

RISK ASSESSMENT REPORT

1.1 RISK ASSESSMENT AND DISASTER MANAGEMENT PLAN

1.1.1 Risk Assessment & Damage Control

Risk assessment is the determination of quantitative or qualitative value of risk related to a concrete situation and a recognized threat.

Accidental risk involves the occurrence or potential occurrence of some accident consisting of an event or sequence of events resulting into fire, explosion or toxic hazards to human health and environment.

Activities requiring assessment of risk due to occurrence of most probable instances of hazard and incident are both **onsite and off-site**.

1.1.2 Scope Of The Plan

- General Scope–Management of all foreseeable emergencies in JSWSteel Limited – Dolvi Works.
- Worst type of accidents anticipated, based on which the present plan has been prepared

1.1.3 Objectives

Statements detailing the outcomes expected to be achieved from applying the plan should be documented, for example:

- To control or limit any effect that an emergency or potential emergency may have on or off site.
- To facilitate emergency response and to provide such assistance on the site as is appropriate to the situation.
- To ensure that all vital information is communicated to relevant and external agencies as soon as possible.
- To facilitate the reorganization and recovery operations so that normal operations can be resumed.
- To provide relevant emergency training so that a high level of emergency preparedness can be continually maintained.
- To provide a basis for the revision of emergency procedures.

1.1.4 Hazard Identification & Risk Assessment (HIRA) for Integrated Steel Project

The steel manufacturing industry is labor intensive and uses large scale and potentially hazardous manufacturing processes. The industry experiences incident rates that are high compared with some other manufacturing industries.

Steel industries experiences risk of a number of hazards inherent to the cement production process. Following hazards may occur:

Table 1:
Types of Emergencies with Locations

S. No.	Types of Emergencies	Locations having Highest Potential
1	Fire	Blast Furnace, Sponge iron Plant, Natural gas Feed lines, Gas line network, HSM, Steel Melting section, Cable Galley, Oil Cellars & LCP.
2	Spillage of molten Metal	Blast furnace – ladle transport – HSM, Steel Melting Section
3	Explosion -	Confined or unconfined vapour cloud explosion of the flammable cloud on leakage or rupture of natural gas, Reformed gas or Blast Furnace gas pipe lines / equipments.
4	Release of Carbon mono Oxide	Sponge Iron Plant, Blast Furnace / Steel melting furnace, Coke Oven Plant.
5	Release of Coke Oven Gas	Coke Oven, Gas holders
6	Release of Oxygen Gas	Oxygen plant, tankers
7	Structure Collapse	Sinter Main stack, Roof, BF, HSM, BM Structures

1.1.5 Preliminary Hazard Analysis

A preliminary hazard analysis is carried out initially to identify the major hazards associated with storages and the processes of the plant. This is followed by consequence analysis to quantify these hazards. Finally, the vulnerable zones are plotted for which risk reducing measures are deduced and implemented.

Table 2 (a):
Preliminary hazard analysis

S.No.	Section/Process Plant	Operation	Hazards	Preventive / Precautionary measure
1	RMHS	Material transfer through Belt Conveyers, screw Conveyers and Storage of material in heaps	Generation of dust / Trip hazard due to moving conveyers	- Waterspraying systems available - Use of Dust mask ensured Working on moving machine with proper power isolation
2	Sinter	Formation of gravels of mixed raw materials and recycled products by heating in furnace	Generation of dust / Noise Exposure of CO	- Use of Mask & Ear Plug - On line gas detection system / Portable monitors and On Line BA set available
3	Sponge Iron Plant	Reduction of ore and formation of lumps for feeding into steel melting shop	Generation of dust / Noise Exposure of CO / Trip hazard due to moving conveyers	- Use of Mask & Ear Plug - On line gas detection system / Portable monitors and On Line BA set available Working on moving machine with proper power isolation
4	LCP	Lime, Dolo & Quick Lime production & Transportation	Dust generation during material transfer through belts and tanker loading.	De-dusting systems (Kiln Proper, Raw material & product), Installation of Telescopic Chutes at Tanker loading points & Installation of Industrial Vacuum Cleaner.
5	Blast Furnace	To convert the raw ore into molten iron with generation of CO and Hydrogen which is	Generation of dust / Noise Exposure of CO / Trip hazard	- Use of Mask & Ear Plug - On line gas detection system / Portable monitors and On Line BA

S.No	Section/Process Plant	Operation	Hazards	Preventive / Precautionary measure
		utilized elsewhere?	due to moving conveyers Molten Metal Fire & Explosion	set available Working on moving machine with proper power isolation Suitable PPE provide • Hydrant system are in place • U-seal & Drip pots available to arrest BF gas leaked from line
6	Steel Melting Shop	Mixing and melting of iron. Ladle lancing	Trip hazard due to moving conveyers Molten Metal Fire & Explosion Generation of dust / Noise Burn injury due to back fire	• Working on moving machine with proper power isolation Suitable PPE provide • Hydrant system are in place • U-seal & Drip pots available to arrest BF gas leaked from line • Use of Mask & Ear Plug • Use of special type of hand gloves
7	Caster	Casting of slabs	Hot Slabs	
8	Mill	Conversion of slabs into steel sheets and their coiling	Trip hazard due to moving / rolling sheets Heat	• Working on moving machine with proper power isolation
9	Coil Yard	Product storage / material handling	Fall of coils and injury	• Follow of SOP
10	Logistic	Dispatch of materials	Fall of material during transportation	• Adequate arrangement for binding / fixing of materials in wagon / trailer
11	Store	Storage of all type of spare parts & disposal of wastes.	Fall of material Fire	• Storage of material in separate bins • Availability and operability of fire hydrant lines
12	Utility	Oxygen storage & distribution, Compressed air plant and its distribution, Water Storage & distribution.	Explosion in SMS due to excess oxygen	• Controlled distribution by taking engineering controls
13	CPP	Generation of power from BF Gas	Fire & Explosion	• Control on BF gas and ensuring proper functioning of U-seal
14	Central Work Shop	Fabrication and repairing of spare parts in machine shop	Trip hazard due to moving machines	• No loose clothing • Follow of SOP's

Table 2 (b):

Plant wise Hazard area and Current Controls

S. No.	Plant / Section	Hazards	Location	Permissible Exposure Limit (PEL)	Current Controls
1	RMHS	Dust	Junction House	10 mg/m ³	Water spray systems are available to prevent prolonged exposure Use of Dust mask ensured
2	Sinter	Dust levels mg/m ³ & Dioxins and furans	Flux and coal Crushing House	10 mg/m ³	Bag filters Use of Mask is ensured

S. No.	Plant / Section	Hazards	Location	Permissible Exposure Limit (PEL)	Current Controls
		Noise levels dB(A)	Flux and coal Crushing House	90 dB(A)	No continuous exposure of the personnel Use of Ear Plug / Ear muff
3	Sponge Iron Plant	Dust levels mg/m ³	Product ware house	10 mg/m ³	No Prolonged exposure of personnel to dust and use of dust masks
		Noise levels db(A)	Injector stack fan area	90 dB(A)	No Prolonged exposure to noise and use of ear protection
		Exposure to CO - PPM	PG compressor area	50 ppm	On line gas detection system / Portable monitors and On Line BA sets are available . Hydrant system are in place U-seal & Drip pots available
4	LCP	Dust generation- mg/m ³	Kiln - 1 Stack	10 mg/m ³	De-dusting systems(Kiln Proper, Raw material & product), Installation of Telescopic Chutes at Tanker loading points & Installation of Industrial Vacuum Cleaner & use of Dust Masks
5	Blast Furnace	Generation of dust (mg/m ³)	Coal Injection, Stock House	10 mg/m ³	Mandatory use of Dust mask
		Exposure to CO- PPM	Cast House Stock GCCS room	50 ppm	On line gas detection system / Portable monitors and On Line BA sets are available . Hydrant system are in place U-seal & Drip pots available. Eye washer & shower
		Heat stress (WBGT)	Cast House & SGP Drum area	25 (WBGT)	No continuous exposure to personnel, Job rotation, provision of rest areas and adequate hydration when working there
6	Steel Melting Shop (SMS)	Noise- dB(A)	Shell - 3 during arcing	90 dB(A)	High noise levels are only found during the arcing. Mandatory use of ear protection
		Heat (WBGT)	Near Shell	25 (WBGT)	No continuous exposure to personnel, Job rotation, provision of rest areas and adequate hydration when working there
		Generation of dust (mg/m ³)	9 M	10 mg/m ³	No prolonged exposure to personnel GCP has been installed to reduce the dust levels mandatory use of Dust mask

S. No.	Plant / Section	Hazards	Location	Permissible Exposure Limit (PEL)	Current Controls
7	Caster	Noise dB(A)	C-1 mould cooling room	90 dB(A)	No prolonged exposure to personnel and Use of ear protection
		CO (PPM)	Caster 1 Segment 3	50 ppm	No exposure to personnel, On line gas detection system / Portable monitors and On Line BA sets are available . Hydrant system are in place U-seal & Drip pots available. Eye washer & shower
8	Mill	Noise dB(A)	TF-A- Discharge floor	90	No prolonged exposure to personnel and mandatory use of ear protection
		CO - ppm	Tunnel Furnace A - Zone 5	50 ppm	Gas levels only detected during draining of gas lines and no exposure to personnel is ensured On line gas detection system / Portable monitors and On Line BA sets are available . Hydrant system are in place U-seal & Drip pots available. Eye washer & shower
		Heat (WBGT)	Sampling station	25 (WBGT)	No continuous exposure to personnel, Job rotation, provision of rest areas and adequate hydration when working there
16	Coke Oven	Heat (WBGT)	Steam Boiler house inlet	25 (WBGT)	No continuous exposure to personnel, Job rotation, provision of rest areas and adequate hydration when working there
		COG & NH ₃ - PPM	Gas Booster & Decomposer area	50 / 25 ppm	No continuous exposure to personnel On line gas detection system / Portable monitors and On Line BA sets are available. Hydrant system are in place. U-seal & Drip pots available. Eye washer & shower
		PAH			Charging emission control HPLA, CGT car.

