

JAWAHARLAL NEHRU PORT TRUST



DISASTER MANAGEMENT PLAN (DMP)

By

IRCLASS
Indian Register of Shipping

February - 2020

This is to state that at the request of Jawaharlal Nehru Port Trust (JNPT), the undersigned surveyors have prepared Disaster Management Plan.

CONFIDENTIALITY CLAUSE

This work has been carried out for JNPT as per their work order dated 22nd October, 2019 and is confidential. No part of this report may be released to any outside organization unless explicitly advised by the owners in writing.

ISSUED BY:

Indian Register of Shipping

Prepared by


Mr. Dipak Sonawane


Mr. Sudarshan Daga


Mr. Somesh Gupta

Reviewed by


Mr. A.R. Kar

Approved by


Mr. N. Girish

REPORT REVISION RECORD

Revision No.	Revision Details	Date
Draft	Draft report issued for review and comment to JNPT.	08.01.2020
Final	Final report issued to JNPT	03-02-2020

Disclaimer

The tasks of preparation of Disaster Management Plan have been done by IRS as a consulting service at the request of JNPT. Conclusions and recommendations resulting from the consulting services have been formed in good faith and on the basis of the best information available from sources believed to be reliable.

IRS provides No warranty, express or implied, as for the completeness or correctness of the analysis and report preparation work. While IRS have made every attempt to ensure that the analysis, conclusions or recommendations contained in the Report are from reliable sources using reliable methodologies; IRS is not responsible for any errors or omissions, or for the results obtained from the use of the deductions or reports.

The services rendered by IRS are without warranty of any kind, express or implied, including, but not limited to warranties of performance, merchantability and fitness for a particular or intended purpose.

The client(s) understand(s) and agree that IRS shall have no liability arising out of or in connection with the results, recommendations or omissions. In no event will IRS, its related partnerships or personnel or agents or employees thereof be liable to JNPT or anyone else for any decision made or action taken in reliance on the services provided by IRS including any consequential, special or similar damages, even if advised of the possibility of such damages.

It is concluded that any usage/implementation/interpretation of the recommendation is at the client's risk. In particular, the recommendations should not be considered as certified, legal or otherwise.

INTRODUCTION OF INDIAN REGISTER OF SHIPPING (IRS)

IRS is a classification society established for the promotion of safety of life and protection of property at sea & promotion of knowledge base. It is therefore engaged in the Management of Safety & Reliability through Development of Rules and Regulations, Surveys, Audits, Certification and Training. It is a member of the 'International Association of Classification Societies' (IACS) which is a consultative body to International Maritime Organisation, a subsidiary body of the 'United Nations Organisation'.

IRS has been incorporated as a section 25 public limited company under the companies Act, 1956 with no shareholders and is collectively managed by the clients it seeks to serve; therefore, no single interest is dominant in its functioning. The Technical & other committees are also constituted of representatives of the industry enabling both financial & organizational independence. IRS is a not-for-profit organization; any surplus resulting from our operations is invested for R&D and growth, to promote its objectives.

IRS is a recognized R&D organization by the Department of Scientific and Industrial Research (DSIR), Ministry of Science & Technology, 'Govt. of India' for its research related to the maritime industry.

In NOS-DCP, IRS has been identified as one of the technical specialist (support agency) to provide advice relating to ship safety, structural integrity and stability of marine casualties and to depute representatives to attend to a casualty and salvage at the SMCU when established.

A strong team of highly qualified and experienced experts in various disciplines of engineering and marine sciences/technology is engaged in IRS to offer prompt technical solutions to marine and other industry.

IMPORTANT NOTE

The Disaster Management Plan (DMP) outlines the steps required for the management of responses to Natural and Man-Made disasters that are the responsibility of the JNPT and companies within port estate.

The DMP of JNPT is a comprehensive document covering all identified Hazards, Risk and Vulnerability analysis, Elements at risk and Level of impact. The plan provides clarity on the roles, delegation of authority and responsibility of each involved staff member in the organization.

It is intended that this plan would provide guidance for quick response in case of an emergency and help in realizing sustainable Disaster Damage Reduction for the Port.

This document should be read/ referred to in conjunction with the JNPT OSCP and NDMA Guidelines.

TABLE OF CONTENTS

CONTENTS		Pg. No.
ABBREVIATIONS		8
PART I		
1.0	PRILIMINARIES	12
1.1	PROFILE OF THE PORT	12
1.2	RATIONALE	28
1.3	SCOPE OF PLAN	30
1.4	VISION	32
1.5	TIME FRAMES	32
1.6	INSTITUTIONAL FRAMEWORK FOR DISASTER MANAGEMENT	32
2.0	HAZARD, RISK, VULNERABILITY & CAPACITY ANALYSIS (HRVCA)	36
2.1	DISASTER RISKS, VULNERABILITIES AND CHALLENGES	36
2.2	UNDERSTANDING DISASTER RISKS	41
3.0	HAZARD SPECIFIC PREVENTION AND MITIGATION MEASURES	69
3.1	PREVENTIVE AND MITIGATIVE MEASURES	69
3.2	HAZARD-WISE RESPONSIBILITY MATRICES FOR DISASTER RISK MITIGATION	70
4.0	MAINSTREAMING DISASTER RISK REDUCTION (DRR)	129
5.0	INCLUSIVE DRR	132
6.0	COHERENCE OF DISASTER RISK MANAGEMENT ACROSS RESILIENT DEVELOPMENT AND CLIMATE CHANGE ACTION	133
7.0	CAPCITY DEVELOPMENT AND COMMUNICATION	135
7.1	CAPCITY DEVELOPMENT	135
7.2	COMMUNICATION STRATEGY	139
8.0	COORDINATION – HORIZONTAL AND VERTICAL LINKAGES	142

Disaster Management Plan

9.0	PREPAREDNESS AND RESPONSE	143
9.1	PREPAREDNESS	143
9.2	EARLY WARNING / ALERT SYSTEM	157
9.3	HAZARD SPECIFIC RESPONSE PLANS	165
9.4	ACTIVATION OF RESPONSE PLAN	286
9.5	LOGISTICS / SERVICE DELIVERY MECHANISM DURING DISASTERS	293
10.0	RECOVERY AND RECONSTRUCTION	293
11.0	BUDGETARY PROVISIONS	300
12.0	PLAN MANAGEMENT	301
REFERENCES		302
APPENDIX A	RESPONSE SUPPORT DIRECTORY	304
APPENDIX B	RESOURCES	305
APPENDIX C	EMERGENCY CONTACT NUMBERS	333
APPENDIX D	ANTIDOTES AND FIRST AID TREATMENT	343
APPENDIX E	CONSEQUENCE ANALYSIS RESULTS	348
PART II		
ENSURING BUSINESS CONTINUITY OF JNPT		366

ABBREVIATIONS

ADIOS	Automated Data Inquiry for oil spills.
AERB	Atomic Energy Regulatory Board
ATI	Advanced Training Institute
BARC	Bhabha Atomic Research Centre
BPCL	Bharat Petroleum Corporation Limited
CBRN	Chemical, Biological, Radiological and Nuclear
CCA	Central Coordinating Authority
CEC	Chief Emergency Controller
CMO	Chief Medical Officer
CIC	Chief Incident Controller
CICP	Oil Spill Contingency Plan
CISF	Central Industry Security Force
CMG	Crisis Management Group
CMV	Central Motor Vehicle
CWC	Cyclone Warning Centers
DCA	District Coordinating Authority
DCC	District Contingency Committee
DDMA	District Disaster Management Authority
DISH	Director of Industrial Safety and Health
DMP	Disaster Management Plan
EAP	Emergency Action Plan
EOC	Emergency Operation Centre
EPPR	Emergency Prevention, Preparedness and Response
FLOP	Fire Loss of Profit
F&SO	Fire and Safety Officer
GNOME	General NOAA (National Oceanic and Atmospheric Administration) Oil Modeling Environment
GPS	Global Positioning System
GTI-APM	Gateway Terminal India – A.P. Moller
HPC	High Powered Committee
HVLR	High Velocity Long Range
IDRN	Indian Disaster Resource Network
INCOIS	Indian National Centre for Ocean Information Services
IMD	India Meteorological Department
IMO	International Maritime Organization
IAP	Incident Action Plan
IRT	Incident Response Team
IOCL	Indian Oil Corporation Limited
IOTL	Indian Oil Tanking Limited
ITOPF	International Tanker Owners Pollution Federation
JNPCT	Jawaharlal Nehru Port Container Terminal
LCA	Lead Combat Agency

Disaster Management Plan

MARG	Mutual Aid Response Group
MbPT	Mumbai Port Trust
MCZMA	Maharashtra Coastal Zone Management Authority
MEFG	Medium Expansion Foam Generator
MLO	Media Liaison Officer
MLOP	Machinery Loss of Profit Insurance
MMD	Mercantile Marine Department
MoEF	Ministry of Environment & Forest
MPCB	Maharashtra Pollution Control Board
MRCC	Maritime Rescue Coordination Centre
MSDS	Materials Safety Data Sheet
MSEB	Maharashtra State Electricity Board
MSIHC	Manufacture, Storage and Import of Hazardous Chemical Rules
MWSSB	Maharashtra Water Supply and Sewerage Board
M&E	Mechanical and Electrical
NEC	National Executive Committee
NCMC	National Crisis Management Committee
NDMA	National Disaster Management Authority
NIDM	National Institute of Disaster Management
NSICT	Nhava Sheva International Container Terminal
NSIGT	Nhava Sheva (India) Gateway Terminal
OH&S	Occupational Health and Safety
OOSA	Online Oil Spill Advisory
OSRL	Oil Spill Response Limited
OSRO	Oil Spill Response Organization
OSTM	Oil Spill Trajectory Model
PAS	Public Address System
PESO	Petroleum and Explosives Safety Organisation
P&IR	Personnel and Industrial Relations
PHO	Port Health Organization
PNGRB	Petroleum and Natural Gas Regulatory Board
PO	Procurement Officer
POC	Port Operation Centre
PPD	Port Planning and Development
PUB	Port User Building
RADMMD	The Revenue Administration, Disaster Management and Mitigation Department
RMC	Regional Meteorological Centre
SA	Statutory Agency
SAR	Search and Rescue
SCMG	State Crisis Management Group
SEC	State Executive Committee
SIC	Site Incident Controller
SIDM	State Institute of Disaster Management

Disaster Management Plan

SMPV	Static and Mobile Pressure Vessel
SO	Safety Officer
SDMA	State Disaster Management Authority
UNDP	United Nations Development Programme
WMO	World Meteorological Organization

Part I

1.0 PRELIMINARIES

1.1 PROFILE OF THE PORT

Jawaharlal Nehru Port Trust is a port at Navi Mumbai (formerly known as the Nhava Sheva Port) within the Mumbai harbour on the west coast of Maharashtra, India. The port was commissioned on 26th May 1989. The port lies on the main land opposite to the city of Mumbai across the Thane creek. It is well connected to the major highways and rail networks in India. The nearest airport to JNPT is Mumbai (Chhatrapati Shivaji International) airport is about 57 km via NH348A.

Location of the port

Latitude: 18°56'43'' N; Longitude: 72°56'24''E

The port encompasses an area of 3000+ hectares. The port handles 56% (JNPT website) of India's container traffic.

The port has four container terminals, one shallow water berth, one liquid cargo jetty (BPCL jetty) and an anchorage area (ONGC). The operations related to different container berths/jetty at JNPT are as follows:

1.1.1 Jawaharlal Nehru Port Container Terminal (JNPCT)

JNPCT is JNPT's own container terminal.

Table 1.1: JNPCT Terminal details

Quay length (m)	600
Maximum Draft (m)	15
Capacity (In million TEUs)	1.35
Reefer Points (Nos.)	576
RMQCs (Nos.)	09
RTGCs (Nos.)	27
RMGCs (Nos.)	05
Tractor Trailers	100
Backup Area in Hectares (Container Yard)	61.49 (Including Shallow Birth area)
Reach Stackers	11 (Hired)
Railway Siding Tracks for ICD	04
Maximum Permissible LOA of The Vessel (m)	370

1.1.2 Gateway Terminal India (GTI- APM)

Gateway Terminals India (GTI) is a joint venture between APM Terminals and the Container Corporation of India Ltd (CONCOR). Incorporated in July 2004, GTI operates the third container terminal at Jawaharlal Nehru Port on a build, operate and transfer (BOT) basis for a period of 30 years. It commenced partial operations in March 2006 and became fully operational from October 2006.

*Disaster Management Plan***Table 1.2:** GTI-APM Terminal details

Quay length (m)	712
Maximum Draft (m)	15
Reefer Points (Nos.)	880
RMQCs (Nos.)	10
RTGCs (Nos.)	40
RMGCs (Nos.)	03
Yard Area (In Hectares)	47.24
Maximum Permissible LOA of The Vessel (m)	370
Empty Handlers	02
Twin Lift Spreaders (m) rated load	61

1.1.3 NSICT and NSIGT-DP WORLD TERMINAL

JN Port entered into a license agreement in July 1997 with M/s. Nhava Sheva International Container Terminal (NSICT) a consortium led by M/s. P & O Ports, Australia, for construction, operation and management of a new 2-berth container terminal on BOT basis for period of 30 years. The same was commissioned in April 1999. The project comprises construction of 600 meters quay length; reclamation of 25.84 hectares of area backup for container yards and requisite container handling equipment along with other related facilities. The present capacity of the terminal is currently assessed as 15.00 million tonnes per year.

Table 1.3: DP World Terminal details

	NSICT	NSIGT
Quay length (m)	600	330
Maximum Draft (m)	15	15
Reefer Points (Nos.)	772	320
RMQCs (Nos.)	08	04
RTGCs (Nos.)	29	16
RMGCs (Nos.)	03	03
Yard Area (In Hectares)	25.84	27
Maximum Permissible LOA of The Vessel (m)	370	370

1.1.4 Bharat Mumbai Container Terminal (BMCT) (Phase I – 3 berths)

BMCT - Fourth Container Terminal is developed on Design, Built, Fund, Operate and Transfer (DBFOT) basis for the concession period of 30 years. The work was awarded to M/s Bharat Mumbai Container Terminals Pvt. Ltd. (the subsidiary of Port of Singapore Authority) at the Revenue Share of 35.790%. The Concession Agreement was signed on 6th May 2014 and the Concession was awarded on 22nd December 2014.

The project is implemented in two Phases. i.e. Phase-I and Phase-II. The total capacity addition would be 4.8 Million TEUs, 2.4 Million TEUs in each phase.

*Disaster Management Plan***Table 1.4:** BMCT Terminal (Phase-I) details

Quay length (m)	1000
Maximum Draft (m)	16.5
Reefer Points (Nos.)	1620
RMQCs (Nos.)	04
RTGCs (Nos.)	36
RMGCs (Nos.)	04
Yard Area (In Hectares)	90
Maximum Permissible LOA of The Vessel (m)	370
Designed Capacity (million TEUs)	2.4

1.1.5 Shallow Water Berth

Shallow Draught Berth Commissioned 1st September 2002 of Total Length 445 meters. Vessels up to 183 meters LOA and up to 10 meters draught are being handled. Container Vessels, Cement, General Cargo and Liquid Cargo Vessels are being handled with a Capacity of about 0.15 Million TEUs Container & 0.9 Million Tons Other Cargo. Total 2.77 Million Tons.

Table 1.5: SWB details

Quay Length (m)	445
Maximum draft (m)	10-Max (Tidal)
Design capacity (Million TEUs Year)	0.15
(Million Tonnes/Year)	2.77
Max. Permissible LOA of The Vessel (m)	183
RMQCs (Nos.)	3

1.1.6 Liquid Cargo berth - BPCL Jetty

BPCL's Liquid Cargo Berth (LCB) is situated at Jawaharlal Nehru (JN) Port, Navi Mumbai inside Jawaharlal Nehru Port Trust (JNPT), Sheva, Navi Mumbai. M/s Bharat Petroleum Corporation Limited (BPCL) is the owner and Jetty operator of the LCB. The Jetty handles various liquid cargos viz. petroleum (Class A, Class B and Class C), non-petroleum, chemicals, etc. from ship to shore and vice-versa through close conduit system of pipeline network, using marine loading arms for POL products and hoses for non-POL products. The Jetty has two parking berths, one on sea side and the other on shore side to facilitate various marine ships/vessels. LCB is developed with large network of pipelines, intermediate lines, pig launchers, marine loading arms and loading hoses.

The total quay length is 300 m. The vessels can be handled at creek side as well as shore side. Vessels with a capacity of 85,000 DWT tankers (Creek side) and 35,000 DWT tankers (Shore side) respectively have been handled at the Jetty. The berths are in operation since February 2002. Water depth in front of berth is maintained at 12.3m during Monsoon 13.0m during fair weather for Creek side and 10.2m for Shore Side with respect to chart data. Three ships can be unloaded simultaneously, one at the shore side and two at the creek side.

Disaster Management Plan

LPG unloading facility is also present at this jetty, which receives at BPCL, Uran LPG Plant. Products such as Crude Oil, Naphtha, Motor Spirit, High speed Diesel (HSD), Phosphoric Acid, Ammonia etc. are handled by private tank farm owners respectively through unloading arm, flexible hoses and transferred through dedicated cross-country pipelines.

There are unloading arms installed on each side of the jetty. BPCL handles the chemicals using SS braided hoses. The hoses are flanged to the unloading pump installed in the ship and then laid across the jetty up to the fixed pipeline.

Six numbers of Marine unloading arms are installed on Creek Side & Four numbers Marine unloading arms are installed on Shore Side. There is also a provision for future installation of a Marine unloading arm on shore side and a Marine unloading arm on sea side.

The jetty operations are carried out round the clock. There is a BPCL office on the Jetty which takes care of the day to day operations.

The details of the unloading arm and hoses given in table below:

Table 1.6: Marine unloading arm/Hose details

MLA/Hose details		Material	Pressure in bar (g)	Temperature (°C)
Dia.	Company			
16"	ONGC	Crude oil	3	Atm.
12"	IOCL	Black oil	3	Atm.
12"	IOCL	White oil	3	Atm.
12"	RIL	White oil	7	Atm.
12"	IMC	White oil	7	Atm.
12"	BPCL	LPG	7	-4
12"	BPCL	Fuel Oil	3	Atm.
8"	BPCL	LDO	3	Atm.
16"	Dipak fertilizers	Ammonia	6	-18
10"	IMC	Chemicals	7	Atm.
8"	GBL	Chemicals	7	Atm.
12" & 8"	IMC/Suraj	Base oil	7	Atm.
12"	IMC/Suraj	Edible oil	7	Atm.
12"	GBL	Edible oil	7	Atm.
12"	GBL	Edible oil	7	Atm.

Pipelines within the Liquid Cargo Jetty includes

- Two numbers of 24" White Oil Pipeline connecting LCB and IOC Terminal
- 24" Black Oil Pipeline connecting LCB and IOC Terminal
- 12" & 8" Furnace Oil Pipelines connecting LCB and BPCL Bunk Depot
- Two numbers of 12" LPG Pipeline connecting LCB and Uran LPG Plant
- 24" White Oil Pipeline connecting LCB and IOT Navghar Terminal
- 24" Black Oil Pipeline connecting LCB and IOT Navghar Terminal

Disaster Management Plan

- 16” White Oil Pipeline connecting LCB and RIL Terminal
- 12” Base Oil Pipeline connecting LCB and Shell Terminal
- 16” Phosphoric Acid Pipeline connecting LCB and Deepak Terminal
- 16” Ammonia Pipeline connecting LCB and Deepak Terminal
- 16” Black Oil Pipeline connecting LCB and IMC Terminal
- 12” Edible Oil Pipeline connecting LCB and IMC Terminal
- 10” Chemicals Pipeline connecting LCB and IMC Terminal
- 8” Base Oil Pipeline connecting LCB and IMC Terminal
- 18” & 12” Edible Oil Pipelines connecting LCB and Suraj Agro Terminal
- 8” Base Oil Pipeline connecting LCB and Suraj Agro Terminal
- 18” Edible Oil/ Molasses Pipeline connecting LCB and GBL Terminal
- 12” Edible Oil Pipeline connecting LCB and GBL Terminal
- 8” Chemicals Pipeline connecting LCB and GBL Terminal
- 30” Crude Oil Pipeline connecting LCB and ONGC Uran

1.1.7 Anchorage area

- Bunkering of HSD for ONGC vessels.

1.1.8 Utility Services

JNPT receives electrical power from Maharashtra State Electricity Distribution Company Ltd. (MSEDCL) at 220KV level from two independent express feeders at Master Unit Sub Station (MUSS) of the Port. Two independent express feeders at 220 KV level ensures 100 percent reliability of power supply from MSEDCL. Three transformers at MUSS ensure 100% redundancy and uninterrupted power to all terminals of JNPT. As green port initiative, total 822.6 KW of rooftop solar panels are installed at various public buildings of JNPT with generation capacity of approximately 10,00,000 units per year.

1.1.9 Ongoing Activity

JNPT has taken up the project of ‘Coastal Berth’. The work comprises of construction of 250 m long Coastal Berth with 2 trestles 94m long each with backup area reclamation of 11 hectares. Dredging to achieve dredged depth of 11 m at Berth pocket back side of the berth is also proposed for handling port crafts with dredged depth of 6m below CD. Capacity for handling liquid cargo of 1.5 MTPA and general coastal cargo of 1 MTPA. It will reduce the delays caused due to Port related paperwork and custom formalities thus save time and enhance overall Trade

1.1.10 Port Layout with HTL, LTL and CRZ mapping

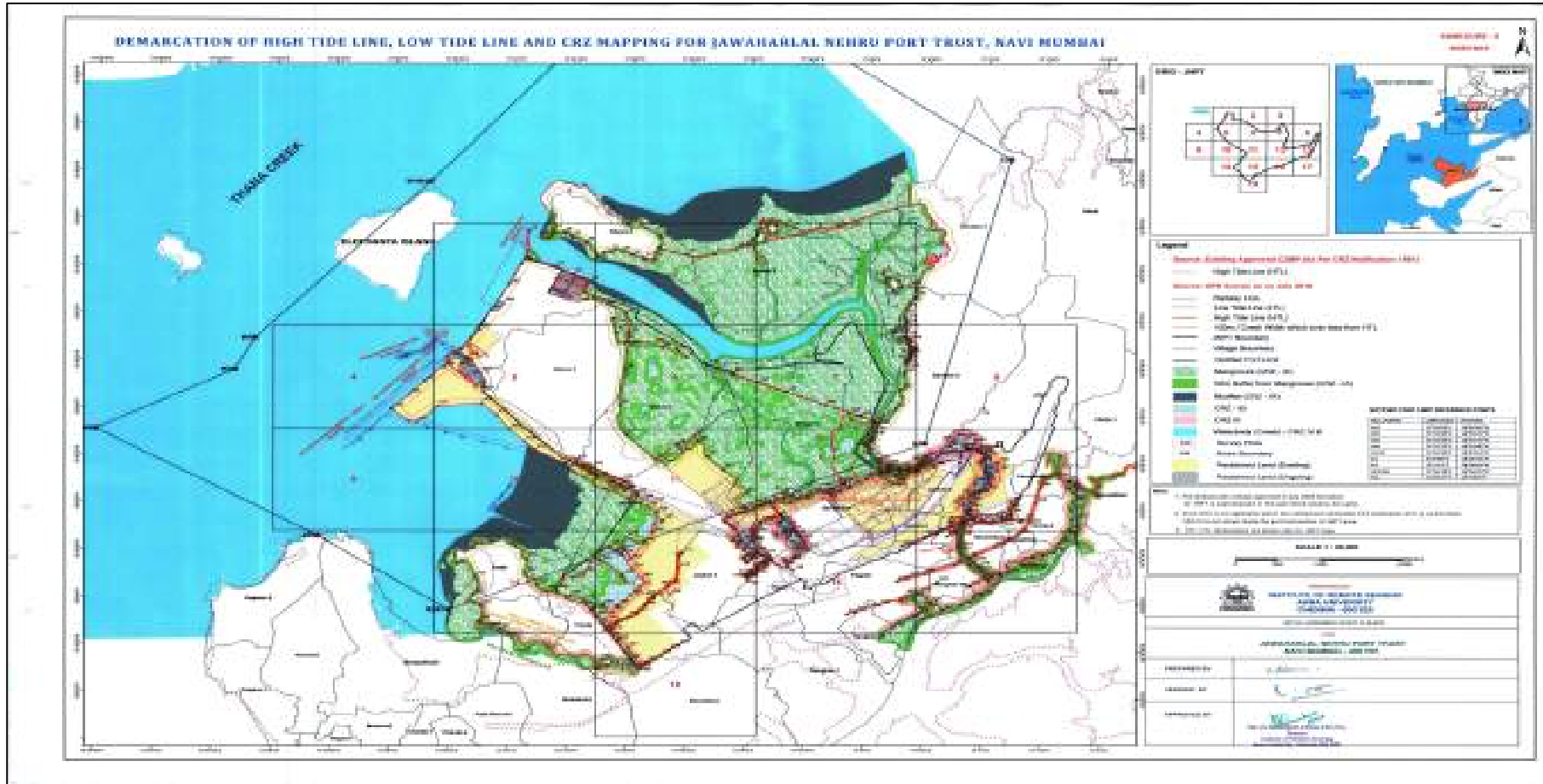
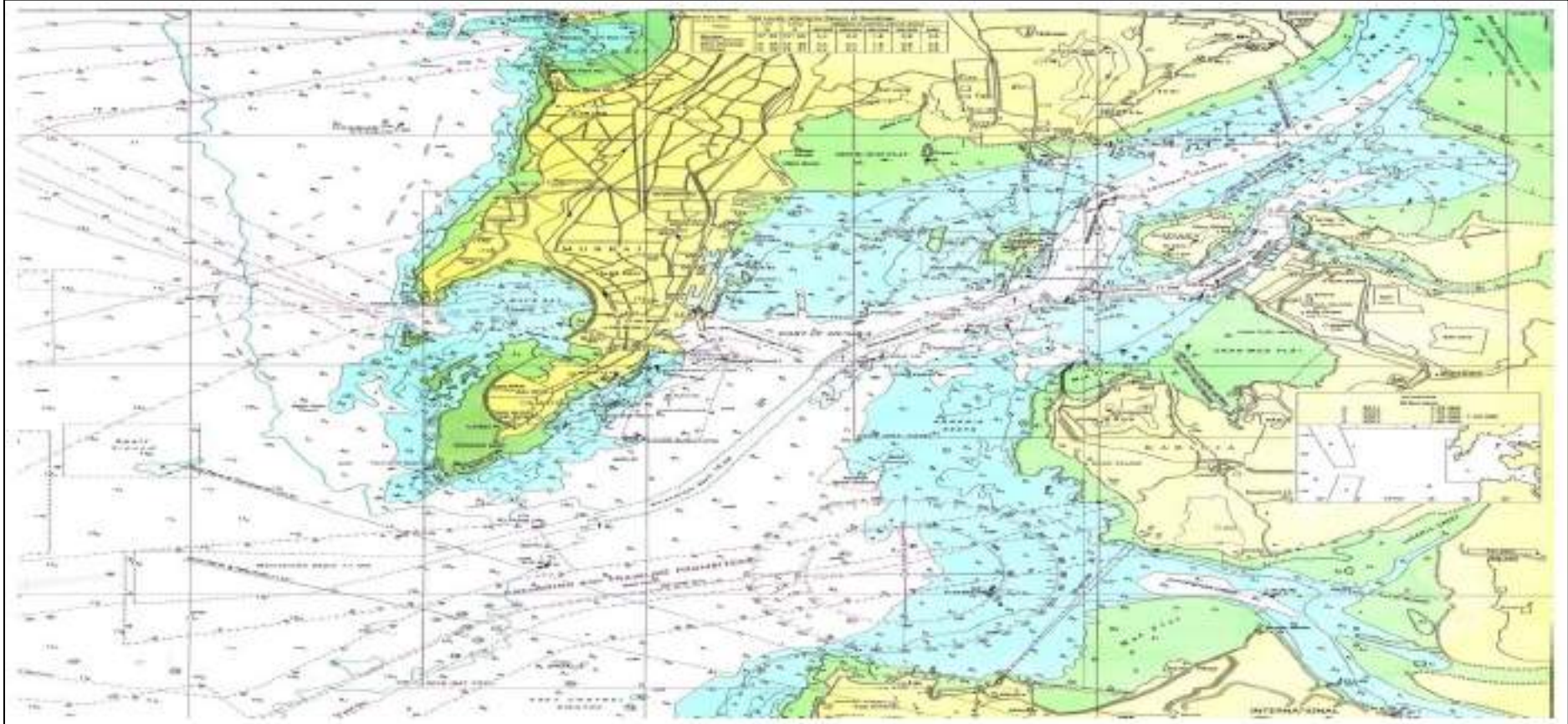


Figure 1.1: Demarcation of HTL, LTL and CRZ mapping

1.1.11 Port Layout



Figure 1.2: Layout of JNPT

1.1.12 Port Limit**Figure 1.3:** Port Limit

*Disaster Management Plan***1.1.13 Port Area****Table 1.7:** Port Area

Water Spread	50 sq. km
Land Area	3252 hectares including reclaimed area

1.1.14 Entrance Channel**Table 1.8:** Entrance Channel

Length	:	22 km channel share with MbPT upto Jawahar Dweep + 7.2 km from Jawahar Dweep to JNPT.
Width	:	370 m at straight reach, 460 m at the berths

1.1.15 Berth Particulars**Table 1.9:** Berth Particulars

Sr. No	Berth	Type	Maximum permissible draft/mtr	Quay length (mtr)	Maximum size of the vessel that can be accommodated length (mtr)
1.	JNPCT + SWB	Alongside	15	680+445	370 183
2.	NSICT	Alongside	15	600	370
3.	GTICT	Alongside	15	712	370
4.	NSIGT	Alongside	15	330	370
5.	BMCT (Phase I - 3 berths)	Alongside	16.5 m (depth)	1000 m	
6.	Liquid Cargo Terminal	Alongside (twin berth)	14 (Tidal) (outer berth), 10 (Tidal) (inner berth)	300	370 185

1.1.16 Establishments within the Port area

- Jawaharlal Nehru Port Container Terminal (JNPCT)
- DP world
 - Nhava Sheva International Container Terminal (NSICT)
 - Nhava Sheva (India) Gateway Terminal Pvt. Ltd. (NSIGT)
- Gateway Terminals India (GTI-APM terminal)
- Bharat Mumbai Container Terminal (BMCT)
- Bharat Petroleum Corporation Limited (BPCL terminal)
- Indian Oil Corporation Limited (IOCL) tank farm
- RIL tank farm
- IMC tank farm
- GBL tank farm
- Bharat Shell tank farm
- Suraj Agro tank farm
- Deepak Fertilizer tank farm

Disaster Management Plan

- Jawahar Customs House
- JNPT - CFS

1.1.17 Storage Facilities**Table 1.10:** Storage facilities

Tank Farm	Product	Storage Tank (nos.)	Total capacity in KL
RIL	Naphtha, Motor Spirit (MS), Kerosene, N-Paraffin, Paraxylene, Mixed Xylene, HSD, Aviation Turbine Fuel (ATF), Light Diesel Oil (LDO), Aromatic Feed Stock (AFS), Aromatic Heavy Ends, Linear Alkyl Benzene	10	71,025
IMC	CBFS, CPO, CDSBO, BUTYL ACRYLATE, STYRENE, MDC, 2EH, ULTRA-6, EHC-110, HSD, MS, CSFO, CRUDE GLYCOL, 500 N, SN-600, 150N, SN150, AP/E CORE2500, PALMOLEIN, R600, J150	46	170,000
GBL	Acetic Acid, Acetone, Aniline, Butyl Acrylate, Butyl Acetate, CG, Chloroform, Crude Glycol, Cumene, EDC, IPA, LAB, MDC, MEG, MIBK, Mix Xylene, N Butanol, Phenol, Styrene Monomer, Toluene, VAM, Edible Oil, Base Oil, Bitumen	Phase I-41 Phase II-22	173819 --
IOCL	MS, BS-III HSD, BS-IV HSD, ATF, LSHF HSD	11	108,000
Deepak Fertilizer	Ammonia, Phosphoric Acid	03	29,000 14000 (KL Phos. acid) 15000 MT (Ammonia)
Bharat Shell	Base Oil	04	15,000
Suraj Agro	Edible Oil	15	65,100



Figure 1.4: Satellite image showing tank farm (from Land use plan)



Figure 1.5: Satellite image showing JNPT CFS (from Land use plan)

1.1.18 Stakeholders

1. Port Authority,
2. Ship owners and operators,
3. Container Terminal operators,
4. Tank farm operators,
5. Liquid Cargo operators,
6. Stevedoring companies,
7. Rail carriers/operators,
8. Truck and Shipping companies,
9. Contractors to support the day- to- day activities of the port.

*Disaster Management Plan***1.1.19 Meteorological Parameters****1.1.19.1 Temperature and Rainfall**

The temperature starts rising from March and May is generally the hottest month of the year with mean daily max temperature of 32.9°C. With the onset of monsoon by about first week of June there is an appreciable drop in temperature. The month of January is the coolest month of the year with mean daily maximum and minimum temperatures of 29.1°C and 19.3°C.

The region is subject to a regular seasonal climatic variation determined by the occurrence of two annual monsoons. The South-West monsoon period extends from June to September. Most of the annual rainfall occurs during South-West monsoon, the average monthly rainfall being about 45 cm. Rain during the North-East monsoon is slight.

The average rainfall in the area is about 2422 mm and annual mean number of rainy days is about 77.8. The period between June to September receives nearly 95% of the seasonal rain. The monthly variation in temperature and rainfall is as per table 1.11.

Table 1.11: Temperature and Rainfall

Month	Temperature		Rainfall (mm)	No of rainy days average
	Maximum °C	Minimum °C		
January	30.6	16.4	0.6	0.3
February	31.3	17.3	1.5	0.1
March	32.7	20.6	0.1	0.1
April	33.1	23.7	0.6	0.3
May	33.3	26.1	13.2	1.2
June	31.9	25.8	514.1	15.4
July	29.8	24.8	868.3	23.5
August	29.3	24.5	553	19.1
September	30.1	24	306.4	12.8
October	32.9	23.1	62.9	3.7
November	33.4	20.5	14.9	1
December	32	18.2	5.6	0.3

1.1.19.2 Wind

General direction of wind is from the North to the West quarter, with seasonal variations are as per table 1.12.

Table 1.12: Wind directions and Speeds

Months	Directions	Speeds
February to May	Mainly from N.W	Max 8 to 10 Beaufort Substantial 4-6 Beaufort
June to September	Mainly from W.N.W	Max 8 to 10 Beaufort Substantial 6-8 Beaufort
October to January	Mainly from N.N.W	Max 6 to 8 Beaufort Substantial 2-6 Beaufort.

Winds are generally light to moderate with some increase in force in the summer and monsoon seasons. During January to May wind strengthens in the afternoon. In the southwest monsoon season winds are mainly from west or north east. During rest of the years, winds are north easterly to easterly in the mornings and blow from directions between south west and northwest in the afternoons. Summary is as per table 1.13.

Table 1.13: Wind speeds

Month	Wind Speed (knots/hr)
January	9.1
February	9.3
March	10.4
April	10.5
May	10
June	12.8
July	14.8
August	13.4
September	10
October	8.5
November	8.2
December	8.5
Total/average	10.5

1.1.19.3 Waves

The predominant waves are the swell waves generated by deep sea storms.

These mainly arise just before and during the South West monsoon. The statistical analysis indicates that most wave periods fall between 6 seconds and 10 seconds.

During the continuance of the North-East monsoon, North-Easterly winds known as "Elephantas" blow for short durations during the months of October-November. As the fetch and duration of these winds are limited, the "Significant height" of the resulting waves is not likely to exceed 1 meter with period ranging from 3 to 5 seconds.

The predominant wave direction during monsoon is from south west to west. During this period, waves of 4 to 5 m height normally occur, however, waves of 8.0 m height and period of 14 seconds have also been reported. October and November are transition periods during which the predominant wave direction changes to north and north east. During December and January the waves mainly occur from north to north east and from February to May waves predominantly come from the north-west quadrant. The summary of wave data is as per table 1.14.

*Disaster Management Plan***Table 1.14:** Wave height

Parameter	Value	
	1 year	100 year
Significant wave height (m)	0.6	1.6
Significant wave period (years)	10	10
Max. wave height (m)	1	3

1.1.19.4 Currents

The currents in Mumbai harbour and the near shore zone are tide induced with reversal at high and low waters. The current strength ranges from 1.5 to 3 knots.

Current speeds and directions within the Bay and associated tributaries are largely due to the tidal movements and show little variation from non monsoon to monsoon. The maximum current speed in the outer Bay exceeds 1 m/s and the variation in the water column at any given time is not significant.

Lateral variations in the speed however occur with current in the eastern area being somewhat stronger. The maximum current speeds decrease in the inner creek and are typically around 0.8 m/s, decreasing markedly during neap tide.

As characterized for a tide dominated system, the alongshore components are fairly strong with the dominance of seaward component while cross-shore components are relatively weak. Their relative magnitude and directions are indicative of net seaward movement over a tidal cycle though shoreward drift can be significant around the change of tide.

Excursion lengths and average current speeds observed for the Bay based on the available drogue trajectories are as per table 1.15.

Table 1.15: Tide excursion at Mumbai Harbour

Tide	Excursion length (km)		Avg. Current speed (m/s)	
	Flood	Ebb	Flood	Ebb
Spring	11.5	11.5	0.5	0.55
Neap	5.5	6.0	0.25	0.3

Excursion lengths during flood and ebb are more or less of a similar magnitude as expected for tidal creeks devoid of large volumes of external water inputs. The overall circulation pattern suggests that the pollutants entering the creek upstream of the bridge at Vashi tend to oscillate within the creek system and flushing to the sea is a delayed process. These pollutants would however be considerably diluted under the influence of tide induced turbulence and advection.

During monsoon however, the creek receives voluminous land run-off and the discharge of near freshwater through the Ulhas estuary, which flushes the inner creek to a large extent.

1.1.19.5 Tides

The quality of water-spread area of the Bay is mainly influenced by tides which induce flushing and dispersion of pollutants entering the system. The tides in Mumbai harbour are characterized by occurrence of two high and two low waters with marked diurnal variation in the levels.

