with oxidizing material.

Olefinic impurities may lead to narcotics effects or it may act like a simple asphyxiate.

C) Polymerisation:

Hazardous polymerization will not occur.

D) Combustion Products :

Not applicable since chlorine is not flammable gas.

E) Properties:

- Physical State at 15 Deg. C and 1 Atm. Pressure: Gas
- TLV: 1 PPM
- IDLH: 10 ppm
- Molecular weight: 70.906
- Boiling Points: -34.0 Deg C
- Freezing Points: -101 Deg C
- Vapour Pressure: 5168 mm Hg @ 21 deg.c
- Vapour Density: (air=1) 2.49
- Liquid Density: (Water=1): 1.56 @ -34. Deg C
- Liquid Vapour conversion: 1:450

ANNEXURE 9 ERDS FOR HAZ CHEMICALS

1. Ethylene Oxide
2. Oleum 65%
3. Sulphur Trioxide
4. Liquidities Petroleum Gas (LPG)
5. Iso-Butane
6. Methanol
7. Ammonia
8. Sulphur Dioxide
9. Phosgene
10. Acrylonitrile

ERDS FOR ETHYLENE OXIDE

Formula: $(\text{CH}_2)_2\text{O}$

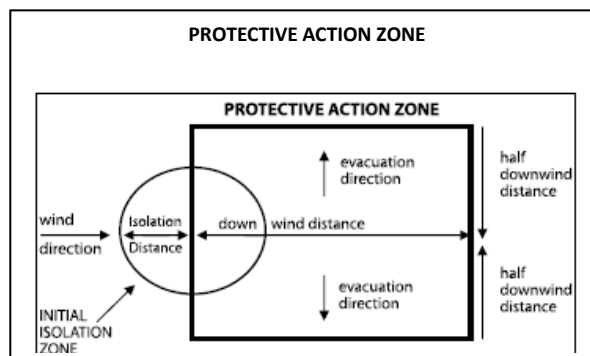
Colourless gas with ether like odour at room temperature.

Flammable:	Extremely Inflammable & Explosive
Flash Point:	-17.7°C
LEL- UEL:	3% & 100%
Toxic:	800 PPM
IDLH:	PPM
TLV:	50 PPM

I. General Response Action

1. On-SITE: Stop Leakage, if possible safely
2. Wear self contained Breathing Apparatus (SCBA) and start water spray
3. INFORM people to all electrical equipments and vehicular movement
4. Use water spray / fog to disperse and dilute vapours
5. Collect runoff for disposal as potential hazardous waste.

II. Evacuation Zone Dimensions



Sr.No	Mass of Release	Approx. Valnerable Distance (m) (in the direction of wind)	Approx. time to reach Max. Vulnerable Dist. (Min)
1	5	200	2
2	10	1200	8

III. Fire

- Highly Inflammable Liquid.
- It causes dangerous fire hazard when exposed to sources of heat and flame

Suggested Action:

- It is a heavier than air and diffuses moderately.
- It is a highly inflammable & explosive keep away from any sources of heat.
- It burns even in absence of air
- It is a highly soluble in water pour water on Ethylene oxide leakage for cooling purpose.
- Burning of Ethylene oxide is extinguished when diluted to 24 volume with water.

IV. Medical ::

- Vapour of Ethylene oxide are moderately Toxic on Inhalation.
- General anesthetic effect along with coughing due to irritation of the respiratory system is caused when large ammounts of Ethylene oxide is Inhaled.
- Large expose can destroy the sense of smell.

Suggested Action:

- Remove the victim from the sources of contamination.
- Wash the skin & eye with water
- Keep the victim warm using blanket.
- Remove victim to the well ventilated area.

Antidotes: N.A.

V. Pollution ::

- A leak of EO poses a significant air pollution hazards
- EO Vapours is heavier than air and travel along the goound may cause flash fire.
- EO vaours dissolve in water hence high humid atmsphere will reduce the rish significantly.
- Contaminated water with EO will be sent for safe disposal

VI. Chemical Information ::

A) Chemical Reactivity:

Reactivity with Water:

EO is highly soluble in water when EO & water are heated in a sealed tube, ethylene glycos is obtained.

B) Reactivity with Common Material:

EO reacts with ammonia to form mixture of mono di and triethanol mines.

C) Polymerisation:

EO may be polymerised to give polyethylene oxide chain.

D) Combustion Products :

E) Properties:

- Physical State at 15 Deg. C and 1 Atm.
Pressure: Gas

- TLV: 50 PPM

- IDLH: ppm

- Molecular weight: 44.05

- Boiling Points: -10.7 Deg C

- Freezing Points: -.... Deg C

- Vapour Pressure: 1095 mm Hg @ 20 deg.c

- Vapour Density: (air=1).....

- Liquid Density: (Water=1): @ -34. Deg C

- Liquid Vapour conversion: 1...

ERDS FOR SULPHUR TRIOXIDE/OLEUM

Formula: SO₃ / Oleum

Liquid (Fuming oily liquid)

Flammable: Non Flammable

Flash Point: N/A

LEL- UEL: N/A

Toxic: N/A

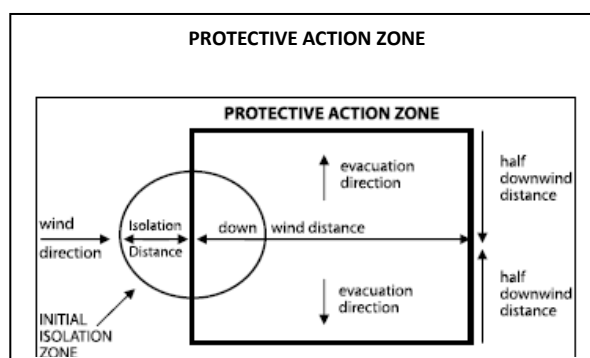
IDLH: PPM

TLV: PPM

I. General Response Action

- On-SITE: keep container dry, keep away from heat and source of ignitions
- PPEs: Face shield, full suit and vapour respirator.

II. Evacuation Zone Dimensions



Sr.No	Mass of Release	Approx. Vulnerable Distance (m) (in the direction of wind)	Approx. time to reach Max. Vulnerable Dist. (Min)
1	5	120	2
2	10	3500	20

III. Fire

- Non Flammable

Suggested Action:

- Keep away from Fluorine & chlorine trifluoride

IV. Medical ::

- Inhalation:- causes damage to human system, coughing, palmonary and olfactory changes,
- Skin & Eyes:- causes corrosive irritation and also damage to macous membrane.

Suggested Action:

- Inhalational :- Remove the victim to frsh air area, provide artificial respiration or oxygen if needed.
- Skin :- Remove the contaminated clothing and wash the affected area with plenty of water and soap.
- Eye :- Irrigate with plenty of water for 15 mins. Seek medical aid immediately.

Antidotes: N.A.