1.1.6 Communication Facilities

To communicate emergency following communication systems are being used:

For Internal communication (Within the Factory)	By Siren & Walky-talky sets, internal phones, mobile phones, megaphones, hand held bells etc. as per emergency communication plan.
For Outside Emergency Services	Mobile / P&T Phones
For Mutual aid Services	Mobile / P&T Phones

Key Persons / Emergency Team Members	Siren, Walky-talky Sets, internal phones, mobile phones, P&T Phones etc.
--------------------------------------	--

1.1.7 Details Of PPE (Personal Protective Equipment) Available

Following PPE are available for use of employees for protection against different hazards during emergency operations:

Table 3:

Personal Protective Equipments Available

S. No.	Item	Quantity	Remarks
1.	Face Mask. Panaroma, Nova Rubber	150	For protection against vapors, chemicals
2.	Respirator Mask V410	5400	For protection against Dust, vapors, solvents
3.	Respirator Mask Dust filter, IS 9473:2002	42015	For protection against Dust, vapors, solvents
4.	Respirator Half mask fold flat	14700	For protection against Dust, vapors, solvents
5.	Ear Plug	4100	For protection against high noise
6.	Harness, Double lanyard	120	For fall protection while working at height
7.	High Visibility Reflective Jackets	5000	Visibility protection. Identification
8.	Tape , Barrier safety	163 rolls	For protection against open trench and pits
9.	Safety Goggles	3424	For Eye protection
10.	Jacket ,Jean 100%cotton Size: XXL,XL,L,M	1400	For protection against heat and fire
11.	Safety Helmets: FRP	2000	For head protection
12.	Hand Gloves : Kevlar Hand Gloves :Work Guard	500 Pairs 13600	Protection against heat Hand protection
13.	Safety Shoes	1900	Foot Protection

Table 4:

Colour Coding Of Pipelines

Water	Sea green
Steam	Aluminum To IS 2339
Mineral , Vegetable and animal oils, Combustible liquids	Light Brown
Acids& Alkali	Dark Violet
Gases : Carbon Monoxide, Coke oven Gases	Canary Yellow
Air	Sky Blue
Lime	Smoke Grey
Other liquids/gases which do not need identification	Black
Hydrocarbons/ organic compounds	Dark Admiralty grey
Fire Protection	Red

1.1.8 Emergency Mock Drills



Preparedness and its guidelines

Emergency plans needs to be tested when first devised and thereafter are rehearsed at predetermined intervals. Updating the plan if major changes in the process or organizational changes have been effected.

A department wise mock drill schedule programme has been developed to organise drill of the key emergency situations of the department as per the programme. Department maintains all the compliance records of the mock drills carried out by them.

A schedule for mock drill of the key emergency situations of the departments is made for compliance report on mock drills.

Training

Objective of emergency plan can only be achieved by providing theoretical training as well as practical training of an emergency situation to the personnel, so that they can effectively control the situation without any further guidance.

All employees including key personnel are trained in their emergency roles both individually and as a team. Employees receive initial and refresher training time to time. Exercises are arranged to test each part of the emergency plan, stage by stage, stating with first immediate action. Emergency isolation and shut down are rehearsed.

For professional emergency services like, Fire Brigade, First Aid Services are trained in their specific fields other than general training.

Mock Drill Exercises

- Table Top Exercise (Key persons Roles and Responsibilities discussion on a pre decided emergency scenario)

- Department wise Exercise (within department / localized)
- Partial Scale- Planned / unplanned
- Full Scale – Planned (involving external agencies)

Review Mechanism

After each rehearsal the plan needs to be reviewed to take account of shortcomings highlighted by the exercise and its effectiveness is to be reviewed every time it is used to deal with real time emergency.

Mock Drill Guidelines (Checklist)

During mock drills the following points should be checked.

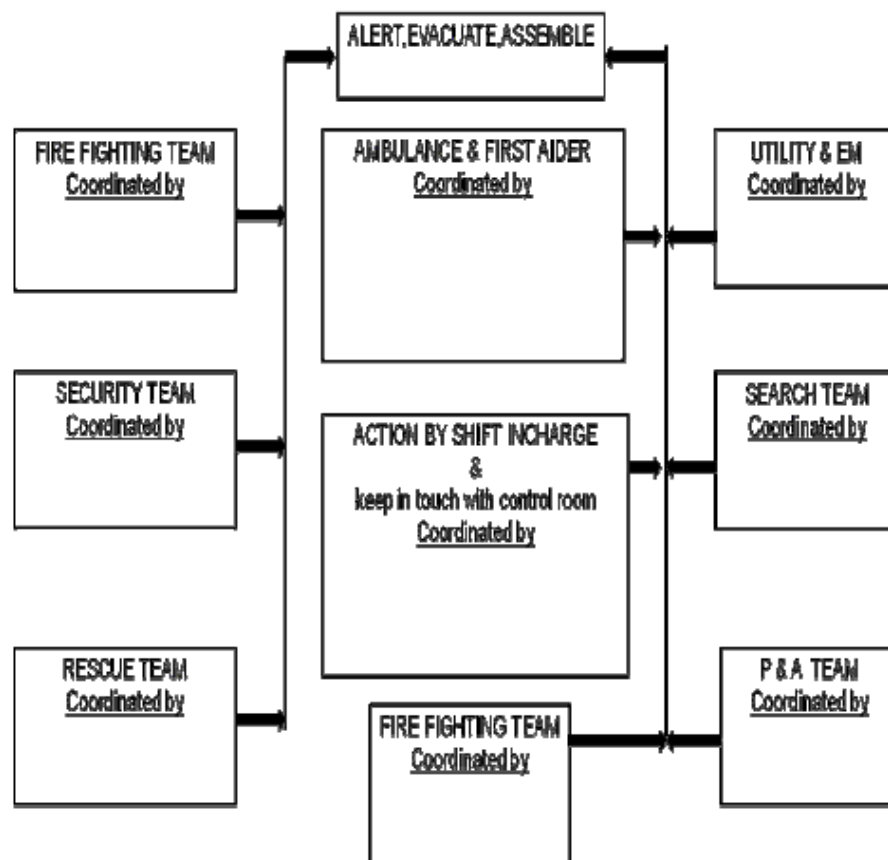
- Emergency plan board (it should contain the action plans and important telephone numbers for ready reference)
- Make sure that alarms are distinctive in term of voice and recognized by all employees as a signal to evacuate the work area or perform actions identified in plan.
- Assembly Point (should be at an open and safe place away from the site of emergency and not in the direction of wind)
- Communication (should be precise, stating the exact location, type and extent of the emergency condition)
- Cordoning the area (to keep the people away)
- Response by other agencies (see that the other agencies like fire brigade, plant medical, security, gas safety etc. reach the site immediately and spring into action)
- Firefighting system and equipment's (see that the fire extinguishers and fire hydrants, etc. are in working condition)
- First Aids (First aid boxes with contents and stretchers are available in the departments)
- Evacuation (People to be evacuated from the site of emergency)
- Preparedness and Alertness (concerned agencies and departmental fire fighters, first aiders)
- Team Work (co-ordinate between different agencies and departmental team)
- Workability of safety devices and equipment's (like automatic alarm/ signaling system, water sprinklers, safety valves, check valves, etc.)
- Involvement of department rescue operation team.



- One person was taken by rescue team members and given CPR at site.
- Shifted in Ambulance to Medical Centre
- Debriefing by Incident controller at site

Mock

Drill Action Sequence



1.1.9 Action Plan for On Site Emergency Plan

Table 5: Action Plan

Step No	Initiator	Action To Take
1.	The person noticing the emergency	Inform the Security Gate, Combat team leader and the concerned Shift-in –charge immediately.
2.	Combat team Leader (CTL)	- Inform site incident Controller (SIC) and rush to spot and organize his team. - Take charge of the situation, arrange for firefighting and medical first-aid available at site. - To start combating, shut-down equipment's, arrest the leakage of gas/fire.
3.	Site Incident Controller (SIC)	- Inform works main controller (WMC) and rush to emergency site. - Discuss with Combat Team Leader (CTL), assesses the situation and call the Rescue Team Leader (RTL) & Auxiliary Team Leader (ATL). - Organize the Rescue Team and Auxiliary Team and send the rescue Team to site. - Arrange to evacuate the unwanted persons and call for additional help. - Pass information to the works main controller (WMC) periodically about the position at site.
4.	Works main Controller (WMC)	- Rush to emergency site and observe the ongoing activities. - Take stock of the situation in consultation with the SIC. - Move to Emergency Control Room. - Take decision on declaration of emergency. - Advise Auxiliary Team Leader to inform the statutory authorities and seek help of mutual aid from partners as required. - Decide on declaration of cessation of emergency. - Ensure that the emergency operations are recorded chronologically.
5.	Fire & Rescue Team (FRTL)	- Consult with Site incident controller (SIC) and organize his team with amenities to arrest firefighting and medical treatment. - Rush to Emergency Site through safe route along with the team members. - Arrange to set off the fire by firefighting equipment's and hydrant points to arrest the fire or to evacuate the area. - Shift the injured persons to hospital by ambulance after providing necessary first aid. - Take roll call (Head Counting) to counter check missing persons if any. - To inform the auxiliary team Leader for necessary help from mutual aid Partners.
6.	Auxiliary Team (ATL)	- On being directed by works main Controller (WMC) informs about the emergency to statutory authorities. - Seek help of Mutual Aid partners and Coordinate

Step No	Initiator	Action To Take
		with Mutual Aid partners to render their services. • Arrange to inform the relatives of casualties. • Take care of visit of the authorities to the Emergency site.
7.	Team members	• Each of the team members should follow the instruction of concerned team leader to mitigate the emergency.