Disaster Management Plan

The monsoon freshwater flow, though important in flushing the inner zone, is not high enough to cause significant changes in the hydrography of the outer Bay. Tides (1.2 - 5 m) in the region are semi-diurnal type with an appreciable diurnal inequality. The flood tidal front advances in north-easterly direction and recedes to south-west. The dominant tide in the *Mumbai Harbour* is the semi-diurnal tide with a period of 12 hours and 40 minutes. Table 1.16 gives the particulars of tidal levels related to Chart Datum.

Table 1.16: Tidal Levels

Tide	Above (+) or Below (-) datum
Highest High Water recorded	+5.39 m
Mean High Water Spring Tides	+4.42 m
Mean High Water Neap Tides	+3.30 m
Mean Sea Level	+2.5 m
Mean Low Water Neap Tides	+1.86 m
Mean Low Water Spring Tides	+0.76 m
Lowest Low Water recorded	-0.46 m
Highest Low Water	+2.74 m

Statistical studies indicate that all high tides exceed + 2.70 m. and about 5% of all high tides would be less than + 3.20 m.

Variations in tides in Mumbai estuary are as per table 1.17.

Table 1.17: Tide Variations

Location	Range (m)		Time lag from Apollo Bunder (min)
	Spring	Neap	
Apollo Bunder	5.0	1.6	-
Pir Pau	4.3	1.4	10-15
Vashi	4.2	1.2	10-30
Airoli	4.9	1.6	12-45
Thane	4.9	1.5	15-60

The tidal range decreases markedly up to Vashi as compared to that at the Apollo Bunder but increases in the inner creek, the range at Thane is only marginally lower than that at Apollo Bunder. This increase appears to be due to the funnel shape geometry of the Bay that is conducive for accumulation of seawater with the advance of tidal front in the lower creek. The tide at Thane lags by 30 to 45 min with respect to the tide at Apollo Bunder with the lag more pronounced for neap tide.

Spring tides are important for spill response as oil beached during this time is likely to remain stranded on the upper portion of the shoreline until the next spring tide (about 14 days) or storm event. If there is a storm surge during a spring tide, the oil can remain stranded for a much longer period.

*Disaster Management Plan***1.1.20 Meteorological Station**

Meteorological Station installed at 800 m away from the jetty at Port Control Station provides data on Air Quality, Pressure, Temperature, Humidity, Rainfall, Wind Speed and Direction and Tide level with the help of sensors as well as the forecast data and warning received from Regional Meteorological Centre (RMC) - Mumbai.

1.1.21 Population at JNPT terminals**Table 1.18:** Population at JNPT terminals

Sr. No	Description	Population	
		Day	Night
1.	JNPCT	3600	1500
2.	NSICT	1453	-
3.	NSIGT		
4.	GTI-APM terminal	1685	-
5.	BMCT	399	100
6.	BPCL Liquid Cargo Jetty	50	-

1.1.22 Population at JNPT Tank Farms**Table 1.19:** Population at JNPT tank farms

Sr. No	Description	Population	
		Day	Night
1.	RIL	37	8
2.	IMC	209	24
3.	GBL	100	25
4.	IOCL	25	8
5.	Deepak Fertilizer	40	12
6.	Bharat Shell	10	04
7.	Suraj Agro	23	10

1.1.23 Population data (approximate) for other areas**Table 1.20:** Population data

Sr. No.	Location	Population	
		Day	Night
1	JNPT Township (Port quarters)	4500	4000
2	Administration Building Port Employee Contract Staff	260	05
3	Customs House EMP Agency	2000	--
4	PUB	2000	10
5	Guest House	50	30
6	Training centre	40	01

Disaster Management Plan

7	JNPT Hospital	50	10
8	South Gate Complex	150	50
9	Centre Gate Complex	300	200
10	North Gate Complex	300	200
11	CISF (G.G + R.G +B.G)	55	45
12	MTNL Office	--	--
13	Police Station	50	10
14	Custom Township	--	--
15	CISF Complex	300	300
16	Railway Quarters	--	--
17	Port Fire Station	26	18
18	Port Operation Centre	50	10
19	Ships at all berths @20 Crew/Ship	280	280
20	Jaskhar Village	2500	2500
21	Karal Village	3500	3000
22	Sonari Village		
23	Sawarkhar Village		
24	Ranjanpada Village	1000	1000
25	Belpada Village	2000	2000
26	JNPT CFS	300	200
27	Air Force Station	-	-

1.2 RATIONALE

1.2.1 Authority and relevant Regulations

- The Disaster Management Act, 2005;
- National Disaster Management Plan , 2019;
- Post 2015 – Global Framework;
- Prime Minister of India’s Ten-Point Agenda for Disaster Risk Reduction.

1.2.1.1 The Disaster Management Act, 2005

The Disaster Management Act, 2005 (DM Act 2005) lays down institutional and coordination mechanism for effective Disaster Management (DM) at the national, state, district and local levels. As mandated by this Act, the GoI created a multi-tiered institutional system consisting of the National Disaster Management Authority (NDMA) headed by the Prime Minister, the State Disaster Management Authorities (SDMA) headed by the respective Chief Ministers and the District Disaster Management Authorities (DDMA) headed by the District Collectors/ District Magistrate and co-chaired by Chairpersons of the local bodies.

1.2.1.1.1 The Disaster Management Act 2005, Section 36

This section of the act lays down the primary responsibility of ministries in the GoI and departments with respect to institutional framework for prevention and mitigation of disasters, allocating sufficient funds and other resources to the National and State government agencies.

1.2.1.1.2 The Disaster Management Act 2005, Section 37

This section of the act lay down the primary responsibility of ministries in the GoI and departments with respect to preparation of Disaster Management Plan, their review, Updation and its approvals. Measures for financing the activities within the plan are also required to be spelled out in the plan.

1.2.1.1.3 The Disaster Management Act 2005, Section 41

This Act specifies the function of local authorities with regards to Disaster Management.

It includes the following functions:

- Ensure that its officers and employees are trained for disaster management;
- Ensure that the resources relating to DM are so maintained as to be readily available for use in the event of any threatening disaster situation or disaster;
- Ensure all construction projects under it or within its jurisdiction conform to the standards and specifications laid down for prevention of disasters and mitigation by National Authority, State Authority and District Authority;
- Carry out relief, rehabilitation and reconstruction activities in the affected area in accordance with the State Plan and District Plan.

1.2.1.2 National Disaster Management Plan, 2019

The National Disaster Management Plan (NDMP) provides a framework and direction to the government agencies for all phases of disaster management cycle. The NDMP is a “dynamic document” in the sense that it will be periodically improved keeping up with the emerging global best practices and knowledge base in disaster management. It is in accordance with the provisions of the DM Act 2005, the guidance given in the National Policy on Disaster Management (NPDM) 2009, and the established national practices.

1.2.1.3 Post 2015 – Global Framework

The Post-2015 goals and agenda are set forth in the three landmark global agreements reached in 2015 – the Sendai Framework for Disaster Risk Reduction (Sendai, Japan, March 2015), Sustainable Development Goals (UN General Assembly, New York, September 2015) and Climate Change Agreement (Conference of Parties, COP21, Paris, December 2015). The three documents set the stage for future global actions on DRR, sustainable development and climate change.

1.2.1.4 Prime Minister of India – Ten-Point Agenda for Disaster Risk Reduction

1. All development sectors must imbibe the principles of disaster risk management
2. Risk coverage must include all, starting from poor households to SMEs to multi-national corporations to nation states
3. Women’s leadership and greater involvement should be central to disaster risk management
4. Invest in risk mapping globally to improve global understanding of Nature and disaster risks
5. Leverage technology to enhance the efficiency of disaster risk management efforts
6. Develop a network of universities to work on disaster-related issues

Disaster Management Plan

7. Utilize the opportunities provided by social media and mobile technologies for disaster risk reduction
8. Build on local capacity and initiative to enhance disaster risk reduction
9. Make use of every opportunity to learn from disasters and, to achieve that, there must be studies on the lessons after every disaster
10. Bring about greater cohesion in international response to disasters

1.2.2 Legal provisions to regulate Fire and Chemical risk in industries

1. Explosives Act, 1884;
2. Petroleum Act, 1934;
3. Factories Act, 1948;
4. Insecticides Act, 1968;
5. Environment Protection Act, 1986;
6. Motor Vehicles Act, 1988;
7. Public Liability Insurance Act, 1991;
8. Other relevant rules and its amendments
 - NDMA guidelines on Chemical Disaster Management,
 - MSIHC Rules,
 - EPPR Rules,
 - SMPV Rules,
 - CMV Rules,
 - Gas Cylinder Rules,
 - Hazardous Waste Rules, and
 - Dock Workers Rules.

1.2.3 Safety initiatives to address Natural Disasters

NDMA guidelines on Disasters like Wind & Cyclone, Tsunami, Earthquake and Floods Management are relevant and these have been prepared to provide the directions to ministries, departments and state authorities for the preparation of their detailed Disaster Management Plans.

1.3 SCOPE OF THE PLAN

1.3.1 Aim and Objective

This plan exhibits the organizations commitment to the safety of employees and increases the organizational safety awareness. It defines the roles and actions necessary to prepare for and respond to any disaster situation in a coordinated manner. Thus, minimize or avoid the potential losses from hazards and disasters caused due to human, technical or natural phenomena inside the Port and Port water limits, through the implementation of rapid, effective and appropriate response & recovery procedures.

DMP is intended to provide guidance to all concerned departments within the port with a general concept of potential emergency assignments before, during and following emergency situations in accordance with the priorities of SENDAI framework.

1.3.2 Disaster Management Cycle

Based on the culture of prevention and mitigation following a disaster or near disaster event, the capacity building measures are institutionalized.



Figure 1.6: Disaster Management Cycle

The primary objectives of the DMP are to:

- a. To contain and control the emergency incidents,
- b. Proactively safeguard the lives of the JNPT employees, contractors, stakeholders, visitors and neighboring population,
- c. Mitigate the effect and minimize the damage to the environment,
- d. Limit damages of port assets,
- e. To ensure that the JNPT responds according to the priorities set by the Chief Incident Controller (CIC) during response operation,
- f. Safely restore operations back to normal as quickly as possible after occurrence of any accident, to enable business to be resumed at the earliest,
- g. To initiate off-site emergency plan in-case of necessity as and when required.

The scope covers –

- The existing preventive and mitigation measures besides those that are additionally required to reduce the risk in time bound manner;
- Identification of potential scenarios that are likely to occur considering risk profile of port;
- the preparedness to develop plans for actions when disaster or emergencies occur;

- the responses that mobilize the necessary emergency services including responders like fire service, police service, medical service including ambulance, government as well as non-governmental agencies;
- the initiation of off-site emergency plan, should the situation escalate to call for support of civic administrations (district and/or state) and their resources;
- the post disaster recovery with aim to restore the affected area to its original conditions.

1.4 VISION

"To build, operate and maintain a safer and disaster resilient Port by a holistic, proactive, technology driven and sustainable development strategy that involves all stakeholders and fosters a culture of prevention, preparedness and mitigation"

1.5 TIME FRAMES

Port is committed to establish required timeframes for capacity building, introducing research and experienced based steps for prevention and mitigation in accordance with SENDAI framework (2015-2030). As part of the effort to institutionalize such timeframes Hazard specific thematic areas and their timeframes have been tabulated in paragraph 3.2.

1.6 INSTITUTIONAL FRAMEWORK FOR DISASTER MANAGEMENT

1.6.1 National Level

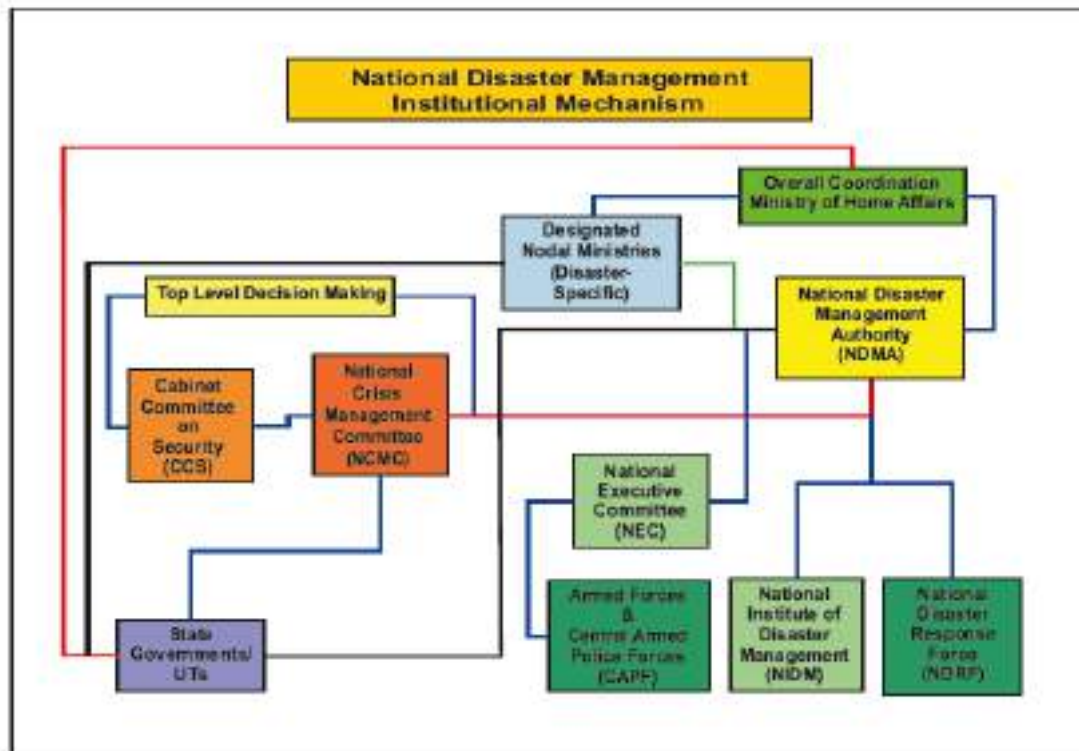


Figure 1.7: National –level disaster management – basic institutional framework

1.6.2 State Level

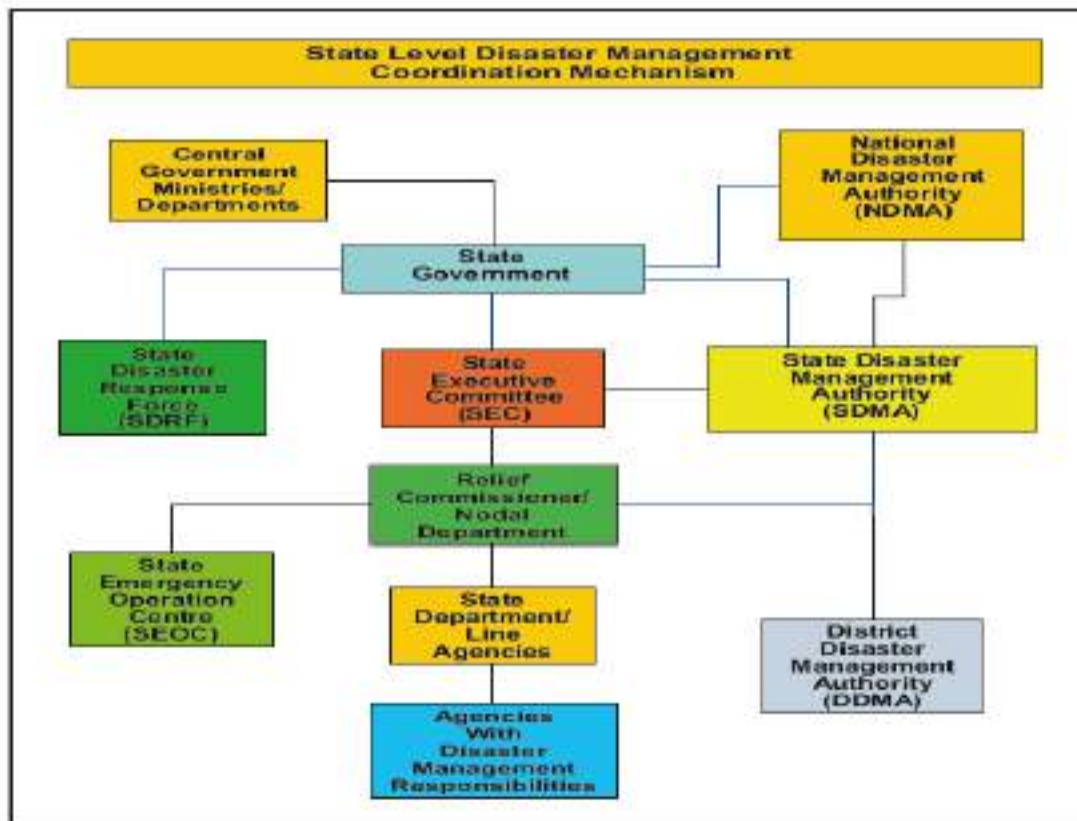


Figure 1.8: State –level disaster management – basic institutional framework

1.6.3 District Level

The DDMA will be headed by the District Collector, Deputy Commissioner, or District Magistrate as the case may be, with the elected representative of the local authority as the Co-Chairperson.

1.6.4 Incident Response Team at JNPT

IRT will be headed by the CIC with the elected representative of the Port department and various functional heads of stakeholders.

Refer **Figure 1.9** and **Figure 1.10** for Onsite and Offsite Emergency Organization Chart.

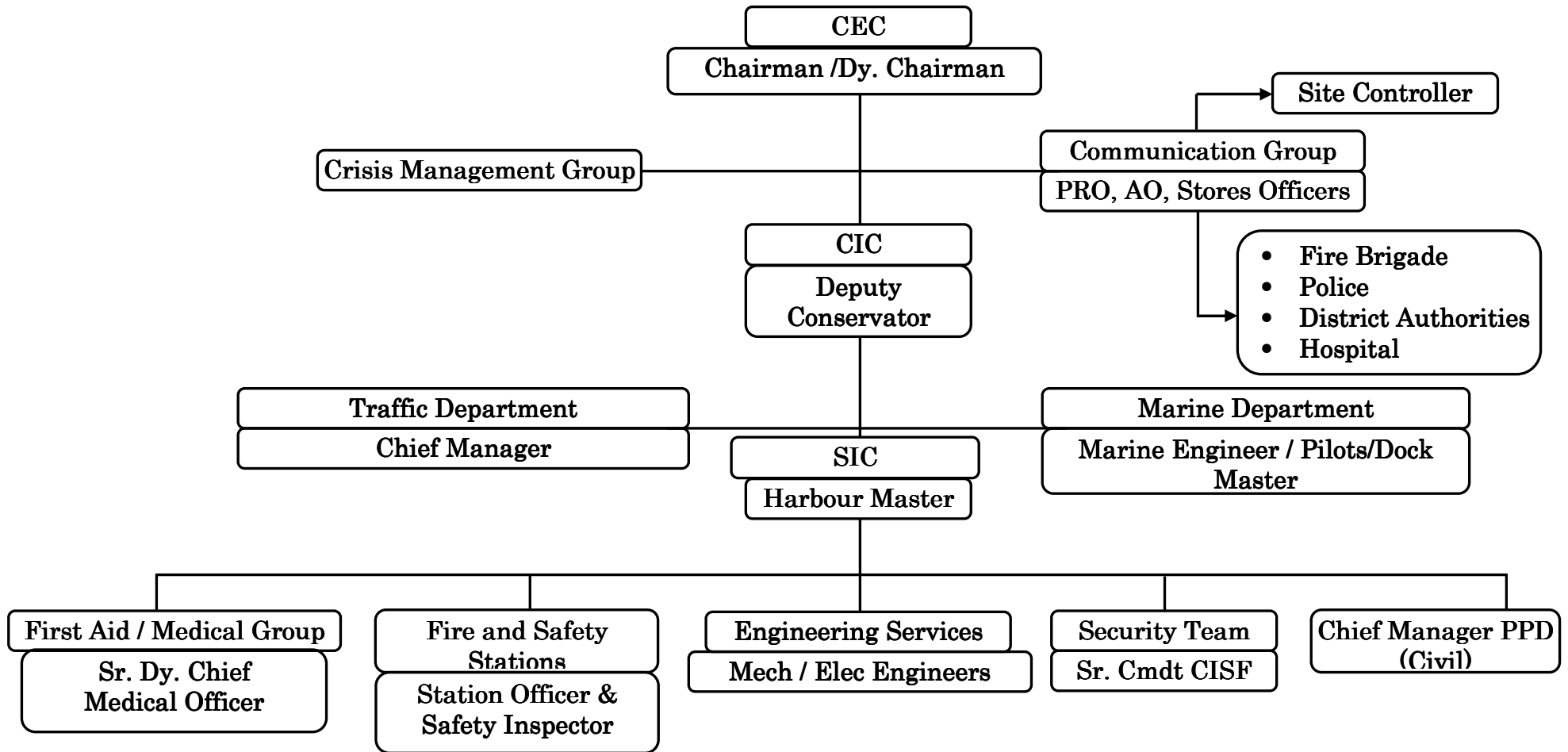


Figure 1.9: ONSITE EMERGENCY ORGANIZATION

Disaster Management Plan

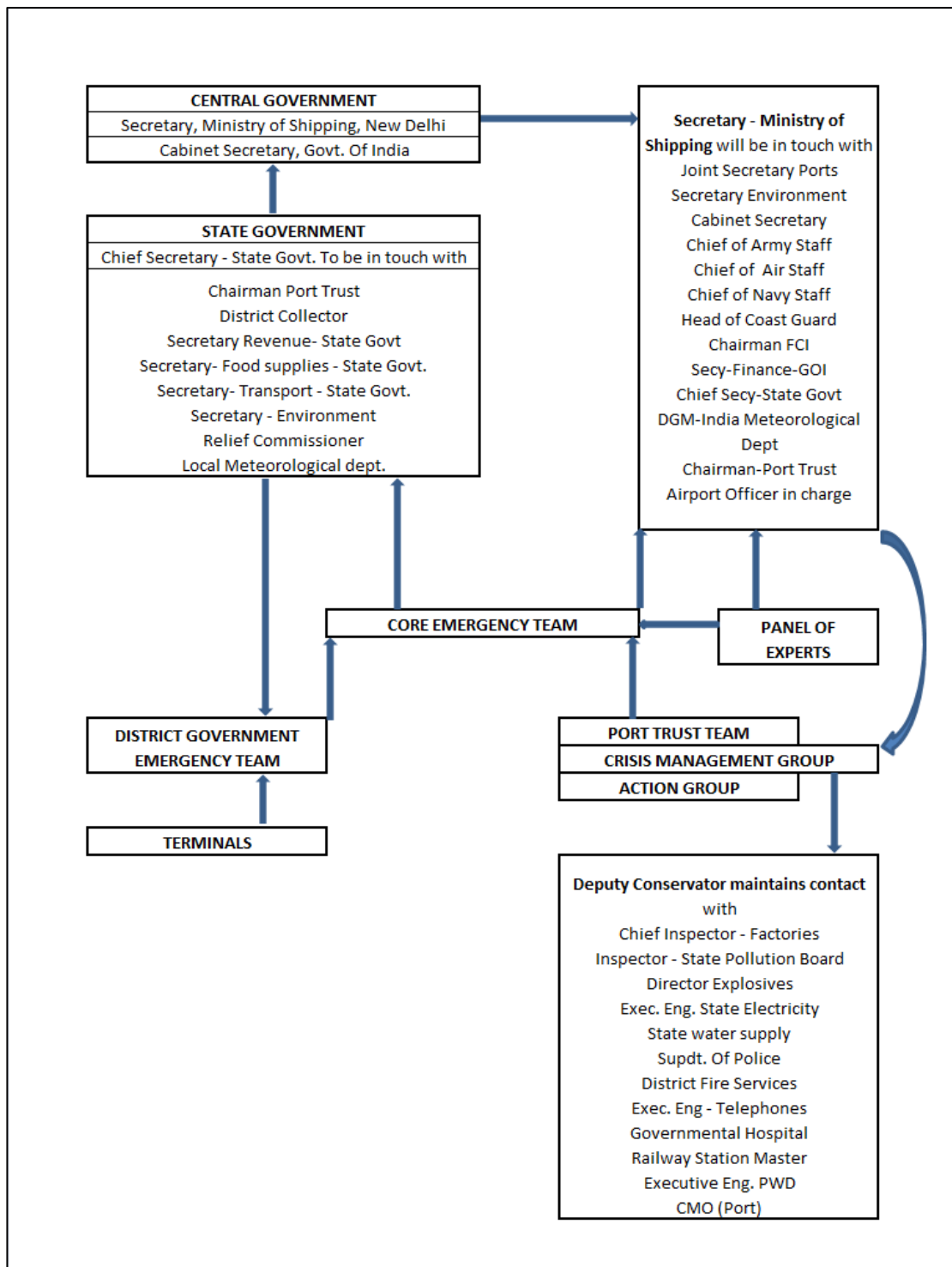


Figure 1.10: Off-Site Emergency Organization Chart – Level 2 and 3

2. HAZARD, RISK, VULNERABILITY & CAPACITY ANALYSIS

2.1 DISASTER RISKS, VULNERABILITIES AND CHALLENGES

2.1.1 DISASTERS IN MAHARASHTRA

Table 2.1: Natural Disaster in Maharashtra (Source: Maharashtra Disaster Management Plan – April 2016)

Natural Disasters	Past History	Vulnerable Areas
Floods	33 districts in 2005 31 districts in 2006	All districts of the State
Cyclones	No major history	Six coastal districts including Mumbai
Earthquake	1967 Koyna 1993 Latur	High Risk : Ratnagiri , Raigad, Satara, Thane, Latur

2.1.2 History of Chemical Disaster

Table 2.2: Chemical Disaster in Maharashtra (Source: Ministry of Environment and Forests (Disaster Management of India – Ministry of Home Affairs GOI)

Sr. No	Year	State & Area	No. of Incidents	Fatalities/ injuries
1.	2002	Gujarat, Kerala, Maharashtra	06	05 deaths 31 injured
1.	2004	Andhra Pradesh, Gujarat, Haryana, Kerala, Madhya Pradesh, Maharashtra, Punjab, Tamil Nadu, Uttarakhand, West Bengal, Delhi	18	47 deaths 91 injured
2.	2006	Andhra Pradesh, Gujarat, Maharashtra, Kerala, Rajasthan, Uttarakhand, Uttar Pradesh, West Bengal	16	32 deaths 24 injured
3.	2007	Assam, Gujarat, Kerala, Madhya Pradesh, Maharashtra, Punjab, Uttarakhand, West Bengal	18	37 deaths 14 injured
4.	2008	Andhra Pradesh, Gujarat, Jharkhand, Kerala, Maharashtra, Uttar Pradesh	23	50 deaths 148 injured

2.1.3 Disasters Classification (as per NDMA)

- Man-Made Disasters
 - Chemical
- Natural Disasters
 - Wind and Cyclone
 - Earthquake
 - Tsunami
 - Flood

2.1.3.1 Chemical Disaster

Chemical disasters may be traumatic in their impacts on human beings and may have casualties and also damages nature and property. The elements which are at highest risks due to chemical disaster primarily include the Port, its employees & staff, adjacent industries, hazardous chemicals vehicles, the residents of nearby settlements, adjacent buildings, occupants and surrounding community.

Chemical disasters may arise in number of ways, such as:

1. Process and safety systems failures
 - Human errors
 - Technical errors
 - Management errors
2. Induced effect of natural calamities
3. Accidents during the transportation (Loading/Unloading/Pipeline/Tank truck)
4. Hazardous waste processing/ disposal
5. Terrorist attack/ unrest leading to sabotage.

2.1.3.2 Wind and Cyclone

In accordance with national and regional hazard map available with BMTPC the Raigarh district falls under moderate cyclone damage risk zone (max. wind speed of 44 m/s).

Cyclones can cause damage to port infrastructures including damage to mangroves, trees and flooding of low line and poor drainage affected areas. In addition, ships in the harbor can also sustain serious damage and grounding.

Cyclones are classified by

- Strength of associated winds,
- Storm surges
- Exceptional rainfall occurrences.

Table 2.3: Wind speed Criterion for deep depression and cyclonic storm

Type of Disturbances	Wind Speed in km/h	Wind Speed in Knots
Depression	31-49	17-27
Deep Depression	49-61	27-33
Cyclonic Storm	61-88	33-47
Severe Cyclonic Storm	88-117	47-63
Super Cyclone	More than 221	More than 120
1 knot - 1.85 km per hour		



Figure 2.1: Wind Hazard Map (Source: Vulnerability Atlas of India)

2.1.3.3 Earthquake

Raigarh district which includes JNPT falls under **Moderate** earthquake damage Risk zone (zone category III).

Table 2.4: Classification of Earthquakes

Class	Scale
Great	8 or more
Major	7-7.9
Strong	6-6.9
Moderate	5-5.9
Light	4-4.9
Minor	3-3.9

The offices, utility buildings and berthing structures including cranes are required to be constructed for damage zone III. The relevant BIS standards are as follows:

- For office and other utility buildings – 2016 (IS 1893)
- For berthing structures -2002

Though the port is a newly developed port (about 30 years) some infrastructure has deteriorated with time due to wind weather effects and aging. A time bound strategy will be undertaken by the port to assess the condition and strengthening of the older buildings and quay side structures that might be affected. This also applies to quay cranes and RMGs. A strategy to counteract the effects of land settlement in the port industrial zone will be adopted to mitigate risk.

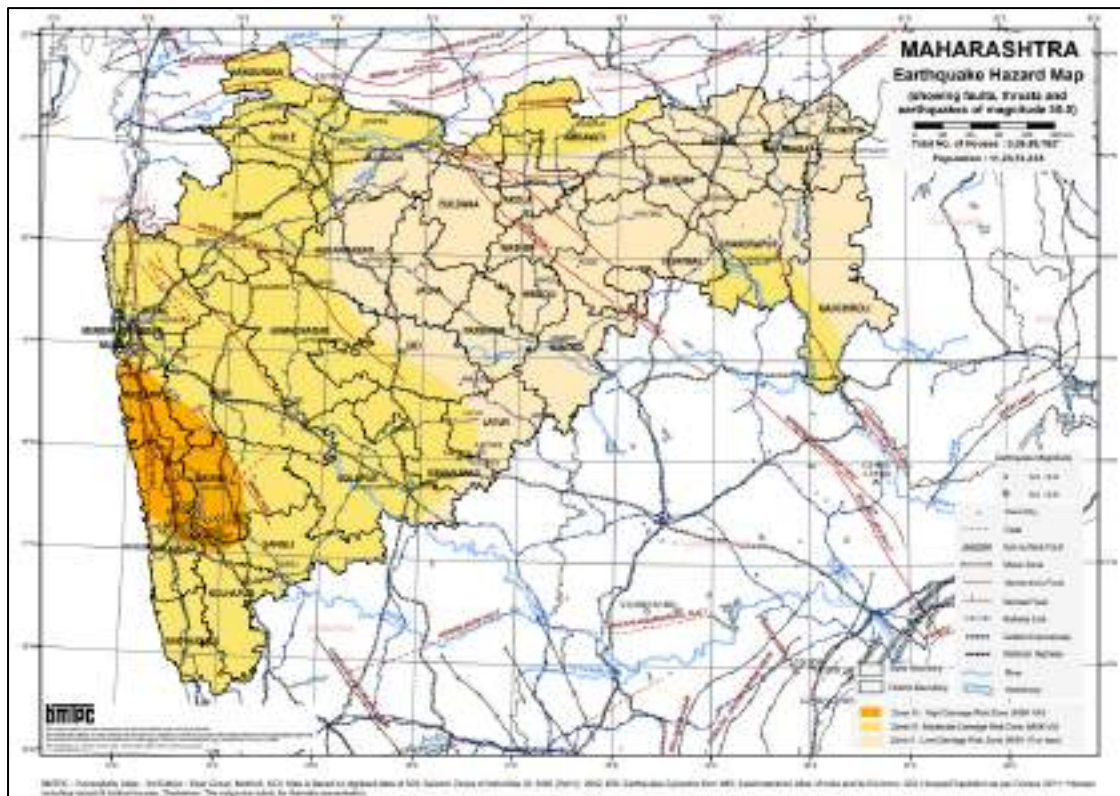


Figure 2.2: Earthquake Hazard Map (Source: Vulnerability Atlas of India)

2.1.3.4 Floods

JNPT being a coastal port in the Mumbai harbor region is bounded on the west by the waterfront, in the north and south by sea water quays. Therefore, has land boundary only on the eastern side. Flood prone areas are located in the latter zone. It comprises of villages where the drainage infrastructure is poor and instances of flooding have occurred in the past during heavy rainfall. The present port infrastructure as such does not face a flooding risk. A maximum surge height of 5 m has been recorded in the past for Raigad – Navi Mumbai coastal zone. The HTL & LTL has been demarcated by MCZMA in the published maps.

Port development plans for future expansion will take into account the strategy to take care of the HTL affected zones within the areas earmarked for expansion allowing sufficient and planned capacity of storm drainage and natural slopes including reservoirs if any that might come within the development zone.

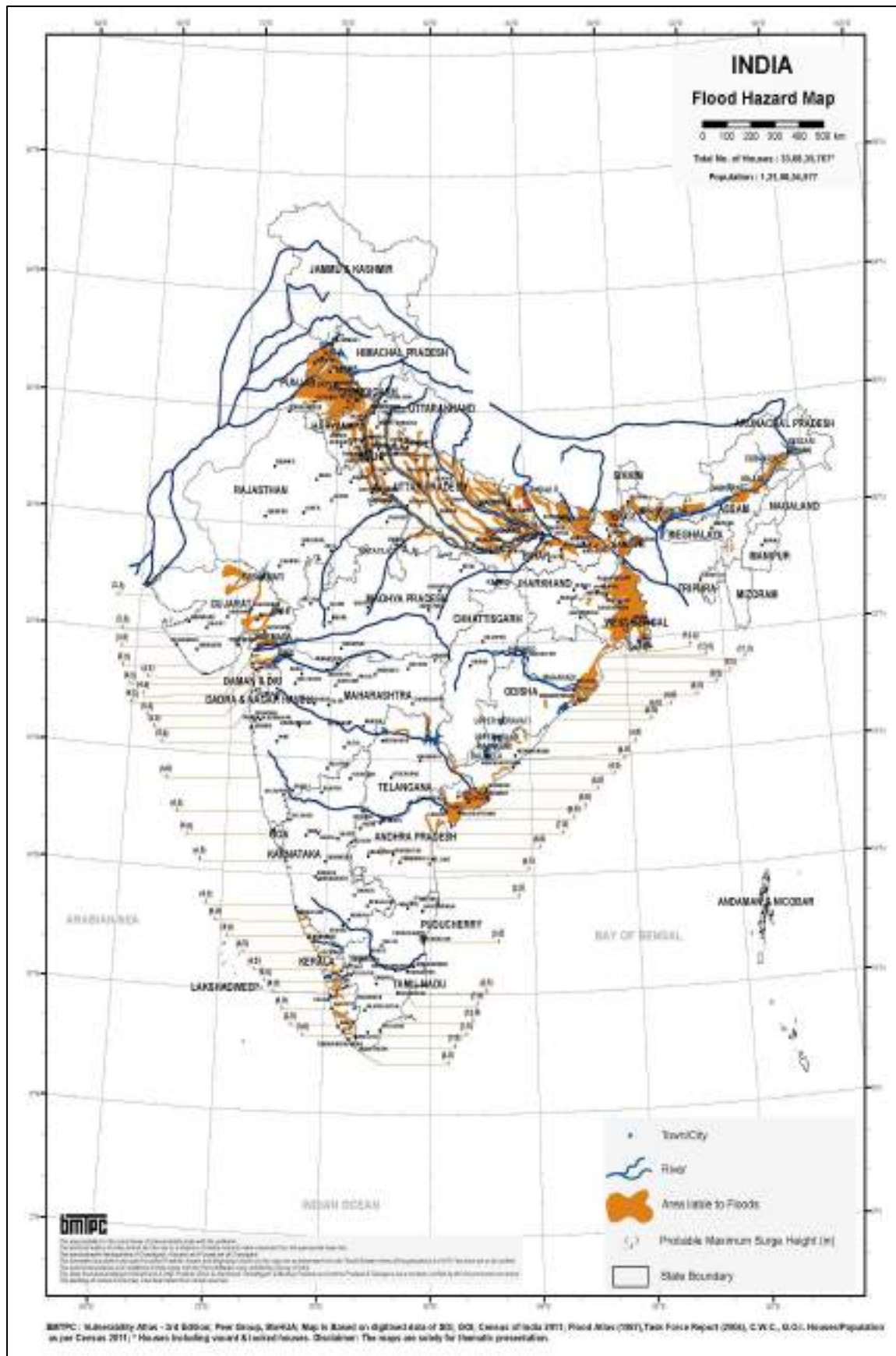


Figure 2.3: Flood Hazard Map (Source: BMTPC, India)

2.1.3.5 Tsunami

An Early Warning System for information related to earthquakes and generation of tsunami has been created under the Ministry of Earth Science, GOI.

A network of tsunami coastal stations has been setup which relay information to the center via satellites.

INCOIS provides such data to JNPT on a regular basis. Hence, adequate early warning will be available to the port. Necessary evacuation measures and provision of tsunami shelters will be provided.

2.2 UNDERSTANDING DISASTER RISKS

In view of the complex nature of the navigational operations connected with pilotage of ships inside the narrow channel and their traffic regulation by VTMS, weather variations including tidal windows etc., berthing complexities, turning circles and usage of tugs; HAZID workshop with various stakeholders connected to marine department was carried out. As a result, a better understanding of navigational risk was achieved.

2.2.1 Chemical Disaster (Fire / Explosion/Toxicity) Risks

These can be caused due to loss of containment of hazardous cargo (LPG, Naphtha, Ammonia etc.) handled in the Port. Fire incidents can also occur in the admin building, Port users building, utility craft etc. This type of hazard can be due to both Man-Made and Natural Disasters.

Risk Assessment using software analysis has been carried out for the following scenarios. The impact zone results are placed in **Appendix E**.