V. Pollution ::

- A leak of SO₃/ Oleum poses a significant air and land pollution hazards

VI. Chemical Information ::

- A) Chemical Reactivity:
Reactivity with Water:
It may react with violently with water to emit toxic gases.
- B) Reactivity with Common Material:
Reactive with oxidizing agents, metals, alchalties,moisture.
- C) Polymerisation:
Will not occur.
- D) Combustion Products : Not applicable
- E) Properties:
 - Physical State at 15 Deg. C and 1 Atm. Pressure: Gas
 - TLV: N.A PPM
 - IDLH: 10 ppm
 - Molecular weight: 80.06..... gm/ml
 - Boiling Points: 45.0 Deg C
 - Freezing Points: 16.8 Deg C
 - Vapour Pressure: N.A mm Hg @ 21 deg.c
 - Vapour Density: (air=1) 2.8
 - Liquid Density: (Water=1): 1.92 @ -34. Deg C
 - Liquid Vapour conversion: 1:

ERDS FOR LPG

Formula: C_3H_8 – C_4H_{10}

Colour less gas odourless

Flammable:

Flash Point: -104°C (-155°F)

LEL- UEL: 2.1 % & 9.5 %

Toxic:

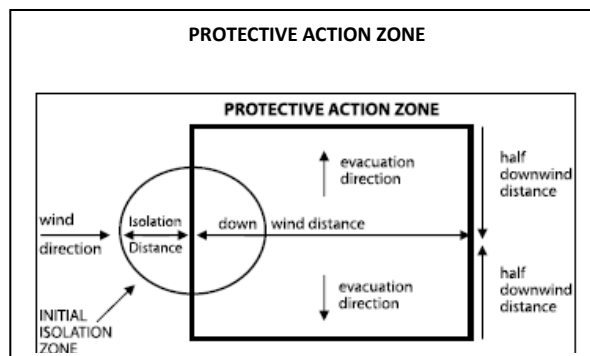
IDLH: PPM

TLV: PPM

I. General Response Action

- On-SITE: keep container dry, keep away from heat and source of ignitions
- PPEs: Face shield, full suit and vapour respirator.

II. Evacuation Zone Dimensions



Sr.No	Mass of Release	Approx. Valnerable Distance (m) (in the direction of wind)	Approx. time to reach Max. Vulnerable Dist. (Min)
1	1200	5	<2

VII. Fire

- Highly Inflammable & Explosive

Suggested Action:

- Avoid contact with oxidizers olefinic impurities may lead to narcotic effect or it may cut a simple as phycicant
- Fire Hazard when exposed to heat or flame
- If fire is big keep surrounding areas cool by spraying water.

VIII. Medical ::

- **Routes of Entry :-** Inhalation, Skin concentration in air greater than 10% causes dizziness in few minutes 1% conc. Give the same symptoms in 10 mins high conc. causes Asphyxiation.
- Liquid on skin causes frostbite.

Suggested Action:

- Remove the victim to the fresh area.
- Provide artificial Resuscitation, Remove the wetted clothes
- Wash the affected area with water

Antidotes: N.A.

II. Pollution ::

- A leak of LPG poses a significant air pollution hazard
- May cause fire and explosion - a great environmental hazard

II. Chemical Information ::

- A) Chemical Reactivity:
- Reactivity with Water:
- B) Reactivity with Common Material:
- C) Polymerisation:
- D) Combustion Products :
- E) Properties:
- Physical State at 15 Deg. C and 1 Atm. Pressure: Gas
 - TLV: PPM 1000
 - IDLH: ... PPM
 - Molecular weight.....
 - Boiling Points: - -40.0 Deg C
 - Freezing Points: -..... Deg C
 - Vapour Pressure: 23 to 123 mm Hg @ 21 deg.c
 - Vapour Density: (air=1)..: Lighter.
 - Liquid Density: (Water=1): 1.6 @ -34. Deg C

ERDS FOR METHANOL

Formula: CH_3OH

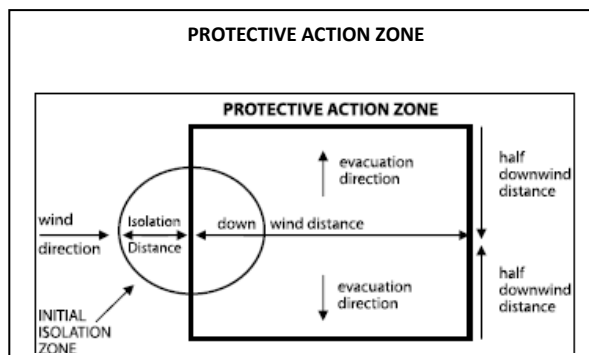
Liquid, clear, colorless&Mild characteristic alcohol odour

Flammable:	Flammable
Flash Point:	11°C
LEL- UEL:	6% - 36%
Toxic:	Yes
IDLH:	6000PPM
TLV:	200PPM

I. General Response Action

- On-SITE:
 - Use water spray to disperse the gas/vapor. Remove all sources of ignition. Absorb spill using
 - an absorbent, non-combustible material such as earth, sand, or vermiculite. Do not use combustible materials such as sawdust.
 - Use a spark-proof tool. Provide ventilation.
 - A vapor suppressing foam may be used to reduce vapors. Water spray may reduce vapor but may not prevent ignition in closed spaces.
 - Face shield and chemical splash goggles when transferring is taking place
 - Full face, positive pressure self-contained breathing apparatus or airline, and protective clothing must be worn. Protective fire fighting structural clothing is not effective protection from methanol.

II. Evacuation Zone Dimensions



Sr.No	Mass of Release	Approx. Valnerable Distance (m) (in the direction of wind)	Approx. time to reach Max. Vulnerable Dist. (Min)
1	500	100	4

III. Fire

Methanol burns with a clean clear flame that is almost invisible in daylight. Stay upwind! Isolate and restrict area access. Concentrations of greater than 25% methanol in water can be ignited

Suggested Action:

- Use fine water spray or fog to control fire spread and cool adjacent structures or containers.
- Contain fire control water for later disposal.
- Fire fighters must wear full face, positive pressure, self-contained breathing apparatus or airline and appropriate protective clothing.
- Protective fire fighting structural clothing is not effective protection from methanol.
- Do not walk through spilled product.

IV. Medical ::

Danger

Eye Contact: Remove contact lenses if worn. In case of contact, immediately flush eyes with plenty of clean running water for at least 15 minutes, lifting the upper and lower eyelids occasionally. Obtain medical attention.

Skin Contact: In case of contact, remove contaminated clothing. In a shower, wash affected areas with soap and water for at least 15 minutes. Seek medical attention if irritation occurs or persists. Wash clothing before reuse.

Inhalation: Remove to fresh air, restore or assist breathing if necessary. Obtain medical attention.

Ingestion: Swallowing methanol is potentially life threatening. Onset of symptoms may be delayed for 18 to 24 hours after digestion.

Suggested Action:

If conscious and medical aid is not immediately available, do not induce vomiting. In actual or suspected cases of ingestion, transport to medical facility immediately.

Antidotes:

Ethanol may inhibit methanol metabolism.