1.1.10

Facilities Available to Combat

Fire Fighting Facilities:

- Fire Station –1
- 5 Fires Officers
 - Crew Members - 32 persons. 8 persons in each shift
- Fire Tenders- 4 (with Foam Tender+ Water Tender).
- Portable Pumps – 1 no.

Fire Hydrant system

Fire hydrant system is provided at different locations inside the plant. Fire hydrant hoses are 63 mm. diameter in size. Two motors along with two suitable pumps which can discharge 173 cum. water per hour are provided to main header to maintain a pressure of 7 kg/cm square.

In case of temporary power failure, the fire pumps are run through DG. An overhead tank is supplying water to the fire main line.

Table 6: Total All Plant Fire Hydrant

S.No.	Plant	No.Of Hydrant	
		1 Way	2 Way
1	HSM	138	0
2	SIP	92	0
3	BF	105	0
4	SINTER	113	10
5	COKE OVEN	114	0
6	LCP	38	0
7	POWER PLANT	21	0
8	PELLET PLANT	95	0
9	BAR MILL & BILLET CASTER	85	0
10	OXYGEN PLANT	15	0
Total		816	10

Fire Extinguishers

Required types of fire extinguishers have been provided at different locations of the plant.

Table 7 (a): Types & number of fire extinguishers provided in different locations.

Plant	DCP		CO ₂		ABC	Foam	Total
	25 kg	10 kg and 5 kg	4.5 kg	2 kg			
HSM	0	383	196	0	49	0	628
BF	0	177	102	0	3	0	282
SIP	0	141	93	0	12	0	246
Sinter	0	42	93	16	11	0	162

LCP	0	40	32	-	-	-	72
PowerPlant	5	1	12	0	17	2	37
Jetty & RMHS	0	31	20	0	8	0	59
ARCL	24	200	300	0	400	0	924
FireStation Go-down	0	130	311	0	269	0	710
Grand Total	29	1145	1159	16	769	2	3120

Table 7 (b):Types & number of fire extinguishers provided indifferent locations.

Plant Wise Total Fire Extinguisher Point		Type wise Total Fire Extinguisher	
Plant	No.	Type	No.
HSM	382	DCP	1174
BF	181		
SIP	176	CO ₂	1175
SINTER	148		
LCP	30		
POWERPLANT	12	ABC	769
JETTY	15		
RMHS	10	FOAM	2
BARMILL&CASTER			
OXYGEN			
Total	954	Total	3048

Fire Pumps

Details regarding the fire pumps are given in table below:

Table 8: Details of Fire Pumps

S. no.	Plant	Head	HP	Discharge Qm ³ /hrs.	Static Water Tank Cap. m ³	No. of Jockey Pump	JockeyPump			Electrical Pump		
							H	HP	Q	H	Q	HP Motor
1.	Sinter Plant	90 m	75 KW	180 m ³ /hr	190 m ³	2	96 m	3 KW	4 m ³			
2.	Coke Oven	115 m	160 KW	356 m ³ /hr	520 m ³	2	117 m	37 KW	56 m ³			
3.	Pellet Plant	88 mtr	218 HP	410 m ³ /hr	850 m ³	2	88 m	15 KW	18 m ³	88 mtr	410 m ³	125 KW

LIFE SAVING EQUIPMENT INSTALLED/USED IN DIFFERENT UNITS

Details regarding the Life saving Equipments are given in table below:

Table 9: Details of Life saving Equipments

Sl. No.	Name of the Plant Unit	Lifesaving equipment installed or used
1.	SIP (DRI Kilns)	Flame retardant dress, safety showers
2.	Blast Furnace	Flame retardant dress, safety showers, CO gas detectors, Oxygen meter, air line system, SCBA, wind socks

3.	HSM	Flame retardant dress, safety showers, CO gasdetectors, air lines, SCBA
4.	LCP	Safety showers, air lines, SCBA ,PVC Suits
5.	Sinter Plant	-do-
6.	Oxygen Plant	O2 detectors, SCBA, wind socks, water monitor.
7.	Castor Mill	Flame retardant dress, safety showers, CO detectors, LEL detectors, air lines, SCBA
8.	Pellet Plant	Flame retardant dress, safety showers, CO detectors, LEL detectors, air lines, SCBA
9	Bar Mill	Flame retardant dress, safety showers, CO gas detectors, air lines, SCBA
10	Billet Caster	Flame retardant dress, safety showers, CO gas detectors, air lines, SCBA
11.	Power Plants	Safety showers, boiler suit, flame retardant dress
12.	Water Treatment Plant	Chemical handling suit, PVC suit, chlorine emergency kits, chlorine sensor and detectors, air lines, SCBA
13.	Fire Station/ECR	Safety net and belt, ropes and lines, fire proximity suit, fire entry suit, SCBA, different gas detectors, other rescue equipment.

Details of Gas Leak Detectors in the Plant

Details regarding the Gas Leak Detectors are given in table below:

Table 10: Details of Gas Leak Detectors

S.No.	Plant	Detectors	Qty.inNo.s
1	HSM	Multi Detector (Dragger)	1
		CO Detector (Senset)	1
		Explosive Detector (VW)	1
2	SIP	Multi Detector (Dragger)	1
		CO Detector (Senset)	1
		Oxygen Detector	1
3	BF	Multi Detector (Dragger)	1
		CO Detector (Senset)	1
		CO Detector (Senset)	1
4	Sinter Plant	Multi Detector (Dragger)	1
		CO Detector (Senset)	1
		Oxygen Detector	1
5	Bar Mill	Multi Detector (Dragger)	1
		CO Detector (Senset)	1
		Explosive Detector (VW)	1
6	Billet Caster	Multi Detector (Dragger)	1
		CO Detector (Senset)	1
		Explosive Detector (VW)	1
7	Oxygen Plant	Multi Detector (Dragger)	1
		Oxygen Detector	1
		Explosive Detector (VW)	1

1.1.11

Emergency Control Centre

The emergency Control Centre should have:

1. An adequate number of internal and external telephones. (Some of these should be ex directly and should be used only for communicating the messages. (The need for such a phone may arise because the switch board of the common telephone may be overloaded with the enquiries from the media and relatives of the employees.)
2. Radio Equipment and public address system.

3. Layout Plan or plans of the works to illustrate:
 - a. Areas where large inventories of hazardous materials, such as, tanks, reactors, drums, and storage places where a number of compressed gas cylinders are kept.
 - b. Locations of radioactive sources if any.
 - c. Sources of safety equipment's.
 - d. Fire hydrant systems and alternate supply sources.
 - e. Stock of other fire fighting materials.
 - f. Works entrance and road system, update at the time of incident to mark the roads blocked by the emergency.
 - g. Assembly points and casualty treatment centres.
 - h. Location of works in relation to surrounding community.
4. Additional area and works plans which can be used at the time of emergency to illustrate:
 - a. Areas effected endangered.
 - b. Deployment of emergency vehicles and personnel.
 - c. Areas where particular problems arose.
 - c. Areas evacuated.
 - d. Other relevant information.

(It will be useful to cover these layout plans by plastic sheets so that any markings done on the sheets can be removed or changed as the scenario changes.)
5. A few copies of Onsite Emergency plans.
6. Note pads, pens and pencils to record any messages received and to send messages during emergency.
7. Nominal rolls of the employees.
8. Addresses of the employees and the contact numbers of the employees and their family members.
9. List of key persons their addresses and phone numbers.
10. Tape recorders and video photography equipment's with batteries in which the incident occurrences, actions being taken, and progresses can be recorded.
11. Torches, explosive gas meters (if flammable substances are involved), some extra sets of personal protective equipment's, artificial breathing equipment's, etc.

1.1.12 Information On Medical Management Of Hazardous Chemicals

Table 11: Medical Management Of Hazardous Chemicals

S. No.	Name of Chemical	Health Hazard Associated	First Aid and Emergency Treatment Procedures or Antidote, if available
1.	Carbon Monoxide	Inhalation causes headache, dizziness, and weakness of limbs, confusion, nausea, unconsciousness, and finally death. 0.04%	Breathing: If a person breathes large amounts of this chemical, move the exposed person to fresh air at once. If breathing has stopped, perform mouth-to-mouth resuscitation. Keep the affected person warm and at rest. Get medical attention as soon as possible. (NIOSH, 2003)

S. No.	Name of Chemical	Health Hazard Associated	First Aid and Emergency Treatment Procedures or Antidote, if available
		conc., 2-3 hours or 0.06% conc., 1 hr.- headache and discomfort; with moderate exercise, 0.1-0.2% will produce throbbing in the head in about ½ hr., a tendency to stagger in about 1 1/2 hr., and confusion of the mind, headache, and nausea in about 2 hrs. 0.20-25% usually produces unconsciousness in about 1/2 hr. Inhalation of a 0.4% conc. can prove fatal in less than 1 hr. Inhalation of high concentrations can cause sudden, unexpected collapse. Contact of liquid with skin will cause frostbite. (USCG, 1999).	
2.	Natural gas	High concentrations may cause asphyxiation. No systemic effects, even at 5% concentration in air. (USCG, 1999).	INHALATION: Immediately leave the contaminated area; take deep breaths of fresh air. If symptoms (such as wheezing, coughing, shortness of breath, or burning in the mouth, throat, or chest) develop, call a physician and be prepared to transport the victim to a hospital. Provide proper respiratory protection to rescuers entering an unknown atmosphere. Whenever possible, Self-Contained Breathing Apparatus (SCBA) should be used; if not available, use a level of protection greater than or equal to that advised under Protective Clothing.
3.	Chlorine	Poisonous; may be fatal if inhaled. Contact may cause burns to skin and eyes. Bronchitis or chronic lung conditions. (EPA, 1998)	Warning: Effects may be delayed. Caution is advised. Chlorine is corrosive and may be converted to hydrochloric acid in the lungs. Signs and Symptoms of Acute Chlorine Exposure: Signs and symptoms of acute exposure to chlorine may include tachycardia (rapid heart rate), hypertension (high blood pressure) followed by hypotension (low blood pressure), and cardiovascular collapse. Pulmonary edema and pneumonia are often seen. The eyes, nose, throat, and chest may sting or burn following exposure to chlorine. Cough with bloody sputum, a feeling of suffocation, dizziness, agitation, anxiety,