Table 2.5: Potential Scenarios for liquid bulk cargoes

Sr. No.	Cargo handling activity	Location	Chemical leakage scenario
1	LPG unloading and transfer to Uran Plant	BPCL - LCB	Small leak and Full Bore Rupture of unloading arm of LPG from 12" marine unloading arm and 12" transfer pipeline.
2	Ammonia unloading and transfer to Dipak Fertilizer terminal	BPCL - LCB	Small leak and Full Bore Rupture of unloading arm of Ammonia from 16" unloading arm and 16" transfer pipeline.
3	Crude oil unloading and transfer pipeline	BPCL - LCB	Small leak and Full Bore Rupture of unloading arm of Crude Oil from 16" unloading arm and 32" transfer pipeline.
4	Naphtha unloading and transfer to Tank farm terminal	BPCL - LCB	Small leak and Full Bore Rupture of unloading arm of Naphtha from 12" marine unloading arm and 24" transfer pipeline.
5	MS unloading and transfer to Tank farm terminal	BPCL - LCB	Small leak and Full Bore Rupture of unloading arm of Naphtha from 16" marine unloading arm and 16" transfer pipeline.
6	Flammable ¹	BPCL -	Small leak and Full Bore Rupture of

Disaster Management Plan

	chemicals unloading and transfer to Tank farm terminal	LCB / Shallow water Berth - SWB	unloading flexible hose of chemicals from 8" flexible hose and 8" transfer pipeline.
7	Toxic ² chemicals unloading and transfer to Tank farm terminal	BPCL - LCB / Shallow water Berth - SWB	Small leak and Full Bore Rupture of unloading flexible hose of chemicals from 8" flexible hose and 8" transfer pipeline.
8	Flammable ³ chemicals handled in tank containers	APMT / JNPCT / NSICT / NSIGT / BMCT	Major leakage, Medium Leakage and Small leakage of the tank container.
9	Toxic ⁴ chemicals handled in tank containers	APMT / JNPCT / NSICT / NSIGT / BMCT	Major leakage, Medium Leakage and Small leakage of the tank container.

1: e.g. Acetone, Acrylonitrile, Alkyl alcohol, Benzene, Cyclo-hexane, Ethylene, MTBE, Propylene, Toluene, Xylene, VAM etc.

2: e.g. Acrylonitrile, Benzene, Toluene etc.

3: e.g. Acrylonitrile, Benzene, Carbon Disulphide, Ethylene oxide, Methylamine, Heptane, Hexane, Propylene Oxide Toluene, Xylene etc.

4: e.g. Acrylonitrile, Benzene, Carbon Disulphide, Ethylene oxide, Methylamine, Propylene Oxide etc.

Potential scenarios for containers:

1. Loss of containment – Major leakage, a puncture or major loss of containment through 2.5" or more dia.
2. Loss of containment – Medium leakage, a puncture or major loss of containment through 1.0" or more dia.
3. Loss of containment – Small leakage, a puncture or major loss of containment through 0.2" or lesser dia.
4. Full Bore Rupture – BLEVE effect

Existing capacities for counter measures to deal with the above emergencies in the form of the firefighting arrangement (fixed and portable) and fire stations with trained man power can be found in **Appendix B**. In addition, MoA between JNPT and industries for fire and chemical disaster are also in place. Joint drills with all stakeholders are carried out periodically.

The shortfalls and gaps if any in these areas will be addressed through time bound measures as given in the hazard specific measures in paragraph 3.2.

2.2.2 Oil Spill Disaster Risk

An Oil Spill Contingency Plan (OSCP) for the port emergency is prepared by the port and the same will be applicable in case of an oil and chemical spill disaster. This plan is prepared in accordance with the requirements of National Oil Spill Disaster Contingency Plan (NOS-DCP). A capability analysis has been carried out as per ICG requirements and is given in the plan.

Collision and Grounding of ships have the potential for causing oil spills of magnitude of Tier 1 (700 tonnes) and above.

Potential scenarios considered in this plan are as follows:

Scenario 1: Collision with small craft - Tanker / Container/ Bulk Carrier in harbour

Scenario 2: Collision between two vessels in channel (Regulated traffic)

Scenario 3: Tanker /Container/ Bulk Carrier tug assisted berthing - Contact with jetty

Scenario 4: Grounding- Tanker/Container/ Bulk Carrier transiting in channel

Scenario 5: Grounding- during pilotage of deep draft vessel

Scenario 6: Collision with dredger within navigational channel

Scenario 7: Collision – passing vessel in port waters (unregulated traffic)

Scenario 8: Dragging anchor

Scenario 9: Contact - during operations in turning circle (large vessels)

Scenario 10: Collision with channel marking buoys

Scenario 11: Fire on vessel in the Navigational channel/Anchorage

2.2.3 Natural Disasters Risk

In view of the historical records and HRVCA profile of the port the following natural disasters are considered for the preparation of the plans and their implementation.

1. Wind and Cyclone
2. Flood
3. Earth quake
4. Tsunami

The port is committed to update plans for the above mentioned geological and meteorological disasters on a periodical basis. Such updates include preparation/Updation of SOPs, structural assessments, project planning, environmental and utility management and provision of emergency equipment. These steps will highlight the strengths and weakness of the capabilities and thus creating resilience. The remedial steps if any will form part of institutional capability building as described in chapter 3 and contained in the paragraph 3.2 of hazard specific preventive and mitigative measures.

2.2.4 CBRN/ Terrorism risk

Considering the threats of nuclear / radiological risk due to concealment of cargoes and mis-declaration, the port will take actions as directed by MoS and equipment and capability provided within the ambit of such directives. The steps for mitigation of risk due to terrorism will be considered separately as part of Port Facility Security Plan (PFSP).

2.2.5 Hazard Assessment worksheet

The above identified hazards have been assessed considering the history of incidents, vulnerability and risk assessment and are placed in the following Hazard Assessment worksheet.

Table 2.6: HAZARD ASSESSMENT WORKSHEET

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact					Impact					
								People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency	
1, 2,6	4	Leakage - Fire/Explosion	Fire /Explosion due to LPG/POL/ Chemical leakage	Leakage at the connections of the hose/unloading arm to the manifold, damage to the pipeline, Static Electricity	Standard Operating Procedure, Ship-Shore checklist, Mobile/or fixed fire-fighting system	Minor Damage to vessel &/or other vessels/ Shore structures, injury to personnel	Major damage to shore structures e.g. loading arms etc, Major damage to vessel & pollution, Capsizing & port closure, fatality	3	3	2	2	2	4	4	3	3	3	Shipboard emergency procedure, Activation of port DMP, POLREP, Activation of port OSCP

Disaster Management Plan

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact					Impact					
								People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency	
3,4	4	Toxic	Toxic gas (Ammonia & Acrylonitrile) leak during operation – on Ship or Ashore	Leakage at the connections of the loading arm to the manifold, valves.	Standard Operating Procedure, Ship-Shore checklist, Mobile/or fixed fire-fighting system	Minor health issue to personnel, Minor environment damage	Serious health issue to personnel	3	1	2	3	2	4	2	3	4	3	Shipboard emergency procedure, Activation of port DMP
5	4	Corrosive	Corrosive acid (Phosphoric) leakage	Leakage at the connections of the hose to the manifold	Standard Operating Procedure, Ship-Shore checklist	Minor Damage to vessel, Shore structures, minor injury to personnel	Major damage to shore structures e.g. hoses, Major damage to vessel & pollution, Serious injury to personnel	2	1	1	1	2	3	2	2	2	3	Shipboard emergency procedure, Activation of port DMP, POLREP, Activation of port OSCP

Disaster Management Plan

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact					Impact					
								People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency	
7	5	Fire/Leakage	Fire/leakage due to Crane Accidents (Container drop/ crane fall)	Human Error, Equipment failure	Emergency Shutdown system, Overload alarm, Standard Operating Procedure	Minor Damage to container and Jetty(Crane), Injury to personnel/ vessel	Major Damage to container and Jetty, Serious injury to personnel, Terminal closure	2	2	0	1	2	3	3	1	2	2	Activation of terminal DMP and port DMP
8	8	Fall	Containers falling into water in case of extreme weather, vessel collision or grounding	Latch Failure, Listing of vessel, Collision with other vessel, Bad weather conditions	Secured Arrangements of containers	Temporary passage block	Channel blockage, HAZMAT Pollution	1	1	0	1	3	2	3	1	3	4	Shipboard emergency procedure, Activation of port DMP, POLREP, Activation of port OSCP
9	1	Fire	Fire in engine room floating craft	Fire due to fuel leakage, Fire during assisting in extinguishing other fires.	Continuous Manning, Automatic Fire detection and fire extinguishing system	Minor Damage to the craft, Serious injury to the person	Major damage, Fatality	1	1	0	1	2	2	2	1	1	3	Activation of port DMP

Disaster Management Plan

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact					Impact					
								People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency	
10.1	2	Collision	Collision with small craft – Tanker/ Container /BC in channel	Vessel equipment failure/ malfunction (navigational, propulsion, steering, auxiliary, tugs), Human error (pilot, master, tug), Language communication issues, Failure to follow Collision Regulations, Environmental conditions (poor visibility, high current flow, unpredicted current eddies, channel size/depth, rough weather, high wind speed)	Exchange of information between Pilot & Master (Pilot exchange card), VTS, Training of personnel, Security boat, Navigational channel is buoyed & well marked, weather monitoring, suspension of operation on increase of wind speed beyond 30 knots.	Avoiding action fails resulting in glancing blow with moderate damage to one or both vessel, Delay to berthing	Penetration to oil tanker/Container/BC, Oil pollution, serious damage to small craft, possible total loss and life of personnel	1	2	0	1	2	3	3	1	3	3	Incident report, Activate port DMP, SOPEP, POLREP, Activate port OSCP

Disaster Management Plan

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact					Impact					
								People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency	
10.2	2	Collision	Collision between two vessels in Channel (Regulated)	Non-compliance with collision regulation, Human error, Lack of communication, Ship's equipment breakdown, Local congestion, difficulty in communication, maneuvering to (dis)embark for pilot, absence of VTS control, Multiple vessel convergence especially in poor visibility, Incomplete passage plan	VTS, VHF, proper communication, Security boat, Pilot information exchange card, Designated anchorage area & designated boarding area & designated channel for port operation & pilot (designated VHF frequency)	Moderate damage to one or both vessel, Delay to berthing	Serious damage to vessels and oil pollution, Vessel(s) stranded, Fire and Explosion , Blockage of the navigational Channel	2	2	0	2	1	4	4	3	4	3	Incident report, Activation of port DMP, PLOREP, Activation of port OSCP

Disaster Management Plan

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact					Impact					
								People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency	
10.3	1	Contact	Tanker/Container/BC tug assisted berthing – Contact with jetty	Mechanical failure (steering or main engine), Vessel blackout, Misjudgment by pilot/master/tug master, Bad weather (wind speed, poor visibility), Break down of tugs, Parting of tow line, Inadequate illumination at berth	Assistance of tugs and use of anchor, Use of electronic aids and proper bridge team management, VTS, Pilot information card, Use of anchor and engines, Weather monitoring, tug assistance, Use of ship's and tugs illumination for night berthing	Minor damage to side shell plating of vessel, No loss of cargo, Minor damage to quay or fendering system	Serious damage to side shell plating of vessel, Serious damage to quay/fender, Loss of cargo containment, pollution, fire/explosion, personnel injury or loss of life	1	1	0	1	2	3	3	1	3	3	Incident report, Remove vessel from damage areas and reberth, Activate port DMP, POLREP, Activate port OSCP.

Disaster Management Plan

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation	
								Most Credible					Worst Credible						
								Impact					Impact						
								People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency		
10.4	3	Grounding	Grounding – Tanker/Container/BC transiting in channel	Vessel equipment failure, Misjudgment, Human failure, Adverse weather conditions, Fishing vessel small craft impedes passage	Use of electronic aids and proper bridge team management, Weather monitoring VTS, Use of Anchor, Proper ship signal, Use of security boat signals, Assistance of tugs	Damage to shell plating – possible water ingress & increase in draught, No loss of cargo	Major hull damage, Vessel stranded, Oil pollution, Possible loss of cargo if machinery disabled or extended stranding, Blockage of Channel	1	2	0	3	3	3	3	3	3	4	4	Incident report, Shipboard emergency procedure, Activate port DMP, POLREP, Activate port OSCP

Disaster Management Plan

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation		
								Most Credible					Worst Credible							
								Impact					Impact							
								People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency			
10.5	2	Grounding	Grounding – During pilotage of deep draft vessel	Engine Failure/Steering Failure, Incorrect assessment taken of vessel's draught & squat during under keel clearance calculations, Vessel transiting too fast, Incorrect chart datum assessed (hydrographic survey outdated), Bad weather condition, Improper maintenance of navigational aids.	Use of Anchor, Master-Pilot info exchange card, Vessel to transit in safe maneuvering speed, Updated navigational chart to be used at all times, Maximum 30 knots wind speed operational limit, Postpone movement, proper maintenance of navigational aids, exchange of information with MbPT.	Tugs required to pull vessel clear, Indentation of bottom hull plating	Breach of hull plating & oil pollution, fire/explosion, Blockage of Channel	1	1	0	3	3	2	4	2	4	4	4	4	Incident report, Port/Local towage capability, Navigational aids, Pilotage communication, Shipboard emergency procedure, Activate port DMP, POLREP, Activate port OSCP

Disaster Management Plan

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact					Impact					
								People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency	
10.6	2	Collision	Collision with dredger within the navigational channel	Vessel equipment failure/ malfunction (navigational propulsion, steering, auxiliary), Human error, improper communication, Environmental conditions (poor visibility, high current flows, unpredictable current eddies, channel size/ depth), results of avoiding action (eg. Small craft or vessel), navigation failure (markers, lights)	Emergency shipboard procedure, VTS, training, adequate work/rest hour, situational awareness, weather monitoring, port marine operation procedure, PMS	Temporary grounding without hull damage	Grounding or sinking of either vessel, Oil/chemical pollution, Fire and Explosion, Blockage of navigational channel	0	1	0	1	3	4	4	2	4	4	Incident report, Shipboard emergency procedure, Port DMP activation, POLREP, Port OSCP activation

Disaster Management Plan

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact					Impact					
								People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency	
10.7	2	Collision	Collision - passing vessel in navigation channel (unregulated traffic)	Non-compliance with COLREGS, vessel equipment failure, communication error or lack of communication causing misjudgment, result of avoiding action (eg. Small craft or vessel), Human error.	Shipboard navigational aids, VTS, PMS, shipboard emergency procedure, security patrolling boats, training, adequate work/hour, situational awareness.	Avoiding action fails resulting in glancing blow with moderate damage to one or both vessel, No loss of cargo, No serious injury	Severe damage to one or both vessel, Oil pollution and/ or loss of cargo, Fire / explosion, loss of life	1	2	0	1	2	3	3	2	4	3	Incident report, Shipboard emergency procedure, Activation of port DMP, POLREP, Activation of port OSCP

Disaster Management Plan

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact					Impact					
								People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency	
10.8	3	Collision	Collision – Anchor dragging	Bad weather, Poor monitoring, Poor holding ground, Insufficient scope of anchor chain, Human error, vessel equipment failure	Met. warning through VTS, Use of all Navigational aids, Vessel to drop anchor in designated anchorage area, Vessel to ensure that sufficient chain is paid out, use of all navigational aids, PMS, shipboard emergency procedure	Minor Damage to vessels and/or other vessels	Grounding and oil pollution, Grounding and capsizing, Blockage of channel	1	1	0	1	3	3	4	3	4	4	Incident report, Shipboard emergency procedure, Port/Local towage capability, Activation of port DMP, POLREP, Activation of port OSCP

Disaster Management Plan

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact					Impact					
								People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency	
10.9	1	Contact	Contact - During operations in turning circle (large vessels)	Wind effect, Illumination inadequate at berth, Excessive load on tug rope, High rate of turn, Misjudgment, Human error (fatigue, lack of knowledge, etc.), Break down of tugs, vessel equipment failure, maneuvering constraint of vessel	Suspend operation at Max-30 knots wind speed, postpone movement, ensure proper illumination at berth, Use of support vessel illumination, Use of additional tugs, Use of electronic aid, proper bridge team management, use of all navigational aids, PMS, Shipboard emergency procedure	Minor Damage to vessel &/or other vessels/ Shore structures	Major damage to shore structures e.g. cranes, Major damage to vessel & pollution, Capsizing & port closure	0	1	0	1	2	3	4	3	4	4	Incident report, Shipboard emergency procedure, Activation of port DMP, POLREP, Activation of port OSCP

Disaster Management Plan

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact					Impact					
								People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency	
10.10	2	Collision	Collision with channel marking buoys	Vessel equipment failure/ malfunction (navigational propulsion, steering, auxiliary), human error, improper communication, environmental conditions (poor visibility, high current flows, unpredictable current eddies, channel size/ depth), results of avoiding action (eg. small craft or vessel), navigational failure (markers, lights)	Emergency shipboard procedure, VTS, training, adequate work/rest hour, situational awareness, weather monitoring, port marine operation procedure, PMS	Minor Damage to vessel &/or buoy	Grounding or sinking of vessel, Oil pollution, Blockage of navigational channel	0	1	0	1	2	3	4	3	4	4	Incident report, Shipboard emergency procedure, Port DMP activation, POLREP and Port OSCP

Disaster Management Plan

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact					Impact					
								People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency	
10.11	2	Fire	Fire on vessel in the navigational channel	Fire caused by faulty equipment, fire caused by human error, inadequate precautions during hot work, failure to take appropriate precautions with gas bottles and/or inflammable vapour, failure to take the appropriate precaution when handling specific cargoes.	Emergency shipboard procedure, VTS, training, adequate work/rest hour, situational awareness, SMS, PMS, fire fighting assistance from tugs.	Minor damage to vessel, Injury to personnel, Loss of power	Major damage to vessel, Multiple injury and/or fatality to personnel, Loss of cargo, Loss of vessel control.	2	1	0	2	2	4	4	3	4	4	Incident report, Shipboard emergency procedure, Port DMP activation, POLREP and Port OSCP

Disaster Management Plan

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact					Impact					
								People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency	
11	2	Blockage of Navigational Channel	Blockage of due to Ground/Sinking of vessel (Wreckage)	Collision, Bad Weather, Fire, Explosion	Shipboard emergency procedure, assistance from tugs, Port fire fighting system	Temporary grounding, Limited flooding/limiting	Sinking of vessel, Loss of life, Loss of cargo, Pollution	0	1	0	2	3	3	3	2	4	4	Incident report, Shipboard emergency procedure, Port DMP activation, POLREP and Port OSCP

Disaster Management Plan

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact					Impact					
								People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency	
12	9	Fire/Explosion/Toxic	Emergency/ Disaster in Tank farm	Leakage leading to fire/explosion due to Short circuit, Hot work, smoking, absence of spark arrester in vehicles.	Emergency Shutdown system, Fire extinguishers, Fire tenders, Fire-fighting system.	Minor fire /toxicity incident, injury to the personnel.	Major fire/explosion /toxicity incident, Property damage, Environmental damage, Fatality	2	1	0	1	2	4	4	3	4	4	Activation of individual tank terminal DMP
13	7	Fire	Fire in CFS -Warehouse	Short Circuit, Hot Work, Smoking, leakage leading to fire/explosion.	Fire extinguishers, Fire Tender, Fire-fighting system.	Minor fire incident, injury to the person present	Major fire/explosion incident, Property damage, Fatality	1	1	0	1	2	3	3	1	2	3	Activation of CFS EAP and port DMP
14	6	Fire	Fire in the Admin building/ Port User building/ Custom House/POC	Short circuit, Smoking	Fire extinguishers, Fire-fighting system	Minor fire incident, injury to the person present	Major fire incident, Property damage, Fatality	1	1	0	1	2	4	3	1	4	3	Activation of port DMP

Disaster Management Plan

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation	
								Most Credible					Worst Credible						
								Impact					Impact						
								People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency		
15, 16	109	Civil Disturbance	Fire/Explosion	War and Terrorism, Bomb Threat	Continuous Monitoring on News channel, Radio, Newspapers, mails	Damage to vessels, Shore structures	Major damage to shore structures e.g. cranes, Major damage to vessel & Oil pollution, Capsizing & port closure	3	3	3	4	4	4	4	4	4	4	5	Activation of port and terminal DMP, POLREP, Activation of port and terminal OSCP

Disaster Management Plan

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact					Impact					
								People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency	
17.1	1 t o 9	Natural Disaster	Cyclone	Natural cause	Weather Monitoring and Public Warning system	Minor Damage to tugs, pilot boats, Shore structures, Injury to personnel	Major damage to shore structures e.g. loading arms etc, Major damage to tugs, pilot boats & pollution, Capsizing & port closure, Serious injury to personnel	3	2	1	3	2	4	4	2	4	4	Shipboard emergency procedure, Activation of port and terminal DMP, POLREP, Activation of port and terminal OSCP

Disaster Management Plan

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation	
								Most Credible					Worst Credible						
								Impact					Impact						
								People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency		
17.2	4 to 9	Natural Disaster	Flood	Natural cause	Weather Monitoring and Public Warning system	Minor Damage to tugs, pilot boats, Shore structures & port property, Injury to personnel	Major damage to shore structures e.g. loading arms etc, Major damage to tugs, pilot boats & pollution, Capsizing & port closure, Serious injury to personnel	2	2	1	3	2	4	3	4	4	4	4	Shipboard emergency procedure, Activation of port and terminal DMP, POLREP, Activation of port and terminal OSCP

Disaster Management Plan

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact					Impact					
								People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency	
17.3	1 t o 9	Natural Disaster	Tsunami	Natural cause	Weather Monitoring and Public Warning system	Minor Damage to tugs, pilot boats, Shore structures & port property, Injury to personnel	Major damage to shore structures e.g. loading arms etc, Major damage to tugs, pilot boats & pollution, Capsizing & port closure, Serious injury to personnel	3	2	1	3	3	4	4	2	4	5	Shipboard emergency procedure, Activation of port and terminal DMP, POLREP, Activation of port and terminal OSCP

Disaster Management Plan

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation	
								Most Credible					Worst Credible						
								Impact					Impact						
								People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency		
17.4	4 to 9	Natural Disaster	Earthquake	Natural cause	Weather Monitoring and Public Warning system	Minor damage to properties/ structures/ cranes, Injury to personnel	Major damage to shore structures e.g. loading arms etc, Major damage properties/ structures/ cranes, port closure, Serious injury to personnel	2	1	0	3	3	4	4	4	4	4	5	Shipboard emergency procedure, Activation of port and terminal DMP, POLREP, Activation of port and terminal OSCP

* Refer Section 9.3- Hazard Specific Incident Action Plan (IAP)
 #Area 1: Inner harbour (inner basin)
 Area 2: Navigational Channel
 Area 3: Anchorage Area.
 Area 4: Liquid Cargo Berths (BPCL jetty/SWB)
 Area 5: Container Terminal
 Area 6: Admin Building/Port User Building/Custom House/POC
 Area 7: CFS Warehouse
 Area 8: Entire Port limit
 Area 9: Tank Farms

*Disaster Management Plan***2.2.6 Risk Estimation****Table 2.7:** Scale of Impact (I0 – I4)

Scale	People	Property	Environment	Port Business
I0	No injury	No damage	Negligible environmental impact	Negligible
I1	Minor (Single slight injury)	Minor damage	Minor Tier 1 oil spill, Minimal environmental harm	Minor
I2	Slight (multiple minor or single major injury)	Local damage	Moderate Tier 2 (limited outside assistance) oil spill or environmental amenity impaired, Moderate environmental impact	Moderate Bad local publicity or short term loss of dues, revenue, etc.
I3	Serious (multiple major injuries or single fatality)	Major damage	Serious Tier 2 (regional assistance) oil spill, localized flooding or multiple amenities impaired, Long term or serious environmental damage	Serious Bad widespread publicity, temporary port closure or prolonged restriction of navigation
I4	Major (More than one fatality)	Total loss	Major Tier 3 (national assistance) oil spill, widespread flooding or extensive damage to amenities, Major environmental harm. e.g. major pollution incident causing significant damage or potential to health or the environment	Major Port closes, navigation seriously disrupted for more than 1-2 days. Long term loss of trade

Table 2.8: Frequency scale (F1- F5)

Category	Descriptive term	Definition
F1	Frequent	An event occurring once a week to once an operating year
F2	Likely	An event occurring once a year to once every 10 operating years
F3	Remote	An event occurring once every 10 operating years to once in 100 operating years
F4	Unlikely	An event occurring once every 100 operating years to once in 1000 operating years
F5	Rare	Considered to occur once in more than 1000 operating years

*Disaster Management Plan***2.2.6.1 Risk Assessment Matrix**

For each identified hazard, risk quantification is done based on a scale of 1 (low risk) to 10 (high risk) as described in the Table 2.9 as below:

Table 2.9: Risk Assessment Matrix

Impact	I4	5	6	7	8	10
	I3	4	5	6	7	9
	I2	3	3	4	6	8
	I1	1	2	2	3	6
	I0	0	0	0	0	0
Frequency	F5	F4	F3	F2	F1	

Where: -

- 0 & 1 - Negligible Risk
- 2 & 3 - Low Risk
- 4, & 5 – Assessed to be in ALARP region
- 6 – Heightened Risk
- 7, 8 & 9 - Significant Risk
- 10- High Risk

Based on the values of frequency and impact as assessed, Risk Ranking have been done in Table 2.10 for each of the four impact entities as described in Table 2.7 both for the ‘most likely’ and the ‘worst credible’ scenarios as mentioned in Table 2.6 Hazard Assessment Worksheet.

2.2.6.2 Risk Ranking

The risk score of each of the four categories (People, Property, Environment and Business) is analyzed to obtain four indices for each hazardous scenario as follows:

- a) The average risk value of the four categories in the ‘most likely’ set.
- b) The average risk value of the four categories in the ‘worst credible’ set.
- c) The maximum risk value of the four categories in the ‘most likely’ set.
- d) The maximum risk value of the four categories in the ‘worst credible’ set.

The hazardous scenarios list is then sorted in order of the aggregate of the four indices to produce an Assessed Risk Ranking List, in descending order, with the highest risk scenario prioritized at the top.

Disaster Management Plan

Table 2.10: Risk ranking for JNPT for identified hazards

Scenario No.	Rank No.	Area	Category	Hazard Detail	Assessed Risk							
					Most Credible				Worst Credible			
					People	Property	Environment	Business	People	Property	Environment	Business
10.2	1	2	Collision	Collision between two vessels in channel (Regulated)	8	8	0	8	7	7	6	7
1,2,6	2	4	Leakage-Fire/Explosion	Fire /Explosion due to LPG/POL/ Chemical leakage	7	7	6	6	7	7	6	6
3,4	3	4	Toxic	Ammonia/Acrylonitrile leak at liquid cargo jetty during operation – on Ship or Ashore	7	3	6	7	7	4	6	7
17.2	4	8	Natural Disaster	Flood	6	6	3	7	6	5	6	6
8	5	8	Fall	Containers falling into water in case of extreme weather, vessel collision or grounding	2	2	0	2	3	5	2	5
17.1	6	8	Natural Disaster	Cyclone	7	6	3	7	6	6	3	6
7	7	5	Fire/Leak	Crane Accidents (Load drop/crane fall) at Container terminals	6	6	0	3	7	7	3	6
10.7	8	2	Collision	Collision – passing vessel in port waters (un-regulated traffic)	3	6	0	3	6	6	4	7
10.11	9	2	Fire	Fire on vessel in navigational channel	6	3	0	6	6	6	5	6
15,16	10	8	Civil Disturbance	Fire/Explosion (War and Terrorism, Bomb Threat)	5	5	5	6	5	5	5	5
12	11	9	Fire/Explosion/Leakage	Emergency/Disaster within the tank farm facility	6	3	0	3	6	6	5	6
10.4	12	2	Grounding	Grounding– Tanker/Container/BC transiting in channel	2	4	0	6	5	5	5	6
5	13	4	Corrosion	Phosphoric acid leakage at BPCL Jetty	6	3	3	3	6	4	4	4
10.1	14	2	Collision	Collision with small craft – Tanker/Container/BC in channel	3	6	0	3	6	6	2	6
17.3	15	8	Natural Disaster	Tsunami	6	4	2	6	5	5	3	5

Disaster Management Plan

10.5	16	2	Grounding	Grounding – During pilotage of deep draft vessel	2	2	0	6	3	6	3	6
17.4	17	8	Natural Disaster	Earthquake	4	2	0	6	5	5	5	5
14	18	6	Fire	Fire in the Admin building/PUB/Custom House/POC	3	3	0	3	7	6	2	7
11	19	2	Blockage of Navigational Channel	Blockage of Navigational Channel due to Ground/Sinking of vessel (Wreckage)	0	2	0	4	5	5	3	6
10.3	20	1	Contact	Tanker/Container/BC tug assisted berthing – Contact with jetty	3	3	0	3	6	6	2	6
10.9	21	1	Contact	Contact – During operations in turning circle (large vessels)	0	3	0	3	5	6	5	6
10.10	22	2	Collision	Collision with channel marking buoys	0	3	0	3	5	6	5	6
13	23	7	Fire	Fire in CFS Warehouse	3	3	0	3	6	6	2	4
10.8	24	3	Collision	Collision – Anchor dragging	2	2	0	2	5	6	5	6
10.6	25	2	Collision	Collision with dredger within navigational the channel	0	2	0	2	6	6	3	6
9	26	1	Fire	Fire in Engine room of floating craft	3	3	0	3	4	4	2	2

3. HAZARD SPECIFIC PREVENTION & MITIGATION MEASURES

3.1 PREVENTIVE AND MITIGATION MEASURES

In accordance with the guiding principle of Sendai Framework, Disaster Risk Reduction (DRR) requires responsibilities to be shared by different divisions/departments of port and various stakeholders. The effectiveness in disaster risk reduction will depend on coordination mechanisms within and across departments and with relevant stakeholders at all levels. For each identified hazard/disaster, the approach used in DM plan incorporates the four priorities enunciated in the Sendai Framework into the framework for DRR under the six thematic areas for action as follows

1. Understanding Risk
2. Inter-Agency Coordination
3. Investing in DRR – Structural Measures
4. Investing in DRR – Non-Structural Measures
5. Capacity Development
6. Climate change risk management

3.1.1 Understanding Risk

This thematic area for action focuses on understanding disaster risk, the Priority-1 in the Sendai Framework integrates into it numerous actions needed for strengthening disaster resilience. The major themes for action are: a) Observation Networks, Information Systems, Research, Forecasting, b) Zoning / Mapping, c) Monitoring and Warning Systems, d) Hazard Risk and Vulnerability Assessment (HRVA), and e) Dissemination of Warnings, Data, and Information. Having adequate systems to provide warnings, disseminate information, and carry out meaningful monitoring of hazards are crucial to disaster risk reduction, and improving resilience. They are also an integral part of improving the understanding of risk.

3.1.2 Inter-Agency Coordination

Inter-agency coordination is a key component of strengthening the disaster risk governance -Priority-2 of the Sendai Framework. The major themes for action required for improving the top level interagency coordination are a) Overall disaster governance b) Response c) Providing warnings, information, and data and d) Non-structural measures.

3.1.3 Investing in DRR – Structural Measures

Undertaking necessary structural measures is one of the major thematic areas for action for disaster risk reduction and enhancing resilience. These consist of various physical infrastructure and facilities required to help communities cope with disasters. The implementation of these measures is essential to enhance disaster preparedness, a component of Priority-4 of the Sendai Framework. It is also an important component of investing in disaster risk reduction for resilience, which is Priority-3 of Sendai Framework.

3.1.4 Investing in DRR – Non-Structural Measures

Sets of appropriate laws, mechanisms, and techno-legal regimes are crucial components in strengthening the disaster risk governance to manage disaster risk, which is Priority-2 of the Sendai Framework. These non-structural measures comprising of laws, norms, rules, guidelines, and techno-legal regime (e.g., building codes) framework and empowers the authorities to mainstream disaster risk reduction and disaster resilience into development activities.

3.1.5 Capacity Development

Capacity development is a theme in all the thematic areas for action. The Sendai Priority-2 (Strengthening DRR governance to manage DR) and Priority-3 (Investing in DRR for resilience) are central to capacity development. The capacity development includes training programs, curriculum development, large-scale awareness creation efforts, and carrying out regular mock drills and disaster response exercises. The capability to implement, enforces, and monitors various disaster mitigation measures has to be improved at all levels from the local to the higher levels of governance. It is also strengthening the DRR governance at all levels to better manage risk and to make the governance systems more responsive.

3.1.6 Climate change risk management

Climate change significantly alters the geographic spread, frequency and intensity of hydrometrological extreme events. It can also exacerbate their impacts. Investments in DRR can play an important role in supporting communities to adapt to climate change.

3.2 HAZARD-WISE RESPONSIBILITY MATRICES FOR DISASTER RISK MITIGATION

For the successful implementation of DM plans, it is necessary to identify various stakeholders within the port and clearly specify their roles and responsibilities. For each hazard/disaster, in the subsections that follow, themes for action are presented in a separate responsibility matrix for each of the five thematic areas for action. The port will play a pro-active role in disaster situations. In the domains of DM planning, preparedness, and capacity building, the port will constantly work to upgrade DM systems and practices. This section covers the matrices for the identified hazards relevant to JNPT as listed below:

Disaster Management Plan

Hazard		Chemical Disaster					
1. Thematic area		Understanding Risk					
Sr · N o	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Information Systems and Research	Support and coordination	<ul style="list-style-type: none"> • JNPT, • Tank farms, • Container terminals, • Liquid Bulk terminals, • CFS. 	<ul style="list-style-type: none"> • Inventory of chemicals handled, • Coordination with vessel for port entry - Ship to Shore checklist and valid certification as per IBC code, • Containers as per IMDG code. 	Centralized Mechanism for reporting the hazardous container inventory information.		
		Online information system on HAZCHEM conforming to international standards	<ul style="list-style-type: none"> • JNPT, • Tank farms, • Container terminals, • Liquid Bulk terminals, • CFS. 	<ul style="list-style-type: none"> • MSDS copy maintained, • Hazardous Waste Management Plan. 			
		Information on (operation and during emergency) dealing with HAZCHEM	<ul style="list-style-type: none"> • JNPT • Tank farms, • Container terminals, • Liquid Bulk terminals, • CFS. 	Online system like CAMEO chemicals is used.			
		Chemical Accident	<ul style="list-style-type: none"> • JNPT, • Tank farms, 	Incidents records maintained with individual tank farm and container	Centralized Mechanism for		

Disaster Management Plan

Hazard		Chemical Disaster					
1. Thematic area		Understanding Risk					
Sr · N o	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
		Information Reporting System	<ul style="list-style-type: none"> • Container terminals, • Liquid Bulk terminals, • CFS. 	terminals and liquid bulk terminal operators (JNPT Safety Operating Procedure for ensuring statutory compliance related to safety and environment at JNPT-Tank farm area and pipeline corridors).	reporting the incident information.		
		Hazardous Waste (import) Information System	<ul style="list-style-type: none"> • JNPT, • Tank farms, • Container terminals, • Liquid bulk terminals, • CFS. 	Information maintained with individual container terminals.			
2	Zoning/ Mapping	Industrial zones on basis of hazard potential and effective disaster management for worst case scenarios	<ul style="list-style-type: none"> • JNPT - Marine and PPD 	Zoning of the tank farm and container terminals, Liquid Bulk terminal already in place with respect to the risk assessment (design consideration).			
			<ul style="list-style-type: none"> • JNPT - Marine and PPD 	Up-dation of zoning carried out regularly after any addition or up-gradation of the facility.			

Disaster Management Plan

Hazard		Chemical Disaster					
1. Thematic area		Understanding Risk					
Sr · N o	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
		Carry out the mapping and related studies in collaboration with central agencies/ technical organizations	<ul style="list-style-type: none"> • JNPT - Marine • JNPT - PPD 			Adhere to CRZ mapping	JNPT Comprehensive Land Use Plan
3	Monitoring	Monitoring compliance with safety norms for HAZCHEM and proper disposal of hazardous waste	<ul style="list-style-type: none"> • JNPT, • CISF, • Tank farms, • Container terminals, • Liquid Bulk terminals • CFS 	<ul style="list-style-type: none"> • Checklist, • Standard Operating Procedure, • CCTV surveillance. 			
		Disposal of hazardous waste	<ul style="list-style-type: none"> • JNPT, • Tank farms, • Container terminals, • Liquid Bulk terminals, 	<ul style="list-style-type: none"> • Recording and Monitoring of generation hazardous waste , • Regularly providing details to MPCB through MPCB- Annual Statement, • Disposal of waste through 			

Disaster Management Plan

Hazard		Chemical Disaster					
1. Thematic area		Understanding Risk					
Sr · N o	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
			<ul style="list-style-type: none"> • CFS. 	MPCB approved waste management parties.			
4	Hazard Risk Vulnerability and Capacity Assessment (HRVCA)	Undertake and provide technical support to HRVCA as part of preparing and periodic revision of DM plans	<ul style="list-style-type: none"> • JNPT – Marine department, • Tank farms, • Container terminals, • Liquid Bulk terminal, • CFS. 	<ul style="list-style-type: none"> • Port DMP as per Disaster Management Act -2005, NDMA Guidelines and NDMP • Emergency Action Plan (EAP), • Emergency Response Disaster Management Plan 	Update plans		
		Constitute/ strengthen the mechanism for consultation with experts and stakeholders	<ul style="list-style-type: none"> • JNPT – Marine department, • JNPT – Engineering Department, • JNPT – PPD. 	Mechanism for strengthening of the port disaster management through <ul style="list-style-type: none"> • Periodical inspection, • Audits (Structural, Fire and Safety) , • JNPT Safety Operating Procedure for ensuring statutory compliance related to safety and environment at JNPT-Tank farm area and pipeline corridors , 			

Disaster Management Plan

Hazard		Chemical Disaster					
1. Thematic area		Understanding Risk					
Sr · N o	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
				<ul style="list-style-type: none"> • Capacity analysis, • Drills, • Training and Awareness, • Land use planning, • Traffic analysis (taken data from IPA / Sagarmala report). 			