III. Pollution ::

Dangerous to aquatic life in high concentrations. May be dangerous if it enters water intakes

III. Chemical Information ::

- A) Chemical Reactivity:
Reactivity with Water:
Miscible soluble in water.
- B) Reactivity with Common Material:
Oxidizing agents, reducing agents, acids, alkali metals, potassium, sodium, metals powders (e.g. hafnium, raney nickel), acid anhydrides, acid chlorides, powdered aluminum, powdered magnesium.
- as
- C) Polymerisation:
Will not occur
- D) Combustion Products :
Avoid contact with strong oxidizers, strong mineral or organic acids, and strong bases. Contact with these materials may cause a violent or explosive reaction. May be corrosive to lead, aluminum, magnesium, and platinum.
- Properties:
- Physical State at 15 Deg. C and 1 Atm. Pressure: Gas
 - TLV: 200PPM
 - IDLH: 6000ppm
 - Molecular weight: 32.04
 - Boiling Points: 64.7Deg C at 1 atm
 - Freezing Points: -98Deg C
 - Vapour Pressure: 128 mm Hg @ 20 deg C
 - Vapour Density: (air=1): 1.11
 - Liquid Density: (Water=1): 7910 g/cm³
 - Liquid Vapour conversion: --

ERDS FOR AMMONIA

Formula: NH_3

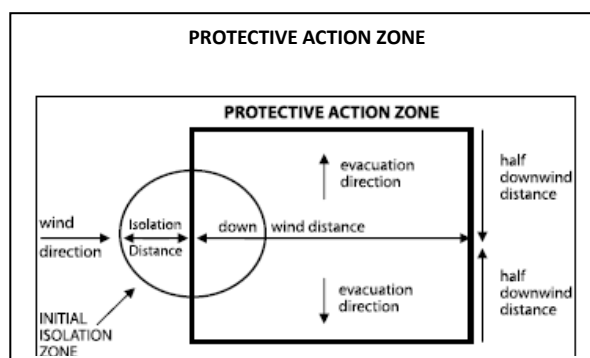
Colourless gas or liquid with pungent odour

Flammable:	Air – Ammonia mixture is inflammable
Flash Point:	N/A
LEL- UEL:	16% - 25%
Toxic:	Yes
IDLH:	300 PPM
TLV:	25PPM

I. General Response Action

- On-SITE: Stop Ammonia Leakage, if possible safely
- Wear self contained Breathing Apparatus (SCBA) and use Ammonia emergency kit
- Stay upwind, out of low areas, and ventilate closed spaces before entering. Evaluate the affected area to determine whether to evacuate or shelter-in-place by taping windows and doors, shutting off outside air intakes (attic fans, etc.), and placing a wet towel or cloth over the face (if needed). Earth-ground and bond all lines and equipment associated with the ammonia system.
- Electrical equipment should be non-sparking or explosion proof.
- Use water spray / fog to disperse and dilute vapours
- Wear PVC Suit, Goggles, Hand gloves

II. Evacuation Zone Dimensions



Sr.No	Mass of Release	Approx. Vulnerable Distance (m) (in the direction of wind)	Approx. time to reach Max. Vulnerable Dist. (Min)
1	5	500 m	3
2	10	10000 m	40

III. Fire

- Ammonia is inflammable. Fire hazards of ammonia are moderate.
- Ammonia forms flammable mixture with air within certain limits (16- 25%) by vol.
- Fire hazard increases in contact with oil or other combustible materials.

Suggested Action:

- To extinguish the fire use CO_2 , DCP or water spray.
- Cool the leaking cylinder with large amt. of water.
- To control the fire, stop the flow of the gas if possible.

IV. Medical ::

Danger

- Skin Contact – Irritation, Burn may be very painful.
- Eye Contact; Highly painful irritation of eye & eyelids
- Watering of eye.
- Serious lesions in eyes.
- Inhalation – Irritation of nose, eyes and throat.
- Difficulty in breathing
- Sudden death.

Suggested Action:

- Immediately remove the victim from the affected area & take him to the nearest shower.
- Immediately administer medical oxygen under low pressure using a pulmotor.

Antidotes: N.A.

IV. Pollution ::

- Ammonia is harmful to aquatic life in very low concentrations and may be hazardous if it enters water intakes.
- Local health and wildlife authorities, as well as operators of water intakes in the vicinity, should be notified of water releases.
- Waterfowl toxicity may occur at elevated concentrations.
- Ammonia does not concentrate in the food chain.
- The conversion of ammonia to nitrites/nitrates by bacteria in aquatic systems can reduce the concentration of dissolved oxygen (referred to as nitrogenous oxygen demand).

Effect on water treatment process: Chlorination will produce chloramines, which are more readily detected by taste and odor.

IV. Chemical Information ::

A) Chemical Reactivity:

Reactivity with Water:

Chlorine is rapidly soluble in water. When ammonia reacts with water, it forms Ammonium Hydroxide
 $(\text{NH}_3 + \text{H}_2\text{O} \rightarrow \text{NH}_4\text{OH})$

B) Reactivity with Common Material:

Ammonia is highly reactive with Sodium, Potassium at ordinary temp.

C) Polymerisation:

Hazardous polymerization will not occur.

D) Combustion Products :

Hydrogen at very high temperatures:
1544°F (840°C).

E) Properties:

- Physical State at 15 Deg. C and 1 Atm. Pressure: Gas
- TLV: 25 PPM
- IDLH: 300 ppm
- Molecular weight: 17.03
- Boiling Points: -33 Deg C at 1 atm
- Freezing Points: -78 Deg C
- Vapour Pressure: 7,600 mm Hg @ 25° C
- Vapour Density: (air=1) 0.597 @ 0° C
- Liquid Density: (Water=1): 0.6818
- Liquid Vapour conversion: 1:450

ERDS FOR SULFUR DIOXIDE

Formula: SO₂

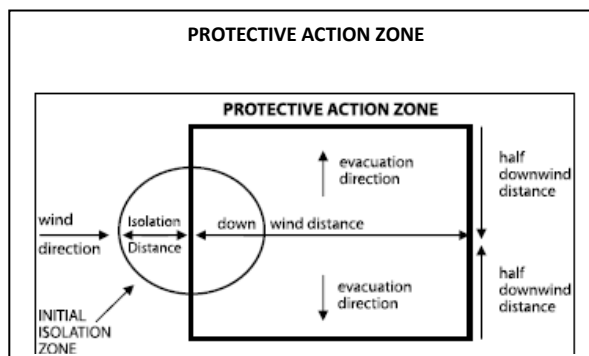
Colourless gas with sharp
pungent odour

Flammable:	Non-flammable
Flash Point:	N/A
LEL- UEL:	NA
Toxic:	Yes
IDLH:	100PPM
TLV:	5PPM

I. General Response Action

- On-SITE:
- Most metals are corroded by this product in the presence of moisture. Systems should be kept free of moisture. Purge system with dry inert gas (e.g. helium or nitrogen) before this product is introduced and when system is out of service. Carbon steel, stainless steel, Monel, or copper are suitable materials of construction for use when no moisture is present
- Safety glasses and face shield.
- Use SCBA or positive pressure air line with mask and escape pack in areas where concentration is unknown or above the exposure limits.
- Leather gloves, safety shoes, and safety glasses for handling cylinders. Acid resistant gloves and splash suit when connecting, disconnecting, or opening cylinders.