S. No.	Name of Chemical	Health Hazard Associated	First Aid and Emergency Treatment Procedures or Antidote, if available
			nausea, and vomiting are common. Dermal exposure may result in sweating, pain, irritation, and blisters. Emergency Life-Support Procedures: Acute exposure to chlorine may require decontamination and life support for the victims. Emergency personnel should wear protective clothing appropriate to the type and degree of contamination. Air-purifying or supplied-air respiratory equipment should also be worn, as necessary. Rescue vehicles should carry supplies such as chlorine-resistant plastic sheeting and disposable bags to assist in preventing spread of contamination. Inhalation Exposure: Move victims to fresh air. Emergency personnel should avoid self-exposure to chlorine. Evaluate vital signs including pulse and respiratory rate, and note any trauma. If no pulse is detected, provide CPR. If not breathing, provide artificial labored; administer oxygen or other respiratory support. Obtain authorization and/or further instructions from the local hospital for administration of an antidote or performance of other invasive procedures. Transport to a health care facility. Dermal/Eye Exposure: Remove victims from exposure. Emergency personnel should avoid self-exposure to chlorine. Evaluate vital signs including pulse and respiratory rate, and note any trauma. If no pulse is detected, provide CPR. If not breathing, provide artificial respiration. If breathing is labored, administer oxygen or other respiratory support. Remove contaminated clothing as soon as possible. If eye exposure has occurred, eyes must be flushed with lukewarm water for at least 15 minutes. Wash exposed skin areas for at least 15 minutes with soap and water. Obtain authorization and/or further instructions from the local hospital for administration of an antidote or performance of other invasive procedures. Transport to a health care facility. Ingestion Exposure: No information is available. (EPA, 1998)

1.1.13 Natural and Manmade Calamities which can lead to Emergency

(a) Earthquake

Maharashtra state lies in earthquake zones II, III and IV. The central districts of Beed (Bir), Dharashiv (Osmanabad) and Latur, along with eastern sections of Ahmednagar, Pune, Satara and Sangli districts falls in Zone III. The districts of Raigad, Ratnagiri and Satara are the only districts to lie in Zone IV, where the maximum expected intensity is VIII (MSK).

List of some of the earthquakes near the project site are:

Table 12: List Of Earthquakes

Year	Area	Latitude and Longitude	Intensity
1594 A.D.	Matheran area, Maharashtra	19.10 N, 73.20 E	Maximum observed intensity IV
26 May 1618	Mumbai area, Maharashtra	18.90 N, 72.90 E	Maximum observed intensity IX
1678 A.D.	Matheran area, Maharashtra.	19.10 N, 73.20 E	Maximum observed intensity VI
9 th December 1751	Vangani-Matheran area, Maharashtra	19.10 N, 73.20 E	Maximum observed intensity VI
16 November 2001	Airoli area, Navi Mumbai, Maharashtra	19.155 N, 73.007 E	ML 2.9

The project site as well as study area lies in Zone-IV of Seismic Zoning Map of India, updated by India Metrological Department (IMD) and National Institute of Disaster Management (NIDM), and thus can be said to be located in an area of High Damage Risk Zone by national standards. Apart from some of the counter-measures to be taken in foreseeable cases, emergency recovery plan has been considered by the emergency management team as per the situation and site conditions as follows:

During a major earthquake shaking of the earth or building is experienced. This shaking may start out as a gentle rocking motion that grows violent, or it may begin as a violent jolt. One will find it difficult to walk during the shaking.

During the Earthquake

- Stay where you are, get under a desk or table or stand in a doorway or the corner of the room. Do not seek cover under tables or benches in laboratories. Chemicals could spill and harm you. If possible, extinguish fires, flames, or other sources of ignition.
- If you are outside get into an open area away from buildings, power lines and trees.
- Do not use elevators.
- If you are driving, pull over to the side of the road and stop immediately. Avoid overpasses and power lines. Stay inside the vehicle until the shaking has stopped.

After the Earthquake

- Gather your valuables and leave the building quickly. If necessary, provide assistance to those who have been trapped in the building, including those with mobility impairments or those who are trapped by debris. Gather at the designated meeting location.
- To expedite rescue and emergency services, a sign should be posted on the front of the building denoting that all of the occupants got out or that people may be trapped in the building. If you

know someone is trapped, note the time, date, number of victims, and their last known locations on the sign.

- Check for injuries, but do not move seriously injured people unless the danger in the area is greater than their injuries.
- Remember, a significant earthquake will affect the entire city and country. You may have to fend for yourself and your fellow workers for quite a long time. Render whatever aid you can provide, but remember that you are responsible for your personal safety.
- Use telephones only to report emergencies (i.e., gas leaks, fire, injuries).
- People working in Plant or other trained individuals should turn off utilities.
- Never touch downed utility poles or lines. Avoid damaged building equipment.
- Do not use your vehicle unless there is an emergency. Keep the streets clear for emergency vehicles.

Be prepared for aftershocks. Aftershocks are usually smaller than the main quake, but they may be strong enough to topple already damaged buildings.

(b) Failure of Environment Control Equipment

The environment control equipment are intended to mitigate the emissions and discharge of pollutants to the receiving bodies. It is also intended that these operate continuously, perform as per their design so that the emission levels are maintained at the lowest levels. Although, there are no reported incidents of any disaster leading to loss of life or property due to the failure of the pollution control equipment, it is necessary to evaluate the impact on the emissions and discharges in case of malfunctioning of these critical equipment so that suitable action can be taken in time. The following subsection evaluates the worst case scenario in terms of the impact on the environment in case of failure of the air and water pollution control systems.

Air Pollution Control Equipment

The failure of air pollution control systems like electrostatic precipitators, bag filters and scrubbers have been considered.

Electrostatic Precipitator

The electrostatic precipitators works on the principle of % reduction and is very sensitive to variation in the inlet dust loading. The ESPs in the expansion phase are designed to meet a stringent norm of 30 mg/Nm³ in normal conditions and 50 mg/Nm³ in case of failure of one field (N-1). The possible scenario of failures are:

- Power failure to the ID fan of the ESP
- Failure of one electrical field

The ESPs are proposed in the following areas:

Sinter Plant and Pellet Plant: The ESPs are installed in the waste gases generated in the agglomeration process and are integral with the plant operations. In case of power failure, the complete plant will come to a standstill condition. Since the ESPs are designed to meet 50 mg/Nm³ even in case of failure of a field, the emissions will be minimal.

BOF shop: The ESPs are installed to clean the crude gases from the Converter so that the LD gas can be used as a fuel. These ESPs are also designed to limit the outlet dust content to $< 50 \text{ mg/Nm}^3$ with one field not in operation. Further, since the LD gas is recovered and used as a fuel after mixing with BF gas, the failure of a field has no impact on the environment. On the other hand, the power failure will lead to stoppage of the whole BOF operation and suitable actions will be taken for a smooth shut down.

Bag Filters

Bag filters work on a principle of filtration of dust over a fabric and are not sensitive to variation in the inlet dust loading. However, in case of failure of some bags, the dirty gas can bypass the bags and dust emission can take place through the chimney. The bag filters are also designed to comply a limit of 30 mg/Nm^3 , so that even in case of failure of bags, the emission level of 50 mg/Nm^3 can be met. However the failure of the bags is a gradual process and can be easily detected during regular inspection. The bag filters are the main air pollution control equipment in the expansion phase and some of the critical ones are given below:

SMS FE System: This bag filter with a capacity of $4.4 \text{ MNm}^3/\text{hr}$ is the largest installation catering to the complete SMS-2 shop. All secondary emissions from the shop are collected and treated in the bag filter. In case of power failure, there will be considerable fugitive dust emissions in the SMS area, requiring smooth shut down of all the BOF converters. Considering the importance of this system, the ID fan and systems have been provided with two feeders so that even in case of failure of one field, this system will continue to operate.

BF GCP: The bag filter is provided to clean the crude gas from the blast furnace so that it can be used as a fuel in the furnaces. This bag filter is integral part of the BF gas system. In case of failure, the blast furnace will go for a smooth shut down. In case of failure of bags, the dust content in the clean BFG increase and has no impact on the environment

Coke Ovens: The bag filters are installed for controlling coal charging emissions, coke pushing emission control and CDQ. In case of power failure, the fugitive emissions will take place from the respective operations. In case of failure of bags, there is no impact on the environment.

Other Areas: The bag filters are installed in RMHS to control fugitive dust emissions during material handling. These are non-critical and have no impact on the environment.

Scrubbers

The scrubbers operate on the principle of inertial impaction where the dust particles are settled by water spray. The scrubbers were important and are now being replaced by bag filters due to improved performance. The only application in the expansion phase is the scrubber planned in the desulphurisation of coke oven gas, wherein the sulphur is recovered as elemental sulphur. The scrubber is an integral part of the COG cleaning system. The scrubber and its associated systems have large buffering capacity and the degradation is noticed during daily analysis and corrective action can be planned. However, in case of power failure, the coke ovens will initiate smooth shut down of the plant.

Water Pollution Control System

Water pollution control systems like the BOD plant, Clarifiers in HSM, ETP in CRM areas have large buffering capacities and the deterioration in performance can be measured during regular analysis of treated wastewater. However, in case of power failure, the equalisation tanks provided will store the wastewater till such time the power is restored. There is no impact of failure of the ETPs in case of failure. A summary of such possible scenario and their impact is given in Table 13.