Disaster Management Plan

Hazard		Chemical Disaster					
2. Thematic area		Inter- agency coordination					
Sr · N o	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Overall disaster governance	Providing coordination, technical inputs, and support, Periodical inspection from government agencies.	<ul style="list-style-type: none"> • JNPT, • CISF, • Tank Farms , • Container terminals, • Liquid Bulk terminals, • CFS. 	<ul style="list-style-type: none"> • Emergency Operation Centre • Coordination with DRR Cell (at MoS level), • JNPT Safety Operating Procedure for ensuring statutory compliance (e.g. MPCB, PNGRB, DISH, DGFASLI, OISD, AERB, PESO etc.) related to safety and environment at JNPT-Tank farm area and pipeline corridors 			
		Address/ identify gaps in equipment/ infrastructure and human resources with DM tasks	<ul style="list-style-type: none"> • JNPT, • Tank Farms, • Container terminals, • Liquid Bulk terminals, • CFS. 	<ul style="list-style-type: none"> • Developmental project reports 	Gap analysis / Periodic reviews in equipment/infrastructure and human resources		

Disaster Management Plan

Hazard		Chemical Disaster					
2. Thematic area		Inter- agency coordination					
Sr · N o	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
2	Response	Organizing and coordinating with Government agencies and stakeholders of the port	<ul style="list-style-type: none"> • JNPT, • Vessel Master, • Tank Farms, • Container terminals, • Liquid bulk terminal, • CISF. 	<ul style="list-style-type: none"> • Coordinating with CMG group, • Coordinating with MbPT, • Coordinating with Vessel Master, • Coordinating with Govt. Agencies (DG shipping, NDMA, ICG, MMD, PESO, MPCB, Navy, etc.), • Mutual aid agreement with relevant stakeholders. 			
3	Warnings, Information, data	Effective coordination and seamless communication among various stakeholders	<ul style="list-style-type: none"> • JNPT, • CISF, • Tank Farms, • Container terminals, • Liquid bulk terminal , • Vessel Master 	<ul style="list-style-type: none"> • VHF/UHF, • Mobile, • Landline, • PA system, • Emergency Siren. 			
		Dissemination of warnings and information	<ul style="list-style-type: none"> • JNPT, • Tank Farms, • Container terminals, 	Dissemination of information to/from <ul style="list-style-type: none"> • Vessel Master, • CMG, • DG shipping, NDMA, ICG, 			

Disaster Management Plan

Hazard		Chemical Disaster					
2. Thematic area		Inter- agency coordination					
Sr · N o	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
			<ul style="list-style-type: none"> • Liquid Bulk terminal , • Vessel Master, • Local and District Authority, • CISF. 	MMD, PESO, MPCB, Navy, Local Police Authority, <ul style="list-style-type: none"> • CISF, • Any other relevant authority. 			

Disaster Management Plan

Hazard		Chemical Disaster					
3. Thematic area		Investing in DRR – Structural measures					
Sr · N o	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Evacuation and support facilities.	<ul style="list-style-type: none"> • Identification hospitals and first aid 	<ul style="list-style-type: none"> • JNPT, • CISF, • Stakeholders, • Local Authorities. 	<ul style="list-style-type: none"> • JNPT Hospital, • Tie up with nearby hospitals, • First Aid centers. 			
	Multiple routes for reliable access and escape.	<ul style="list-style-type: none"> • Ensuring fresh water storage facilities for drinking purpose 	<ul style="list-style-type: none"> • JNPT 	<ul style="list-style-type: none"> • Water supply from CIDCO and MJP (Maharashtra Jeevan Pradhikaran), • Elevated Service Reservoir (ESR) , • Ground Service Reservoir (GSR), • Water tanker supply. 			
	Decontamination facilities	<ul style="list-style-type: none"> • Providing wide roads and multiple routes to allow quick access by first responders and to ensure 	<ul style="list-style-type: none"> • JNPT, • CIDCO, • Tank farms, • Container terminals, • Liquid bulk terminals, • CFS. 	<p>Evacuation by Land facilities</p> <ul style="list-style-type: none"> • Gate complexes available, • Periodic maintenance of internal roads, • JNPT Port and hired vehicles as per Appendix B, • Individual container terminals, Liquid Bulk terminal, Tank farm terminals, CFS vehicles available, • Coordination with state 			

Disaster Management Plan

Hazard		Chemical Disaster					
3. Thematic area		Investing in DRR – Structural measures					
Sr · N o	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
		escape pathways		transport for additional vehicles, <ul style="list-style-type: none"> • Land Use Planning, • Vehicle Traffic SOP, • Parking facility available. Evacuation by sea route facilities <ul style="list-style-type: none"> • JNPT owned/hired crafts and Other terminal owned crafts (details provided in the Appendix B), • Landing Jetties, • Vessel Traffic Management system. 			
		<ul style="list-style-type: none"> • Establish decontamin ation facilities 	<ul style="list-style-type: none"> • JNPT, • Stakeholders. 	Personnel decontamination <ul style="list-style-type: none"> • Hospitals , • Tie up with nearby hospitals, • Eyewash and Safety Showers available. 			

Disaster Management Plan

Hazard		Chemical Disaster					
3. Thematic area		Investing in DRR – Structural measures					
Sr · No	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
2	Disaster Response equipment	Ensuring (as per OISD and other relevant requirements) and maintaining fire-fighting equipment	<ul style="list-style-type: none"> • JNPT, • Tank Farms, • Container Terminals, • Liquid Bulk terminal, • JNPT Hospital, • PUB, • Customs House. 	<ul style="list-style-type: none"> • Procuring and maintaining fire-fighting equipment as per the OISD and other relevant requirements, • JNPT Fire Station , • Mutual Aid Agreement with the Stakeholders , • Fire Water storage facilities available at individual tank farms and container terminals, CFS, PUB, Customs House, JNPT Hospital and Fire Station. • FIFI Tugs. 			
		Ensuring (as per ICG requirements) and maintaining oil pollution response equipment	<ul style="list-style-type: none"> • JNPT , • MbPT, • Oil Companies as mentioned in Mutual Aid Agreement. 	<ul style="list-style-type: none"> • O & M (common with MbPT) of Pollution response equipment as per the requirement, • Contract for O &M the equipment given to OSRO, • Mutual Aid Agreement with the Stakeholders. 			

Disaster Management Plan

Hazard		Chemical Disaster					
4. Thematic area		Investing in DRR – Non- Structural measures					
Sr · N o	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Laws Regulations, Techno Legal regimes Enforcement, compliance and Monitoring Institutional arrangements	Formulate/ strengthen the SOP for the compliance w.r.t. the statutory requirements ensuring greater safety in hazardous industries and reduce the likelihood of disasters	<ul style="list-style-type: none"> • JNPT – Marine, • JNPT – PPD, • Tank Farms, • Container terminals, • Liquid bulk terminal, • CFS. 	<ul style="list-style-type: none"> • Study the relevant guidelines issued by Pollution Control Board, Government of Maharashtra and other departments regarding safety control, coastal zone regulation, handling & storage of cargo terminals and land use. • Periodic audit of Tank farms, Pipeline corridor and Oil Jetty as per the JNPT SOP, • Structural Audit, • Fire Audit, • Safety Audit, • Risk Assessment, • Safety committee meetings. 			
2	Risk Transfer	Insurance	<ul style="list-style-type: none"> • JNPT, • Tank Farms, • Container terminals, • Liquid Bulk terminals, • CFS. 	<ul style="list-style-type: none"> • Workmen Compensation Policy, • Public Liability Insurance, • Property Insurance. 			

Disaster Management Plan

Hazard		Chemical Disaster					
5. Thematic area		Capacity Development					
Sr · No	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Training	<ul style="list-style-type: none"> • Training and orientation programs on management (handling, storage and transfer) and disposal of HAZCHEM • Incorporating disaster response, search and rescue in the training programs 	<ul style="list-style-type: none"> • JNPT, • CISF, • Tank Farms, • Container terminals, • Liquid Bulk terminal, • CFS. 	<ul style="list-style-type: none"> • IMO level training (OSR) for the identified personnel, • ISO and OHSAS training, • Simulation training provided for crane operators, • Fire-fighting training, • Safety Training, • First Aid training. 			

Disaster Management Plan

Hazard		Chemical Disaster					
5. Thematic area		Capacity Development					
Sr · No	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
2	Mock drills/ Exercises	<ul style="list-style-type: none"> • Planning and execution of emergency drills by all the stakeholders 	<ul style="list-style-type: none"> • JNPT, • CISF, • Tank Farms, • Container terminals, • Liquid Bulk terminal, • CFS. 	Conduct mock drills with all the stakeholders (as per PNGRB regulation, OISD and MSIHC rules) as applicable.			
		<ul style="list-style-type: none"> • Joint planning and execution of emergency drills 	<ul style="list-style-type: none"> • JNPT , • CISF, • MbPT, • Tank Farms, • Container terminals, • Liquid Bulk terminal, • CFS. 	Organize (involving all the stakeholders) mock-drills through various government agencies like CISF, NDRF, Local authorities, Civil defense, ICG, MbPT etc.			
3	Documentati on	Ensure accurate documentatio n of all aspects of disaster events for	<ul style="list-style-type: none"> • JNPT, • Tank Farms, • Container terminals, • Liquid Bulk terminal, 	<ul style="list-style-type: none"> • Maintenance of the incident and near miss record by JNPT, individual tank farm terminals, container terminals, Liquid Bulk terminal and JNPT owned CFS. • Accident/incident reporting, 			

Disaster Management Plan

Hazard		Chemical Disaster					
5. Thematic area		Capacity Development					
Sr · N o	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
		creating good historical records for future research and Risk Management planning	<ul style="list-style-type: none"> • CFS, • PUB, • Custom House, • Hospital. 	analysis, investigation and implementation of recommendations.			
4	Awareness	Promote culture of disaster risk prevention, mitigation, and better risk management	<ul style="list-style-type: none"> • JNPT, • Tank Farms, • Container terminals, • Liquid Bulk terminal, • CFS, • PUB, • Custom House, • Hospital. 	<ul style="list-style-type: none"> • Safety day/week celebration, • Award and recognition, • Safety Bulletins, • Periodic Health Check- up (PME Periodical medical examination). 			

Disaster Management Plan

Hazard		Fire (Offices, Hospital, electrical substations, Control Rooms, etc.)					
1. Thematic area		Understanding Risk					
Sr · N o	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Information Systems and Research	Support and coordination	<ul style="list-style-type: none"> • JNPT – Fire department, • JNPT Marine and electrical department, • Tank farms, • Container terminals, • CFS, • Liquid Bulk terminal. 	<ul style="list-style-type: none"> • Fire system layout and equipment details, • Electrical system layout and equipment details, • Fire Station. 			
2	Zoning/ Mapping	Mapping of sites that pose fire and explosion (LPG cylinders) risks	<ul style="list-style-type: none"> • JNPT – Fire department, • JNPT Marine and electrical department, • Tank farms, • Container terminals, • CFS, • Liquid Bulk terminal. 	<ul style="list-style-type: none"> • JNPT layout (latitude and longitude), • Individual terminal layout. 			

Disaster Management Plan

Hazard		Fire (Offices, Hospital, electrical substations, Control Rooms, etc.)					
1. Thematic area		Understanding Risk					
Sr · N o	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
3	Monitoring	Monitoring compliance with safety norms	<ul style="list-style-type: none"> JNPT – Fire department, JNPT Marine and electrical department, Tank farms, Container terminals, CFS, Liquid Bulk terminal. 	As per Maharashtra Fire Safety Act and National Building Code, Continuous monitoring with the <ul style="list-style-type: none"> Fire and smoke detection system, 24*7 CCTV surveillance, Manning of the areas. 			
4	Hazard Risk Vulnerability and Capacity Assessment (HRVCA)	Undertake HRVCA as part of preparing and periodic revision of DM plans	<ul style="list-style-type: none"> JNPT – Marine department, Tank farms, Container Terminals, Liquid Bulk terminal. 	<ul style="list-style-type: none"> Port DMP as per Disaster Management Act -2005, NDMA Guidelines and NDMP, Emergency Action Plan (EAP), Emergency Response Disaster Management Plan (ERDMP). 	Update plans		
		Constitute/ strengthen the mechanism for consultation	<ul style="list-style-type: none"> JNPT – Marine department JNPT – Engineering Department 	Mechanism for strengthening of the port disaster management through <ul style="list-style-type: none"> Periodical inspection and testing of response equipment, 			

Disaster Management Plan

Hazard		Fire (Offices, Hospital, electrical substations, Control Rooms, etc.)					
1. Thematic area		Understanding Risk					
Sr · N o	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
		with experts and stakeholders	<ul style="list-style-type: none"> • Tank farms, • Container terminals, • Liquid Bulk terminal. 	<ul style="list-style-type: none"> • Fire Audit , • JNPT Safety Operating Procedure for ensuring statutory compliance related to safety and environment at JNPT-Tank farms area and pipeline corridors , • Capacity analysis, • Drills, • Training and Awareness. 			

Disaster Management Plan

Hazard		Fire (Offices, Hospital, electrical substations, Control Rooms, etc.)					
2. Thematic area		Inter- agency coordination					
Sr · N o	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Overall disaster governance	Identify and address the gaps in existing capabilities, equipment, infrastructure, and human resources	<ul style="list-style-type: none"> • JNPT, • CISF, • Tank Farms, • Container terminals, • Liquid Bulk terminal, • CFS, • PUB, • Custom House, • Hospital. 	<ul style="list-style-type: none"> • Fire-fighting team, • Fire-fighting equipment, • Fire Station. 	<ul style="list-style-type: none"> • Recruitment/ outsource of fire-fighting personnel • Procurement of Port Fire tender 		
		Establish fire stations	<ul style="list-style-type: none"> • JNPT, • Tank farms, • Container terminals, • Liquid Bulk terminal, • CFS, • Hospital, • Admin building, • PUB, • Customs House. 	<ul style="list-style-type: none"> • Established Port Fire station , • Identified list of nearby Fire Stations as per Appendix B, • Individual fire fighting system with the tank farms, container terminals, Liquid Bulk terminal, CFS, Hospital, Admin building, PUB and Customs House. 	Fire fighting system OISD 156 at shallow water berth.		

Disaster Management Plan

Hazard		Fire (Offices, Hospital, electrical substations, Control Rooms, etc.)					
2. Thematic area		Inter- agency coordination					
Sr · N o	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
		Implementati on of DM plans	<ul style="list-style-type: none"> • JNPT, • Tank farms, • Container terminals, • Liquid Bulk terminal, • CFS, • PUB, • Custom House, • Hospital. 	<ul style="list-style-type: none"> • Conducting fire and evacuation drills, • Training and Awareness. 			
2	Response	Organizing and coordinating the immediate response Coordinate with Government agencies and stakeholders of the port	<ul style="list-style-type: none"> • JNPT, • CISF, • Tank farms, • Container terminals, • Liquid Bulk terminal, • CFS, • PUB, • Custom House, • Hospital. 	<ul style="list-style-type: none"> • Activation of DM Plan, • Coordinating with Fire station (JNPT & External e.g. CIDCO, ONGC, MSEB). 			

Disaster Management Plan

Hazard		Fire (Offices, Hospital, electrical substations, Control Rooms, etc.)					
2. Thematic area		Inter- agency coordination					
Sr · N o	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
3	Warnings, Information, data	Effective coordination and seamless communicatio n	<ul style="list-style-type: none"> • JNPT, • CISF, • Tank farms, • Container terminals, • Liquid Bulk terminal, • CFS, • PUB, • Custom House, • Hospital. 	Coordination among various port stakeholders and CMG to ensure quick, clear, effective dissemination of warnings, information and data via <ul style="list-style-type: none"> • VHF /UHF, • Landline, • PA system, • Mobile Phones, • Emergency Siren. 			

Disaster Management Plan

Hazard		Fire (Offices, Hospital, electrical substations, Control Rooms, etc.)					
3. Thematic area		Investing in DRR – Structural measures					
Sr · N o	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Fire Fighting systems	Procurement and maintenance of fire Fighting systems as per relevant rules	<ul style="list-style-type: none"> • JNPT, • Tank farms, • Container terminals, • Liquid Bulk terminal, • CFS, • PUB, • Custom House, • Hospital. 	<ul style="list-style-type: none"> • Periodical up-gradation and maintenance of the fire fighting system. 			<ul style="list-style-type: none"> • Overhead water tank and pump house (2026-2030 plan) • Water sump for fire-fighting (2026-2030 plan)
2	Evacuation and support facilities. Multiple routes for reliable access and escape.	Identification of Assembly points	<ul style="list-style-type: none"> • JNPT, • CISF, • Tank farms, • Container terminals, • Liquid Bulk terminal, • CFS, • PUB, • Custom House, • Hospital. 	Identified assemble points.	Updation of assembly points and sign boards		
		Providing vehicles for	<ul style="list-style-type: none"> • JNPT, • Tank farms, 	<ul style="list-style-type: none"> • Passenger vehicles of JNPT as per Appendix B. 			

Disaster Management Plan

Hazard		Fire (Offices, Hospital, electrical substations, Control Rooms, etc.)					
3. Thematic area		Investing in DRR – Structural measures					
Sr · N o	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
		safe transportation	<ul style="list-style-type: none"> • Container terminals, • Liquid Bulk terminal, • CFS. 	<ul style="list-style-type: none"> • Passenger vehicles in container terminals, liquid bulk terminal, Tank farms, CFS. • Vehicle traffic Management SOP – Local Administration. 			
3	First aid and Decontamination facilities	<ul style="list-style-type: none"> • Establish First aid and decontamination facilities • Identification of hospital 	<ul style="list-style-type: none"> • JNPT, • Tank Farms, • Container terminals, • Liquid Bulk terminal, • CFS, • PUB, • Custom House, • Hospital. 	Personnel first aid and decontamination <ul style="list-style-type: none"> • JNPT Hospital, • Other identified hospitals as per Appendix B, • First aid facility of JNPT as per Appendix B, • First aid facility of individual tank farms, Liquid Bulk terminal, CFS, PUB, Customs House. 			

Disaster Management Plan

Hazard		Fire (Offices, Hospital, electrical substations, Control Rooms, etc.)					
4. Thematic area		Investing in DRR – Non- Structural measures					
Sr · N o	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Rules, laws, guidelines	Strict implementation and strengthening of fire safety rules	<ul style="list-style-type: none"> • JNPT, • Tank Farms, • Container Terminals, • Liquid Bulk terminal, • CFS, • PUB, • Custom House, • Hospital. 	<ul style="list-style-type: none"> • Fire fighting and evacuation plan, • Safety Committee Meeting, • Environment, Health and Safety Policy, • Safety Manual, • Safety budget, • Work Permit System. 			
2	Fire safety audit of structures and buildings	Carry out fire safety audit of buildings and critical infrastructure	<ul style="list-style-type: none"> • JNPT, • Tank Farms, • Container terminals, • Liquid Bulk terminal, • CFS, • PUB, • Custom House, • Hospital. 	Periodic Fire audit.			

Disaster Management Plan

Hazard		Fire (Offices, Hospital, electrical substations, Control Rooms, etc.)					
4. Thematic area		Investing in DRR – Non- Structural measures					
Sr · N o	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
3	Risk Transfer	Insurance	<ul style="list-style-type: none"> • JNPT , • Tank Farms, • Container terminals, • Liquid Bulk terminal, • CFS, • PUB, • Custom House, • Hospital. 	<ul style="list-style-type: none"> • Workmen Compensation Policy, • Public Liability Insurance, • Property Insurance. 			

Disaster Management Plan

Hazard		Fire (Offices, Hospital, electrical substations, Control Rooms, etc.)					
5. Thematic area		Capacity Development					
Sr. No	Sub-thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Training	Incorporating disaster response in the training programs	<ul style="list-style-type: none"> • JNPT, • Tank Farms, • Container terminals, • Liquid Bulk terminal, • CFS, • PUB, • Custom House, • Hospital. 	<ul style="list-style-type: none"> • Fire Induction/Refresher Training, • Fire fighting training, • First Aid training. 	Advanced Training at NCDC - Nagpur		
2	Mock drills/ Exercises	<p>Planning and execution of emergency drills by all the stakeholders</p> <p>Joint planning and execution of emergency drills</p>	<ul style="list-style-type: none"> • JNPT, • Tank Farms, • Container terminals, • Liquid Bulk terminal, • CFS, • PUB, • Custom House, • Hospital. 	Annual Drill schedule			

Disaster Management Plan

Hazard		Fire (Offices, Hospital, electrical substations, Control Rooms, etc.)					
5. Thematic area		Capacity Development					
Sr. No	Sub-thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
3	Documentation	Ensure accurate documentation of all aspects of disaster events for creating good historical records for future research and Risk Management planning	<ul style="list-style-type: none"> • JNPT, • Tank Farms, • Container Terminals, • Liquid Bulk terminal, • CFS, • PUB, • Custom House, • Hospital. 	<ul style="list-style-type: none"> • Maintenance of the incident and near miss record by JNPT, individual tank farms terminals, container terminals, Liquid Bulk terminal and JNPT CFS, • Accident/incident reporting, analysis, investigation and implementation of recommendations. 			
4	Awareness	Promote culture of disaster risk prevention, mitigation, and better risk management	<ul style="list-style-type: none"> • JNPT, • Tank Farms, • Container terminals, • Liquid Bulk terminal, • CFS, • PUB, • Custom House, • Hospital. 	<ul style="list-style-type: none"> • Safety day/week celebration, • Award and recognition, • Safety Bulletin, • Periodical Health Check up. 			

Disaster Management Plan

Disaster		Earthquake					
1. Thematic area		Understanding Risk					
Sr · No	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Seismic Zoning/ Mapping	Identification of the vulnerable areas	Not applicable to JNPT for zoning and mapping	Earthquake hazard map as given in BIS standard 1893 -2016.	The requirements of BIS standard 1893- 2016 are to be complied with for seismic zone III.		
2	Hazard Risk Vulnerability and Capacity Assessment (HRVCA)	Undertake HRVCA as part of preparing and periodic revision of DM plans	<ul style="list-style-type: none"> • JNPT– Marine department, • Tank Farms, • Container Terminals, • Liquid bulk terminal, • CFS. 	<ul style="list-style-type: none"> • Port DMP as per Disaster Management Act -2005, NDMA Guidelines and NDMP, • Emergency Action Plan (EAP) , • Emergency Response Disaster Management Plan (ERDMP). 	Update Plans		

Disaster Management Plan

Disaster		Earthquake					
2. Thematic area		Inter- agency coordination					
Sr · No	Sub- thematic area	Plan components	Responsible section	Recurring /Regular measures	Short term	Medium term	Long term
1	Overall disaster governance	Providing coordination, technical inputs, and support	<ul style="list-style-type: none"> • JNPT, • CISF, • Tank Farms , • Container terminals, • Liquid Bulk terminals, • CFS. 	<ul style="list-style-type: none"> • Emergency Operation Centre, • As per National Disaster Management Guidelines for Earthquakes. 			
		Address/ identify gaps in equipment and infrastructure with seismic zone and standards	<ul style="list-style-type: none"> • JNPT, • Tank Farms, • Container terminals, • Liquid Bulk terminals, • CFS. 	<ul style="list-style-type: none"> • Developmental project reports 	Gap analysis / Periodic reviews in infrastructure		
2	Response	Coordinating with port stakeholders and Government agencies	<ul style="list-style-type: none"> • JNPT, • Tank Farms, • Container terminals, • Liquid Bulk terminals, • CFS, • CISF. 	<ul style="list-style-type: none"> • CMG group, • NDRF, SDRF, Civil Defense, Local authorities. 			

Disaster Management Plan

Disaster		Earthquake					
3. Thematic area		Investing in DRR – Structural measures					
Sr · No	Sub-thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Strengthening and seismic retrofitting of prioritized critical structures and buildings	Implementation on strengthening and seismic retrofitting as per recommendations of structural safety audits	<ul style="list-style-type: none"> • JNPT, • Tank Farms, • Container terminals, • Liquid Bulk terminals, • CFS. 	<ul style="list-style-type: none"> • Seismically safe design and construction of jetties, wharfs, trestles, office buildings, utilities, township, • Seismically safe design and construction for industrial zones. 	Inspection of critical structures and buildings and prioritization for repairs including areas of ground settlement.	Undertake repair and retrofitting	

Disaster Management Plan

Disaster		Earthquake					
4. Thematic area		Investing in DRR – Non- Structural measures					
Sr · N o	Sub- thematic area	Plan components	Responsible section	Recurring /Regular measures	Short term	Medium term	Long term
1	Structural safety audit of lifeline structures and buildings	Carry out structural safety audit of lifeline buildings and critical infrastructure	<ul style="list-style-type: none"> • JNPT, • Tank Farms, • Container terminals, • Liquid Bulk terminals, • CFS. 	Structural safety audit of critical buildings and infrastructure.			
2	Risk Transfer	Insurance	<ul style="list-style-type: none"> • JNPT , • Tank Farms, • Container Terminals, • Liquid Bulk terminals, • CFS. 	<ul style="list-style-type: none"> • Workmen Compensation Policy, • Public Liability Insurance, • Property Insurance. 	Renewals of Policies		

Disaster Management Plan

Disaster		Earthquake					
5. Thematic area		Capacity Development					
Sr · N o	Sub- thematic area	Plan components	Responsible section	Recurring /Regular measures	Short term	Medium term	Long term
1	Training	Training and awareness regarding earthquake related emergencies and do's and don't's Reference documents: NDMA guidelines for earthquake	<ul style="list-style-type: none"> • JNPT, • Tank Farms, • Container Terminals, • BPCL Jetty, • CFS. 				
2	Mock drills/ Exercises (Evacuation and rescue)	Joint planning and execution of emergency drills	<ul style="list-style-type: none"> • JNPT , • Tank Farms, • Container Terminals, • BPCL Jetty, • CFS. 	Exercises in accordance with the District and State Disaster Management Plan.			

Disaster Management Plan

Disaster		Wind and Cyclone					
1. Thematic area		Understanding Risk					
Sr · N o	Sub- thematic area	Plan components	Responsible section	Recurring /Regular measures	Short term	Medium term	Long term
1	Observation networks, Information systems, Research, Forecasting, Early warning	Enhancement of Observational Network Stations (ONS)	JNPT Marine Department	<ul style="list-style-type: none"> • VTMS, • AIS, • GMDSS, • Microwave, • VHF. 			
		Establishment of at least one High Wind Speed Recorder and one surge recorder		Locations at which anemometer is installed, RADAR locations, Admin building (with recorder), On all cranes RMQCs, Shift in-charge office, Maintenance office (indicator with Sirens).			
2	Zoning / Mapping	Identification of the vulnerable areas	Not applicable to JNPT for zoning and mapping.	Cyclone hazard map as given in Maharashtra DMP (Moderate zone- 44m/s).			
3	Monitoring	System to monitor cyclone	JNPT– Marine department	Monitoring via <ul style="list-style-type: none"> • TV /Radio, • IMD bulletins. 			
4	Hazard Risk Vulnerability and Capacity	Undertake HRVCA as part of	<ul style="list-style-type: none"> • JNPT– Marine department, • Tank Farms, 	<ul style="list-style-type: none"> • Port DMP as per Disaster Management Act -2005, NDMA Guidelines and 	Update Plans		

Disaster Management Plan

Disaster		Wind and Cyclone					
1. Thematic area		Understanding Risk					
Sr · N o	Sub- thematic area	Plan components	Responsible section	Recurring /Regular measures	Short term	Medium term	Long term
	Assessment (HRVCA)	preparing and periodic revision of DM plans	<ul style="list-style-type: none"> • Container Terminals, • Liquid bulk terminal, • CFS. 	NDMP, <ul style="list-style-type: none"> • Emergency Action Plan (EAP), • Emergency Response Disaster Management Plan (ERDMP). 			
		Constitute/ strengthen the mechanism for consultation with experts and stakeholders	<ul style="list-style-type: none"> • JNPT – Marine department, • JNPT – Engineering Department, • JNPT – PPD, • Tank Farms, • Container Terminals, • Liquid bulk terminal, • CFS. 	Mechanism for strengthening through <ul style="list-style-type: none"> • SOP, • Preventive inspection of cranes, high mast lighting, communication towers and antennae, • Stacking of containers as per wind criteria, • Effective storm drainage system. 	Land use planning		

Disaster Management Plan

Disaster		Wind and Cyclone					
2. Thematic area		Inter- agency coordination					
Sr · No	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Overall disaster governance	Providing coordination, technical inputs, and support.	<ul style="list-style-type: none"> JNPT, Tank Farms , Container terminals, Liquid Bulk terminals, CFS. 	Emergency Operation Centre			
		Address/ident ify gaps in equipment/ infrastructure and human resources with DM tasks	<ul style="list-style-type: none"> JNPT, Tank Farms, Container terminals, Liquid Bulk terminals, CFS. 	Standard Operating Procedure (SOP)	Review of SOP		
				<ul style="list-style-type: none"> Developmental project reports 	Gap analysis / Periodic reviews in infrastructure and human resources.		
2	Response	Coordinating with port stakeholders and Government agencies	<ul style="list-style-type: none"> JNPT, Vessel Master. 	<ul style="list-style-type: none"> CMG group, MbPT, Vessel Master, NDRF, SDRF, Civil Defense, Local authorities. 	Review for adequacy and continue existing MoUs		

Disaster Management Plan

Disaster		Wind and Cyclone					
2. Thematic area		Inter- agency coordination					
Sr · N o	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
3	Warnings, Information, data collection	Effective coordination and seamless communicatio n among various port stakeholders, Vessel Master and owner, CMG and Port to ensure quick, clear, effective dissemination of warnings, information and data.	<ul style="list-style-type: none"> • JNPT, • Vessel Master, • Tank Farms, • Container terminals, • Liquid Bulk terminals, • CFS. 	<ul style="list-style-type: none"> • VHF channels, • Mobile Phones, • PA System, • Display of cyclone signals. 			

Disaster Management Plan

Disaster		Wind and Cyclone					
3. Thematic area		Investing in DRR – Structural measures					
Sr · No	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Multi-Purpose Cyclone Shelters	Identification of safe buildings and sites with basic facilities like drinking water, food and first aid to serve as temporary shelters for people evacuated from localities at risk	<ul style="list-style-type: none"> JNPT 	<ul style="list-style-type: none"> Multipurpose Hall – JNPT Township, JNPT Hospital, St. Mary’s JNP School - JNPT Township, JNP Vidyalaya – JNPT Township, Officers and Staff club in Township. 	Periodic inspection		
2	Hospitals and First Aid centres	<ul style="list-style-type: none"> Identification hospitals and first aid 	<ul style="list-style-type: none"> JNPT, Tank Farms , Container terminals, Liquid Bulk terminals, CFS. 	<ul style="list-style-type: none"> JNPT Hospital - trauma centre and casualty ward , Tie up with nearby hospitals, First Aid centers. 			

Disaster Management Plan

Disaster		Wind and Cyclone					
4. Thematic area		Investing in DRR – Non- Structural measures					
Sr · No	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Laws Regulations Enforcement mechanisms	Complying with the coastal zone laws	<ul style="list-style-type: none"> • JNPT, • Tank Farms, • Container Terminals, • Liquid Bulk terminals, • CFS. 	<ul style="list-style-type: none"> • SOP for Cyclone, • Load test of cranes. 	Land-use planning as per the CRZ notification.		
	Techno- Legal regimes Institutional Arrangement s Codes for disaster risk reduction Compliance monitoring	Consider shoreline erosion, risk to structures, monitoring shoreline changes paying attention to the preservation of natural barriers	<ul style="list-style-type: none"> • JNPT 			Construction of seawalls in erosion prone areas of Elephanta and Panje village.	
2	Risk Transfer	Insurance	<ul style="list-style-type: none"> • JNPT , • Tank Farms, • Container 	<ul style="list-style-type: none"> • Workmen Compensation Policy, • Public Liability Insurance, 	Renewals of Policies		

Disaster Management Plan

Disaster		Wind and Cyclone					
4. Thematic area		Investing in DRR – Non- Structural measures					
Sr · N o	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
			Terminals, <ul style="list-style-type: none"> • Liquid Bulk terminals, • CFS. 	<ul style="list-style-type: none"> • Property Insurance. 			

Disaster Management Plan

Disaster		Wind and Cyclone					
5. Thematic area		Capacity Development					
Sr · No	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Training	Training and awareness regarding cyclone related emergencies and do's and don'ts Reference documents: NDMA guidelines for cyclones	<ul style="list-style-type: none"> • JNPT, • Tank Farms, • Container Terminals, • Liquid Bulk terminals, • CFS. 			Training by Civil Defense and other agencies	
2	Mock drills/ Exercises	Joint planning and execution of emergency drills	<ul style="list-style-type: none"> • JNPT , • Tank Farms, • Container Terminals, • Liquid Bulk terminals, • CFS. 				
3	Awareness			To the local fisherman and all concerned stakeholders			
3	Empowering following	Emergency evacuation	<ul style="list-style-type: none"> • JNPT, • Tank Farms, 	<ul style="list-style-type: none"> • Display plan and areas of employment for special 			

Disaster Management Plan

Disaster		Wind and Cyclone					
5. Thematic area		Capacity Development					
Sr · N o	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
	categories of employees • Women • disabled	facilities	<ul style="list-style-type: none"> • Container Terminals, • Liquid Bulk terminals, • CFS. 	category employees, <ul style="list-style-type: none"> • Provision of transports. 			

Disaster Management Plan

Disaster		Wind and Cyclone					
6. Thematic area		Climate change risk management					
Sr · No	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Climate change adaptation (CCA)	Sensitization and awareness creation	<ul style="list-style-type: none"> • JNPT , • Tank Farms, • Container Terminals, • Liquid Bulk terminals, • CFS. 	<p>JN Port has prepared an action plan related to environmental protection as part of Green Port Initiative from GoI.</p> <p>This includes new</p> <ul style="list-style-type: none"> • Sewage Treatment Plant, • Development of Eco Park, • Use of renewable energy, • Comprehensive plantation, • Prohibition of disposal of all kind of garbage in sea, • Greenhouse gas emission control , • Vapour emission control systems. 			

Disaster Management Plan

Disaster		Flood					
1. Thematic area		Understanding Risk					
Sr · N o	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Observation networks, Information systems, Research, Forecasting, Early warning	Assessment and Monitoring	<ul style="list-style-type: none"> JNPT 	<ul style="list-style-type: none"> Tide table, Sea level monitoring, IMD bulletins. 			
2	Zoning/ Mapping and classification of flood prone areas	Identification of the vulnerable areas	JNPT for zoning and mapping	<p>Coastal zone map of MCZMA indicating HTL and LTL are available.</p> <p>Port HTL and LTL demarcated by IRS Anna University-Chennai</p>			
3	Hazard Risk Vulnerability and Capacity Assessment (HRVCA)	Undertake HRVCA as part of preparing and periodic revision of DM plans	<ul style="list-style-type: none"> JNPT– Marine department, Tank Farms, Container Terminals, Liquid bulk terminal, CFS. 	<ul style="list-style-type: none"> Port DMP as per Disaster Management Act -2005, NDMA Guidelines and NDMP Emergency Action Plan (EAP) Emergency Response Disaster Management Plan (ERDMP) 	Update Plans		

Disaster Management Plan

Disaster		Flood					
1. Thematic area		Understanding Risk					
Sr · N o	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
		Constitute/ strengthen the mechanism for consultation with experts and stakeholders	<ul style="list-style-type: none"> • JNPT – Marine department, • JNPT – Engineering Department, • JNPT – PPD, • Tank Farms , • Container Terminals, • Liquid bulk terminal, • CFS. 	Mechanism for strengthening through <ul style="list-style-type: none"> • Project development reports incorporating effective draining and anti-flooding measures. 	Assessment of anti-flooding and drainage system in newly completed projects.	Land use planning	

Disaster Management Plan

Disaster		Flood					
2. Thematic area		Inter- agency coordination					
Sr · N o	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Overall disaster governance	Providing coordination, technical inputs, and support	<ul style="list-style-type: none"> • JNPT, • CISF • Tank Farms , • Container terminals, • Liquid Bulk terminals, • CFS. 	Emergency Operation Centre			
		Address/ident ify gaps in infrastructure with DM tasks	<ul style="list-style-type: none"> • JNPT 	Developmental project reports	Gap analysis / Periodic reviews in infrastructure		
2	Response	Coordinating With port stakeholders and Government agencies	<ul style="list-style-type: none"> • JNPT, • CISF • Tank Farms, • Container terminals, • Liquid Bulk terminals, • CFS. 	<ul style="list-style-type: none"> • CMG group, • SDRF, Civil Defense, Local authorities. 			
3	Warnings, Information,	Effective coordination	<ul style="list-style-type: none"> • JNPT, • CISF, 	<ul style="list-style-type: none"> • VHF/ UHF, • Mobile Phones, 			

Disaster Management Plan

Disaster		Flood					
2. Thematic area		Inter- agency coordination					
Sr · N o	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
	data	and seamless communication among various port stakeholders, CMG and Port to ensure quick, clear, effective dissemination of warnings, information and data.	<ul style="list-style-type: none"> • Tank Farms, • Container terminals, • Liquid Bulk terminals, • CFS. 	<ul style="list-style-type: none"> • PA System, • Tide tables. 			

Disaster Management Plan

Disaster		Flood					
3. Thematic area		Investing in DRR – Structural measures					
Sr · N o	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Multi- Purpose Shelters	Identification of safe buildings and sites with basic facilities like drinking water, food and first aid to serve as temporary shelters for people evacuated from localities at risk	<ul style="list-style-type: none"> JNPT 	<ul style="list-style-type: none"> Multipurpose Hall – JNPT Township, JNPT Hospital, St. Mary's JNP School - JNPT Township, JNP Vidyalaya – JNPT Township , Officers and Staff club in Township. 	Periodic inspection		
2	Hospitals and First Aid centres	Identification hospitals and first aid	<ul style="list-style-type: none"> JNPT, Tank Farms, Container terminals, Liquid Bulk terminals, CFS. 	<ul style="list-style-type: none"> JNPT Hospital - trauma centre and casualty ward Tie up with nearest hospitals First Aid centres 			
3	Civil works	Upgrade and maintenance of the existing	<ul style="list-style-type: none"> JNPT, Tank Farms, 	<ul style="list-style-type: none"> Drainage system, Boundary walls. 	Repair and Maintenance of the existing		

Disaster Management Plan

Disaster		Flood					
3. Thematic area		Investing in DRR – Structural measures					
Sr · N o	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
		drainage and storm water systems	<ul style="list-style-type: none"> • Container terminals, • Liquid Bulk terminals, • CFS. 		drainage system		

Disaster Management Plan

Disaster		Flood					
4. Thematic area		Investing in DRR – Non- Structural measures					
Sr · N o	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Operation and Maintenance of Drainage Systems	Budgetary Provision	<ul style="list-style-type: none"> JNPT 	Adequate budget to be provided to take care of the men, material, equipment and machinery for O&M of drainage systems on a periodic basis.			
2	Regulation and enforcement of laws, norms, regulations, guidelines	Complying with the coastal zone laws	<ul style="list-style-type: none"> JNPT 	<ul style="list-style-type: none"> Implementing land-use regulation as per flood control norms. 	Land-use planning as per the CRZ notification		
3	Risk Transfer	Insurance	<ul style="list-style-type: none"> JNPT , Tank Farms, Container Terminals, Liquid Bulk terminals, CFS. 	<ul style="list-style-type: none"> Workmen Compensation Policy, Public Liability Insurance, Property Insurance. 	Renewals of Policies		

Disaster Management Plan

Disaster		Flood					
5. Thematic area		Capacity Development					
Sr · No	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Training	Training and awareness regarding flood related emergencies and do's and don't's Reference documents: NDMA guidelines for Flood	<ul style="list-style-type: none"> • JNPT, • Tank Farms, • Container Terminals, • Liquid Bulk terminals, • CFS. 				
2	Mock drills/ Exercises	Joint planning and execution of emergency drills	<ul style="list-style-type: none"> • JNPT, • Tank Farms, • Container Terminals, • Liquid Bulk terminals, • CFS. 	Exercises in accordance with the District and State Disaster Management Plan.			