II. Evacuation Zone Dimensions



Sr.No	Mass of Release	Approx. Valnerable Distance (m) (in the direction of wind)	Approx. time to reach Max. Vulnerable Dist. (Min)
1	5	622	4
2	10	3100	15

III. Fire

Nonflammable Substance

Suggested Action:

- Keep the containers cool by spraying water f exposed to heat or flame.
- Solubility of sulphur Dioxide in water is fairlry large but water should not be put on leaking cylinder. Otherwies the leakage will be increased due to corrsion.
- It can be neutralised withh dil Caustic Soln.
- Do not expose cylinder to direct sunlight or heat.

IV. Medical ::

Danger

- **EYE CONTACT:** Immediately flush eyes with plenty of water for at least 15 minutes. Get immediate medical attention.
- **INHALATION:** Move exposed personnel to uncontaminated area. If not breathing, administer artificial respiration. If breathing is difficult, administer oxygen. Obtain prompt medical attention and continue with administration of oxygen. If airway obstruction occurs the placement of an artificial airway by an emergency medical technician may be necessary.
- **SKIN CONTACT:** Immediately flush with large amounts of water. Remove contaminated clothing, including shoes, after flushing has begun. Applications of ice water compresses for 30 minutes after

Suggested Action:

- Immediately remove the victim from the affected area & take him to the nearest shower.
- Immediately administer medical oxygen under low pressure using a pulmotor.

Antidotes: N.A.

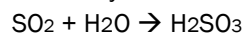
V. Pollution ::

Can cause significant air pollution and cause damage to flora and fauna and largely environment.

V. Chemical Information ::

A) Chemical Reactivity:

Reactivity with Water:



SO₂ react with water to form Sulphurous acid. Which is unstable towards heat

B) Reactivity with Common Material:

SO₂ in aqueous soln. is an outstanding oxidising / reducing agent

C) Polymerisation:

Hazardous polymerization will not occur.

D) Combustion Products :

NA

E) Properties:

- Physical State at 15 Deg. C and 1 Atm.

Pressure: Gas

- TLV: 5 PPM
- IDLH: 100 ppm
- Molecular weight: 64.06
- Boiling Points: -10 Deg C at 1 atm
- Freezing Points: -75.5 Deg C
- Vapour Pressure: 2,538 mm Hg @ 25° C
- Vapour Density: (air=1) 2.264 @ 0° C
- Liquid Density: (Water=1): 1.45 @ -10° C
- Liquid Vapour conversion:

ERDS FOR ACRYLONITRILE

Formula: C_3H_3N

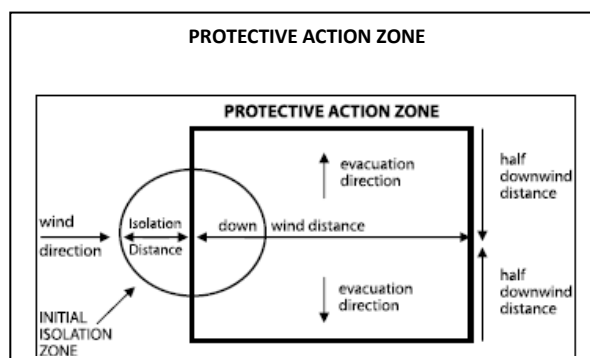
Colour less to yellow irritating odour.

Flammable:	Yes
Flash Point:	0.55
LEL- UEL:	3.1 % & 17 %
Toxic:	
IDLH:	PPM
TLV:	4.5 PPM

I. General Response Action

- On-SITE:
- PPEs. .Gloves & Face mask

IX. Evacuation Zone Dimensions



Sr.No	Mass of Release	Approx. Vulnerable Distance (m) (in the direction of wind)	Approx. time to reach Max. Vulnerable Dist. (Min)
1	302 kilogram s/sec	3.8 KM	20 MIN

X. Fire

- Flammable material : Yes
- Combustible material : Yes

Suggested Action:

- Fire Extinguisher = DCP, CO_2
- Special procedure :- Container cool by spraying water it exposed to flame or heat.

XI. Medical ::

- Vapour Inhalation may cause weakness, headache, sneezing, abdominal, pain & vomiting.
- Eye:- Causes sever irritation ingestion causes vomiting & cubdominal.

Suggested Action:

- Remove the victim to the fresh area.
- Remove the contaminated cloths & wash the affected area with soap & water.
- Eyes :- Irrigate countinously with water for 15 mins.

Antidotes:Amilnitrile, salt water.

VI. Pollution ::

VI. Chemical Information ::

F) Chemical Reactivity: Stable
Reactivity with Water:

G) Reactivity with Common Material:

H) Polymerisation: may occur spontaneously

I) Combustion Products : Emits toxic fames of NOX and CN

J) Properties:

- Physical State at 15 Deg. C and 1 Atm.

Pressure: Gas

- TLV: 4.55 PPM
- IDLH: ... PPM
- Molecular weight.....
- Boiling Points: - 77.4 Deg C
- Freezing Points: -..... Deg C
- Vapour Pressure: 100 mm Hg @ 35 deg.c
- Vapour Density: (air=1).1.83
- Liquid Density: (Water=1): 0.80 @ 20. Deg C
- Liquid Vapour conversion: ..

PART-C

PAC Analysis for Emergency Scenarios

Introduction

The PAC analysis is a method developed by PRESTELS for developing Emergency Response Plan for a particular emergency scenario. The PAC analysis clarifies the roles and responsibilities of various responders, actions to be taken and communication to be made. The PAC analysis throws light on the resources required to combat emergency. It also draws attention to the pacific's of communication that must be made.

P-A-C

The term PAC stands for Person – Action – Communication during an emergency, each responder is required to take certain Action and make certain Communication. The PAC analysis charts the Actions to be taken and the Communication to be made against every responder. The analysis begins at the onset of signs for a looming disaster and ends with the 'calling-off' of the off-site emergency.

Person

The person is an individual authority or role such as District Collector or Site Controller. It may also be group of people such as Police Constables, Bus Drivers or NGOs volunteers.

Action

The action is an act undertaken by person such as assessment of damage potential or projection of vulnerable zone or transportation of person from one place to another or diversion of traffic.

Communication

Communication is a message communicated from one person to other person(s) to initiate actions from the person(s) to whom the message is communicated.

Explanation of Columns on the PAC sheet

Person

Primary

Here, enter name of authority, role such as District Collector, Police officer or Site Incident Controller Enter the name of persons in brackets.

Alternate

Here, enter name of person who will assume temporary charge in absence of the person listed in the Primary.

Action

Act

Here, enter the activities to be undertaken such as Assess Damage, Divert Traffic and others by concerned persons.

Resource

Here enter the resource(s) required by the person to carry out his Act sufficiently and efficiently. e.g.: Nose Masks, Ambulances, Water etc.