Table 13: Details of Failure Scenarios, Impacts and Action Plans

S. No.	Failure Scenario	Impact	Max Duration in minutes	Action Planned in the proposed expansion	Impact on environment (on a 0-5 rating)		
					Local	Inside Plant	Outside
1.	Coke ovens						
	Failure of power to ID fans of bag filters	Fugitive dust emissions	5	Alternate source of power	5	3	0
	Failure of up to 10% of bags	Emissions visible	Continuous	Inventory of bags	0	0	0
	Breaking of coal cake	Visible emission of crude gases	30	Fast evaluation by chain conveyor	5	3	0
	Failure of exhauster leading to no suction	Visible emission till restoration	30	100% flare of crude gas	5	3	0
	H2S recovery system - deteriorations	Increased S in COG	Continuous	Shift wise analysis	0	0	0
2.	Sinter and Pellet Plant						
	Failure of one field of ESP	No impact	-	Design for (N-1) basis	0	0	0
	Power failure	Fugitive emission during shut down	15	SOP for smooth shut down	3	0	0
3	Blast Furnace						
	Failure of bags in GCP	No impact	Continuous	Inventory of bags	0	0	0
	Power failure	Fugitive emission during shut down	15	SOP for smooth shut down	3	0	0
	Failure of bags in Cast house & stock house	Emissions visible	Continuous	Inventory of bags	0	0	0
	Power failure to ID fans	Emissions visible	Continuous	Inventory of bags	0	0	0
4	SMS -2						
	Failure of ESP in GCP	No impact	Continuous	Design for (N-1) basis	0	0	0
	Power failure	Fugitive emission during shut down	15	SOP for smooth shut down	3	0	0

S. No.	Failure Scenario	Impact	Max Duration in minutes	Action Planned in the proposed expansion	Impact on environment (on a 0-5 rating)		
					Local	Inside Plant	Outside
	Power failure to ID fans of Sy FE System	Emissions visible	Continuous	Inventory of bags	0	0	0
5	Rolling Mills						
	Power failure	Fugitive emission during shut down	15	SOP for smooth shut down	3	0	0
6	LCP						
	Failure of bags in GCP	No impact	Continuous	Inventory of bags	0	0	0
	Power failure	Fugitive emission during shut down	15	SOP for smooth shut down	3	0	0
7	RMHS						
	Failure of bags in GCP	No impact	Continuous	Inventory of bags	0	0	0
	Power failure	Fugitive emission during shut down	15	SOP for smooth shut down	3	0	0

(c) **High Risk Categories and Preventive Measures**

High Risk Categories and Preventive Measures are given in Table - 14.

Table 14: High Risk Categories and Preventive Measures

High Risk Categories	Prevention
Contractors	Contractor Safety Management
Young/Temporary Employees	Special Safety Induction Training
Direct Causes	
Traffic & Mobile Plant	Driver Training
Falls from Heights, Objects falling from Heights	Safety Procedures for Work at Heights, Overhead Protection, In-house training
Caught in Starting/Moving Equipment	Plant Isolation Procedures, Machine Guarding

1.4.14.1 Measures for occupational Health Hazards

- ☞ Dust Exposure level of shop floor workers is being/will be appropriately monitored.
- ☞ Check of the effectiveness of preventive and control measures on regular basis.
- ☞ Adequate supply of potable drinking water is being/will be provided. Water supplied to areas of Plant food preparation or for the purpose of personal hygiene (washing or bathing) are/will be according to drinking water quality standards
- ☞ Where there is potential for exposure to harmful dusts by ingestion, arrangements have been/will be made for clean eating areas, where workers are not exposed to the hazardous or noxious substances

- ⌘ Periodic medical hearing checks are being/will be performed on workers exposed to high noise levels
- ⌘ Provisions have been made to provide OHS orientation training to all new employees to ensure they are apprised of the basic site rules of work at / on the site and of personal protection and preventing injury to fellow employees
- ⌘ Contractors that have the technical capability to manage the occupational health and safety issues of their employees have been/will be hired, extending the application of the hazard management activities through formal procurement agreements
- ⌘ Ambulances and First aid treatment facilities are/will be made available for any emergency situation.

1.1.14 Disaster Management Plan

1.4.14.1 Definition

A major emergency in a work is one, which has the potential to cause serious injury or loss of life. It may cause extensive damage to property and serious disruption both inside and outside the work. It would normally require the assistance of emergency services to handle it effectively.

1.4.14.2 Scope

The aim of hazard control and disaster management is concerned with preventing incidents through good design, operation, maintenance and inspection, by which it is possible to reduce the risk of an incident, but it is not possible to eliminate it. Since, absolute safety is not achievable; an essential part of major hazard control must also include mitigating the effects of a major incident. An important element of mitigation is emergency planning, i.e. recognizing incidents as soon as possible, assessing the consequences of such incidents and deciding on the emergency procedures, both on-site and off-site, that would need to be implemented in the event of an emergency.

1.4.14.3 Objective

The overall objectives of the emergency plan will be:

- a) To localize the emergency and, if possible eliminate it; and
- b) To minimize the effects of the incident on people and property.
- c) Restore normalcy at minimum possible time

Elimination will require prompt action by operations and works emergency staff using, for example, fire-fighting equipment, water sprays etc. Minimizing the effects may include rescue, first aid, evacuation, rehabilitation and giving information promptly to people living nearby.

To deal with the above emergencies, the Emergency Plan is prepared.

1.4.14.4 Onsite Emergency Plan

The Onsite Emergency Management Plan is a master plan which contains the emergency organization structure, responsibilities of key members, communications mean and emergency response strategies to control a range of major incidents.

1.4.14.5.1 Disaster control Management system

Disaster Management plan plays an important role in combating emergency in a systematic manner. In addition; the implementation of an Emergency Response Plan relies on a number of response functions, which deal with different aspects of emergency, with the most important ones being:

Communication and Co-ordination

Emergency procedure

Fire and Rescue (Emergency Mitigation) Emergency Control Team at Incident Site

Medical Services

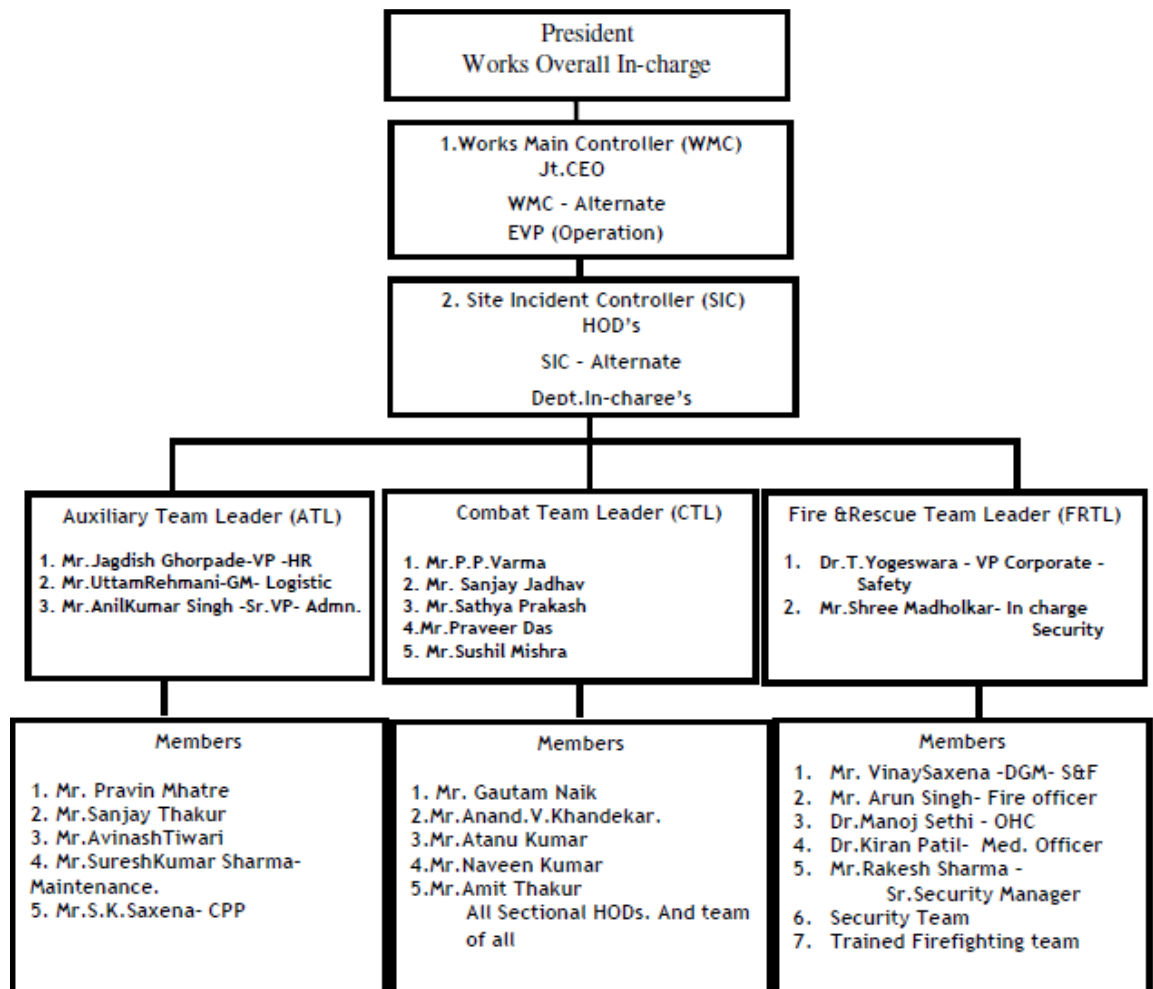
Security

Administration (Logistics and Welfare)

Co-ordination with external agencies.