Disaster Management Plan

Disaster		Tsunami					
1. Thematic area		Understanding Risk					
Sr · No	Sub-thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Zoning/ Mapping	Identification of the vulnerable areas	<ul style="list-style-type: none"> JNPT 	Mapping of areas of flooding with a tide level of 5.1m (maximum HTL).	Mapping of areas of flooding with a significant wave height of deemed wave specified in NDMA Tsunami standards.		
2	Receipt of warnings, data and information	Monitor periodic bulletins from agency	JNPT- Marine department	Monitoring via <ul style="list-style-type: none"> Forecasting agencies, INCOIS. 			
3	Hazard Risk Vulnerability and Capacity Assessment (HRVCA)	Undertake HRVCA as part of preparing and periodic revision of DM plans	<ul style="list-style-type: none"> JNPT– Marine department, Tank Farms, Container Terminals, Liquid bulk terminal, CFS. 	<ul style="list-style-type: none"> Port DMP as per Disaster Management Act -2005, NDMA Guidelines and NDMP, Emergency Action Plan (EAP) , Emergency Response Disaster Management Plan (ERDMP). 	Update Plans		

Disaster Management Plan

Disaster		Tsunami					
2. Thematic area		Inter- agency coordination					
Sr · N o	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Overall disaster governance	Providing coordination, technical inputs, and support	<ul style="list-style-type: none"> • JNPT, • Tank Farms, • Container terminals, • Liquid Bulk terminals, • CFS. 	Emergency Operation Centre			
2	Response	Coordinating with port stakeholders and Government agencies	<ul style="list-style-type: none"> • JNPT, • Tank Farms, • Container terminals, • Liquid Bulk terminals, • CFS. 	<ul style="list-style-type: none"> • CMG group, • Vessel Master, • NDRF, SDRF, Civil Defense, Local authorities. 			

Disaster Management Plan

Disaster		Tsunami					
2. Thematic area		Inter- agency coordination					
3	Warnings, Information, data	Effective coordination and seamless communication among various port stakeholders, Vessel Master and owner, CMG and Port to ensure quick, clear, effective dissemination of warnings, information and data.	<ul style="list-style-type: none"> • JNPT, • Vessel Master, • Tank Farms, • Container terminals, • Liquid Bulk terminals, • CFS. 	<ul style="list-style-type: none"> • VHF/UHF, • Mobile Phones, • PA System, • Display of Tsunami signals. 			

Disaster Management Plan

Disaster		Tsunami					
3. Thematic area		Investing in DRR – Structural measures					
Sr . No	Sub-thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Strengthening and retrofitting of prioritized vulnerable and critical structures	Ensure compliance with relevant building codes or hazard resistant construction	<ul style="list-style-type: none"> JNPT 	Implementation in compliance with relevant building codes/ standards/ technical guidance.			
		<ul style="list-style-type: none"> Identification and repair/ retrofitting of houses and buildings as per the recommendations of structural audit Detailed assessment of tsunami hazard to the structure and foundation 	<ul style="list-style-type: none"> JNPT 	<ul style="list-style-type: none"> Periodic inspection of vulnerable/critical structures (power stations, warehouse, fire stations, oil and other storage tanks, public buildings, marine structures etc.). Repairs/ retrofitting done as and when required for tsunami resistance. 			

Disaster Management Plan

Disaster		Tsunami					
3. Thematic area		Investing in DRR – Structural measures					
		and the benefits of strengthening					
2	Multi-Purpose Tsunami Shelters	<ul style="list-style-type: none"> • Identification of safe buildings and sites with basic facilities like drinking water, food and first aid to serve as temporary shelters for people evacuated from localities at risk 	<ul style="list-style-type: none"> • JNPT 	<ul style="list-style-type: none"> • Multipurpose Hall – JNPT Township, • JNPT Hospital, • St. Mary’s JNP School - JNPT Township, • JNP Vidyalaya – JNPT Township , • Officers and Staff club in Township. 	Periodic inspection		
3	Hospitals and First Aid centres	Identification hospitals and first aid	<ul style="list-style-type: none"> • JNPT, • Tank Farms, • Container terminals, • Liquid Bulk terminals, 	<ul style="list-style-type: none"> • JNPT Hospital - trauma centre and casualty ward , • Tie up with nearest hospitals, • First Aid centres. 			

Disaster Management Plan

Disaster	Tsunami					
3. Thematic area	Investing in DRR – Structural measures					
			• CFS.			

Disaster	Tsunami						
4. Thematic area	Investing in DRR – Non-Structural measures						
Sr · No	Sub-thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Regulation and enforcement of relevant laws	Ensure compliance with coastal environment protection laws and regulations such as the CRZ	• JNPT	Implementation of coastal zone regulation			
2	Non-structural shore stabilization measures and bio-shields	Establishment of bio-shields like mangroves, as natural defense	• JNPT - PPD	• Plantation of mangroves			

Disaster Management Plan

3	Risk Transfer	Insurance	<ul style="list-style-type: none">• JNPT ,• Tank Farms,• Container Terminals,• Liquid Bulk terminals,• CFS.	<ul style="list-style-type: none">• Workmen Compensation Policy,• Public Liability Insurance,• Property Insurance.	Renewals of Policies		
---	---------------	-----------	---	--	----------------------	--	--

Disaster Management Plan

Disaster		Tsunami					
5. Thematic area		Capacity Development					
Sr · N o	Sub- thematic area	Plan components	Responsible section	Recurring / Regular measures	Short term	Medium term	Long term
1	Training	Training and awareness regarding Tsunami related emergencies and do's and don'ts Reference documents: NDMA guidelines for Tsunami	<ul style="list-style-type: none"> JNPT 	Training of local administration in forecasting warning dissemination and evacuation techniques.			
2	Mock drills/ Exercises (Evacuation and Rescue)	Joint planning and execution of emergency drills	<ul style="list-style-type: none"> JNPT 	Organizing drills on regular basis to check the viability of all plans and to check the readiness of all concerned.			

4. MAINSTREAMING DISASTER RISK REDUCTION

The objective of mainstreaming is ensuring the ongoing and new development projects of the port lead to integration measures. The sub-thematic areas where such measures can lead to DRR are as follows:

1. Awareness and understanding of disaster risk;
2. Disaster governance;
3. Disaster risk transfer;
4. Institutional arrangements and capacity development;
5. Budget allocations for integrating DRR into development programs;
6. Project appraisals, scrutiny of development plans, effective and detailed land-use plans, from the point of view of expected hazards;
7. Setting targets and monitoring mechanisms.

4.1 INVESTING IN DRR – STRUCTURAL MEASURES

Port sector in general implements the building code as per IS standards. Hence, engineered buildings and structures are designed and constructed taking into account various loads including seismic criterion. As such, only the older buildings which suffer degradation on account of aging related factors will require reassessment and strengthening. Damage of buildings and structures also depends upon the soil conditions e.g. settlement and topology of the area.

However, few areas which may include village populations and non-industrial pockets inside the port land use zone may not be designed as per the required building codes. The civil authority of the State Govt. will need to assess the vulnerability aspects for the villages sonari, karal, jaskhar, sawarkhar, ranjanpada, belpada.

4.2 INVESTING IN DRR – NON-STRUCTURAL MEASURES

4.2.1 Land Use Planning

Port micro zonation planning for rural population may be required. It will help to guide modify land use planning accordingly.

4.2.2 Capacity Building

The port undertakes consultative measures with expert agencies such as IITs, Govt. Departments, technical Universities and private institutions for advice in Land use planning, port development, projects implementation, environmental management and training of personnel. It also conducts awareness programme through agencies such as CISF, Civil Defence, NDRF, SDRF, NDMA, DGFASLI, etc.

4.2.3 Risk Transfer Insurance

The port assets are insured for incidents like tsunami, cyclone etc. and has a consultative committee constituted by IPA in this regard. The details of such arrangements are given in chapter 11.

In disaster management cycle, preparedness and mitigation are the two important stages before the occurrence of disaster. It has a great importance in reduction of loss of life and property if proper preparedness and mitigation strategies are followed.

4.3 STRATEGIES FOR SUSTAINABLE DEVELOPMENT PRACTICES FOLLOWED IN THE PORT

Port's developmental plans are synchronized with the Coastal Zone Management and Land Use plans.

The CZMP is meets the goals of the ICZM, viz

1. Maintaining the functional integrity of the coastal resource systems.
2. Reducing resource-use conflicts.
3. Maintaining the health of the environment.
4. Facilitating the progress of multi-sectoral development.

The CZMP of the port has been approved in the year 2005 and periodically updated.

4.4 DISASTER RISK GOVERNANCE PROGRAMMES AND PRACTICES OF THE PORT

4.4.1 Environmental macro level-Coastal zone monitoring

The macro level monitoring includes following aspects.

1. Master planning of the port facilities with respect to the traffic forecast and identification of projects.
2. Environmental impact analysis, land use planning and finalisation of the location of the projects.
3. Finalisation of the Port's conceptual plan for future development.
4. The port's Integrated Management System (IMS), includes ISO-14001 Environment Management System.
5. The IMS policy and the objectives also address the environmental concerns of the Port.
6. Obtaining statutory permissions like Environmental Clearance, Consent to Establish/Operate from the MoEF&CC and State Pollution Control Board.

4.4.2 Micro Level Monitoring

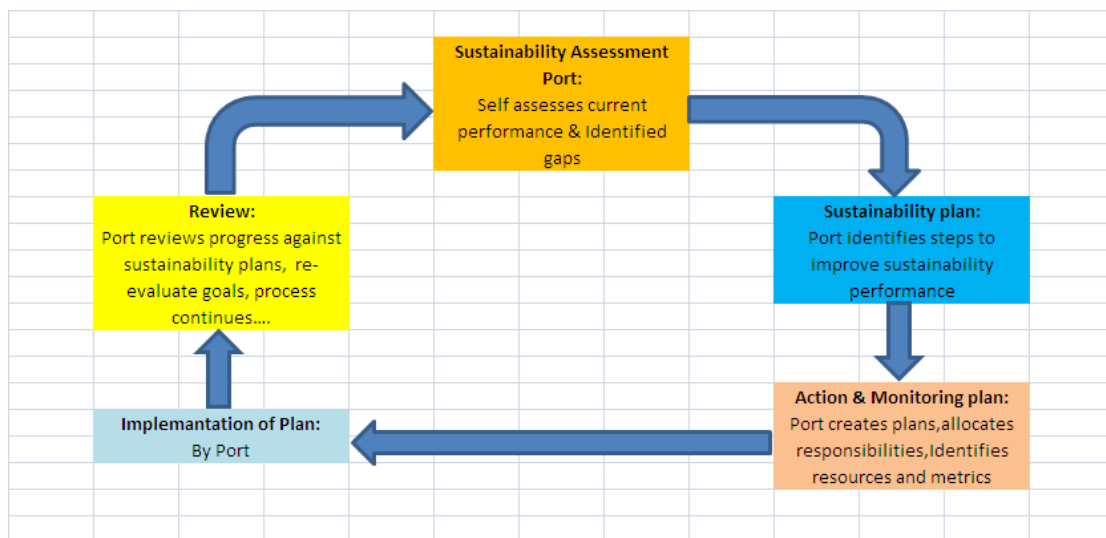
The port further carries out environmental monitoring on actual site as a micro level monitoring. The Port has taken up many resources for this, which areas under.

1. Obtaining environmental clearances for a project and monitoring of the pollutants during the execution of the project as per the approved Environmental Management Plan (EMP).
2. Continuous monitoring of the effects of the Port's working on the environmental parameters, to check the pollutant's level with respect to the EMP, which has been in progress form the last 20 years.
3. Comparing the monitoring results with respect to the standards adopted in the EMP and Identification of the nonconformities.
4. Finalisation of the corrective and preventive actions to be taken to mitigate the non-conformities found. Inclusion of the necessary works for such mitigations.
5. Provision of appropriate Budget allocations for execution of the works identified.
6. Maintenance of the existing green cover of the Port.
7. Plantation and related allied environmental works.
8. Implementing non-conventional energy sources applications in the port working, to reduce emission of the Green House gases.
9. Eco friendly techniques in its workings and environmental safeguard have remained the major policy of the port since inception.
10. The private terminal operators of the Port keenly follow the good

environmental practices in their working.

The macro and micro monitoring gives the actual environmental efforts taken at the ground level and also provides a long term data. This ultimately helps in analysing the effects of the port's working and development on the environmental attributes.

4.5 SUSTAINABILITY DEVELOPMENT CYCLE



Following the above path (Sustainability Development cycle) can help reduce disaster losses and control the risk level consequent to development/expansion programs.

5. INCLUSIVE DRR

The port functions as a developed model port with design and development based on national and international standards of safety and as such the stakeholders do not generally include socially vulnerable groups. However, there is a community of project affected persons (PAP) which include few villages inside the port boundary. This population is a mix of rich-poor, social mix of men, women and children's including some domestic animals. The port will continuously liaise with the district administration regarding their relief and rehabilitation measures including disaster relief. Such communities are covered in the district and state disaster relief plans.

Development of parking plazas and complexes catering for day to day shopping stalls/restaurants will be facilitated and designed accordingly keeping in the needs of the floating population.

6. COHERENCE OF DISASTER RISK MANAGEMENT ACROSS RESILIENT DEVELOPMENT AND CLIMATE CHANGE ACTION

As per the Sendai Framework, it is necessary to address existing challenges and prepare for future ones by focusing on monitoring, assessing, and understanding disaster risk and sharing relevant information.

- The framework notes that, to cope with disasters, it is “urgent and critical *to anticipate, plan for and reduce disaster risk*”.
- It requires the *strengthening of disaster risk governance and coordination* across various institutions and sectors.
- It requires the full and meaningful *participation of relevant stakeholders* at different levels.
- It is necessary to *invest in the economic, social, health, cultural and educational resilience* at all levels.
- It requires *investments in research* and the use of technology to enhance multi-hazard Early Warning Systems (EWS), preparedness, response, recovery, rehabilitation, and reconstruction.

While the above stipulations in the Sendai framework have been made and directing member states to undertake planning and execution based on the above fundamental thrust areas, the port has undertaken the above in the implementation of DMP as follows.

In the chapter 3 of Hazard Specific Prevention and Mitigation Measures, the hazards have been identified and thematic areas of Sendai framework introduced, so that the development responsibility in each of these thematic areas is properly addressed indicating present and planned arrangement and who is responsible to address each of these.

In the chapter 2 of HRVCA, the risk profile of the port has been assessed through detailed planning steps. This includes chemical and oil disaster plan in accordance with national guidelines (NOS-DCP). The capacity analysis and any short falls have been indicated. As a result of this plan (OSCP) the Net Environment Benefit Analysis (NEBA) was prepared to indicate specific measures that would be required to meet the challenge of the oil/chemical spill. Methodology for assessing environment impact of a disaster for claims settlement has also been described. Neighboring marginal communities including fishermen likely to be impacted and their claim settlements have been assessed. Thus, building resilience for oil and chemical disasters. The gap analysis for equipment's is a continuous process which the port will undertake through periodic reviews.

With regard to natural disaster, the vulnerability profiling has been prepared and areas requiring immediate actions are identified. For NAT-CHEM disasters the vulnerability areas have been identified.

With regard to the participation of stakeholders in the risk governance the following mechanisms are in place:

- Availability of Mutual Aid Agreement for disaster situations;

Disaster Management Plan

- Joint planning and execution of mock drills at unit level (individual facility) and also at the level of the entire port (including non-custom bound area);
- To combat the oil spill around JNPT and Mumbai Harbour, a common oil spill response Tier- I facility (spillage upto 700 MT) is set up at Jawahar Dweep, Mumbai Port Trust through OSRO agency.

In respect of aspects relating to climate change the following issues have been identified having bearing on disaster risk reduction and resilience:

- Sea level rise – Minimum height of landside construction has been kept at 7.1 m above Mean Sea Level (MSL) which is considered adequate for developmental activities.
- Heavy rain fall (cloudburst) and flooding – Land use planning and the detailed development thereafter will meticulously factor-in the requirements of natural slope, land topography, storm water drainage, height and width of culverts, natural drainage for ponds.
- High wind and cyclone – Meticulous implementation of SOPs for preventing damage during an event.

7. CAPACITY DEVELOPMENT AND COMMUNICATION

7.1 CAPACITY DEVELOPMENT

The capacity development covers all aspects of disaster management. The key aspects and broad thematic areas for capacity development applicable are summarized in Table 7.1. The hazard-specific capacity development needs for prevention and response are given in the plan matrix of the Chapter-3. The effort will be to follow the industry best practices especially in the area of oil spill response and chemical disaster response which affect the ports in a major way.

Table 7.1: Summary of Broad Capacity Development Themes

	<i>Capacity Development Themes</i>
Key Aspect	Thematic Areas
Prevention or mitigation for disaster risk reduction	<p>Hazards, Risk, and Vulnerability Assessment</p> <ul style="list-style-type: none"> • Safety awareness and training • Improve the awareness and preparedness of stakeholders at all levels Documenting lessons from previous disasters and ensuring their wide dissemination • Preparing DM plans, regular updating, and mock drills • Institutional arrangements, policies, legal support, and regulatory framework • Developing appropriate risk transfer instruments by collaborating with insurance companies and financial Institutions • Mainstreaming of disaster risk assessment, mapping and management into development plans and programs • Retrofitting as per relevant standards • Rapid visual surveys for safety evaluation of buildings • Training and skill development for dock operators, crane operators, truck drivers, management staff. • Promoting community-based DM taking into account specific needs, • Disaster resilience by maintaining list of nearby hospitals and health care centres • Business resilience of productive assets by strengthening the supply chains and service providers, ensuring continuity of services • Integrate disaster risk management into business models and practices Preparedness and response plans at all levels

Disaster Management Plan

Effective preparedness and response	<p>Emergency response capabilities – EOCs, infrastructure, equipment upgrades and adoption of best available technologies</p> <ul style="list-style-type: none"> • Strengthening of the Fire and Emergency Service through revamping, institutional reforms, and modernization • Adoption and adaptation of emerging global good practices • Early warnings, maps/ satellite data/ effective dissemination of information • Table-top exercises, simulations, and mock drills to improve operational readiness of the plans • Housing and Temporary shelters • Power and fuel supply management • Transportation systems and network • Logistics and supply chain management
Recovery and Build Back Better	<ul style="list-style-type: none"> • Port infrastructure damage assessment mechanism and award of reconstruction projects, contracting including revised specifications for resilient infrastructure • Studies on past disasters and recovery to draw useful lessons

7.1.1 Training

Regular training should be provided to all personnel who have a role in planning and operational response to an emergency. The goal of training for emergencies is to enable the participants to understand their roles in the response organization, the tasks associated with each position and the procedures for maintaining effective communications with other response functions and individuals.

The training objectives are:

1. To familiarize personnel with the contents and manner of implementation of the Plan and its procedures,
2. To train personnel in the performance of the specific duties assigned to them in the plan and in the applicable procedures,
3. To keep personnel informed of any changes in the plan,
4. To maintain a high degree of preparedness at all levels of the emergency response organization,
5. Train new personnel who may have moved within organization,

A well co-ordinated programme of training exercises includes activities of varying degrees of interaction and complexity.

The SIC is responsible for the development and maintenance of emergency capabilities of the IRT through ongoing development and rehearsal of emergency response procedures and plans. Specific inductions are to be provided for all team members and support personnel to ensure they are conversant with the roles and responsibilities outlined in this plan prior to their appointment in any capacity.

Personnel allocated to the IRT should undergo skills training over and above that received by other personnel of the port. The skills training are delivered by external service providers to national competency standards in the following areas;

- First aid
- Self Contained Breathing Apparatus
- Rescue from heights
- Rescue from confined spaces

- Fire fighting
- Rescue from water
- Handling Oil and Hazardous Material Spills

7.1.2 Drills & Exercises

Emergency drills and integrated exercises have the following objectives.

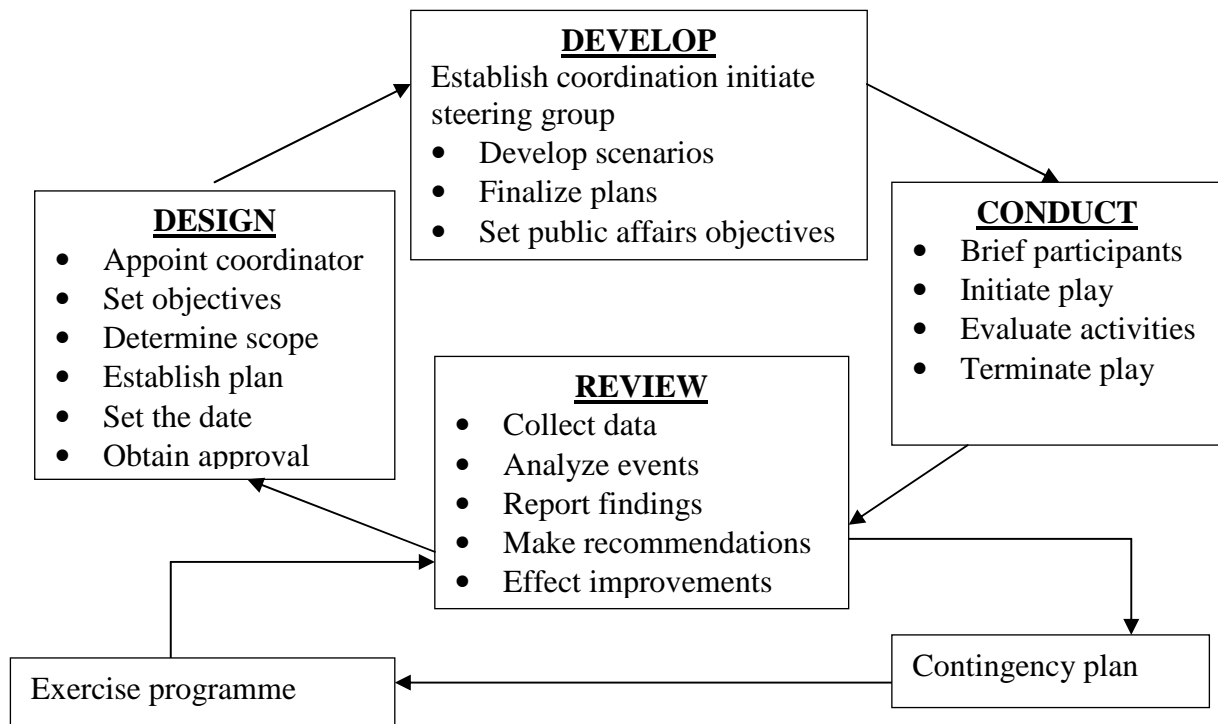
1. To test the adequacy of the effectiveness, timing, and content of the plan and implementing procedures,
2. To ensure that the emergency organization personnel are familiar with their duties and responsibilities by demonstration,
3. Provide hands-on experience with the procedures to be implemented during emergency,
4. Maintain emergency preparedness.

The frequency of the drills should vary depending on the severity of the hazard. However, drills should be conducted at least once a year. Scenarios may be developed in such a manner as to accomplish more than one event objective

- **Notification exercises**
 - Test communication systems, frequency, public warning system
- **Tabletop exercises**
 - To check availability of participants and check response time
- **Equipment deployment exercises**
 - Alarm systems to be tested,
 - Frequent tests of fire fighting and other response equipment.
- **Incident management exercises**
 - Simulated emergencies like fire, gas leakage, oil spillage, cyclone and vessel related emergencies like grounding, collusion, leakage, Pollution etc., to be conducted and monitored and feedback to be documented.
 - Evacuation practice
 - Deployment of Machineries

Disaster Management Plan

Figure 7.1: The Exercise Planning Process



The evaluation of a drill or exercise shall be submitted by Asst. Manager (F&S) to CIC/SIC for review and acceptance who shall then determine the corrective actions to be taken and assign the responsibility to appropriate personnel. Thus, gap identification in terms of resources and procedures can be made and exercise plan amended accordingly.

Records of drills, exercises, evaluations, and corrective actions should be duly maintained.

The SIC shall prepare an Incident response exercise and training schedule for the forthcoming year, in consultation with the CIC and all the HODs of the Port and stakeholders.

Business Continuity Framework – The CIC/SIC is responsible for ensuring that a program exists for training new staff and refreshing existing staff on the Port Business Continuity and that Managers ensure appropriate personnel complete the training.

7.2 COMMUNICATION STRATEGY

7.2.1 Communication Flowchart

Figure 7.2: Cyclone /Tsunami/Flood/Earthquake

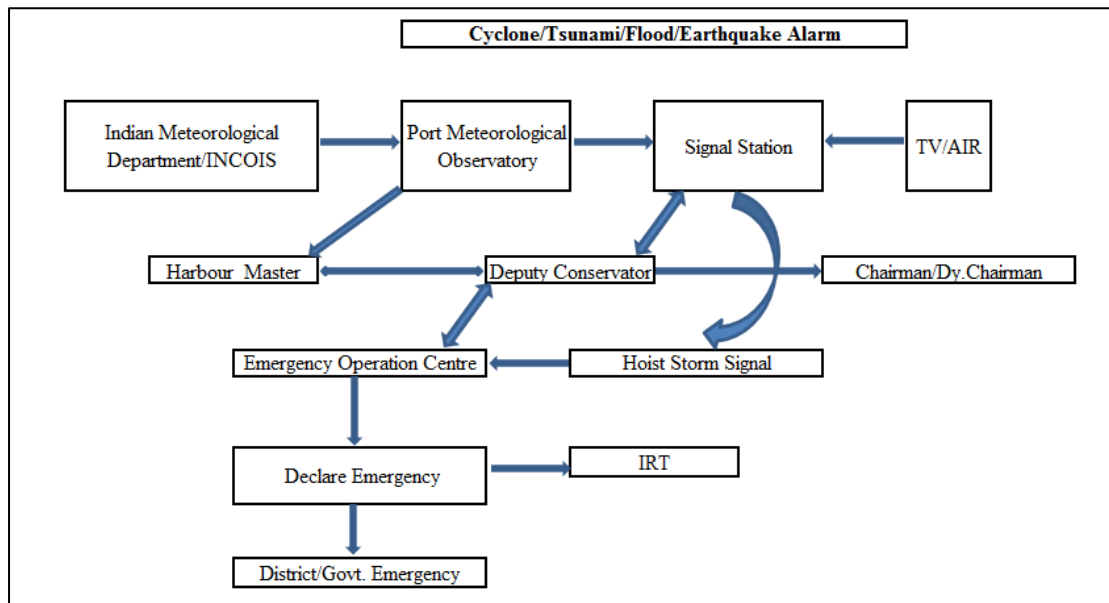
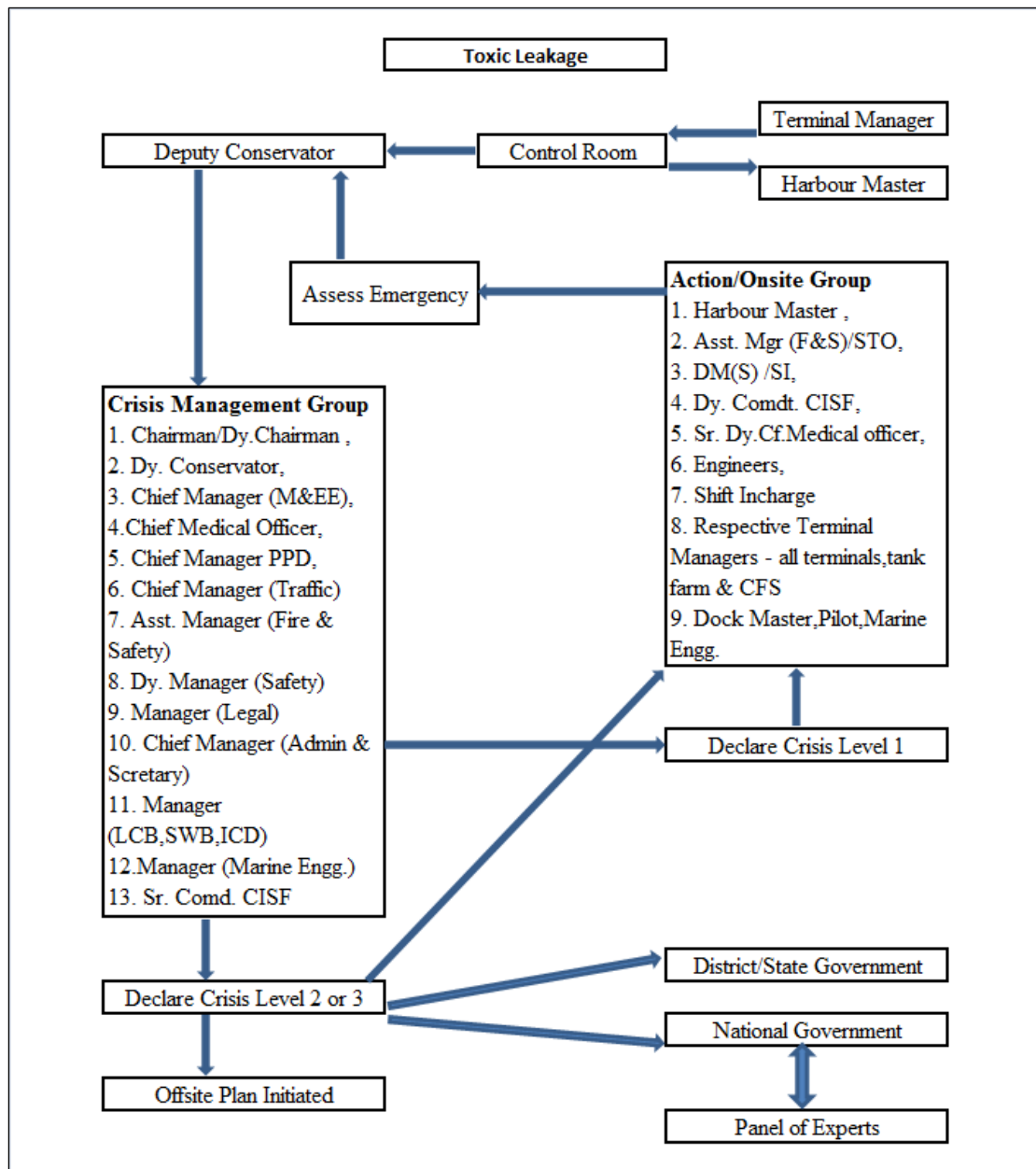
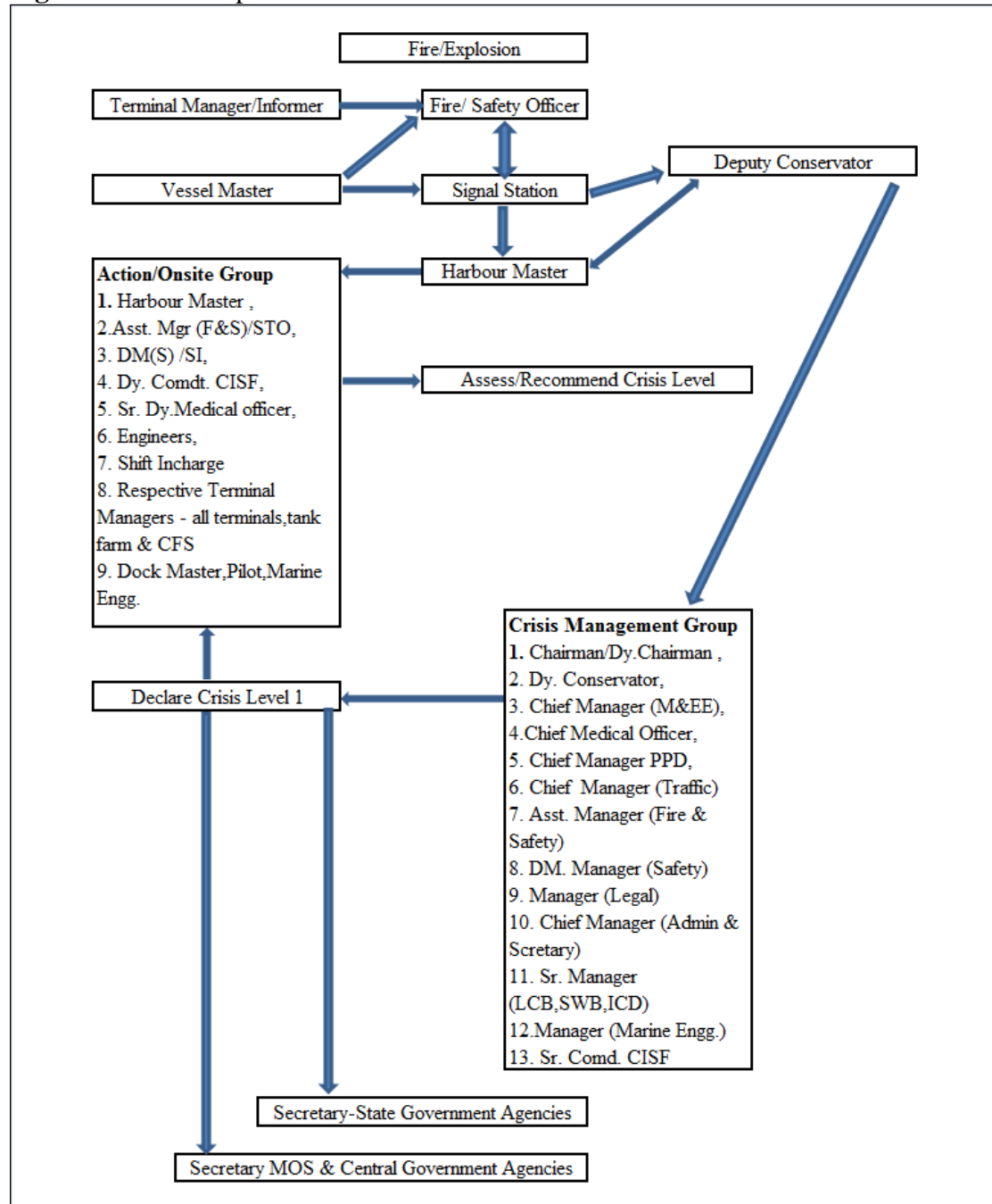


Figure 7.3: Toxic Leakage



Note: For Level of disaster refer paragraph 9.1.2.

Figure 7.4: Fire/Explosion



Note: For level of disaster refer paragraph 9.1.2.

8. COORDINATION – HORIZONTAL AND VERTICAL LINKAGES

Dealing with a major disaster requires resources from outside the port. When the capacities of a port administration are overwhelmed, higher levels of aid assistance is required. Likewise, assets and capabilities in the industries and non-governmental organizations available around the port will have to be brought to use. There are many actions undertaken by participants in disaster management that support this goal, both pre-disaster (to reduce potential damage) and post-disaster (to recover from actual damage). For achieving this objective, the plan has a pre-established and practiced mechanism for Inter, intra and extra agency coordination.

Communication is the most important tool for effective coordination. Emergency Operation Centre (EOC) is the enabler of communication and coordination. Port Authority and stakeholders will coordinate with all heads of department at the local level, district & state level groups, CMG, Expert Groups, NGOs for effective implementation of DM Plans. Port authority should also have a link with neighbouring industries in case of disasters.

Coordination with the following external agencies would be required

- Local Crisis Group-Uran and Patalganga,
- District Crisis Group,
- State and National Crisis Group,
- Indian Coast Guards,
- DD, AIR for media briefing,
- MSEB, MWSSB, MSRTC,
- Meteorological Department, MERI,
- Co-ordinate with the NGOs and aid agencies (contact nos.),
- Enlist services of GOI/GOM laboratories and expert institutions for Specialized services.(contact nos.) e.g. BARC emergency response centre in case of radiological emergencies, DRDO for CBRN emergencies.

9. PREPAREDNESS AND RESPONSE

9.1 PREPAREDNESS

9.1.1 Emergency Organization

9.1.1.1 Crisis Management Group

The Crisis Management Group consists of all HOD`s under the head of the Chairman which lays down the policies and decisions.

- Chairman/Dy. Chairman;
- Dy. Conservator (CIC/Nodal Officer);
- Chief Manager (M & E Engineering);
- Sr. Dy. Chief Medical Officer;
- Chief Manager - PPD;
- Dy. Manager (Safety);
- Assistant Manager (Fire and Safety);
- Manager (Legal);
- Chief Manager (Administration and Secretary);
- Chief Manager (Traffic);
- Manager (MCB, LCB & SWB I & II,ICD,SWB-III);
- Manager (Marine Engineer);
- Sr. Commandant CISF;
- Respective Terminal Manager – All terminals, Tank farms & CFS.

9.1.1.2 Action Group (Incident Response Team)

The action group carries out the decisions made by CMG. It shall be formed at the time of crisis with Harbour Master as the head.

- Harbour master (SIC/alternate Nodal Officer - will act as Nodal Officer in the absence of Dy. Conservator);
- Dock Master;
- Station Officer (Fire and Safety);
- Safety Inspector;
- Engineers-Mechanical and Electrical;
- Managers (PP&D);
- Sr. Dy. Chief Medical Officer;
- Assistant Manager (Traffic) – Shift In-charge;
- Deputy Manager (IR);
- Pilot;
- Sr. Dy. Marine Engineer;
- Dy. Commandant CISF;
- Dy. Manager (MCB, LCB & SWB I & II,ICD,SWB-III);
- Respective Terminal Manager – All terminals, Tank farms & CFS.

Refer **Figure 1.9** and **Figure 1.10** for Onsite and Offsite Emergency Organization Chart respectively.

Disaster Management Plan

9.1.2 Level of Disasters

L - Defines the different levels of disasters in order to facilitate the responses and assistances to ports.

L0 – denotes normal times which will be utilized for close monitoring, documentation, prevention and preparatory activities. Training on search and rescue, drills, evaluation and inventory updating for response activities will be carried out during this time

L1 – specifies disaster that can be managed at Port level, however, the terminals and district will remain in the state of readiness.