Communication**Whom**

Here enter the authority, role to whom the communication must be made. Enter the name of person in brackets

How

Here, enter the means of communication and phone numbers as:

INT: for internal line numbers

O: for office landline numbers

R: for residence landline numbers

M: for mobile numbers

What

Here, enter the specifics of message to be communicated

Remarks

This section is to be used for making observations on the Person – Action – Communication proceeds. This section may be filled during a Mock Drill exercise

Time

Here, enter the clock time at the completion of a particular Person – Action – Communication Sequence

.

Resource Gap

Here, enter the shortcoming in resources and additional resources necessary

Communication Gap

Here, enter communication gaps observed

Other

Here, enter other observations, comments or suggestions

Serial Numbering Rules for PAC Sheet

Every row of PAC corresponds to the entity 'Person'. Number rows as '1, 2, 3...etc.'. For every 'Person', there will be numbers of actions. Label 'Act' as 'a, b, c...etc'. Every 'Act' will have its resource requirement. Label 'Resources' as 'a, b, c...etc' corresponding to the respective 'Act'. Likewise, one 'Person' may have to communicate too many others. Under communication Columns, label 'Whom' as 'a, b, c...etc' and label the 'How' and 'What' as 'a, b, c...etc' corresponding to the 'Whom' respectively. (see examples for clarity of labelling serial numbers. Wherever required grouping of serial numbers such as 'a, b)' or 'a-f)' is permitted. Where only one item exists labelling can be dropped. However, every label in 'Act' column must have a corresponding label in 'Resources' column and every label in 'Whom' column must have a corresponding label in 'How' and 'What' column. In case a particular 'Act' does not require any 'Resources', then the entry may be made as '-' in the Resources column.

Benefits of PAC

The benefits of PAC are as under:

- Clarity of roles and responsibilities to people involved in emergency management.
- Identification of resource gaps for resource planning and procurement.
- Specificity of communication and improvement in communication messages, which is crucial to efficient response mitigation.
- Improved specificity of observations during mock-drills and identification of improvement opportunities.
- The PAC can be a very effective tool for training emergency responders

Case Study 1 - Chlorine Leak

Scenario

A chlorine pipeline connected to the bulk storage tank is ruptured. Initially about 500 kg of liquid Chlorine leaks out creating a major emergency. The flow is stopped by applying special cement, and the transfer of chlorine to the spare tank is started. However, there is a danger of escalation because the cement could give way to the internal pressure before the transfer is completed. Thus, the off-site plan is activated including evacuation. The scenario incorporates situations illustrating how the plan is activated, how each responder responds and what problems arise.

Development

The incident occurs at 4-30 pm when the second shift has started. As soon as the emergency occurs, the shift maintenance engineer assumes charge of Incident Controller. The Dy. Chief Engineer who is in charge of the factory at that time assumes the charge of Site Controller. He informs the District Collector, Fire Brigade, Police, Medical Officer and other agencies. He informs the Chief Maintenance Engineer, who arrives and takes over as the Incident Controller. He informs the CEO/Manager, who immediately reaches factory and then takes over as Site Controller from Dy. Chief Engineer.

The RDC who was in the office when the message is received assumes the charge and informs the Collector who reaches office in 15 minutes. Before the Collector arrives, the RDC has activated the Plan and has

informed the Fire Brigade, Police, Medical Officer, Transport provider among responders and has confirmed that they have received the information and have initiated their action.

Meanwhile the Site Controller procures and projects the details on extent of emergency and informs it to the District Collector, Fire Brigade, Police and other responders. He informs that the situation is getting under control but can develop into a major emergency requiring intimation to public to stay confined indoors and evacuation from certain areas. He also identifies the area likely to be affected and gives the details to the agencies.

The Police block the traffic, send a vehicle with loud speaker to alert public to go stay confined indoors. Those who are on the streets are directed to walk crosswind.

Police realize that a public meeting is going on an open ground nearby. A constable is sent to ask the public to walk away in particular direction and get inside confined shelters. The leaders of the political party conducting the meeting (which is the opposition party) take it amiss and refuse to disperse, taking it as a ploy to prevent their meeting. A senior officer is deputed with a police van. The leaders understand the gravity and situation is under control. People start evacuating the ground.

In a nearby cinema house a show is going on. Police inform the manager of cinema theatre. An announcement is made to ask the people to stay inside. The air conditioning system is stopped. As the AC system is stopped the people are uncomfortable and in bad mood. Situation is tactfully controlled.

Hutments near the factory, are not "gas-proof", staying inside is not safe. The Collector asks State Transport to dispatch buses to undertake evacuation. The ST drivers refuse, questioning about their safety. There are no PPE for them. They are persuaded to go with wet cloth tied over the nose. A decision is taken to evacuate women, children and old people first. They are shifted to "shelters" (such as school). Food and water arrangements are made through the civil supplies department and help from NGOs.

There is a milk dairy in the vicinity. The cattle are in open sheds and hence not safe. Evacuation is difficult. The dairy owners are asked to cover the sides of the sheds by tarpaulin sheets, which are provided by the nearby supplier. People affected by chlorine are shifted to hospitals and treated by medical teams.

The Fire Brigade tenders help the Incident Controller to establish water curtains.

Ambulance is kept ready near the incident-spot, in case anybody from the incident controller's team gets affected.

The District Collector continuously monitors the actions being taken and ensures proper coordination amongst the responding agencies. The District Collector also requests for additional assistance from the neighbouring districts and the State Authorities. The Collector also is constantly in touch with the Site Controller at the factory to know the status and to ascertain the developing situation. (For example, the wind direction may change, leak may aggravate.)

The Incident Controller and his team work hard and ensure that the emergency does not escalate further and Chlorine is transferred from the affected tank to the spare tank.

When the Chlorine transfer to safe spare tank is complete, the Site Controller informs the District Collector, who calls off the emergency.

Arrangements are made to ensure that the people who were shifted from the hutments are again brought back to their homes. The Factory Inspectorate initiates accident investigation. The Pollution Control Board alerts the District Collector on the possible pollution and its effects on near and distant future. The long term clean up and post-emergency restoration activities are initiated.

Case Study 2 - Transportation Emergency

Scenario

Tanker carrying highly flammable naphtha overturns on mountainous road (goat) and develops a leak after its valve is damaged. The leak is minimal but can develop further if untreated. The driver and his assistant (cleaner) are luckily not injured. The tanker belongs to Kerala state and accident takes place in Karnataka state.

Development

The driver, using his cell phone, tries to call the Police Control Room but the network is weak. Meanwhile, the cleaner requests a passing vehicle to report the incidence to the next police station on way.

The driver succeeds in calling the Police Control Room and informs them about the type of emergency, location and what help is required. The driver also tries to contact his employer. (The Police also receive information from the driver of a passing vehicle, which had seen the overturned vehicle.)

The cleaner tries to keep the moving traffic as far away as possible by using stones and tree branches. (He improvises because he is not carrying the equipment for road blockage like the portable plastic cones or a barrier stand). He is unable to repair or stop the leak.

Some local nomads gather and try to collect the leaking liquid. Driver tries to stop them, warns them about the hazard.

Traffic jam ensues.