1.4.14.5.2 Emergency Organization and its Responsibilities

Command and control of an emergency condition encompasses the key management functions necessary to ensure the health and safety of employees, as well as those of public living in the vicinity. In addition, the implementation of an Emergency Response Plan relies on a number of response functions, which deal with different aspects of emergency, with the most important ones being.



Responsibilities of Emergency Organization

Works Overall Incharge

Unit President will be over all in charge of the situation.

WMC (Works main controller) (Jt.CEO) will brief about the overall situation

WMC will interact and initiate actions based on the advice from President (Works Overall In charge)

Works Overall In charge will take the responsibility of communications to Directors.

Works Main Controller (WMC)

Jt.Chief Executive Officer (Jt.CEO) or his nominated deputy will retain overall responsibility for the Plant Site and its personnel. As soon as he is informed of the emergency, he shall proceed to the control room and meet the communication officer. His duties shall be –

Jt.CEO will resume the role of Main Controller. He shall be the overall In- charge of the situation. He will co-ordinate all internal and external activities. In his absence his subordinate will resume the charge of Main Controller

On being informed of an incident, he has to:

- ✎ Rush to the emergency Site, collect all information from SIC.
- ✎ Decide if emergency is to be declared and advise Site incident Controller (SIC) accordingly and reach Emergency Control Room (ECR).
- ✎ Advise Rescue Team Leader (RTL)/ Security Gate to blow the siren with appropriate code for declaration of emergency. Two minutes with a pause of five seconds for 3 times for fire hazard. Three minutes with pause of five seconds for 5 times for Gas leakages.
- ✎ Advice (Auxiliary Team Leader) ATL for communication to statutory authorities and for mutual aid as required.
- ✎ Through (Auxiliary Team Leader) ATL ensure constant communication to statutory authorities and to mutual aid partners as required.
- ✎ Maintain continuous communication with Site Incident Controller (SIC) to review the situation and assess the possible course of action for emergency operations.
- ✎ To declare normalcy at the end of operation and advise Rescue team leader (RTL)/security Gate to blow “all clear siren” [for 1 minute continuously].

Ensure the record keeping of emergency operations chronologically.

Site Incident Controllers (SIC's)

He is available at the factory or in the colony near by at any point of time and on being informed about an accident, he has to:

- ✎ Intimate the works main Controller (WMC) and proceed to the emergency site.
- ✎ Take the necessary instruction from Combat Team Leader (CTL), assess the situation and call Rescue Team Leader (RTL) and Auxiliary Team Leader (ATL).
- ✎ Inform Works Main Controller (WMC) regarding the situation.
- ✎ Take necessary steps and provide guidance to Combat Team, Rescue

- ✎ Team, and Auxiliary Team Leaders to mitigate the emergency situation.
- ✎ Examine for major emergency shutdown operation activities, decide safe escape route and announce for evacuation to Assembly Point.
- ✎ Inform Works Main Controller (WMC) about the status of the situation at regular intervals.

Combat Team Leaders (CTL's)

He is the leader to attend to the emergency and is available in the factory or in the colony at any instant.

On being informed about an accident, he has to:

- ✎ Immediately rush to the site and lead the team to control the situation.
- ✎ Inform Site incident controller (SIC) about the incident and request him to rush to the spot.
- ✎ Instruct the rescue Team leader (RTL) for fire fighting and medical assistance.
- ✎ Co-ordinate the activities of team members and combat the emergency, so as to eliminate the root cause of the hazard.
- ✎ Shut-down the plant if necessary to take up repair measures.
- ✎ To arrest the leakage and spillage from various equipments, shut down the concerned equipments.
- ✎ Take necessary action to remove unwanted persons from the site of the incident.
- ✎ Keep informed about the developments to Site incident Controller (SIC).

FIRE & RESCUE TEAM LEADER (FRTL's)

He is the person who conducts rescue operations and should be available at any instant.

On receiving the information about the incident he has to:

- ✎ Rush to site of emergency through safe route.
- ✎ Ensure presence of all his team members, availability of fire fighting facilities and take necessary action to arrest the fires/leakage of gas.
- ✎ Arrange for safe escape of entrapped persons.
- ✎ Make necessary arrangements to send the affected persons for immediately medical attention through the medical officer.
- ✎ Head counting :Search for the missing persons on the basis of role call taken by Auxiliary team leader (ATL).
- ✎ Give the feedback to the site incident controller (SIC) about the developments.

Auxiliary Team Leader (ATL's)

He is the communication manager for the crisis management. On being informed of the emergency, he should proceed to Emergency Control Room (ECR) and:

- ✎ Keep in constant touch with works main controller (WMC) and Site Incident Controller (SIC).
- ✎ Inform the Statutory Authorities and District Administration.
- ✎ Communicate to mutual Aid Partners, Fire service stations at Pen/Raigad.
- ✎ Send communications to District Hospital at Pen/Raigad for rendering services.

- ☞ Inform the relatives of casualties and send them to their residence or hospital as the case may be.
- ☞ Take care of visit of the authorities to the Emergency site.
- ☞ Give feed back to work main controller (WMC) about the status with respect to his areas of activities.
- ☞ Handy pocket size booklets showing names of WMC,SIC,CTL,FTRL and other imp. points to control manmade or natural disasters to be distribute among S/I, Managers level persons.

A. Duties of the Key Persons of the Assistance Groups

- **Duties of Head – HR & ADMIN:**

He handles the evacuation of the personnel from the emergency situation to the Assembly point.
 He takes the head count of the Evacuated personnel.
 He will assist the site controller in liaison with the local emergency authorities.
 Manage traffic movement towards the incident area and clears way to the Emergency vehicles.

- **Duties of Head – Electrical:**

He will be the heading the Shutdown.
 After receiving the communication from the Incident controller, he will arrange to stop the power supply to the site and shutdown of the other equipment at site as per requirement.
 After receiving the “All Clear” communication from the incident controller, he will resume the power supply to site.

- **Duties of Head-Mechanical**

He will be the heading the heavy equipment
 After receiving the communication from the Incident controller, he will arrange to properly access at site.
 After receiving the “All Clear” communication from the incident controller, he will resume the tool tackles (welding machine, cutting machine, grinding machine etc.) to site.

- **Duties of the fire fighting team**

After receiving the emergency communication, they will immediately report to the Incident controller.
 As per his instruction they will mobilize the Fire fighting equipment's and Leak control kits etc.
 They will control the fire & Gas leakages.
 In emergency situation other than Fire & Gas leakages, they will help the first aid team.

- **Duties of the first aid team**

After receiving the emergency communication First aid team will immediately reports to the Incident controller
 First aid team will remove the casualties from the incident area to the safe place.
 They will provide the immediate first aid to the casualties.
 Help them to transport to the medical aid if warrants.

- **Duties of Person who first detects a Fire / Accident**

On noticing a fire or accident he will immediately try to alert the personnel in the vicinity by shouting. He will notify the location of fire / accident.

He will try to control the emergency by using proper fire & safety equipment's / installations at the site.

If possible, he shall try to salvage the equipment's and materials not involved in the fire / accident.

- **Duties of area incharge of Emergency Affected Area**

He will immediately proceed to the scene of incident to confirm and assess the situation.

He will notify the nature of emergency to the fire station and security office to inform SIC / SMC and the concerned persons.

Area In-charge should clearly indicate to fire station and security office about

- I) Nature of emergency
- II) Location of emergency

He will ensure that all hot jobs including welding, cutting, grinding, chipping, open fire heating, etc. are stopped in the area.

He will coordinate the actions of site emergency services, maintenance services and other services for quick control of the situation, he will also perform emergency control measures as per directions from SIC / SMC.

He will furnish the full details about the incident to the Senior Management and Safety Officer, SMC / SIC, and other emergency services at site.

He will set up an emergency control post on site for team leaders of assistance groups from where the control and direction of the emergency operation is safe and he will arrange some communication media e.g. telephone at the emergency control post.

He will keep himself in constant touch with the emergency post and continue to pass on information / receive direction from emergency post to the concerned personnel.

He will ask for spare manpower from the other area in-charges of the unaffected areas for the help in emergency operations, if required.

He will announce through paging system or any other way, in the concerned affected area for evacuation of the personnel to their designated assembly point, if required.

- **Duties of Area in charge of Unaffected Area in Emergency**

After getting information from emergency control Post of affected area he will send the spare persons from his area and report to the emergency post on site.

He will render all necessary help to the in-charge of the affected areas in tackling and controlling the emergency situations as directed from the control post.

He will maintain normal operating conditions of his equipment's, until gets the instructions from emergency control post / SMC / SIC.

- **Duties of Concerned Section Head**

On receipt of information of emergency:

He will ensure about the steps to localize the hazards and decide about the operations of various equipment's and units at the site. If necessary, he will ensure the safe shutdown of the plant, so as to stop the spread of hazard, with the consultation with SM / SIC.

He will ensure to give the inventory of hazardous materials and operations hazards to various assistance groups for emergency handling.

He will look after the emergency operations in the concerned area.

- **Duties of Staff in affected areas**

They shall act as per instructions of their In-charge. Trained personnel will be nominated to assistance Fire fighters to fight the fire. Other persons will take care of their areas as usual, unless otherwise directed by the Area In-charge.

They are expected not to be panicky but remain calm. If called for evacuation they will follow instructions in an orderly disciplined manner.

If directed to evacuate, the Area In-charge may direct them to safe shutdowns of running machines and evacuate in a disciplined manner.

After evacuation they will collect at the nearest specified assembly point and await further instructions from the Area In-charge.

Shall see that the persons assigned with specified duties in an emergency are not disturbed or obstructed.

- **Duties of the Other Staff in Unaffected Area**

They will follow the emergency signals and instructions given by In-charge / SMC / SIC.

They will not leave their place of work and will continue the routine work.

They are expected not to be panicky but remain calm. If called for evacuation they will follow instructions in an orderly disciplined manner.

If directed to evacuate, the Area In-charge may direct them to safe shutdowns of running machines and evacuate in a disciplined manner.