L2 – disaster situations are those, which require assistance and active participation of the port, terminals within port limit and district/State.

L3 – disaster situation is in case of large scale disaster where the state and district authorities have been overwhelmed and require assistance from the Central Government for rescue, relief, and other response and recovery measures. In most cases, the scale and intensity of the disaster as determined by the concerned technical agency like IMD, INCOIS etc. are sufficient for the declaration of L3 disaster.

9.1.3 Roles and Responsibilities of Berth Operators and Port Authority

Role	Berth Operators – Containers & Liquid Cargo	Port Authority
Prevention	<ul style="list-style-type: none"> •Prepare, revise, test and exercise own facility EAP/ERDMP. •Train own staff. 	<ul style="list-style-type: none"> • Prepare DM Plan, •Conduct emergency exercises, •Guideline to encourage all Port Facility Operators to have Emergency Management Plans.
During Response	<p>Undertake following:</p> <ul style="list-style-type: none"> •First Aid, •Advise staff, •Contain (if possible), •Evacuation (as appropriate), •Partial or Full Shutdown (as appropriate), •Security. <p>When external emergency services arrive:</p> <ul style="list-style-type: none"> •Provide specialist advise/liaison, •Media Advise as required, •Advise Port, Security, and Harbour Master as required, •Advice neighbouring facilities as required. 	<ul style="list-style-type: none"> •Monitor •Make Strategic decisions regarding: <ul style="list-style-type: none"> ○ Shipping movements ○ Threats to Port facility operators and effects on their business operations •Advice and assist to affected Port facility Operators on matters where qualified to do so. •Escalate response level by obtaining assistance from Local Crisis Groups.
Recovery and	<ul style="list-style-type: none"> •Advice and assistance to own staff 	<ul style="list-style-type: none"> •Assist Port facility

Disaster Management Plan

reconstruction	in resuming operations. • Implement respective BCPs.	operators &/or shipping to resume operations. •Establish continuity of port business.
-----------------------	---	--

9.1.4 Roles and Responsibility key personnel

CHECKLIST -1		CHIEF EMERGENCY CONTROLLER (CEC)		
Phase		Action	Time	
Mobilization /Activation	1	Obtain details of incident and of any mitigative actions taken from CIC.		
	2	Communicate with and coordinate with		
		a.	Local, District, State and National Authorities	
		b.	Mumbai Port Trust	
		c.	Crisis Management Group (CMG)	
		d.	Chief Incident Controller (CIC)	
		e.	Media Liaison officer	
Establishing Control	3	Nominate alternate person if any functionary is not available.		
	4	Establish radio or telephone contact with CIC and CMG.		
Planning	5	Advice and provide support to CIC on		
		a.	Propriety of response level	
		b.	Location of EOC	
	c.	Additional Human Resource		
6	Advice CIC on activation of DMP.			
Ongoing Response	7	Activate Off Site Plan, if necessary.		
	8	To issue Media briefings when required.		
Response Termination	9	Terminating response advice given to CIC if conditions are met.		
	10	Receive incident reports from CIC/ nominated alternate person.		
	11	Analyze and advise on further course of action in consultation with CIC/ nominated alternate person.		

END CEC CHECKLIST

CHECKLIST -2		CHIEF INCIDENT CONTROLLER (CIC)		
Phase		Action	Time	
Mobilization / Activation	1	Obtain details of incident and of any mitigative actions taken.		
	2	Start recording of events in the Personal Log.		
	3	Communicate and coordinate with		
		a.	Chairman/Dy. Chairman	
		b.	IRT and CMG	

Disaster Management Plan

		c.	CISF	
		d.	Local, District, State and National Authorities	
		e.	Respective Terminal Managers	
Establishing Control	4	Assess the Incident and authorize any immediate action by SIC (Raising appropriate alarm) and on-site staff as required.		
	5	Proceed to the EOC.		
	6	Mobilize IRT (as required) to the EOC and assign IRT roles.		
	7	Establish radio or telephone contact with Local, District, State and National Authorities.		
Evaluation	8	Determine resources at risk.		
	9	Evaluate the assessment of the incident, in consultation with the SIC.		
Planning	10	Arrange for monitoring of the event/incident.		
	11	Convene planning meeting.		
	12	Instruct Procurement Officer to make a list of required needs: Personnel, equipment, transport etc. Authorize acquisition.		
Ongoing Response	13	Implement response actions as per OSCP and DMP.		
	14	Continue to monitor incident.		
	15	Monitor the response by scheduling and undertaking regular briefings/debriefings of IRT.		
	16	Amend the SOP and Action Plan as required.		
	17	Ensure that IRT is supplied with necessary personal needs such as PPE, food etc.		
	18	Arrange for shift/rotation of IRT members.		
	19	Monitor OH&S performance.		
	20	Monitor casualties, traffic movements, and waste volumes.		
	21	Communicate media statements from the PRO.		
	22	Terminate response if conditions are met.		
Response Termination	23	Advise the SIC and inform CEC.		
	24	Ensure that all IRT members, combat and support agencies are informed of termination of response.		
	25	Monitor to ensure safe and complete demobilization.		
	26	Debrief IRT.		
	27	Attend debrief with Chairman.		
	28	Ensure that all records are collated and stored.		

END CIC CHECKLIST

Disaster Management Plan

CHECKLIST -3		SITE INCIDENT CONTROLLER (SIC)		
Phase		Action	Time	
Mobilization /Activation	1	Obtain details of incident and of any mitigative actions taken.		
	2	Start recording of events in the Personal Log.		
	3	Initiate		
		a.	DMP	
	4	Communicate and coordinate with		
		a.	CIC	
		b.	IRT	
c.		CMG		
d.		Master of the vessel		
e.	Terminal and Berth Managers			
Establishing Control	5	Assess the severity of the Risk.		
	6	Conduct initial briefing.		
	7	Authorize any immediate action required by on site staff and contract agencies.		
	8	Establish radio or telephone contact with CIC and CMG.		
Planning	9	Arrange for		
		a.	Deployment of Pollution and Fire-extinguishing response equipment.	
		b.	Multi Purpose Vessels	
		c.	Tugs, etc.	
	d.	Ensure evacuation of personnel to assembly areas.		
10	Assist Procurement Officer to compile a list of needs: Personnel, equipment, transport etc.			
Ongoing Response	11	Implement response actions as per OSCP and DMP.		
	12	Continue to monitor incident.		
	13	Monitor the response as per CIC schedule and undertake regular briefings/debriefings of IRT.		
	14	Coordinate Search and Rescue operations.		
	15	If necessary, call for additional resources.		
	16	Arrange relief for IRT members & Monitor OH&S performance.		
	17	Monitor waste volumes, if any.		
Response Termination	18	Terminate response if conditions are met on permission of CIC.		
	19	Ensure that all IRT members, Contract Agencies and CIC are informed of termination of response.		
	20	Monitor to ensure safe and complete demobilization.		

Disaster Management Plan

	21	Ensure that all records are collated and stored.	
--	----	--	--

END SIC CHECKLIST

CHECKLIST -4		DOCK MASTER (DM)	
Phase		Action	Time
Mobilization / Activation	1	Communicate and coordinate with	
		a. CEC	
		b. CIC	
		c. SIC	
		d. Port Control Room	
		e. Pilot and Marine Engineers	
		f. Master of the vessel	
		g. Meteorological department	
Initial Action	2	Ensure telephone operator / signal room communicate with entire emergency team.	
	3	Keep the switchboard open for emergency calls and transmit the same to the concerned personnel effectively.	
	4	On receipt of instructions from SIC, notify the fire brigade/Police/Hospitals/District Collector/ Mutual Aid Partners.	
	5	Refrain from exchanging information with any person other than authorized to do so by the CIC.	
Ongoing Response	6	Coordinate with SIC and provide necessary information.	
Response Termination	7	Terminate response on instructions of CIC/SIC	
	8	Ensure that all records are collated and stored.	

END DM CHECKLIST

CHECKLIST -5		ASSISTANT MANAGER (F&S)/STO		
Phase		Action	Time	
Mobilization / Activation	1	Obtain details of spill/fire and of any mitigative actions taken.		
	2	Start recording of events in the Personal Log.		
	3	Communicate and coordinate with		
		a.	SIC	
		b.	CIC	
		c.	Port Control room and Fire Station	
	d.	Terminal and Berth Managers		
	4	Activate Fire Station.		
Establishing Control	5	Lead Fire Fighting Team		
	6	Establish radio or telephone contact with SIC		
Initial Actions	7	Announce Fire Incident Point on PAS.		
	8	Be updated about wind direction.		

Disaster Management Plan

		Arrange for	
	9	a. <ul style="list-style-type: none">• Fire Extinguishers• Maintain sufficient water pressure in fire hydrant system.	
		b. Safety Equipment	
		c. Rescue of injured persons to medical centers	
		d. In consultation with SIC evacuate workers to assembly areas.	
	10	Assist SIC to compile a list of needs: personnel, equipment, transport etc.	
Response Actions	11	Implement response actions as per OSCP and DMP as per SIC/CIC instructions.	
	12	If necessary, call for additional resources	
Response Termination	13	Terminate response if conditions are met on consultation with SIC.	
	14	Ensure safe return of response personnel.	
	15	Ensure that all records are collated and stored.	

END F&S/STO CHECKLIST

CHECKLIST -6		DY. MANAGER (SAFETY) /SAFETY INSPECTOR		
Phase		Action	Time	
Mobilization / Activation	1	Start recording of events in the Personal Log.		
	2	Communicate and coordinate with		
		a.	CIC	
		b.	SIC	
		c.	Ship owners / Agents / C & F agents / stevedores.	
		d.	Terminal and Berth Managers	
		e.	Salvage Association	
	f.	Waste/ Sludge disposal agencies		
Establishing Control	3	Establish radio or telephone contact with CIC and SIC.		
	4	Furnish information to the SIC with regards to the safety.		
	5	Inform MPCB and other environmental agencies about the incident for getting necessary guidance.		
Initial Action	6	Prepare consolidated list of dangerous goods including tankers in port.		
	7	To collect necessary evidences required for detailed investigation of any accidents.		
	8	Ensure proper accountability of the Cargo Handling Workers and the Private workers engaged by various agencies present at the time of crisis.		
	9	Coordinate with the salvage association and waste/sludge disposal agencies.		
Ongoing Response	10	Assist in the safe evacuation of personnel.		

Disaster Management Plan

Response Termination	11	Terminate response if conditions are met on permission of CIC/SIC.	
	12	Submit detailed report regarding the accidents to CIC/SIC.	
	13	Ensure that all records are collated and stored.	

END DM(S)/SI CHECKLIST

CHECKLIST -7		ENGINEERS (MECHANICAL) (EM)		
Phase		Action	Time	
Mobilization / Activation	1	Start recording of events in the Personal Log.		
	2	Communicate and coordinate with		
		a.	CIC	
		b.	SIC	
	c.	Maintenance engineers		
Establishing Control	3	Depute engineers on-site.		
	4	Establish radio or telephone contact with CIC and SIC.		
Initial Action	5	Maintain sufficient stock of required equipment/materials.		
	6	Coordinate with nearby CIC, SIC, Fire Officer & Procurement officer.		
	7	Ensure water supply to the hydrants.		
Ongoing Response	8	Provide necessary advice and supports.		
	9	Arrange for Bulldozers, mobile cranes, forklifts or any other specialized equipment.		
	10	Mobilize cargo handling equipments.		
Response Termination	11	Terminate response if conditions are met on permission of CIC/SIC.		
	12	Ensure that all records are collated and stored.		

END EM CHECKLIST

CHECKLIST -8		ENGINEERS (ELECTRICAL) (EE)		
Phase		Action	Time	
Mobilization / Activation	1	Start recording of events in the Personal Log.		
	2	Communicate and coordinate with		
		a.	CIC	
		b.	SIC	
	c.	State Electricity Board		
Establishing Control	3	Depute engineers on-site.		
	4	Establish radio or telephone contact with CIC and SIC.		
Initial Action	5	Implements elaborate plans for providing continuity of emergency supplies and services such as, electric power, emergency lighting etc.		

Disaster Management Plan

	6	Keep alert on duty for any electrical isolation of equipment during an emergency.	
	7	Suggests optimal strategies for conducting emergency isolation operations of damaged equipment, the emergency transfer of materials and all other process related emergency operations	
	8	Coordinate with nearby CIC, SIC, Fire Officer & Procurement officer.	
	9	Arrange Public Address system to caution the public.	
Ongoing Response	10	Provide necessary advice and supports.	
	11	Provide lighting facilities wherever necessary.	
Response Termination	12	Terminate response if conditions are met on permission of CIC/SIC.	
	13	Ensure that all records are collated and stored.	

END EE CHECKLIST

CHECKLIST -9		ENGINEERS (CIVIL) (EC) – (PP&D)		
Phase	Action			Time
Mobilization / Activation	1	Start recording of events in the Personal Log.		
	2	Communicate and coordinate with		
		a.	CIC	
		b.	SIC	
	3	Depute engineers on-site.		
Establishing Control	4	Establish radio or telephone contact with CIC and SIC.		
	5	Coordinate with CIDCO and MJP if required.		
Initial Action	6	Arrange sand bags, Diesel pumps, sufficient quantities of bleaching powder etc., for the event of Cyclone/flood. Plans/strategy, as contemplated, to be forwarded to higher levels.		
	7	Determines the level of contamination of the site as a result of the accident and hire barges for collecting the spilled oil, if any.		
	8	Identify local contractors and keep them as standby to meet emergency requirements such as man power, equipment etc.		
	9	Render and Monitor assistance for extricating trapped personnel by cutting structures etc.		
	10	To ensure that adequate clean water is available in the reservoirs.		
	11	Instruct the contractors to carry out urgency civil works if required.		
	12	Coordinate with CIC, SIC, Fire Officer & Procurement officer.		
Ongoing	13	Provide necessary advice and support.		

Disaster Management Plan

Response	14	In case of fire and especially if the fire involves toxic/flammable materials, contain the run off fire water and other water from the damaged units.	
	15	Cooperate with IRT to conduct the actual cleanup work during and after the emergency.	
Response Termination	16	Terminate response if conditions are met on permission of CIC/SIC.	
	17	Ensure that all records are collated and stored.	

END EC CHECKLIST

CHECKLIST -10		MAINTENANCE COORDINATOR (MC)	
Phase		Action	Time
Mobilization / Activation	1	Communicate and coordinate with	
		a. CIC	
		b. SIC	
		c. M& E dept.	
		d. PP&D	
Initial Action	2	Gather necessary information	
Ongoing Response	3	Instruct maintenance staff	
	4	Recommend the appropriate procedures to isolate damaged units without introducing new hazards and provide resources both in terms of personnel and equipment to accomplish this.	
	5	Provide the necessary utilities during the emergency, isolating or recommending emergency isolation procedures to prevent utility distribution to damaged parts of the facility. If required, activate back up emergency generators, pumps, welding services and underwater diving.	
	6	Render and monitor assistance for extricating trapped personnel by cutting structures, wires etc.	
	7	Remain alert on duty for any electrical isolation of equipment.	
	8	In case of fire and if the fire involves toxic/flammable materials, assist in containing the run off fire water and other water from the damaged units.	
	9	During natural disaster, coordinate with PPD and arrange for sand bags.	
Response Termination	10	Assist in accident investigation.	
	11	Terminate response if conditions are met on permission of CIC/SIC.	
	12	Ensure that all records are collated and stored.	

END MC CHECKLIST

Disaster Management Plan

CHECKLIST-11		PILOT (MARINE ENGINEER) (PO)		
Phase		Action	Time	
Mobilization / Activation	1	Upon callout, report to CIC/SIC.		
	2	Start recording of events in the Personal Log.		
	3	Attend Initial Briefing.		
Assessment	4	Assist SIC/ Dock Master to obtain and collate available data re:		
		a. Weather.		
		b. Tides, currents.		
		c. Latest update on action taken.		
Planning	5	Determine field response equipment/ labor/ transport requirements and provide to CIC.		
Ongoing Response	6	Direct and coordinate marine response activities.		
	7	Prepare all tugs/crafts for mobilization at the earliest.		
	8	Prepare directive for marine response teams.		
	9	Ensure that field response teams receive required		
		a.	Information i.e. Briefings/Inductions/Weather.	
		b.	Personal protective equipment (PPE).	
		c.	Essential supplies (e.g. food, first aid etc.).	
		d.	Weather conditions.	
	e.	Monitoring of response activities.		
	10	Coordinate dispersant operations when permitted.		
11	Seek for necessary means for aerial observation, containment and recovery actions and vessel dispersant spraying operations.			
12	Inform Dy. Manager Safety of anticipated waste quantity and type.			
Response Termination	13	Advise for termination of response operation.		
	14	Ensure safe return of response personnel.		
	15	Ensure that all equipment are cleaned and returned to stores.		
	16	Attend debriefing.		
	17	Ensure that all records are collated and stored.		

END PO CHECKLIST

CHECKLIST-12		CHIEF COMMANDANT - CISF (CCC)		
Phase		Action	Time	
Mobilization / Activation	1	Obtain details of incident and of any mitigative actions taken.		
	2	Start recording of pertinent facts and figures in the Personal Log.		
	3	Communicate and coordinate with		
		a.	CIC	

Disaster Management Plan

		b. SIC	
		c. Police Authorities	
Establishing Control	4	Authorize any immediate action required by on site staff.	
	5	Establish radio and telephone contact with CIC and SIC	
Initial Action	6	Obtain necessary instructions from SIC.	
Ongoing Response	7	Control entry of unauthorized persons.	
	8	Facilitate entry of authorized persons, agencies.	
	9	Facilitate entry of emergency vehicles such as ambulance etc.	
	10	Assist in Search and Rescue operation.	
	11	Ensures that residents within port area are notified about disaster and instructions to evacuate if necessary.	
Response Termination	12	Carry out a reconnaissance of the evacuated area before declaring the same as evacuated.	
	13	Terminate response if conditions are met on permission of CIC or SIC.	
	14	Ensure that all records are collated and stored.	

END CCC CHECKLIST

CHECKLIST -13		SR. DY. CHIEF MEDICAL OFFICER (CMO)	
Phase		Action	Time
Mobilization / Activation	1	Start recording of events in the Personal Log.	
	2	Communicate and coordinate with	
		a. CIC	
		b. SIC	
		c. ICLO, Nearby Hospitals and Health care professionals.	
	d. Port Control Room and Fire Station.		
Establishing Control	3	Activate Hospital Emergency Action Plan and depute doctors on-site to give first aid to the injured.	
	4	Establish radio or telephone contact with CIC and SIC and understand the emergency situation.	
	5	Advise CIC on industrial hygiene and make sure that the frontline personnel are not exposed to unacceptable levels of toxic substances.	
	6	Inform hospitals of the situation in case of a toxic release and apprise them of the antidotes necessary for the treatment	
	7	Coordinate with ICLO. Along with the District Administration and health care professionals, ICLO will facilitate infection control programme in the event of a natural disaster.	

Disaster Management Plan

Initial Action	8	Maintain sufficient stock of medicines, antidotes, oxygen, stretchers etc and arrange for ambulance.	
	9	Suggest and provide an antidote in the event of toxic release	
	10	Coordinate with nearby hospitals and doctors.	
Ongoing Response	11	Provide necessary advice and supports for appropriate treatment of the injured persons.	
Response Termination	12	Terminate response if conditions are met on permission of CIC/SIC.	
	13	Ensure that all records are collated and stored.	

END CMO CHECKLIST

CHECKLIST -14		CHIEF MANAGER - TRAFFIC (TM)	
Phase		Action	Time
Mobilization / Activation	1	Start recording of events in the Personal Log.	
	2	Communicate and coordinate with	
		a. CIC	
		b. SIC	
		c. Tank Truck contractors	
d. Terminal and Berth Managers			
Establishing Control	3	Prepares vessels to vacate from berth.	
	4	Establish radio or telephone contact with CIC and SIC.	
Initial Action	5	Prepare consolidated list of dangerous goods including tankers in port and provide details to SIC.	
	6	Arranges to protect cargo in vicinity from damage.	
	7	Arranges to segregate and shift cargo in sheds.	
Ongoing Response	8	Coordinate with the tank truck contractors.	
	9	Provide necessary advice and supports.	
Response Termination	10	Terminate response if conditions are met on permission of CIC/SIC.	
	11	Ensure that all records are collated and stored.	

END TM CHECKLIST

CHECKLIST -15		BERTH MANAGER (BM) (MCB, LCB, SWB, ICD)	
Phase		Action	Time
Mobilization / Activation	1	Start recording of events in the Personal Log.	
	2	Communicate and coordinate with	
		a. CIC	
		b. SIC	
		c. Ship owners / Agents / C & F agents / stevedores.	
d. Terminal Managers			
Establishing	3	Prepares vessels to vacate from berth.	

Disaster Management Plan

Control	4	Establish radio or telephone contact with CIC and SIC.	
Initial Action	5	Prepare consolidated list of dangerous goods including tankers in port.	
	6	Arranges to protect cargo in vicinity from damage.	
	7	Arranges to segregate and shift cargo in sheds.	
Ongoing Response	8	Coordinate with ship owners/agents/C&F agents/stevedores.	
	9	Provide necessary advice and supports.	
Response Termination	10	Terminate response if conditions are met on permission of CIC/SIC.	
	11	Ensure that all records are collated and stored.	

END BM CHECKLIST

CHECKLIST -16		SECRETARY (SEC)	
Phase		Action	Time
Mobilization / Activation	1	Communicate and coordinate with	
		a. CEC	
		b. Media (preparing brief)	
Initial Action	2	Arranges for food and water and accommodation	
	3	Arranges for transport	
	4	Arranges to communicate with relatives of employees	
Response Termination	5	Liaises with media under guidelines provided by the CEC.	

END SEC CHECKLIST

CHECKLIST -17		Legal (L)	
Phase		Action	Time
Mobilization / Activation	1	Communicate and coordinate with	
		a. CEC	
		b. CIC	
Initial Action	2	Gather information	
Ongoing Response	3	To issue notice under Major Port Trust Act, Indian Ports Act, Major Port Prevention and Control of Pollution Rules etc. to the defaulters.	
Response Termination	4	Arrange for settlement of related claims	
	5	Liaises with media under guidelines provided by the CEC.	

END L CHECKLIST

9.2 EARLY WARNING/ ALERT SYSTEM

9.2.1 Receiving and managing alerts

Information of the occurrence of incidents in and around JNPT area may come from a variety of sources. On receipt of information designated Personnel must carry out investigation to confirm the incident and gather as many details and as quickly as possible:

- Prepare an incident report.
- Immediately forward the report to and inform the Dy. Conservator/Harbourmaster.

The information so collected shall be maintained by making hourly log entry in a register.

9.2.2 Activation of EOC and initial resource coordination

9.2.2.1 Establishing the Emergency Operational Centre

9.2.2.1.1 Location

The EOC will be located in the Port Control room or secondary control room which is Chamber of Chief Manager (Admin) & Secy. located in the Admin building or as directed by the Chairman).

For small scale or short duration responses, the local EOC will be used inside the port. For larger scale responses, where external help is needed the Main Office Area will be utilized along with local EOC.

9.2.2.1.2 Muster Point

IRT personnel will muster at the nominated EOC unless otherwise directed by the SIC.

9.2.2.1.3 First Person On-Site

The person who arrives first at the EOC premises will commence preparation for the meeting.

9.2.2.1.4 Responsibility

The designated CIC/SIC will mobilize IRT members.

9.2.2.1.5 Resource mobilization

The CIC/SIC will ensure mobilization sufficient equipment and personnel resources required to manage the response.

9.2.2.1.6 Direction, control and coordination – Function coordination amongst IRT

The overall responsibility of the Emergency management lies with the Dy. Conservator, JNPT. He assumes the responsibility of CIC on receipt of the information of an impending emergency.

Some of the critical functions are:

- Activation of the EOC,
- An ongoing emergency assessment, including upgrading or downgrading of the emergency alarm level,
- Notification of outside governmental agencies,
- The decision to ask for outside help and resources,
- The decision to evacuate people,

Disaster Management Plan

- Decisions involving the safety of offsite vulnerable points (e.g recommendations to evacuate or take shelter, in the case of a toxic vapour release).

PROCEDURE-A		ESTABLISHING THE EMERGENCY OPERATION CENTRE (EOC)		
Task	Action		Status	
1.0	Obtain and/or assign EOC equipment.			
1.1	Communications.			
	A	Telephone lines. (1 Hot line linking Dy. Commissioner of the district)		
	B	Fax lines.		
	C	Radio frequency (as required).		
1.2	Information Display.			
	A	Set of forms (minimum of 5 sets).		
	B	Regional Maps and Charts:		
		i	Nautical charts.	
	ii	Topographic maps		
	C	Overhead projector (in nominated briefing room).		
D	Whiteboards.			
1.3	Copy(s) of the JNPT DMP and OSCP.			
1.4	Computer and Printer.			
1.5	Stationary: Markers, Pens, Pencils and A4 white paper.			
1.6	Tables and chairs			
1.7	Order and obtain any items needed (1.1-1.6)			
1.8	Advise reception to direct incoming calls to the EOC.			

9.2.2.1.7 Emergency Operating Room Equipment

As a general guideline the following equipment should be catered to

- Flip up of maps should be available-preferably a digitized map on the computer,
- Terminals storing toxic chemicals and terminals storing flammable chemicals,
- Transportation map depicting transportation route for LPG and chemical tankers by road,
- Map showing salt pans (if any),
- Map depicting densely populated areas,
- Map depicting fishing area zones,
- Emergency lights and torches,
- Computer,
- Fax,
- Printer,
- Telephone,
- Portable PA Sets,
- Walkie talkies / mobile telephone,
- Chemical protective suit,

Disaster Management Plan

- Loud hailer,
- VHF sets,
- Binoculars,
- Copy of Disaster Management plan, Oil Spill Emergency Plan and Business Continuity Plan,
- Reference books-chemical Encyclopedia,
- Table-seating,
- Chairs,
- Stationery,
- Gas masks with canisters,
- Safety goggles,
- Self contained breathing apparatus.

Refer **Appendix B** for details of the EOC equipment with JNPT.

9.2.3 Competent Agencies

Table 9.1: Competent agencies for issuing warnings

Disaster	Agencies
Earthquakes	IMD
Floods	Central Water Commission
Cyclones	IMD, Regional Specialized Meteorological Centre (RSMC) – Arabian Sea
Tsunami and Storm Surge	INCOIS

These agencies shall be responsible for keeping track of developments in respect of specific hazards assigned to them and inform the designated authorities/agencies at National, State and District levels about the impending disasters. All these agencies have developed guidelines for early warning of disasters.

9.2.3.1 Cyclone

Indian Meteorological Department (IMD) has a developed detailed procedure for Four Stage Warning of Cyclone

1. **Pre-Cyclone Watch:** Pre-cyclone watch is an early warning issued about 72 hrs. in advance of the commencement of bad weather. This is issued by the IMD Headquarters to all designated authorities including the Cabinet Secretary and other senior officers of Govt. of India and the Chief Secretaries of concerned Maritime States, media and all Cyclone Warning Centers (CWS) of IMD.
2. **Cyclone Alert:** Cyclone Alert is issued to all designated authorities/Agencies as far as possible, 48 hours before the expected commencement of adverse weather.
3. **Cyclone Warning:** Cyclone warning are issued to all designated Authorities/Agencies including the Chief Secretaries of the maritime States and the District Magistrates/Collectors of the coastal districts and the immediate interior districts expected to be affected by the cyclone. Cyclone

Warning is also issued to the designated railway officials and defence personnel. After initial warning, cyclone warnings are issued to above officials twice a day by high priority telegrams based on 0830 IST and 1730 IST charts till the weather improves.

- 4. Post Landfall Outlook:** Post landfall outlook is issued at least 12 hours in advance of the landfall by concerned CWCs. On the basis of this outlook, the concerned Meteorological Centre will also issue cyclone warnings for the interior areas.

9.2.3.1.1 Cyclone Warning Dissemination System (CWDS)

Cyclone Warning Dissemination System (CWDS) receivers have been established in vulnerable coastal areas using INSAT/METSAT. The system is being used extensively on operational basis during cyclone. The cyclone warning message is originated from Area Cyclone Warning Centre (ACWC) Colaba, Mumbai whenever a storm is observed. Warning messages are received in local languages directly by CWDS receivers located in areas likely to be affected by the cyclone.

In addition Cyclone Warning is disseminated through the following means:

- a. Police Wireless network
- b. Warnings through All India Radio (AIR) Bulletins
- c. Television
- d. Press Bulletins
- e. Aviation Warning
- f. Telephone and Fax
- g. Telex
- h. Telegrams

9.2.3.2 Tsunami

In the aftermath of the Indian Ocean Tsunami of 26 December 2004, the Ministry of Earth Sciences has set up an Indian Tsunami Early Warning Center at the Indian National Centre for Ocean Information Services (INCOIS) Hyderabad. The Center is mandated to provide advance warnings on Tsunamis likely to affect the coastal areas of the country.

Tsunami Warning (RED) contains information about the earthquake and a tsunami evaluation message indicating that tsunami is expected. This is the highest level wherein immediate actions are required to move public to higher grounds. Message also contains information on the travel times and tsunami grade (based on run-up estimates) at various coastal locations.

Tsunami Alert (ORANGE) contains information about the earthquake and a tsunami evaluation message indicating that tsunami is expected. This is the second highest level wherein immediate public evacuation is not required. Public should avoid beaches since strong currents are expected. Local officials should be prepared for evacuation if it is upgraded to warning status. Message also contains information on the travel times and tsunami grade at various coastal locations.

Tsunami Watch (YELLOW) contains information about the earthquake and a tsunami evaluation message indicating that tsunami is expected. This is the third

highest level wherein immediate public evacuation is not required, Local officials should be prepared for evacuation if it is upgraded to warning status. Message also contains information on the travel times and tsunami grade at various coastal locations.

Tsunami cancellation (GREEN) will be issued if the tsunami warning was issued on the basis of erroneous data or if the warning center determines from subsequent information that only an insignificant wave has been generated. In addition, tsunami warning may be cancelled on a selective basis when a significant wave that has been generated clearly poses no threat to one or more of the areas the warning center warns, either because of intervening continents or islands which screen them or because the orientation of the generating area causes the tsunami to be directed away from these areas.

Tsunami All Clear (GREEN) bulletin indicates that the 'Tsunami Threat' is passed and no more dangerous waves are expected.

9.2.3.3 Flood

Central Water Commission has developed a network of flood forecasting stations and issues Daily Flood Bulletins to all designated Authorities/Agencies of the Central Government and State Governments/ district Administration during the South East Monsoon season for all the major river basins in the following categories:

Category IV:

Low Flood (Water level between Warning Level and Danger Level)

Category III:

Moderate Flood (Water Level below 0.50m. less than HFL and above Danger Level)

Category II:





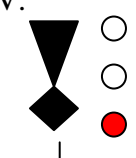
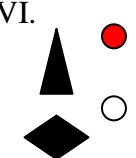
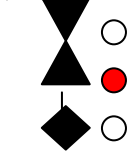
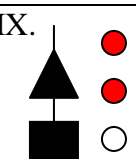
High Flood (Water Level less than Highest Flood Level but still within 0.50m. of the HFL)

Category I:

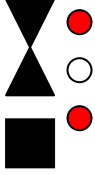

Unprecedented Flood (Water Level equal and above Highest Flood Level (HFL))

Disaster Management Plan

Table 9.2: Storm Warning Signals

SIGNAL NO.	DESCRIPTION	ACTION
D/N		
I 	DISTANT CAUTIONARY : There is a region of squally weather in which a storm may be forming.	Monitor weather report, TV news Internet and keep close watch.
II 	DISTANT WARNING : A storm has formed.	Monitor weather report, TV news, Internet and keep close watch inform all.
III. 	LOCAL CAUTIONARY : The Port is threatened by squally weather.	Inform all. Warn fishermen
IV. 	LOCAL WARNING : The Port is threatened by a storm but it does not appear that the danger is as yet sufficient great to justify extreme measures of precaution.	Alert all concerned to be ready and available.
V. 	DANGER : The Port will experience weather from a storm of slight or moderate intensity that is expected to cross the Coast to the South of the Port	Implement Contingency Plan.
VI. 	DANGER : The Port will experience sever weather from a storm of slight or moderate intensity that is expected to cross the Coast to the North of the Port.	Implement Contingency Plan.
VII 	DANGER : The Port will experience severe weather from a storm of slight or moderate intensity that is expected to cross the Coast over or near to the Port.	Implement contingency Plan.
	NOTE: this signal is also hoisted when a storm is expected to skirt the Coast without (actually) crossing it.	
IX. 	GREAT DANGER : The Port will experience severe weather from a storm of greater intensity that is expected to cross the Coast to the North of the Port.	Implement contingency Plan.
X.	GREAT DANGER : The Port will experience severe weather from a	Implement contingency Plan.

Disaster Management Plan

	<p>storm of great intensity that is expected to cross over or near the Port.</p>	
	<p>NOTE: This signal is also hoisted when a severe storm is expected to skirt the Coast without (actually) crossing it.</p>	
<p>XI.</p> 	<p>FAILURE OF COMMUNICATION : Communications with the Meteorological Warning Centre have broken down and the local Officer considers that there is danger of bad weather.</p>	
	<p>NOTE: Squally weather is meant to cover occasional/frequent squalls with rain or persistent type of storage gusty winds (mean wind speed not less than 20 knots) accompanied by rain. Such conditions are associated with low pressure systems or onset strengthening of monsoon. Mean wind speeds exceeding 33 knots associated with cyclonic storms are generally covered by signal higher than LC.III. The word generally has been added to permit hoisting of LC.III at Ports outside the inner storm area where wind speeds may exceed 33 knots.</p>	

9.2.4 PUBLIC WARNING

The capabilities and processes the Port has in place to information collection and disseminates warning messages to the stakeholders and all the personnel as to the nature of the hazard, the timing, and the recommended or required protective/preventive actions which are to be implemented by the action group are described in the following sections.

9.2.4.1 Message content

The message needs to be announced at least in local language which may be for example Evacuate, Assemble etc.

9.2.4.2 Public Warning System

The various types of warnings through hooters/sirens with indication locally and in control room, depending on the location of emergency as specified below:

➤ Siren for declaring Emergency

1. On receipt of the information about the Emergency, the control station will authorize CISF at Central Gate Complex to actuate the Emergency Siren as follows: -

- Siren to be sounded continuously for 30 Seconds with an interval of 5 seconds to be repeated 10 times.

Disaster Management Plan

- **Siren declaring Evacuation from the Port area**
 1. On receipt of the orders from the Deputy Conservator or in his absence the Harbour Master the port control room will authorize CISF at Central Gate Complex to actuate the Siren as follows:
 - Siren declaring Evacuation from the Port area: Siren to be sounded for 5 seconds till the area is evacuated by people or for ½ hour whichever is less

- **Siren declaring All Clear and returning to the work**
 1. On receipt of the information from the Deputy Conservator or in his absence Harbour Master the port control room will authorize CISF at Central Gate Complex to actuate the Siren as follows:
 - Continuous ringing of siren for 5 minutes

9.3 HAZARD SPECIFIC RESPONSE PLAN

Following potential scenarios have been identified in accordance with the risk assessment for the port. The action flowchart and action plan for each scenario has been prepared in accordance with the Incident Response System (NDMA).