The police team reaches the spot. The police control room alerts and transmits information to District Collector, Fire Brigade, Medical Office, Police headquarters for additional staff to control the situation. The District Collector declares and off-site emergency. The technical team to repair and stop the leakage, a spare tanker and a crane to move the overturned tanker is called for.

The driver briefs the police who have arrived at the spot and they immediately stop the traffic, and also disperse the crowd local nomads. TM.

(Observe that first the driver and later the police team are the 'Incident Controllers'. The officer at the Police Control Room is the 'Site Controller')

The technical team arrives and the leader of the team takes charge as the 'Incident Controller'. The repairs stopped the leakage, but it is decided that the tanker will be emptied before it is made to stand on its wheels. The fire brigade arrives and is kept on standby in case its service is required. The spare tanker, requested earlier, arrives. The transfer is started. The crane arrives and the overturned tanker is lifted. The police regulate the traffic and the jam is gradually reduced. The incident is brought under control. The off-site emergency is called off and the post-emergency operations are initiated.

(Note: The following PAC draft may show the same communication or task being done by multiple agencies. This is to ensure that intimation has reached at least from one source or action is initiated in fastest possible manner.)

Role of Incident Controller and Site Controller

The Site Controller and the Incident Controller are the two vital roles in the management of emergency. This note seeks to clarify the two roles.

Incident Controller

The incident controller is responsible for attending to the source or the cause of emergency. He leads the team involved in repairing, controlling and preventing escalation at the source. He is expected to have the required technical knowledge, skill and resources required to attend to the incident causing emergency. For example, if there is a crack in a pipeline carrying toxic gas, he ensures that the valve on the supply line is closed and repairs the damaged pipeline. If a bulk

Storage tank has a crack, transfer of the contents to a spare tank is started and repairs undertaken.

The incident controller co-ordinates with only the 'Site Controller' (see below). The incident controller must ask for any additional help (staff, tools, material, equipment etc required for dealing with the incident) from the Site controller. The site controller will arrange for the same at the earliest. This enables incident controller to concentrate on his job of attending to the incident without being burdened by communication tasks. Also, in the normal course, the incident controller does not directly interact with the outside industry authorities and agencies such as the District Collector, Fire brigade, Police etc. This is done by the site controller.

The incident controller gives continuous feedback about the status of the operation to the site controller.

Site Controller

The 'Site Controller' is overall in-charge of the operation at the incident-site. While the incident controller attends to the source or the cause of emergency, the site controller will be in the Emergency Control Room (ECR). The ECR is a place to be well equipped with telephones, drawings and maps, computer programs for dispersion modelling etc.

The site controller ensures that the off-site responders (District Collector, Police, Fire Brigade etc) are given quick intimation. He also ensures prompt assistance to the requirements of the incident controller. He may have to arrange the assistance from the factory itself or get help from outside (from fire brigade, mutual aid member, stockiest etc). He will continuously monitor the progress and give information to the offsite responders. He will identify the areas likely to be affected and communicate the same to the responders. He will update all concerned responders with the emergency status. For example: Escalation in the emergency, change in wind direction etc. The site controller will also communicate the necessary information to the media and public at large. In short, the site controller acts as the focal point who on the one hand interacts with the incident controller to give him required assistance and know the status and on the other hand, interacts with other district authorities and agencies to give information.

Temporary Assumption of Roles

It needs to be noted that 'Incident Controller' and 'Site Controller' are emergency roles. It is not necessary that only the one person will act as incident controller / site controller from beginning to end. For example, when a valve fails and toxic gas starts leaking, the person on the spot assumes the charge of incident controller till a senior expert, personnel (appointed incident controller) reaches the spot and takes over from him. This will be especially true when the incident happens during a late night shift, when only the skeleton staff may be present. Similarly, a senior person present will assume the charge of site controller till the manager / CEO (appointed Site Controller) reaches the factory and takes over.

For a transport emergency, the driver may be the first incident controller till the Police team and subsequently a technical team reaches with tools to take care of the emergency. Then the police and later the technical team leader will be incident controller.

It may be mentioned that it is difficult to lay down specific and rigid guidelines in this respect. What is important is that the relevant functions are carried out efficiently, smoothly and promptly. There should be no loss of time, there should be no conflict, and the aim should be to bring the emergency control as fast as possible with least damage or loss.

Glossary of Terms

Blast wave: A pressure wave generated from explosion.

BLEVE: Boiling Liquid Expanding Vapour Explosion usually occurs from a sudden release of large mass of liquid under pressure. The most likely scenario is a flame of fire impinging on a vessel above the liquid level thereby weakening the vessel and causing sudden rupture.

Consequence: The outcome of an incident.

Consequence analysis: The analysis of the possible manifestation and effect of an incident.

Dispersion model: The mathematical model describing the dispersion of a material release, usually in free atmosphere.

Domino effect: The triggering of secondary incidents from a primary incident, thus leading to increase in the consequence or the vulnerable zone. For example: Explosion of a tank producing high pressure wave leading rupture and subsequent toxic release from a neighbouring tank.

Dovetailing: The process of aligning a sub-level plan to higher level plan. For example, the onsite plan of a factory should be in line and agreement to the offsite plan of the district in which the factory is situated. The onsite procedure or part thereof should not be in conflict with the offsite procedure or a part thereof.

Explosion: Sudden release of energy that causes pressure disturbance.

Fireball: The atmospheric burning of fuel-air mixture in which thermal energy is radiated.

Flash point: The lowest temperature at which the liquid can produce sufficient flammable vapour to ignite in presence of external source of ignition.

Hazard: A chemical or physical condition that has the potential for causing damage to people, property, or the environment.

Hazard Analysis: A process used to identify hazards and select means to controlling or eliminating them.

Incident: The undesirable loss of containment of material or energy. For example, gas release, fire or explosion.

IDLH: Immediately Dangerous to Life and Health is an estimate of the maximum concentration in the air to which a healthy person could be exposed for a specified period of time (30 minutes as per NIOSH standards) without suffering permanent health effects.

Lower Explosive Limit (LEL): The concentration of a flammable vapour in air below which the air –vapour mixture will not ignite.

Maximum Credible Loss Scenario (MCLS): A loss scenario with a maximum damage effect, which is believed to be possible.

Over pressure: The pressure above the normal atmospheric pressure, usually arising from a blast wave.

Plume: The gas cloud resulting from a continuous release.

Pool fire: The combustion of material evaporating from a layer of liquid underneath.

Risk: A measure of human, property or environmental damage in terms of both the magnitude and the likelihood of damage.

Risk assessment: The quantitative estimate of risk.

Upper Explosive Limit (UEL): The concentration of a flammable vapour in air above which the air vapour mixture will not ignite.

UVCE: Unconfined Vapour Cloud Explosion is open explosion of flammable vapour and air. The term is also referred to as Vapour Cloud Explosion.

Vulnerable zone: The area that can get affected by an incident. For toxic release, it is the area over which the airborne concentration of toxic gas exc. needs certain accepted level of concentration. For fire, it is the area over which the intensity of heat radiation exceeds certain accepted levels. For explosion, it is area over which the pressure of blast wave exceeds certain accepted level.