After evacuation they will collect at the nearest specified assembly point and await further instructions from the Area In-charge.

Shall see that the persons assigned with specified duties in an emergency are not disturbed or obstructed.

- **Procedures to be followed during non-working hours**

The help of most of the personnel listed earlier will not be available and hence a separate working procedure has to be followed:

All applicable duties for silent hours / enumerated earlier will apply.

In-charge of the affected area will handle the situation with the available manpower and services, till the designated authorities of emergency organization reach the emergency site.

1.4.14-5.3 Emergency Control Post

Emergency control post will be set up at the time of any major emergency, by the in-charge of the concerned area, for team leaders of assistance groups, from where the control and directions of

the emergency operation is safe. Communication media e.g. telephone will also be provided at the control post.

1.4.14.5.4 Assembly Points

The assembly points are provided so as to cover the whole site area with the consideration of wind direction, nearby paging facility and more than one road approach on each point.

General - All department heads are requested to identify at least two assembly points at two opposite directions of their unit where people in case of emergency should assemble. Kindly mark those with sign boards. They will assemble there and wait for the Heads about their future course of actions i.e. to assemble there or to go and assemble at the emergency assembly points or to move out of the plant through a particular gate. These local assembly points are for Fire or at the initial stage of any toxic release but not for a major disaster like huge toxic release.

Total 18 nos emergency assembly points have been identified and displayed covering individual plants.

Total 2 gates at the site is available.

1) Security Goa Gate (2) Security Alibaug gate

1.4.14.5.5 Communication System

Communication is crucial factor in handling an emergency. It is the practice at many plants that any employee can raise an emergency alarm, so allowing the earliest possible action to be taken to control the situation. The possible communication can be given by

- a) By telephone,
- b) By shouting,
- c) By messenger,
- d) By walkie-talkie

Concerned SHE In-charge will inform the Fire Station through the quickest way possible for quick response and Security Office for passing of the information to the concerned persons and services. The following persons and services inside the work place will be informed in case of major emergencies like – major fire, major accident, major spillage, gas leak, cyclone, etc. These authorities and services will be notified by Security Officer as per the direction by the Head - SHE of the Site.

- a) Fire Station
- b) Medical Centre / Medical In-charge
- c) Plant head
- d) SHE Staff
- e) Security Staff

1.4.14.5.6 Basic Steps for Handling the Various Emergencies

A. Emergency Evacuation Procedure

On receipt of evacuation instructions, the personnel in the affected area shall proceed to their designated assembly point.

On receipt of evacuation, personnel shall close all the working gadgets, taking care that closing or shutting down operations does not lead to additional hazards.

When the emergency is announced, one security guard at the site gate will be posted by security section and he will secure the vehicle gates halting all routine traffic and material movement into the site. This guard shall clear the road from the main gate so that if outside emergency vehicles are needed the road be clear.

All personnel of the site will remain at their announced assembly points until the clear signal is announced.

When the emergency announcement has been made, outside contractors on site will be instructed to report to the gate. Their supervisors should make a count of all personnel and report this data to the security at the gate.

Evacuation of the people will be especially in the opposite direction of exposure / wind direction.

B. In Case of Fire

In case of emergency, if required, help would be taken from nearby city fire station and industries under mutual aid arrangement, in addition to our own firefighting systems as fixed installations and other firefighting equipments.

C. In Case of Collapse of Building, Shed or Structure

In case of collapse of Building, Shed or Structure raise the emergency alarm, inform the Head-SHE and evacuate the area. Call Fire Brigade to assist in removal of debris from the site and immediately arrange any medical help if required.

D. Liquid Spill Control Procedure

Any spillage will be immediately localized and the area cordoned off.

Area In-charge will announce about the spillage through the public-address system and inform to the Fire Station, Medical Centre, Security and Site In-charge.

Vehicular traffic will be stopped by the security staff in the affected area of the plant.

It will be kept in mind that chemical spillage will not be drained to the common drainage system from the site.

E. Injury Procedure

In case of injury to any member, information will be sent to Medical Centre.

First aiders will give the first aid at Emergency area.

First aiders will advise medical attention for the injured.

F. Storm

Area In-charge will take the following actions in case of storm.

All loose, light objects will be removed from the site, which could become hazardous missiles during high winds.

Buckets, ladders, maintenance materials and other like things will be placed in the safe place.

Hydra, trucks, welding machines, etc. will be placed at safe positions / places.

All construction materials i.e. beams, pipes, power equipment's etc. which cannot be moved to a safe location, they will be lashed in place in the best possible manner known.

G. Riot or Civil Disturbances Procedure or Bomb Threat or Terrorist Attack

If there are persons on or near company property with the suspected intent of causing damage to the property, injury to the plant personnel, disruption of normal operations, etc. The information will be given to SH (P&A) / SH (Security) and the following steps will be taken:

Security In-charge will be instructed to give the related details and the police services will be informed, if required.

The staff on duty or other personnel as given under plant personnel emergency notification list will be called for alertness.

Security In-charge will instruct to the security to close and lock all the site entry gates.

It will be ensured that no unauthorized person is allowed access to the site without positive identification by the gate security staff & as per instructions given by Head HR & Admin.

Emergency vehicles will be kept ready.

Medical staff at the Medical Centre will be alerted.

Fire & Safety staff will be alerted.

All Area In-charges of the site will be alerted.

H. Land Slide, Floods, Earthquake, And Other Natural Calamities

In case of a land slide, earthquake or any other natural calamity, the incident controller will immediately inform the Main Site controller, who will contact the Corporation (VMC), and police for remedial actions. M/s. JSW Steel Limited will also be immediately informed to apprise them of the situation.

The staff on duty or other personnel as given under plant personnel emergency notification list will be called for alertness.

Emergency vehicles will be kept ready.

Medical staff at the Medical Centre will be alerted.

Fire & Safety staff will be alerted.

All Area In-charges of the site will be alerted.

I. Review of Emergency

A team, under the chairmanship of Plant head will review the situation and decide the actions to be taken to mitigate the effect and restart the operations without losing any time.

1.4.14.5.7 Name and Telephone Numbers of Key Persons of Factory

List of telephone numbers for emergency situations are given below:

Table 15: Telephone Numbers For Emergency Situations

Emergency Designation	Normal Designation	Office Phone	Name	Residence Phone Number / Mobile Number
Works Overall In charge	President	02143-248301	Mr.ParthaSengupta	8334022000

Emergency Designation	Normal Designation	Office Phone	Name	Residence Phone Number / Mobile Number
Works Main Controller	Jt. CEO	02143-246031	Mr. Ashok Aggarwal	8805022550
WMC alternate 1	EVP	02143-248306	Mr. Alok Chandra	9594759000
Works incident Controller	Sr. VP (Project Ph. II & Utility)	02143-246669	Mr. V.K. Patidar	9870006522
SIC alternate 1	Sr. VP-Project 5 MTPA & HSMII	02143-248305	Mr. Atulya Verma	7506706401
SIC alternate 2 a	Sr. VP-Civil, Structure, Infra, Land, Security & Admn.	02143-248303	Mr. Anil Kumar Singh	7774089777
SIC alternate 2 b	VP-Iron & Agglomeration	02143-246300	Mr. P.P. Varma	8108162774
SIC alternate 2 c	VP- SMS, LF & LCP	02143 -246910	Mr. Sanjay S. Jadhav	9594795000
SIC alternate 2 d	VP- Caster & Mill	02143 -246205	Mr. Sathya Prakash	8108162784
SIC alternate 2 e	VP – RMHS	6439	Mr. Prabir Kumar Das	8108162752
SIC alternate 2 f	VP – Coke Ovens	7310,7450	Mr. Ravikumar Iyer S	7774089800
SIC alternate 2 g	GM – Logistics	6259	Mr. Uttam Ramani	8108152267
Emergency Fire and Rescue In Charge	VP-Corporate – Safety	02143 -246248	Dr. T. Yogeswara	7066045470
Emergency Safety & Fire Officer	DGM – Safety & Fire Services	02143 -246347	Mr. V.P. Saxena	8380024170
ESFO Alternate 1	AGM	02143 -246815	Mr. Amit Kumar	8805023009
ESFO Alternate 2	Sr. Mgr	02143 -246348	Mr. Vivek Bhatnagar	8108162929
Emergency Maintenance Officer	AVP Central Maintenance	02143-246282	Mr. Suresh K Sharma	8108162769
EMO Alternate 1	GM - E & A	02143 -246364	Mr. Girish Narayan Muley	8108162737
Emergency Medical Officer	Medical In charge	02143 -246468	Dr. Manoj Sethi	8108162739
Emergency Offsite Coordinator	In charge Security	02143 -246563	Mr. Shree Madholkar	8691015200
EOC alternate	Sr. Manager Security	02143 -246700	Mr. Rakesh K. Sharma	7066045449
Emergency Environment In charge	VP- Environment	02143 -246029	Mr. Bharat Balkrishna Nimbarte	7774090111
Emergency Account In charge	VP- Accounts	02143 -246060	Mr. Pradeep Bhargava	8805022385
Emergency Account Officer	Head Budgetary control	02143 -246006	Mr. Manoj Mishra	8308223344
Liaison with Govt. Authority	VP – HR	02143-246003	Mr. Jagdish Ghorpade	8805022551
Emergency Public Relation Officer	DGM HR	02143-246140	Mr. Praveen Narayan Mhatre	8691015198
Emergency Roll	Sr. Mgr HR	02143-246315	Mr. Ajay Thakur	8692916699

Emergency Designation	Normal Designation	Office Phone	Name	Residence Phone Number / Mobile Number
Call Officer				

1.4.14.5 Off-Site Emergency Planning

The off-site emergency plan is an integral part of any hazard control system. It is based on those incidents identified by the works management, which could affect people and the environment outside the works. Thus, the off-site plan follows logically from the analysis that took place to provide the basis for the on-site plan and the two plans therefore complement each other. The roles of the various parties that may be involved in the implementation of an off-site plan are described below. The responsibility for the off-site plan will be likely to rest either with the works management or with the local authority. Either way, the plan identifies an emergency coordinating officer who would take overall command of the off-site activities. Consideration of evacuation includes the following factors:

In the case of a major fire but without explosion risk (e.g. an oil storage tank), only houses close to the fire are likely to need evacuation

If fire is escalating very fast it is necessary to evacuate people nearby as soon as possible.