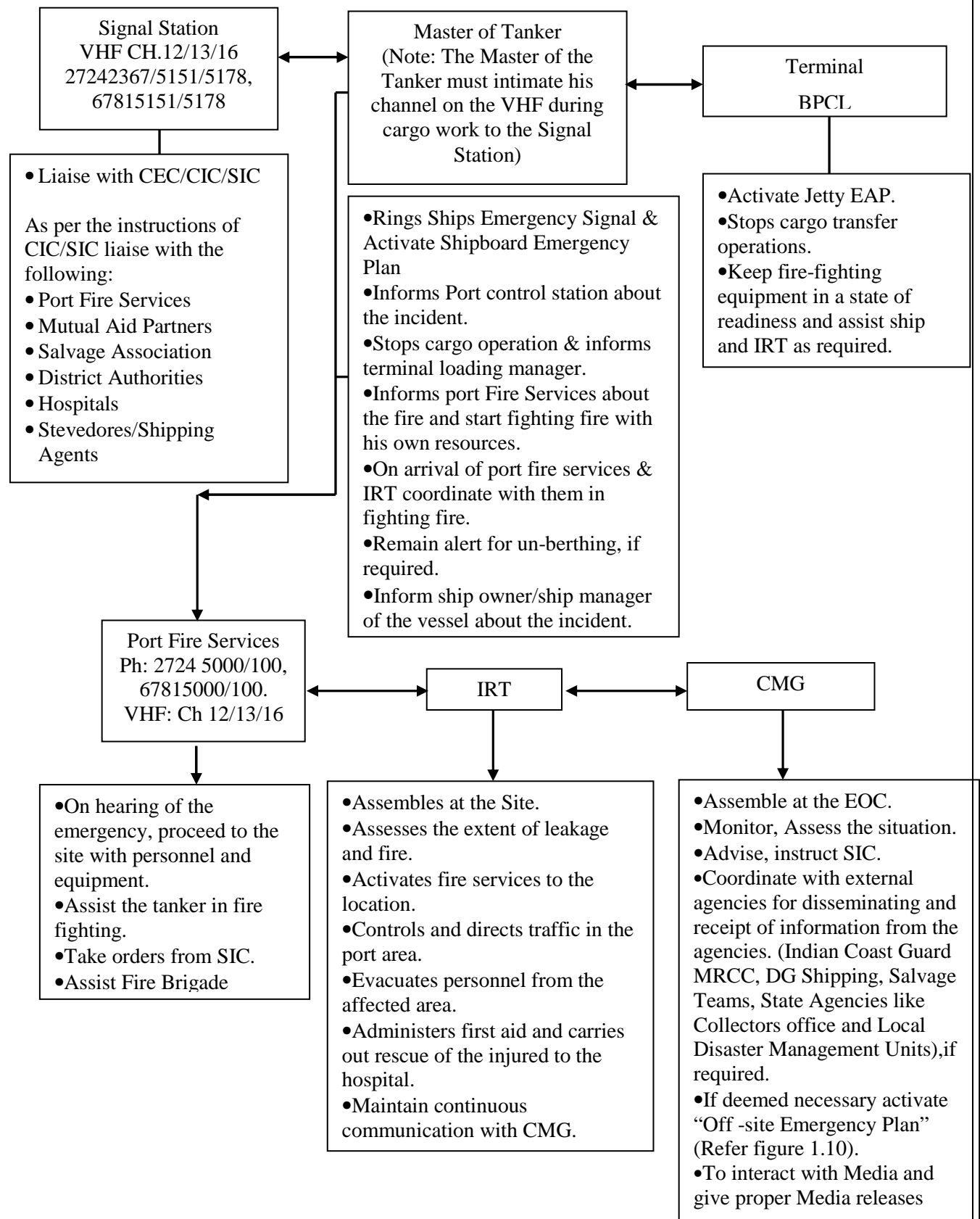
Sr. No.	Scenarios	Page No.
1.	Fire/explosion due to LPG leakage at BPCL Liquid Cargo Jetty during operation – on Ship or Ashore	166
2.	Fire due to leakage of POL/Chemical at BPCL Liquid Cargo Jetty – on ship or ashore	174
3.	Toxic gas (Liquid Ammonia) leak at BPCL Liquid Cargo Jetty during operation – on Ship or Ashore	182
4.	Toxic gas (Acrylonitrile) leak at SWB during operation – on Ship or Ashore	191
5.	Corrosive Acid - Leakage (Phosphoric acid) at BPCL Liquid Cargo Jetty during operation – on Ship or Ashore	200
6.	Fire /Explosion at Shallow Water Berth during handling of Chemicals – on Ship or Ashore	208
7.	Fire /leakage due to Crane Accidents (Container drop/crane fall) at Terminal - NSICT, NSIGT, JNPCT, GTI-APM, BMCT	216
8.	Containers falling into water in case of extreme weather, vessel collision or grounding	222
9.	Fire in Engine room of Floating Craft	228
10.	Ship Grounding/Collision within JNPT port limit	234
11.	Blockage of Navigational Channel due to Ground/Sinking of vessel (Wreckage)	241
12.	Emergency/Disaster within the facility (Reliance/IMC/GBL/Deepak Fertilizer/Suraj Agro/IOCL/Bharat Shell) inside the port limit	250
13.	Fire in CFS – Warehouse	251
14.	Fire in Port Administration building/PUB/Customs House/Port Operation Centre	257
15.	War and Terrorism	263
16.	Bomb Threat	269
17.	Natural Disaster (Cyclone, Earthquake, Flood, Tsunami)	276

S1: Scenario 1**Part A:**

- 1. Fire/explosion due to LPG leakage at BPCL Liquid cargo jetty during operation – on Ship or Ashore**
- 2. Precautions:** MSDS, SOP, Berthing and un-berthing procedures and House-keeping.
Leaks from LPG pump glands, pipes flanges or pipeline ruptures or from vent emissions due to cargo tank over-pressure or relief valve failure will initially produce vapour. This vapour will not ignite immediately but, if the vapour production is large, there is a hazard of the resultant cold and dense vapour cloud of LPG spreading to a source of ignition before it is diluted below the lower explosive limit. Therefore, in case of release of large quantity of flammable vapour cloud, immediate effort should be directed to eliminate such source of ignition. In such event, eliminate all sources of ignitions i.e. open flames, welding, cutting, operation etc. in the entire port area.
- 3. Impact Zone:** Refer **Appendix E** and Risk Assessment report.
Consequence analysis indicates that the LPG (Propane) leak from pipeline would cover approx. 1000 meters for Vapor cloud explosion (VCE) scenario.
- 4. Resources required:** Organizational setup enumerated in Figure S1.2 and major material and equipment resources as given in **Appendix B**.

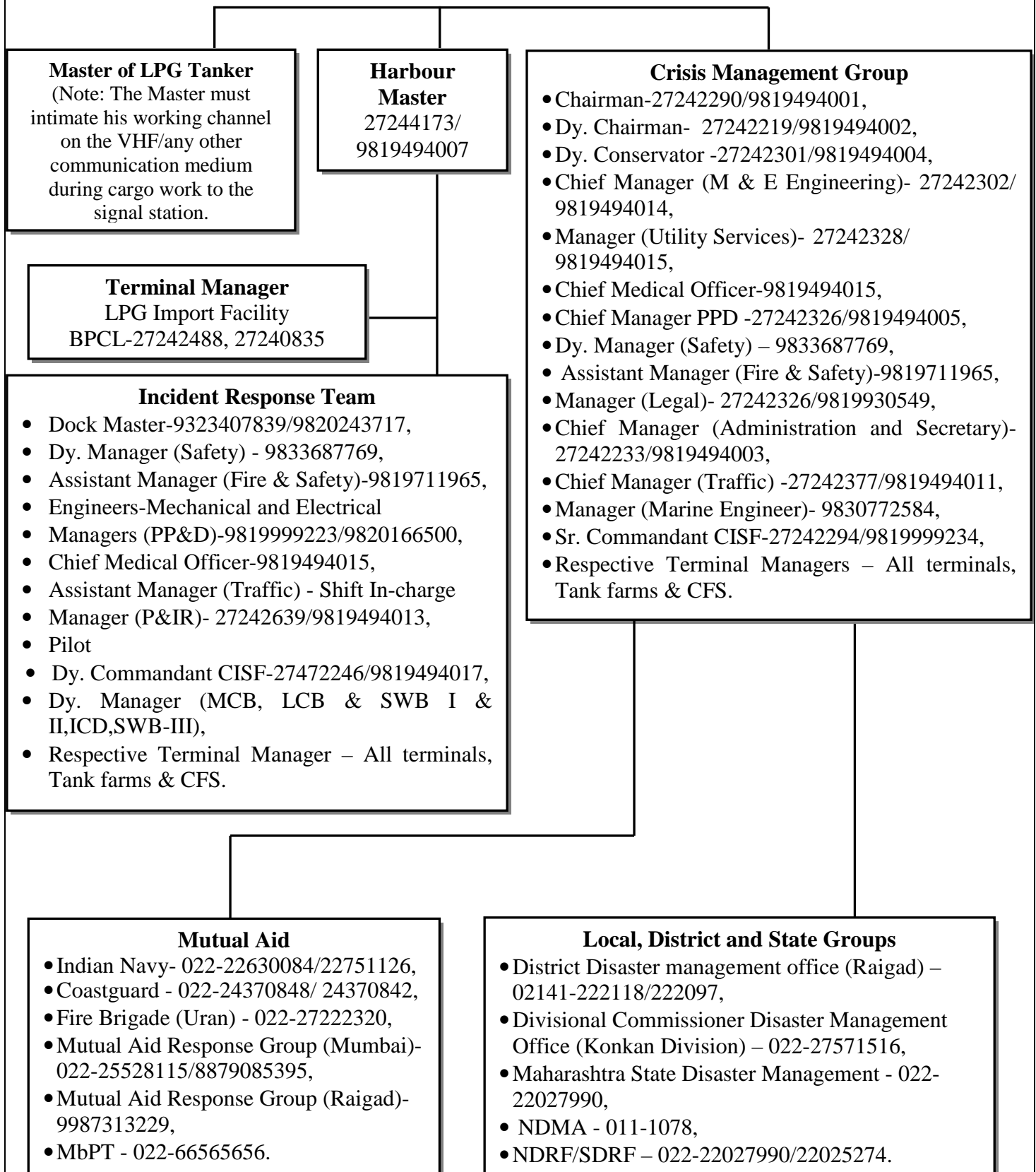
Disaster Management Plan

Figure S1.1: Action Flow Chart



Disaster Management Plan

Figure S1.2: Action group



*Disaster Management Plan***Part B: Action Plan**

The vessel upon berthing at the BPCL jetty will follow standard procedures. However, in a less likely scenario, a leak from the pipeline system may occur at the jetty leading to self-detection by vessel personnel or by the terminal automatic alarm and detection system. Further in a more unlikely situation, due to a possible ignition the leakage might catch fire and lead to explosion. The following actions will be required

1. The Master of the Ship (Alternate: Chief Officer)

Response Action	Contact
a. Should raise ships emergency alarm and activate ship board emergency action plan.	
b. Stop LPG transfer operation (as per SOP of the ship).	
c. Terminal, Vessel in the vicinity and Port should be informed of any incident on the ship without delay.	<ul style="list-style-type: none"> • BPCL • Port Control Station • Vessels in the vicinity
d. Personnel to remain stand by to disconnect metal arms.	
e. Shall be responsible for fighting the fire with ships own resources as well as with the available support from IRT.	
f. Also, to remain prepared to un-berth the ship to the safe area (high sea).	
g. The siren should be continued till the ship is taken to a safe location as per CIC instructions.	

2. The terminal personnel should

Response Action	Contact
a. Activate Jetty EAP (prepared by the terminal) and inform JNPT.	<ul style="list-style-type: none"> • Port Control Station
b. Shut off isolation valve on LPG pipeline at the berth (action as per SOP of the terminal).	
c. Area should be cordoned off.	
d. Pour Dry Chemical Powder.	
e. Assist IRT and provide all necessary equipment.	<ul style="list-style-type: none"> • SIC
f. He will direct operation staff. Coordinate with the ship in-charge/C&F agents/stevedores.	

3. Deputy Conservator (Alternate: Harbour Master) should

Response Action	Contact
a. Assess the level of disaster and activate the DMP.	
b. Establish EOC and be stationed to review & assess possible developments to determine the most necessary course of action.	

Disaster Management Plan

c. Give necessary instructions to SIC and Port Control Station & arrange for external aid as necessary.	<ul style="list-style-type: none"> • SIC • Port Control Station
d. Review the situation and accordingly inform to the Chairman/ DY. Chairman.	<ul style="list-style-type: none"> • Chairman • Dy. Chairman
e. Assess the condition of site and of potential affected area and take decision on evacuation in consultation with SIC.	<ul style="list-style-type: none"> • SIC
f. Be in constant touch with District and Local Administration for rescue and relief operation.	
g. Terminate the response and debrief before allowing normal operation.	

4. The Port Control Station

Response Action	Contact
a. Gather information related to the weather conditions. Monitor the wind directions and accordingly convey the message to CIC/SIC and Fire & Safety Officers.	<ul style="list-style-type: none"> • CIC • SIC • F&SO
b. Liaise with Master of the Vessel/Pilot.	<ul style="list-style-type: none"> • Master of the vessel • Pilot
c. Listening watch to be maintained on VHF channel-16 and walkie-talkie channel-12.	
d. Notify to CIC, SIC and the vessels moving into, through and inside the port. Keep CIC/SIC informed of all the messages received by telephone, VHF sets or by messenger.	<ul style="list-style-type: none"> • CIC • SIC
e. Notify the other Authorities and stakeholders within Port as per instructions of CIC/SIC.	<ul style="list-style-type: none"> • Navy • Coastguard • Stakeholders
f. Notify the information to the owner of the vessel as per the instruction of CIC/SIC/ Master of the Vessel.	

5. The Fire-fighting Personnel should

Response Action	Contact
a. Raise Alarm (siren)	
b. Start the pumps as per the requirement	
c. Use water sprays and portable nozzles to maintain curtain and to disperse LPG vapors.	
d. Ensure the gas leak has been stopped. Allow the gas to burn rather than extinguishing.	
e. Open the water curtain valve to protect shore installations from heat radiation.	
f. Inform fire officers to arrange for fire float fire-fighting tug and Marine Engineer to arrange for tugs , as required	<ul style="list-style-type: none"> • Fire Officer • Marine Engineer

Disaster Management Plan

g. Ensure all the ignition sources in the vicinity are extinguished if fire has not occurred.	
h. If the fire is under control and extinguished, give all clear signal	

6. Duties of IRT

Designated Officer	Role	Duties	Alternate Officer
Harbour Master	Site Incident Controller	During Emergency shall proceed to the scene & communicate & collect all information from the Master of the Tanker, Berth Manager and Terminal Manager.	Dock Master
		Conduct initial Briefing.	
		Report the situation to the CIC/CMG and assist CIC in assessing the incident.	
		Initiate DMP.	
		Alert vessels within the vicinity.	
		Assess the condition of site and of potential affected area and take decision on evacuation in consultation with CIC.	
		Extend all necessary help to the Master of the ship to fight the fire.	
		Instruct the Asst. Manager (Fire and Safety) to keep the fire fighting installation in a state of readiness & activate if required.	
Dock Master	Port Control Room Coordinator	Instruct Dock Master/Marine Engineer(s) to keep tugs ready for fire fighting.	Duty Supervisor
		Coordinate with all functional heads to take actions.	
		Shall monitor the communication on VHF/any other communication medium & convey and relay messages on the advice from CIC /SIC.	
		Organize tugs, mooring boats and Pilots for rescue.	
		Hire additional crafts, as necessary.	
		Maintain Log of events.	

Disaster Management Plan

Asst. Manager (Fire and Safety)	Fire Coordinator	Shall take orders from the SIC.	Station Officer
		Lead the fire-fighting team and mobilize fire tenders, men & fire-fighting equipment to the scene & extend all necessary support to the Master of the vessel/Terminal Manager/Berth Manager for fire-fighting.	
		Inform SIC for arrangement of any additional equipment as required.	
Dy. Manager (Safety)	Marine Pollution Control Coordinator	Shall take orders from the SIC.	Safety Inspector
		Ensure responsible actions for containing the run off fire water and other water from the damaged units.	
		Assist in evacuation of the personnel to the assembly point or as directed by SIC.	
		Conduct clean- up work during and after the emergency as quick as possible.	
Sr. Commandant- CISF	Security and Evacuation	Shall take orders from the SIC.	Dy. Commandant- CISF
		Cordon off the area.	
		Controls & Directs gate security and traffic in the area.	
		Shall facilitate evacuation, transport, first aid and rescue of personnel from the scene at the time of emergency.	
		Control the entry of unauthorized persons and vehicles.	
		Check for entry of emergency vehicles.	
		Liaise with the Police authorities.	
		Responsible for the head count of the personnel.	
Chief Manager (Traffic)	Traffic Coordinator	Shall take orders from SIC and assist Manager LCB.	Asst. Manager (Traffic)
		Submits consolidated list of dangerous goods in port including tankers in port and tank farms in port area.	
		Regulate the traffic in the area.	

Disaster Management Plan

Chief Manager (Port, Planning and Development)	Civil Coordinator	Inform MPCB and other environmental agencies and take necessary guidance.	Manager (I,II)
		Shall mobilize and dispatch sufficient number of vehicles to the site of emergency.	
		Shall be responsible to carry out urgent civil works as required.	
Chief Manager (Mechanical & Electrical)	In charge of Electrical Installation	Shall be responsible for uninterrupted electrical supply to vital equipment and utility at the berth.	Asst. Engineer
		Shall remain alert on duty for any electrical isolation of equipment during emergency.	
		Liase with SIC and assist Terminal Manager.	
Sr. Dy. Chief Medical Officer	Medical Coordinator	Shall be responsible to organize and keep first aid team with ambulance & necessary medicines to attend to any injured person at the site of the accident.	Alternate Officer
		Shall coordinate with the local hospitals.	
Duty Pilot	In Charge of Pilotage	Shall be ready on site for taking the ship out of berth and be ready for providing any assistance on site.	Standby Pilot
Manager (Marine Engg.)	ME Coordinator	Responsible for organizing tugs for combating the fire and rescue.	Sr. Dy. Manager (Marine Engg.)
		Hire additional crafts as necessary.	

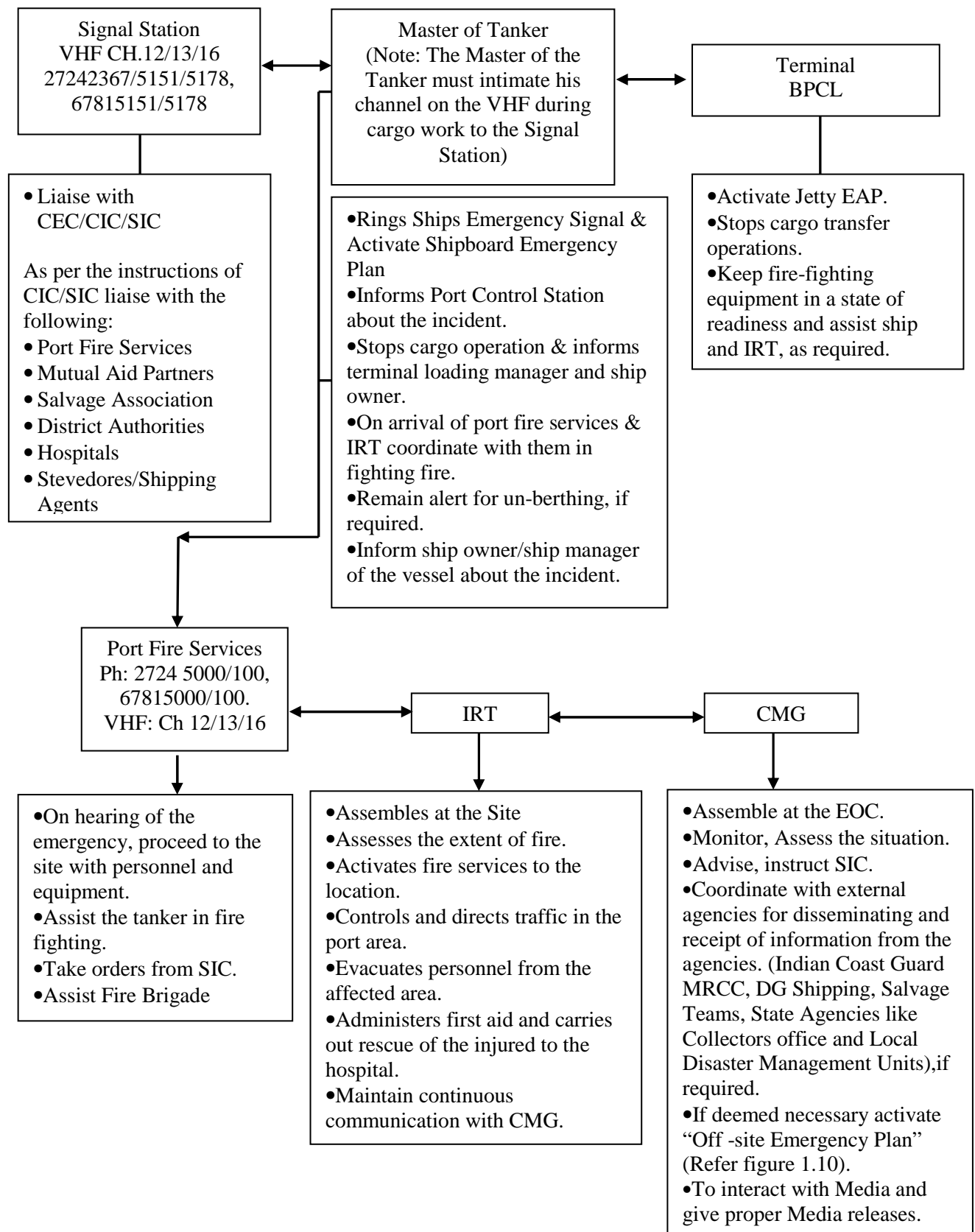
Disaster Management Plan

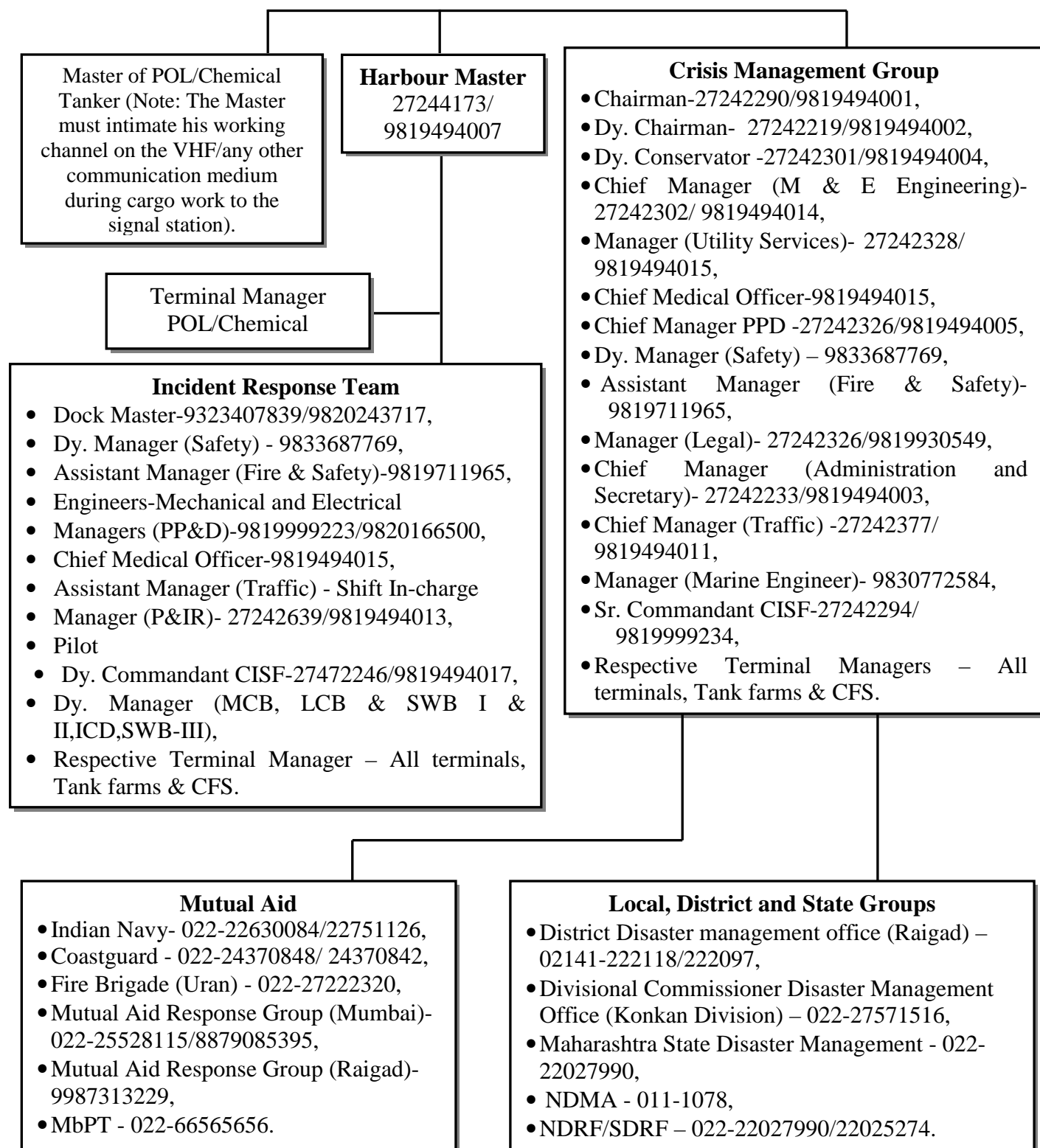
S2: Scenario 2**Part A**

- 1. Fire due to leakage of POL/Chemical at BPCL Liquid Cargo Jetty – on ship or ashore.**
- 2. Precautions:** MSDS, SOP of terminal and berthing and un-berthing procedure.
- 3. Impact Zone:** Refer **Appendix E** and Risk Assessment report.
Consequence analysis indicates that the MS leak from pipeline would cover approx. 1350 meters for Vapor cloud explosion (VCE) scenario.
- 4. Resources required:** Organizational setup enumerated in Figure S2.2 and major material and equipment resources as given in **Appendix B**.

Disaster Management Plan

Figure S2.1: Action Flow Chart



*Disaster Management Plan***Figure S2.2:** Action group

Disaster Management Plan

Part B: Action Plan

The vessel upon berthing terminal will follow standard procedures. However, in a less likely scenario a leak from the pipeline system may occur at the jetty leading to self-detection by vessel personnel or by the terminal automatic alarm system. Further in a more unlikely situation due to a possible ignition the leakage might catch fire and leading to explosion. The following action will be required

1. The Master of the Ship (Alternate: Chief Officer)

Response Action	Contact
a. Should raise ships emergency alarm and activate ship board emergency action plan.	
b. Stop POL/Chemical transfer operation (as per SOP of the ship).	
c. Terminal, Vessel in the vicinity and Port should be informed of any incident on the ship without delay.	<ul style="list-style-type: none"> • Terminal • Port Control Station
d. Personnel to remain stand by to disconnect hoses.	
e. Shall be responsible for fighting the fire with ships own resources as well as with the available support from IRT.	
f. Also, to remain prepared to un-berth the ship to the safe area (high sea).	
g. The siren should be continued till the ship is taken to a safe location as per CIC instructions.	

2. The terminal persons tasked with POL/Chemical cargo operations at the Jetty should

Response Action	Contact
a. Activate Jetty EAP (prepared by the terminal) and inform JNPT.	Port Control Station
b. Shut off isolation valve on POL/Chemical pipeline at the berth (action as per SOP of the terminal).	
c. Area should be cordoned off.	
d. Pour foam/dry chemical powder on POL/Chemical spillage to reduce rate of vaporization.	
e. Assist IRT and provide all necessary equipment.	
f. He will direct operation staff. Coordinate with the ship in-charge/C&F agents/stevedores.	

3. Deputy Conservator (Alternate: Harbour Master)

Response Action	Contact
a. Assess the level of disaster and activate the DMP.	
b. Establish EOC and be stationed to review & assess possible developments to determine the most necessary course of action.	

Disaster Management Plan

c. Give necessary instructions to SIC and Port Control Station & arrange for external aid as necessary.	<ul style="list-style-type: none"> • SIC • Port Control Station
d. Review the situation and accordingly inform to the Chairman/ Dy. Chairman.	<ul style="list-style-type: none"> • Chairman • Dy. Chairman
e. Assess the condition of site and of potential affected area and take decision on evacuation in consultation with SIC.	<ul style="list-style-type: none"> • SIC
f. Be in constant touch with District and Local Administration for rescue and relief operation.	
g. Terminate the response and debrief before allowing normal operation.	

4. The Port Control Station

Response Action	Contact
a. Gather information related to the weather conditions. Monitor the wind directions and accordingly convey the message to CIC/SIC and F& SO.	<ul style="list-style-type: none"> • CIC • SIC • F&SO
b. Liaise with Master of the Vessel/Pilot.	<ul style="list-style-type: none"> • Master of the Vessel • Pilot
c. Listening watch to be maintained on VHF channel-16 and walkie-talkie channel-12.	
d. Notify to CIC, SIC and the vessels moving into, through and inside the port. Keep CIC/SIC informed of all the messages received by telephone, VHF sets or by messenger.	<ul style="list-style-type: none"> • CIC • SIC
e. Notify the other Authorities and stakeholders within Port as per instructions of CIC/SIC.	<ul style="list-style-type: none"> • Navy • Coastguard • Stakeholders
f. Notify the information to the owner of the vessel as per the instruction of CIC/SIC/ Master of the Vessel.	

5. The Fire-fighting personnel should

Response Action	Contact
a. Raise Alarm (siren)	
b. Start the pumps as per the requirement	
c. Use water sprays and portable nozzles to maintain curtain.	
d. Open the valves of the monitors and direct the jet on the seat of fire.	
e. Inform fire officers to arrange for fire-fighting tug and Marine Engineer to arrange for tugs , as required	<ul style="list-style-type: none"> • F&SO • Marine Engineer
f. In case of fire onboard assist Master in fighting fire as per Masters Instructions.	

Disaster Management Plan

g. Ensure all the ignition sources in the vicinity are extinguished if fire has not occurred.	
h. If the fire is under control and extinguished, give all clear signal.	

6. Duties of IRT

Designated Officer	Role	Duties	Alternate Officer
Harbour Master	Site Incident Controller	During Emergency shall proceed to the scene & communicate & collect all information from the Master of the Tanker, Berth Manager and Terminal Manager.	Dock Master
		Conduct initial Briefing.	
		Report the situation to the CIC/CMG and assist CIC in assessing the incident.	
		Initiate DMP.	
		Alert vessels within the vicinity.	
		Assess the condition of site and of potential affected area and take decision on evacuation in consultation with CIC.	
		Extend all necessary help to the Master of the ship to fight the fire.	
		Instruct the Asst. Manager (Fire and Safety) to keep the fire fighting installation in a state of readiness & activate if required.	
		Instruct Dock Master/ Marine Engineer(s) to keep tugs ready for fire fighting.	
Dock Master	Port Control Room Coordinator	Shall monitor the communication on VHF/any other communication medium & convey and relay messages on the advice from CIC /SIC.	Duty Supervisor
		Responsible for organizing tugs, mooring boats and pilots for combating the fire and rescue.	
		Hire additional crafts as necessary.	
		Maintain Log of events.	

Disaster Management Plan

Tank Terminal Manager	Cargo Work	Shall be responsible of shutting down of cargo operation & coordinating with JNPT and rendering necessary assistance to the SIC by providing additional fire fighting & emergency equipment as required.	Assistant Terminal Manager
Asst. Manager (Fire and Safety)	Fire Coordinator	Shall take orders from the SIC.	Station Officer
		Lead the fire fighting team and mobilize fire tenders, men & fire-fighting equipment to the scene & extend all necessary support to the Master of the vessel/Terminal Manager/Berth Manager for fire fighting.	
		Inform SIC for arrangement of any additional equipment as required.	
Dy. Manager (Safety)	Marine Pollution Control Coordinator	Shall take orders from the SIC.	Safety Inspector
		Ensure responsible actions for containing the run off fire water and other water from the damaged units.	
		Assist in evacuation of the personnel to the assembly point or as directed by SIC.	
Sr. Commandant-CISF	Security and Evacuation	Conduct clean- up work during and after the emergency as quick as possible.	Dy. Commandant-CISF
		Shall take orders from the SIC.	
		Cordon off the area.	
		Controls & Directs gate security and traffic in the area.	
		Shall facilitate evacuation, transport, first aid and rescue of personnel from the scene at the time of emergency.	
		Control the entry of unauthorized persons and vehicles.	
		Check for entry of emergency vehicles.	
		Liaise with the Police authorities.	
Responsible the head count of the personnel.			
Chief Manager (Traffic)	Traffic Coordinator	Shall take orders from SIC and assist Manager LCB.	Asst. Manager (Traffic)

Disaster Management Plan

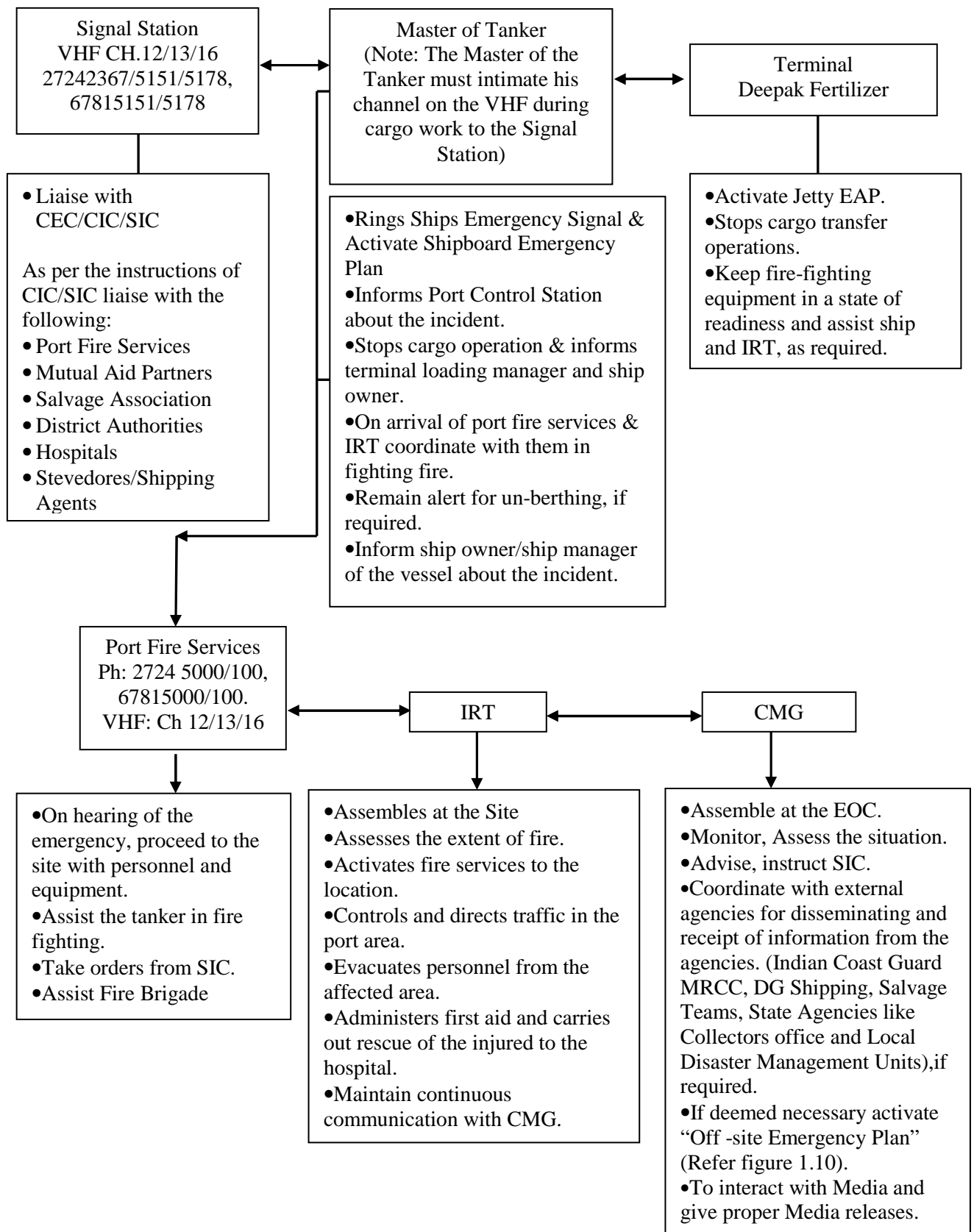
		Submits consolidated list of dangerous goods in port including tankers in port and tank farms in port area.	
		Regulate the traffic in the area.	
Chief Manager (Port, Planning and Development)	Civil Coordinator	Inform MPCB and other environmental agencies and take necessary guidance.	Manager (I, II)
		Shall mobilize and dispatch sufficient number of vehicles to the site of emergency.	
		Shall be responsible to carry out urgent civil works as required.	
Chief Manager (Mechanical & Electrical)	In charge of Electrical Installation	Shall be responsible for uninterrupted electrical supply to vital equipment and utility at the berth.	Asst. Engineer
		Shall remain alert on duty for any electrical isolation of equipment during emergency.	
Sr. Dy. Chief Medical Officer	Medical Coordinator	Shall be responsible to organize and keep first aid team with ambulance & necessary medicines to attend to any injured person at the site of the accident.	Alternate Officer
		Shall coordinate with the local hospitals.	
Duty Pilot	In Charge of Pilotage	Shall be ready on site for taking the ship out of berth and be ready for providing any assistance on site.	Standby Pilot
Manager (Marine Engg.)	ME Coordinator	Responsible for organizing tugs for combating the fire and rescue.	Sr. Dy. Manager (Marine Engg.)
		Hire additional crafts as necessary.	

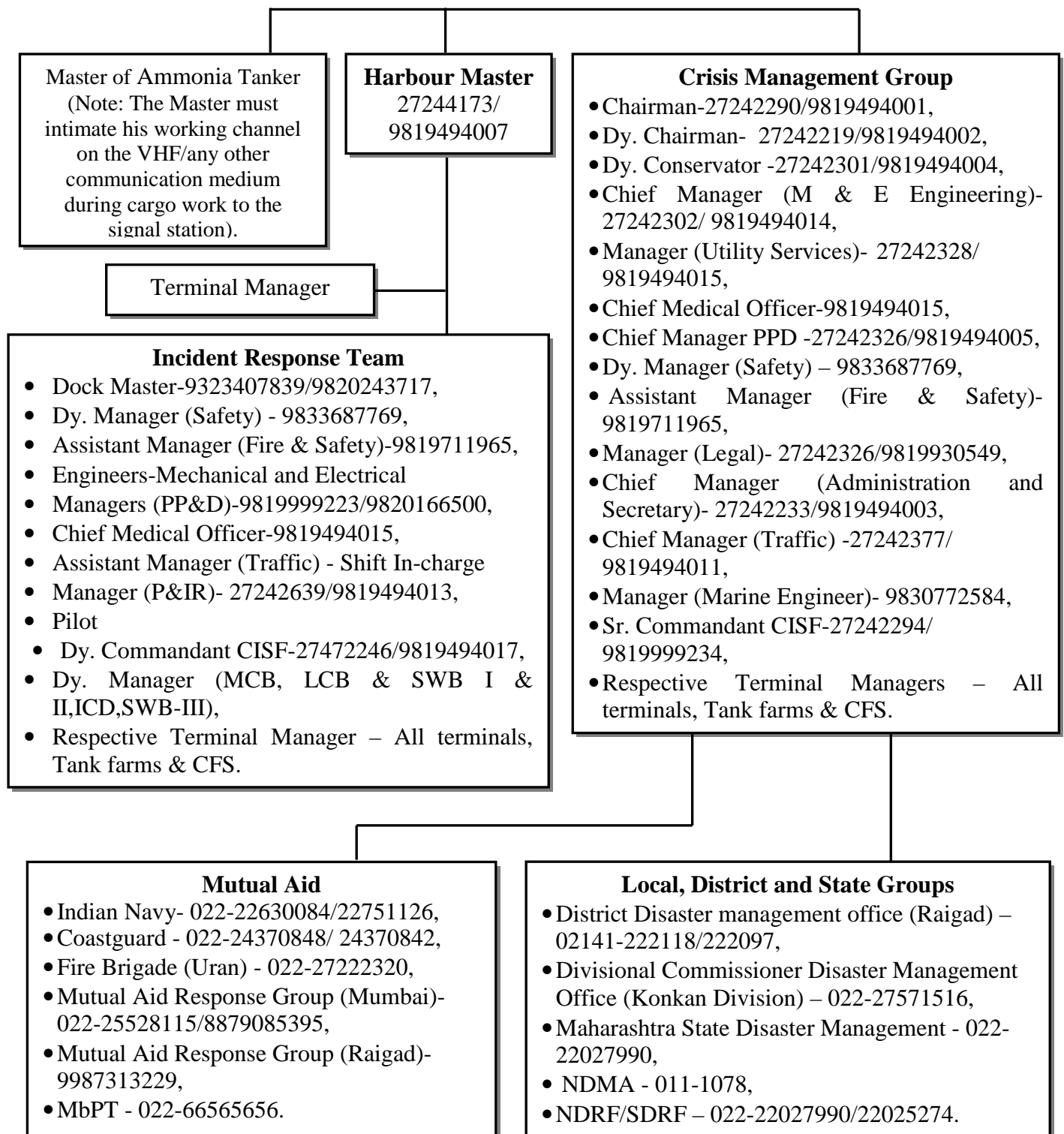
S3: Scenario 3**Part A:**

1. **Toxic gas (Liquid Ammonia) leak at BPCL Liquid Cargo Jetty during operation – on Ship or Ashore.**
2. **Precautions:** MSDS, SOP of terminal and berthing and un-berthing procedures. Stay upwind and wear positive-pressure breathing apparatus and full protective clothing, as necessary.
3. **Impact Zone:** Consequence analysis indicates that the Ammonia leak from pipeline would cover to the 9 KM for toxic dispersion with IDLH level of 300 ppm.
4. **Resources required:** Organizational setup enumerated in Figure S3.2 and major material and equipment resources as given in **Appendix B.**
Important: Trained medical personnel and fire fighters as ammonia is toxic.