PAC Analysis for Emergency Scenarios - Explanation Sheet

Sr.	Person		Action		Communication			Remarks(To be filled by observers During Mock Drill Trial)			
	Primary	AlterNet	Act	Recourse	Whom	How	What	Time(min)	Recourse Gap	Communication Gap	Other
1	Incident Controller	(Name Of Incident Controller)	Action Required By Incident Controller	Recourse Required To Carry Out To Assigned Action	What Is To Be Contacted	How Is The Person To Be Contacted	What is message to be Communicated	Time Taken	Recourse Gap Observed	Communication Gap Observed	Other Remarks, If any
2					Police Officer	Mobile-Landline	Extent of Damage ,Extent Of Disaster Possible				

PAC Analysis

Emergency Scenario Description: 10T Chlorine Bullet leak at ABC Chemicals, Anandnagar (0261)

PRESTELS PAC ANALYSIS for EMERGENCY SCENARIOS - ILLUSTRATION PURPOSE ONLY

Sr.	Person		Action		Communication		
	Primary	AlterNet	Act	Recourse	Whom	How	What
1	Incident Controller		a)Attend To leakage With Maintenance Team b)Start Transfer activity c)Use neutralizing Medium For Spilled Liquid ,Fog And Curtain To Prevent Spread.	a)Team Of Trained Works ,Equipment For Repairs , Emergency Kit ,Local Exhaust,SCBAs,Special Quick Setting Cement b)Permanent Piping Arrangement For Transfer To Other Storage Vessel. c)Neutralizing Medium, Gas Scrubbing Arrangement ,Water For Creating Fog And Water Curtain	Site Controller	INT:202	Chlorine Leak From Pipe Of bulk Storage Tank ,Flow Being Stopped Temporarily By Using Cement Transfer Being Started Help Of Fire Brigade For Fog And Water Curtain Needed Assessed Quantity Spilled About 3 kg And That Leak May start Again If Cement gives way.
2	Site Controller		b)Coordinate actions with Incident Controller For Staff ,Material,Equipment,Experts Advise And Arrange For Help c)Identify If All Workers Are Safe And Arrange For Rescue Where Necessary .	Templates ,Windsock, Plant And Area Map b)Internal Telephone c)Transport For Injured d)Communication Centre	a)District Collector b)Police c)Fire Brigade d)Factory Inspector e)Mutual Aid Representative g) Media		a-f) The Nature Of Emergency ,Consequences ,Area Likely To Be Affected Presently And If Emergency Is Escalated, What Help is Required g)Nature Of Emergency ,Area Likely To Be Affected And Precautions to be taken by Public at Large.

PAC Analysis

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PRESTELS PAC ANALYSIS for EMERGENCY SCENARIOS - ILLUSTRATION PURPOSE ONLY

Sr.	Person		Action		Communication		
	Primary	Alternate	Act	Resource	Whom	How	What
3	District Collector	Asst.District Collector	a) Conform That Police Fire Brigade And Medical Officer have received information and activated their plan. Direct them suite by. b) Direct concerned Revenue official For Evacuation, sheltering arrangement wherever necessary. c) Monitor Situation At factory continuously and in the affected area and issues directions to responders. d)Requisition from Authorities and Agencies (both Government and Private) such as transportation, water , Electricity Providers as necessary. e)Arrange Media Center To Give information to media,public,families.	a-d) Area map vulnerably ability Templates ,telephones e)Communication centre	a)Police b)Fire Brigade c)Medical officer d)state Transport depot manager e) Electricity board official f)Water supply officer g)Supply officer (Revenue Dept.) h)Station Master i) Media j)Outside District Authorities (neighbouring districts ,state authority)		a) Inform police about nature of emergency per sifting wind direction, affected areas, isolation area, and arrangement for warning and preparation for evacuation. b)Inform Fire Brigade abo requirement us nature of emergency ,wind direction ,casualties in the factory ,rescue requirement ,mitigation requirements. i) Arrange for informing public through local cable TV, SMS, local FM Radio, PA system. stop the traffic on the railway line passing through the area likely to be affected. shelters, food. h) Direct station master, Anandnagar to and instruct him to be ready to arrange to evacuate people in coordination with police and to arrange for providing safe Tenuous water supply with proper pressure. g) Alert supply officer (revenue dept.) Constant electric supply to the area. f) Direct water supply officer to ensure con- from DC/police. e) Direct electricity board officials to ensure Area. Direct him to keep buses ready with drivers, full with fuel and await instructions d) Inform State Transport depot manager about nature of emergency, likely affected Likely to be affected. Direct medical officer to alert hospitals in the area. c) Inform medical officer about nature of emergency, casualties in the factory, area j) Request for all additional help required to mitigate the emergency.

Sr.	Person		Action		Communication		
	Primary	Alternate	Act	Recourse	Whom	How	What
4	Fire Brigade Chief	Deputy Fire Chief	a) Arrange for water curtains and fog around the spilled liquid chlorine in association with the factory fire team. b) Rescue the affected persons. Evacuate them and other casualties and hand over to medical team.	a) Water, nozzles for fog and curtain, fire tenders, SCBAs. b) Fire tender with extendible ladders , SCBAs, stretchers, arrangement to lower the stretchers from height.	a) Fire Brigade (neighboring District) b) Medical Officer c) District Collector		a) Request for fire tenders. B) Inform location of effected rescued persons. c) Request for additional assistance from Fire Brigade of Neighboring cities, districts if required.
5	Police Superintendent	Deputy Police Superintendent	a) Cordon off area, stop traffic going towards effected area. b) Arrange for warning public. c) Arrange for personnel at various spots to maintain law and order .d) Send Police to public congregation to ask them to stay confined. e) Make arrangements to evacuate dwellers from neighbouring hutments, which are likely to be affected. Hand over charge of evacuees to revenue officer. f) Interact continuously with site controller and District Collector.	a) Barricades' b) PA system fixed on Jeeps. e) Police Personnel, vehicles f) Telephone	a) Commandant Home Guards b) Commandant Civil Defense c) State Transport Manager d) District Collector e) Neighboring District Headquarters		a) Inform where they are needed and about action to be taken. b) Inform where they are needed and about action to be taken. c) Request to arrange buses to evacuate people from public congregation and hutments. d) Inform ground-status and request for Additional arrangements or measures to be taken. e) Inform emergency and ask for additional Staff and resources.

Sr.	Person		Action		Communication		
	Primary	Alternate	Act	Recourse	Whom	How	What
6	Medical officer	Asst. Medical Officer	a) Arrange for ambulances, doctors and staff. b) Arrange for oxygen and other requirements for Emergency treatment.	a) Ambulances, Doctors, Nursing staff b) Oxygen Cylinders	Identified hospitals and doctors		Inform about nature of emergency, and ask them to be ready for treatment. Inform about likely number of casualties and ask them to make beds available promptly, dispatch ambulances and pick up casualties in Coordination with Police and other authorities.
7	State Transport Manager	Asst.State Transport Manager	a) Keep vehicles ready with drivers and with sufficient fuel. Ascertain number of buses, pick points, routes and destinations from District Collector and Police. Dispatch vehicles with necessary instructions to drivers as directed by Police / District Collector for evacuation, or for transportation of provisions. b) Arrange for more vehicles from other depots if required.	a) Buses, water tankers, Drivers. b) Telephone	a) Police/ District Collector b) Other depots for additional vehicles		a) Details of requirements of buses, pickup points, routes, destinations b) Requirement for additional vehicles
8	Factory Inspector In-charge	Deputy Factory Inspector	a) Visit site in coordination with technical experts. b) Investigate accident in due course.	a) Transport arrangement. b) Investigation form	a) Experts b) Mutual Aid Members		a) Inform about emergency and seek their technical advice. b) Direct to provide assistance in handling emergency.