In acute emergency people are advised to stay indoors and shield themselves from the fire.

1.4.14.5.1 Organization

Organizational details of command structure, warning systems, implementation procedures, emergency control centres include name and appointments of incident controller, site main controller, their deputies and other key personnel involved during emergency.

1.4.14.5.2 Communications

Identification of personnel involved, communication centre, call signs, network, list of telephone numbers.

1.4.14.5.3 Special Emergency Equipment

Details of availability and location of heavy lifting gear, specified fire-fighting equipment, etc.

1.4.14.5.4 Voluntary Organizations

Details of Voluntary organizations, telephone numbers nearby of hospitals, Emergency helpline, resources etc to be available with chief authorities.

1.4.14.5.5 Non-government Organizations (NGO)

NGO's could provide a valuable source of expertise and information to support emergency response efforts. Members of NGOs could assist response personnel by performing specified tasks, as planned during the emergency planning process.

Evacuation of personnel from the affected area

Arrangements at rallying posts and parking yards

Rehabilitation of evacuated persons.

1.4.14.5.6 Chemical information

Details of the hazardous substances (MSDS information) and a summary of the risks associated with them are to be made available at respective site.

1.4.14.5.7 Meteorological information

There is to be arrangements for obtaining details of weather conditions prevailing at, before the time of incident and weather forecasts updates.

1.4.14.5.8 Humanitarian Arrangements

Transport, evacuation centres, emergency feeding, treatment of injured, first aid, ambulances, temporary mortuaries.

1.4.14.5.9 Public Information

Dealing with the media-press office

Informing relatives, etc.

1.4.14.5.10 Assessment

Collecting information on the causes of the emergency

Reviewing the efficiency and effectiveness of all aspects of the emergency plan.

1.4.14.5.11 Role of local authority

Local Authorities like Panchayat, Sabha, Samity, municipalities can help in combating emergency situation after assessing the impact scenario in rescue phase.

1.4.14.5.12 Role of police

The police are to assist in controlling of the incident site, organizing evacuation and removing of any seriously injured people to hospitals.

Co-ordination with the transport authorities, civil defence and home guards

Co-ordination with army, navy, air force and state fire services

Arrange for post mortem of dead bodies

Establish communication centre with easy contact with Head-EHS

1.4.14.5.13 Role of Fire Brigade

The fire brigade is to be organized to put out fires and provide assistance as required during emergency.

1.4.14.5.14 Media

The media is to have ready and continuous access to designated officials with relevant information, as well as to other sources in order to provide essential and accurate information to public throughout the emergency and to avoid commotion and confusion.

Efforts are made to check the clarity and reliability of information as it becomes available, and before it is communicated to public.

Public health authorities are consulted when issuing statements to the media concerning health aspects of chemical incidents.

Members of the media are to facilitate response efforts by providing means for informing the public with credible information about incidents involving hazardous substances.

1.4.14.5.15 Role of health care authorities

Hospitals and doctors must be ready to treat all type of injuries to casualties during emergency.

Co-ordinate the activities of Primary Health Centres and Municipal Dispensaries to ensure required quantities of drugs and equipments.

Securing assistance of medical and paramedical personnel from nearby hospitals/institutions.

Temporary mortuary and identification of dead bodies.

Contact details of Organisations under Mutual Aid

Sr.No	Name of the Factory	Authorized contact person	Phone number
01	RTI, Nagothane	Sh. MI Nagare, GM – Safety	02194-668022 9970050114
02	WMSL, Salav	Sh. V M Saswadkar, DGM – F & S	02144-260110 9552599086
03	SPL, Amdoshi	Mr. M. G. Kulkarni, Manager HSE	02194-222540 9673840698
04	HPCL, Usar	Sh. S.R. Kesarkar, Exe. Operations Officer	02141-265377, 02141 - 282829 9226184802
05	GAIL, Usar	Mr. G Senthil, Sr.Mgr (F & S)	02141-265407 02141 -265413 8308823412
06	RCF, Thal	Sh. PC Patnaik, CE (F&S)	

Contact details of various Hospitals, Doctors, Nursing Homes

			IONS AVAILABLE
SaiRugnalaya	Next To Government Hospital Chinchpada Road-402107 Pen, Maharashtra	02143 - 55692 +919423891590	Emergency and OPD with admission
Civil Hospital	Pen, Raigad	02143-52237	
Govt. Hospital Pen	Pen, Raigad	02143-255899	
Govt. Hospital Alibag	Beach Road Alibag, Raigad	02141-222021/222157	
FRU Municipal Hospital Vashi	Vashi	022-27899901-05	
Trimurti Eye Hospital Pen	Trimurti Eye Hospital Pen Pen, Raigad	02143-256980/252195	
Dr.Kumtekar Hospital Alibag	Shreebag no. 01 Alibag, Raigad	02141-222617	Eye Specialist
Palvia Hospital Gadab	Gadab, Raigad	02143-274021	
Laxmi Eye Hospital Panvel	Near Panchratna Hotel, Uran Road, New Panvel, Navi Mumbai - 410206 Panvel, Raigad	022-27452228/27453747	Eye Care
Life line Hospital Panvel	SHIVAJI ROAD,ALPAJI ST STAND, NEAR KETAKI HOTEL Panvel, Raigad	022-61567000	
Paramount Hospital Panvel	Near Rupali Cinema, Old Panvel, Panvel City, Navi Mumbai - 410206 Panvel, Raigad	022-27455611/27455610	

Dr. Purohit Hospital Panvel	Plot No 78, Middle Class Housing Society, Near Barns High School, Panvel, New Panvel, Navi Mumbai - 410206 Panvel, Raigad	022-27452922/ 27450501	
Gandhi Hospital Panvel	112, Meech Society, Near Kohinoor Technical Institute, Panvel, Navi Mumbai - 410206 Panvel, Raigad	022-27165023	
Sasharabudhe Hospital Panvel	Plot No 77/1/5, Vidhya CHS, NityanandMarg, Near Taluka Police Station, Panvel, Navi Mumbai, - 410206 Panvel, Raigad	022-27151058	
Panacia Hospital Panvel	Plot No. 141, SAI Arcade, Beside St. Francis Church, Opposite St Bus Depot, Mission Compound, Line Ali, Panvel, Navi Mumbai - 410206 Panvel, Raigad	022-27469998	
Arunoday Hospital Panvel	Near Cidco Garden Sector 10, Plot No 86, New Panvel, Navi Mumbai - 410221 Panvel, Raigad	022-27465723	
MGM Hospital Kamothe	182, Sector 18, Kamothe, Navi Mumbai - 410209 Kamothe, Raigad	022-27437900	
MGM Hospital CBD Belapur	Plot No 1a, Sector 1a, CbdBelapur, Navi Mumbai - 400614	022-27572293	
MGM Hospital Vashi	Plot No 35, Near Vashi Police Station & Navi Mumbai Sports Association, Sector No	022-27822203/ 27821659	

	3, Vashi, Navi Mumbai - 400703		
Lakshadeep Hospital Vashi	Plot 1-B, Sector 9-A, Vashi, Navi Mumbai - 400703	022-27897699/ 27882501	
Hiranandani Hospital Vashi	Fortis Hiranandani Hospital Mini Sea Shore Road, Sector 10 A, Vashi, Navi Mumbai - 400703	022-39199100	
Dr. DY Patil Hospital Nerul	Sector No 5, Nerul, Navi Mumbai - 400706	022-27716677/ 39215906	
Suraj Hospital Sanpada	Plot No 1/1a, Sun Palm View, Sector No 15, Opposite Palm Beach Road, Sanpada, Navi Mumbai - 400705	022-27810099	
Mahajan Hospital Airoli	R 831, TTC MIDC, Next To Rabale Police Station & Shell Petrol Pump, Thane Belapur Road, CbdBelapur, Navi Mumbai - 400614	022-27691679	
National Burn Centre Airoli	Plot No 1, Sector No 13, Samarth Ramdas Swami Marg, Airoli, Navi Mumbai - 400708	022-2760666/ 27605227	

Contact details of Civic Authorities

Sr.No	Department	Phone No.	E-mail Address
01	District Collector & D. M. Alibag, District - Raigad	+91-2141-222118	collector_raigad@maharashtra.gov.in
02	Adl. District Collector, Raigad	(02141) 222086	
03	Superintendent of Police, Raigad	02141- 222093 (O) 02141-222008 (R)	
04	ADD. SP RAIGAD	02141- 228530 (O) 02141-228531 (R)	
05	Home Dy. S.P., Raigad	02141-222007(O) 02141- 222091 (R)	
06	Alibag Control Room	02143 - 222100	
07	Control Room Navi Mumbai	022-27574928	
08	Uran Police Station	022-27220642	
09	Parvel Police Station	022 27462333	
10	CBD Belapur PS	022-27580255	
11	Nagothane Police Station	02144-222034	
12	Khapoli Police Station	02192 63333	

1.1.15 Conclusion

It has concluded that there will be no major risk involved due to Proposed Change In Configuration project. Suitable Risk Control Measures with respect to Risk Assessment have been/will be implemented to minimize the risk to an acceptable level. Regular Training, Implementation of SOPs and compliance of relevant Personal Protective Equipment's (PPEs) shall help to minimize the health hazards and incidental casualties. So, it is safe to say that there will be no major risk involved due to the Proposed Change In Configuration project.