Sr.	Person		Action		Communication		
	Primary	Alternate	Act	Recourse	Whom	How	What
9	TechnicalExperts 1	TechnicalExperts 2	a) Respond with appropriate technical advice to the factory, District Collector, Police, Fire Brigade, medical officer, factory inspector. b) Visit site in coordination with District Collector, Factory Inspector to provide necessary advice.	a) Own expertise, technical reference library, internet facility, telephone b) Vehicle	a) Factory b) Factory inspector c) District Collector d) Fire Brigade e) Medical Officer	--	a-e) Technical advice for handling emergency
10	Pollution Control Board Member	---	Project areas to be affected and monitor chlorine concentration levels at various spots	Monitoring equipment	--	--	--
11	Electricity Board	---	Ensure uninterrupted electric supply to the factory and at shelters	--	--	--	--
12	Animal Husbandry	---	Provide necessary care for cattle of the Dairies, arrange for veterinary doctor.	--	Veterinary doctor	--	Look after the cattle

Sr.	Person		Action		Communication		
	Primary	Alternate	Act	Recourse	Whom	How	What
13	Civil Defense and Home Guards	--	a) Co-ordinate with Police and arrange to control traffic, assist in evacuation. b) Assist Police for security of evacuated property.	a, b)Staff	Police	--	Information regarding evacuation and traffic control arrangements
14	PWD/Water Supply	--	a) Ensure continuous water supply with Adequate pressure for Fire Brigade. b) Arrange drinking water at shelters. c) Ensure water for the cattle.	a)Water, b)Drinking water c)water for cattle	--	--	--
15	Civil Supplies Department	--	Arrange for food, water and other basic amenities as necessary for evacuees	Food, water and other basic amenities	--	--	--

Sr.	Person		Action		Communication		
	Primary	Alternate	Act	Recourse	Whom	How	What
16	Railway Station Master	--	a) Stop trains passing through the affected area as advised by District Collector. b) Coordinate with Police if evacuation is necessitated.	--	--	--	Ground status reporting
17	Head of Local Government Body	--	Mobilize resources required under the control of the body like buses, shelters (community halls, town hall, schools), food and water supply	Emergency Shelters, Food and Water supply	District Collector	--	Find out resources, personnel help required
18	Telecommunication Department	--	Ensure that communication lines are efficiently working	-	--	--	--
19	NGO	--	a) Assist emergency responders. b) Help families of casualties, counsel victims.	--	--	--	--
22	Information OFFICER	--	Disseminate vital information to public in a responsible manner	--	Public at large	Media channels	Precautions and actions to be taken by public

Sr.	Person		Action		Communication		
	Primary	Alternate	Act	Recourse	Whom	How	What
1	Driver	Co-Driver	a) Call the Police. Request passing vehicles to inform the police, if phone out of range. b) Stop vehicles and divert traffic away from leaking tank. c) Warn people by putting up display board stating 'Danger'.	a) Phone b) Road blocking arrangement c) Display board of 'Danger'	a) Police Control Room b) Employer	--	a) The tanker carrying highly flammable Naphtha has overturned, there is leakage from the valve and there is a danger of fire and possible explosion. Details of location. Traffic has to be stopped. Repairs needed and spare tanker for transfer of material required. Crowd is gathering and needs quick control.
2	Police control room	Police control room	--	---	a) Nearest Police Station b) District Collector c) Fire Brigade d) Medical Officer e) Mutual Aid Group coordinator	--	a-e) The details of the incident and details of exact location.

Sr.	Person		Action		Communication		
	Primary	Alternate	Act	Recourse	Whom	How	What
3	Leader of Police team at the spot 1	Leader of Police team at the spot 2	a) Stop traffic from both directions. b) Cordon off area to ensure that people are at safe distance c) Ensure that there is no source of Ignition like a smoking Bidi/cigarette. d) Ensure that there is no blockage of Smooth arrival of emergency responders.	--	Police control room ---	--	Request for enforcements, if Needed, Update on status at site.
4	District Collector	Assistant District Collector	Ascertain type of accident and possible consequences	--	a) Fire Brigade b) Medical Officer c) Mutual Aid Group d) Road transport Authority e) Provider of crane, spare tanker with pumping arrangement f) Inspector Factory	--	a-c Inform about the incident etc, if they have not received it earlier, monitor progress of action taken. d) Inform about the incident and location, and direct him to arrange for a crane and a spare tanker. not received it earlier, monitor progress of Direct him further to reach the spot. e) Requisition for resources such as crane, spare tanker with pumping arrangement, if required. f) Inform about incident and direct to seek appropriate technical advice.
5	Fire Brigade Chief	Deputy in charge-Fire Brigade	Send a fire tender to the spot.	--	--	--	
6	Medical Officer	Asst. Medical Officer	Arrange to send an ambulance from a source nearest to the spot.	Ambulance	Hospitals		Inform about the Incident. Request them to be in state of Readiness if there are fire/explosive casualties.

Sr.	Person		Action		Communication		
	Primary	Alternate	Act	Recourse	Whom	How	What
7	Road Transport Authority Chief	Deputy officer, RTO	a) Arrange for resources required such as crane, spare tanker with pumping arrangement. b) Proceed to the spot for rendering assistance. c) Initiate accident investigation	a) Resource directory b) Vehicle c) Accident investigation report format	Nearest provider of crane, spare tanker with pumping arrangements	--	Requisition for crane, spare tanker with Pumping arrangement.
8	Factory Inspector	factory Inspector	a) Arrange for technical assistance from technical experts. b) Direct Mutual Aid Group to render assistance.	a) Resource directory b) Telephone	--	--	--
9	Mutual Aid Group coordinator	---	a) Arrange for resources required such as crane, spare tanker with pumping arrangement. b) Proceed to the spot with technical experts for rendering assistance.	a) Available resources b) Vehicles, Transport arrangement	a) District Collector b) Police c) Fire Brigade d) RTA	---	a-d) Inform and offer available resources to mitigate the emergency.
10	Owner of vehicle involved in above accident	Manager at Owner's facility	a) Arrange for resources required such as crane, spare tanker with pumping arrangement b) Proceed to the spot for rendering assistance	a) Available resources b) Vehicles, Transport arrangement	a) District Collector b) Police c) Fire Brigade d) RTA e) Neighboring Owners of such transportation companies.	---	a-d) Inform and offer available resources to mitigate the emergency e) Inform about incident details and seek assistance