Disaster Management Plan

Figure S3.1: Action Flow Chart



*Disaster Management Plan***Figure S3.2:** Action group

Disaster Management Plan

Part B: Action Plan

The vessel upon berthing terminal will follow standard procedures. However, in a less likely scenario a leak from the pipeline system may occur at the jetty leading to self-detection by vessel personnel or by the terminal automatic alarm system. The following action will be required

Spill handling: Evacuate and restrict person's not wearing protective equipment from area of spill or leak until cleanup is complete. Remove all ignition sources. Stop the flow of gas if it can be done safely. Stay upwind; keep out of low areas. Wear positive pressure breathing apparatus and full protective clothing.

1. The Master of the Ship (Alternate: Chief Officer)

Response Action	Contact
a. Should raise ships emergency alarm and activate ship board emergency action plan.	
b. Stop Ammonia transfer operation (as per SOP of the ship).	
c. Terminal, Vessel in the vicinity and Port should be informed of any incident on the ship without delay.	<ul style="list-style-type: none"> • Terminal • Vessel in the vicinity • Port Control Station
d. Personnel to remain stand by to disconnect metal arms;	
e. Shall be responsible to arrest the leak and for fighting the fire with ships own resources as well as with the available support from IRT.	
f. Also, to remain prepared to un-berth the ship to the safe area (high sea).	
g. The siren should be continued till the ship is taken to a safe location as per CIC instructions.	

2. The terminal persons tasked with Ammonia cargo operations at the Jetty should

Take personal precautions, protective equipment and follow emergency procedures. Wear respiratory protection. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas. Environmental precautions: Prevent further leakage or spillage if safe to do so.

Contain spillage, and then collect with an electrically protected vacuum cleaner (vehicle mounted in some cases) or by wet-brushing and place in container for disposal.

Response Action	Contact
a. Activate Jetty EAP (prepared by the terminal) and inform JNPT.	<ul style="list-style-type: none"> • Port Control Station
b. Shut off isolation valve on ammonia pipeline at the berth	

Disaster Management Plan

(action as per SOP of the terminal).	
c. Area should be cordoned off.	
d. Assist IRT and provide all necessary equipment.	
e. He will direct operation staff. Coordinate with the ship in-charge/C&F agents/stevedores.	

3. Deputy Conservator (Alternate: Harbour Master)

Response Action	Contact
a. Assess the level of disaster and activate the DMP.	
b. Establish EOC and be stationed to review & assess possible developments to determine the most necessary course of action.	
c. Give necessary instructions to SIC and Port Control Station & arrange for external aid as necessary.	<ul style="list-style-type: none"> • SIC • Port Control Station
d. Review the situation and accordingly inform to the Chairman/ Dy. Chairman.	<ul style="list-style-type: none"> • Chairman • Dy. Chairman
e. Consult with Chairman / Dy. Chairman and decide on clearing of ships in close proximity to the incident location or to sail the ammonia tanker to the higher seas and evacuating the people from the likely affected zone.	
f. Take decision on evacuation in consultation with SIC.	<ul style="list-style-type: none"> • SIC
g. Be in constant touch with District and Local Administration for rescue and relief operation.	
h. Terminate the response and debrief before allowing normal operation.	

4. The Port Control Station

Response Action	Contact
a. Gather information related to the weather conditions. Monitor the wind directions and accordingly convey the message to Master of the vessel, CIC/SIC and F& SO.	<ul style="list-style-type: none"> • Master of the vessel, CIC • SIC • F& SO
b. Liaise with Master of the Vessel/Pilot.	<ul style="list-style-type: none"> • Master of the Vessel • Pilot
c. Listening watch to be maintained on VHF channel-16 and walkie-talkie channel-12.	
d. Notify to CIC, SIC and the vessels moving into, through and inside the port. Keep CIC/SIC informed of all the messages received by telephone, VHF sets or by messenger.	<ul style="list-style-type: none"> • CIC • SIC
e. Notify the other Authorities and stakeholders within Port	<ul style="list-style-type: none"> • Navy

Disaster Management Plan

as per instructions of CIC/SIC.	<ul style="list-style-type: none"> • Coastguard • Stakeholders
f. Notify the information to the owner of the vessel as per the instruction of CIC/SIC/ Master of the Vessel.	

5. The Fire-fighting Personnel should

Response Action	Contact
a. Raise Alarm (siren).	
b. Start the pumps as per the requirement.	
c. Use water sprays and portable nozzles to maintain curtain and dilution.	
d. Open the valves of the monitors and direct the jet on the seat of fire, in case of fire.	
e. Inform fire officers to arrange for fire-fighting tug and Marine Engineer to arrange for tugs, as required.	<ul style="list-style-type: none"> • F&SO • Marine Engineer
f. In case of leakage/fire onboard assist Master in arresting the leak/diluting the vapour/ fighting fire as per Masters Instructions.	
g. Announce in mobile van with PA system in the effecting zones to evacuate the zone. Ensure complete evacuation and report to the EOC.	
h. Ensure all the ignition sources in the vicinity is extinguished if fire has not occurred.	
i. If the situation is under control, give all clear signals.	

6. Duties of IRT

Designated Officer	Role	Duties	Alternate Officer
Harbour Master	Site Incident Controller	During Emergency shall proceed to the scene & communicate & collect all information from the Master of the Tanker, Berth Manager and Terminal Manager.	Dock Master
		Conduct initial Briefing.	
		Report the situation to the CIC/CMG and assist CIC in assessing the incident.	
		Initiate DMP.	
		Alert vessels within the vicinity.	
		Shall assess and decide on the evacuation of the personnel considering the direction of wind and dispersion and will instruct Safety Officer and CISF to carry	

Disaster Management Plan

		<p>out the evacuation in a safe manner.</p> <p>He will extend all necessary help to the Master of the ship to fight the fire.</p> <p>Instruct the Asst. Manager (Fire and Safety) to keep the fire- fighting installation in a state of readiness & activate if required to fight fire or for disperse the vapour cloud.</p> <p>Instruct Dock Master/ Marine Engineer(s) to keep tugs ready for fire fighting.</p> <p>Coordinate with all functional heads to take actions.</p>	
Dock Master	Port Control Room Coordinator	<p>Shall monitor the communication on VHF/any other communication medium & convey and relay messages on the advice from CIC /SIC.</p> <p>Responsible for organizing tugs, mooring boats and Pilots for combating the fire and rescue.</p> <p>Hire additional crafts as necessary.</p> <p>Maintain Log of events.</p>	Duty Supervisor
Terminal Managers- BPCCL and Deepak Fertilizer	Cargo Work	Shall be responsible of shutting down of cargo operation & coordinating with JNPT and rendering necessary assistance to the SIC by providing additional emergency equipment as required.	Assistant Terminal Manager
Asst. Manager (Fire and Safety)	Fire Coordinator	<p>Shall take orders from the SIC.</p> <p>Lead the fire fighting team and mobilize fire tenders, men & fire-fighting equipment to the scene & extend all necessary support to the Master of the vessel/Terminal Manager/Berth Manager for fire fighting.</p> <p>Inform SIC for arrangement of any additional equipment as required.</p>	Station Officer
Dy. Manager (Safety)	Marine Pollution Control Coordinator	<p>Shall take orders from SIC.</p> <p>Assist in evacuation of the personnel to the assembly point or as directed by SIC.</p>	Safety Inspector

Disaster Management Plan

Sr. Commandant- CISF	Security and Evacuation	Shall take orders from the SIC.	Dy. Commandant- CISF
		Cordon off the area.	
		Controls & Directs gate security and traffic in the area.	
		Shall facilitate evacuation, transport, first aid and rescue of personnel from the scene at the time of emergency.	
		Control the entry of unauthorized persons and vehicles.	
		Check for entry of emergency vehicles.	
		Liaise with the Police authorities.	
Responsible the head count of the personnel.			
Chief Manager (Traffic)	Traffic Coordinator	Shall take orders from SIC and assist berth Manager.	Asst. Manager (Traffic)
		Submits consolidated list of dangerous goods in port including tankers in port and tank farms in port area.	
		Regulate the traffic in the area.	
Chief Manager (Port, Planning and Development)	Civil Coordinator	Inform MPCB and other environmental agencies and take necessary guidance.	Manager (I, II)
		Shall mobilize and dispatch sufficient number of vehicles to the site of emergency.	
		Shall be responsible to carry out urgent civil works as required.	
Chief Manager (Mechanical & Electrical)	In charge of Electrical Installation	Shall be responsible for uninterrupted electrical supply to vital equipment and utility at the berth.	Asst. Engineer
		Shall remain alert on duty for any electrical isolation of equipment during emergency.	
Sr. Dy. Chief Medical Officer	Medical Coordinator	Shall be responsible to organize and keep first aid team with ambulance & necessary medicines to attend to any injured person at the site of the accident.	Alternate Officer
		Shall coordinate with the local hospitals.	
Duty Pilot	In Charge of	Shall be ready on site for taking	Standby Pilot

Disaster Management Plan

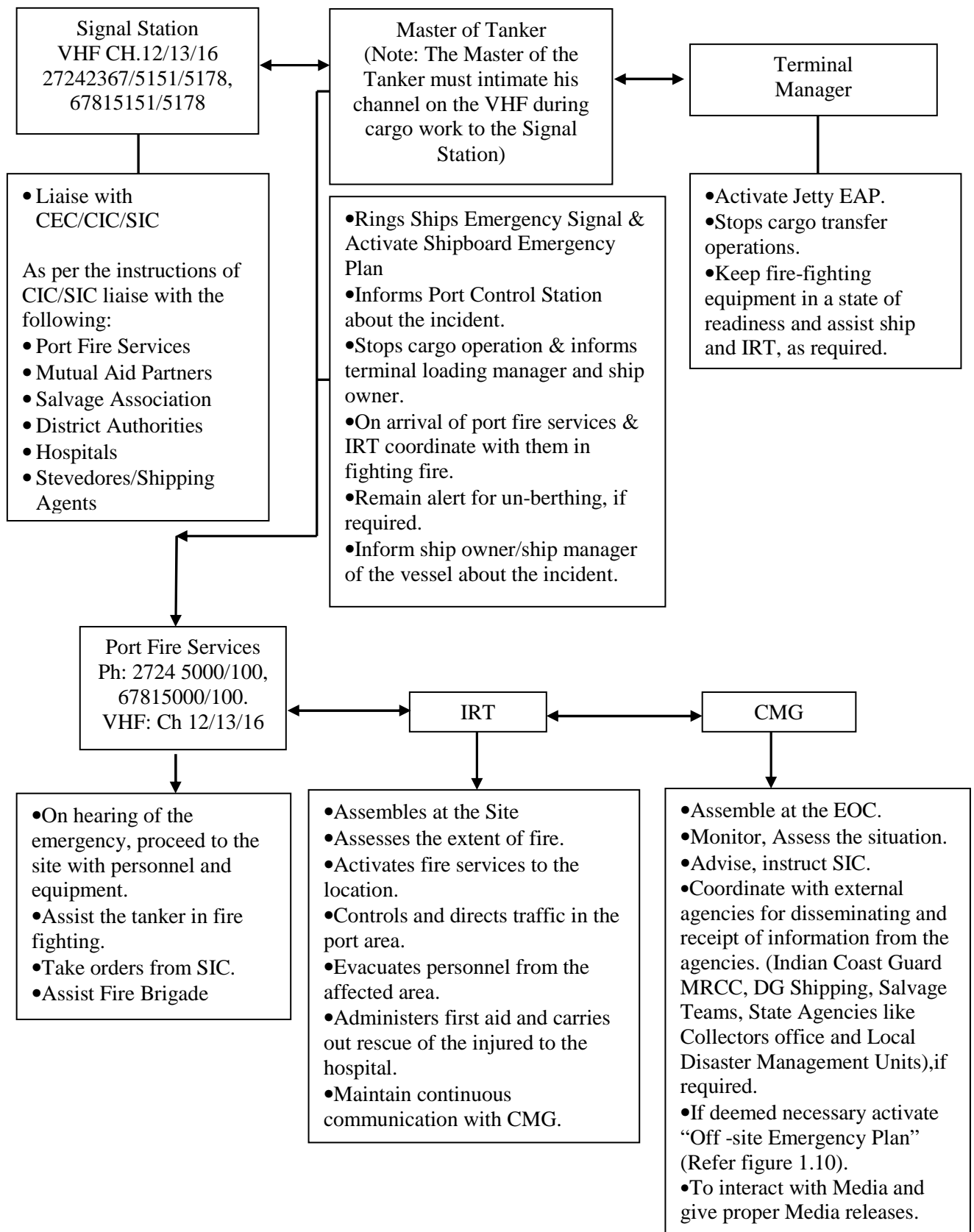
	Pilotage	the ship out of berth and be ready for providing any assistance on site.	
Manager (Marine Engg.)	ME Coordinator	Responsible for organizing tugs for combating the fire and rescue. Hire additional crafts as necessary.	Sr. Dy. Manager (Marine Engg.)

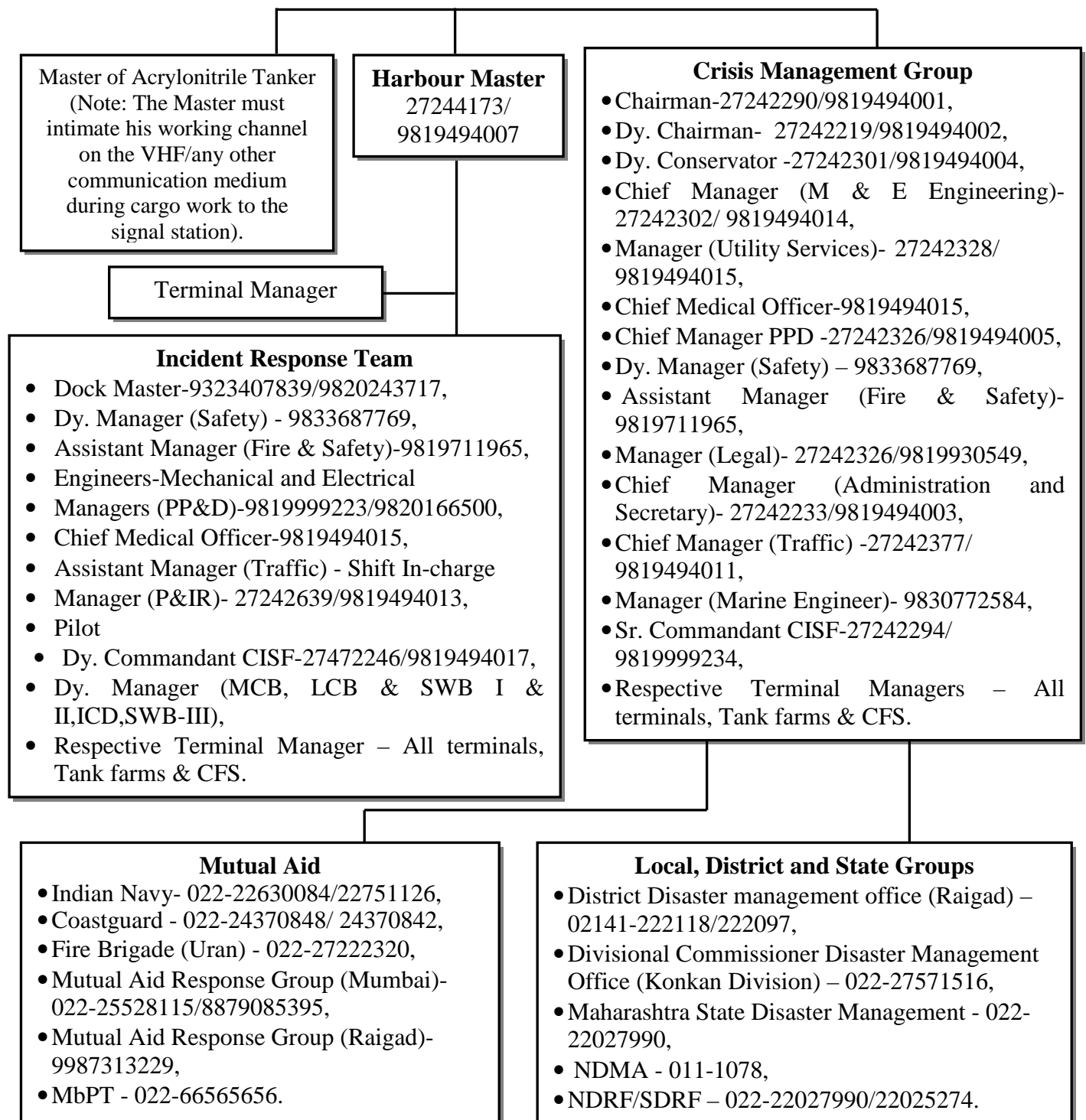
S4: Scenario 4**Part A:**

- 1. Toxic gas (Acrylonitrile) leak at Shallow water berth during operation – on Ship or Ashore.**
- 2. Precautions:** MSDS, SOP of terminal and berthing and un-berthing procedures. Stay upwind and wear positive-pressure breathing apparatus and full protective clothing, as necessary.
- 3. Impact Zone:** Consequence analysis indicates that the Acrylonitrile leak from pipeline would cover to the 5 KM for toxic dispersion with IDLH level of 85 ppm.
- 4. Resources required:** Organizational setup enumerated in Figure S4.2 and major material and equipment resources as given in **Appendix B**.
Important: Trained medical personnel and fire fighters as Acrylonitrile is toxic.

Disaster Management Plan

Figure S4.1: Action Flow Chart



*Disaster Management Plan***Figure S4.2:** Action group

*Disaster Management Plan***Part B: Action Plan**

The vessel upon berthing terminal will follow standard procedures. However, in a less likely scenario a leak from the pipeline system may occur at the jetty leading to self-detection by vessel personnel or by the terminal automatic alarm system. The following action will be required

Spill handling: Evacuate and restrict person's not wearing protective equipment from area of spill or leak until cleanup is complete. Remove all ignition sources. Stop the flow of gas if it can be done safely. Stay upwind; keep out of low areas. Wear positive pressure breathing apparatus and full protective clothing.

1. The Master of the Ship (Alternate: Chief Officer)

Response Action	Contact
a. Should raise ships emergency alarm and activate ship board emergency action plan.	
b. Stop transfer operation (as per SOP of the ship).	
c. Terminal, Vessel in the vicinity and Port should be informed of any incident on the ship without delay.	<ul style="list-style-type: none"> • Terminal • Vessel in the vicinity • Port Control Station
d. Personnel to remain stand by to disconnect metal arms;	
e. Shall be responsible to arrest the leak and for fighting the fire with ships own resources as well as with the available support from IRT.	
f. Also, to remain prepared to un-berth the ship to the safe area (high sea).	
g. The siren should be continued till the ship is taken to a safe location as per CIC instructions.	

2. The terminal persons tasked with cargo operations at the berth should

Take personal precautions, protective equipment and follow emergency procedures. Wear respiratory protection. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas. Environmental precautions: Prevent further leakage or spillage if safe to do so.

Contain spillage, and then collect with an electrically protected vacuum cleaner (vehicle mounted in some cases) or by wet-brushing and place in container for disposal.

Response Action	Contact
a. Activate Jetty EAP (prepared by the terminal) and inform JNPT.	<ul style="list-style-type: none"> • Port Control Station
b. Shut off isolation valve on pipeline at the berth (action as per SOP of the terminal).	
c. Area should be cordoned off.	

Disaster Management Plan

d. Assist IRT and provide all necessary equipment.	
e. He will direct operation staff. Coordinate with the ship in-charge/C&F agents/stevedores.	

3. Deputy Conservator (Alternate: Harbour Master)

Response Action	Contact
a. Assess the level of disaster and activate the DMP.	
b. Establish EOC and be stationed to review & assess possible developments to determine the most necessary course of action.	
c. Give necessary instructions to SIC and Port Control Station & arrange for external aid as necessary.	<ul style="list-style-type: none"> • SIC • Port Control Station
d. Review the situation and accordingly inform to the Chairman/ Dy. Chairman.	<ul style="list-style-type: none"> • Chairman • Dy. Chairman
e. Consult with Chairman / Dy. Chairman and decide on clearing of ships in close proximity to the incident location or to sail the tanker to the higher seas and evacuating the people from the likely affected zone.	
f. Take decision on evacuation in consultation with SIC.	<ul style="list-style-type: none"> • SIC
g. Be in constant touch with District and Local Administration for rescue and relief operation.	
h. Terminate the response and debrief before allowing normal operation.	

4. The Port Control Station

Response Action	Contact
a. Gather information related to the weather conditions. Monitor the wind directions and accordingly convey the message to Master of the vessel, CIC/SIC and F& SO.	<ul style="list-style-type: none"> • Master of the vessel, CIC • SIC • F& SO
b. Liaise with Master of the Vessel/Pilot.	<ul style="list-style-type: none"> • Master of the Vessel • Pilot
c. Listening watch to be maintained on VHF channel-16 and walkie-talkie channel-12.	
d. Notify to CIC, SIC and the vessels moving into, through and inside the port. Keep CIC/SIC informed of all the messages received by telephone, VHF sets or by messenger.	<ul style="list-style-type: none"> • CIC • SIC
e. Notify the other Authorities and stakeholders within Port as per instructions of CIC/SIC.	<ul style="list-style-type: none"> • Navy • Coastguard • Stakeholders

Disaster Management Plan

- | | |
|---|--|
| f. Notify the information to the owner of the vessel as per the instruction of CIC/SIC/ Master of the Vessel. | |
|---|--|

5. The Fire-fighting Personnel should

Response Action	Contact
a. Raise Alarm (siren).	
b. Start the pumps as per the requirement.	
c. Use water sprays and portable nozzles to maintain curtain and dilution.	
d. Open the valves of the monitors and direct the jet on the seat of fire, in case of fire.	
e. Inform fire officers to arrange for fire-fighting tug and Marine Engineer to arrange for tugs, as required.	<ul style="list-style-type: none"> • F&SO • Marine Engineer
f. In case of leakage/fire onboard assist Master in arresting the leak/diluting the vapour/ fighting fire as per Masters Instructions.	
g. Announce in mobile van with PA system in the effecting zones to evacuate the zone. Ensure complete evacuation and report to the EOC.	
h. Ensure all the ignition sources in the vicinity is extinguished if fire has not occurred.	
i. If the situation is under control, give all clear signals.	

6. Duties of IRT

Designated Officer	Role	Duties	Alternate Officer
Harbour Master	Site Incident Controller	During Emergency shall proceed to the scene & communicate & collect all information from the Master of the Tanker, Berth Manager and Terminal Manager.	Dock Master
		Conduct initial Briefing.	
		Report the situation to the CIC/CMG and assist CIC in assessing the incident.	
		Initiate DMP.	
		Shall assess and decide on the evacuation of the personnel considering the direction of wind and dispersion and will instruct Safety Officer and CISF to carry out the evacuation in a safe manner.	

Disaster Management Plan

		Alert vessels within the vicinity. He will extend all necessary help to the Master of the ship to fight the fire.	
		Instruct the Asst. Manager (Fire and Safety) to keep the fixed Fire-fighting installation in a state of readiness & activate if required to fight fire or for disperse the vapour cloud.	
		Instruct Dock Master/ Marine Engineer(s) to keep tugs ready for fire fighting.	
		Coordinate with all functional heads to take actions.	
Dock Master	Port Control Room Coordinator	Shall monitor the communication on VHF/any other communication medium & convey and relay messages on the advice from CIC /SIC.	Duty Supervisor
		Responsible for organizing tugs, mooring boats and Pilots for combating the fire and rescue.	
		Hire additional crafts as necessary.	
		Maintain Log of events.	
Terminal Manager	Cargo Work	Shall be responsible of shutting down of cargo operation & coordinating with JNPT and rendering necessary assistance to the SIC by providing additional emergency equipment as required.	Assistant Terminal Manager
Asst. Manager (Fire and Safety)	Fire Coordinator	Shall take orders from the SIC.	Station Officer
		Lead the fire fighting team and mobilize fire tenders, men & fire-fighting equipment to the scene & extend all necessary support to the Master of the vessel/Terminal Manager/Berth Manager for fire fighting.	
		Inform SIC for arrangement of any additional equipment as required.	
Dy. Manager (Safety)	Marine Pollution Control Coordinator	Shall take orders from SIC.	Safety Inspector
		Assist in evacuation of the personnel to the assembly point or as directed by SIC.	

Disaster Management Plan

Sr. Commandant- CISF	Security and Evacuation	Shall take orders from the SIC.	Dy. Commandant- CISF
		Cordon off the area.	
		Controls & Directs gate security and traffic in the area.	
		Shall facilitate evacuation, transport, first aid and rescue of personnel from the scene at the time of emergency.	
		Control the entry of unauthorized persons and vehicles.	
		Check for entry of emergency vehicles.	
		Liaise with the Police authorities.	
Responsible the head count of the personnel.			
Chief Manager (Traffic)	Traffic Coordinator	Shall take orders from SIC and assist berth Manager.	Asst. Manager (Traffic)
		Submits consolidated list of dangerous goods in port including tankers in port and tank farms in port area.	
		Regulate the traffic in the area.	
Chief Manager (Port, Planning and Development)	Civil Coordinator	Inform MPCB and other environmental agencies and take necessary guidance.	Manager (I, II)
		Shall mobilize and dispatch sufficient number of vehicles to the site of emergency.	
		Shall be responsible to carry out urgent civil works as required.	
Chief Manager (Mechanical & Electrical)	In charge of Electrical Installation	Shall be responsible for uninterrupted electrical supply to vital equipment and utility at the berth.	Asst. Engineer
		Shall remain alert on duty for any electrical isolation of equipment during emergency.	
Sr. Dy. Chief Medical Officer	Medical Coordinator	Shall be responsible to organize and keep first aid team with ambulance & necessary medicines to attend to any injured person at the site of the accident.	Alternate Officer
		Shall coordinate with the local hospitals.	

Disaster Management Plan

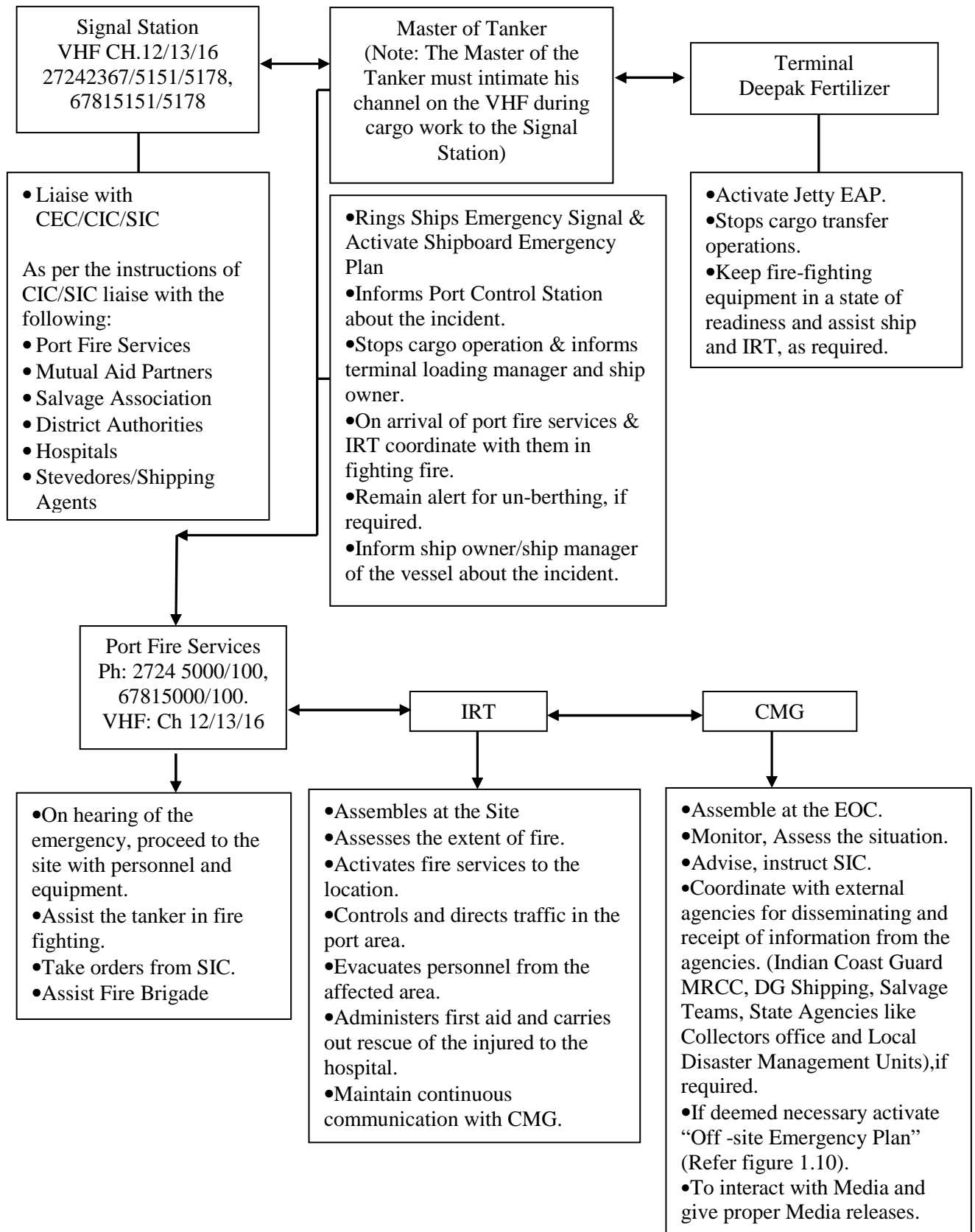
Duty Pilot	In Charge of Pilotage	Shall be ready on site for taking the ship out of berth and be ready for providing any assistance on site.	Standby Pilot
Manager (Marine Engg.)	ME Coordinator	Responsible for organizing tugs for combating the fire and rescue. Hire additional crafts as necessary.	Sr. Dy. Manager (Marine Engg.)

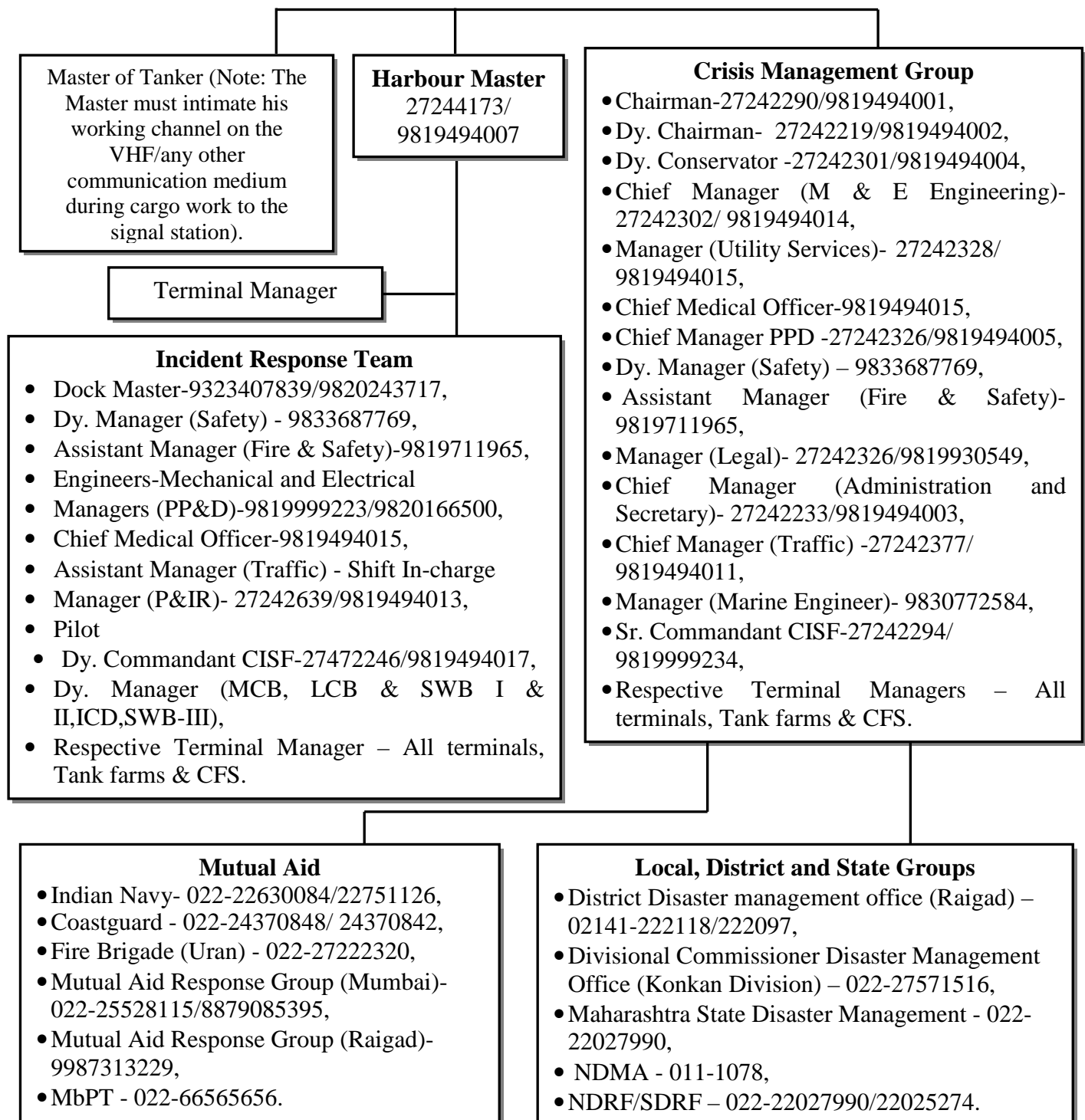
S5: Scenario 5**Part A**

1. **Corrosive Acid - Leakage (Phosphoric acid) at BPCL Liquid Cargo Jetty during operation – on Ship or Ashore.**
2. **Precautions:** MSDS, SOP of terminal and berthing and un-berthing procedures.
3. **Impact Zone:** Respective Jetty.
4. **Resources required:** Organizational setup enumerated in Figure S5.2 and major material and equipment resources as given in **Appendix B**.

Disaster Management Plan

Figure S5.1: Action Flow Chart



*Disaster Management Plan***Figure S5.2:** Action group

Disaster Management Plan

Part B: Action Plan

The vessel upon berthing terminal will follow standard procedures. However, in a less likely scenario a leak from the pipeline system may occur at the jetty leading to detection by vessel personnel or by the terminal alarm system. The following action will be required.

1. The Master of the Ship (Alternate: Chief Officer)

Response Action	Contact
a. Should raise ships emergency alarm and activate ship board emergency action plan.	
b. Stop transfer operation (as per SOP of the ship).	
c. Terminal, Vessel in the vicinity and Port should be informed of any incident on the ship without delay.	<ul style="list-style-type: none"> • Terminal • Vessel in the vicinity • Port Control Station
d. Personnel to remain stand by to disconnect hoses;	
e. Shall be responsible to arrest the leak with ships own resources as well as with the available support from IRT.	
f. Also, to remain prepared to un-berth the ship to the safe area (high sea).	
g. The siren should be continued till the ship is taken to a safe location as per CIC instructions.	

2. The terminal persons tasked with cargo operations at the Jetty should

Response Action	Contact
a. Activate Jetty EAP (prepared by the terminal) and inform JNPT.	<ul style="list-style-type: none"> • Port Control Station
b. Shut off isolation valve on pipeline at the berth (action as per SOP of the terminal).	
c. Area should be cordoned off.	
d. Assist IRT and provide all necessary equipment.	
e. Responsible for diluting and neutralizing the acids and disposal of the neutralized liquids down the drain.	
f. He will direct operation staff. Coordinate with the ship in-charge/C&F agents/stevedores.	

3. Deputy Conservator (Alternate: Harbour Master)

Response Action	Contact
a. Assess the level of disaster and activate the DMP.	
b. Establish EOC and be stationed to review & assess possible developments to determine the most necessary course of action.	
c. Give necessary instructions to SIC and Port Control	<ul style="list-style-type: none"> • SIC

Disaster Management Plan

Station & arrange for external aid as necessary.	<ul style="list-style-type: none"> • Port Control Station
d. Review the situation and accordingly inform to the Chairman/ Dy. Chairman.	<ul style="list-style-type: none"> • Chairman • Dy. Chairman
e. Decide on clearing of ships in close proximity to the incident location or to sail the tanker to the higher seas and evacuating the people from the likely affected zone.	
f. Assess the condition of site and take decision on evacuation in consultation with SIC.	<ul style="list-style-type: none"> • SIC
g. Be in constant touch with District and Local Administration for rescue and relief operation.	
h. Terminate the response and debrief before allowing normal operation.	

4. The Port Control Station

Response Action	Contact
a. Gather information related to the vessel type, cargo quantity and position.	
b. Gather information related to the weather conditions. Monitor the wind directions and accordingly convey the message to Master of the vessel, SIC and F& SO.	<ul style="list-style-type: none"> • Master of the vessel • SIC • F& SO
c. Liaise with Master of the Vessel/Pilot.	<ul style="list-style-type: none"> • Master of the Vessel • Pilot
d. Listening watch to be maintained on VHF channel-16 and walkie-talkie channel-12.	
e. Notify to CIC, SIC and the vessels moving into, through and inside the port. Keep CIC/SIC informed of all the messages received by telephone, VHF sets or by messenger.	<ul style="list-style-type: none"> • CIC • SIC
f. Notify the other Authorities and stakeholders within Port as per instructions of CIC/SIC.	<ul style="list-style-type: none"> • Navy • Coastguard • Stakeholders
g. Notify the information to the owner of the vessel as per the instruction of CIC/SIC/ Master of the Vessel.	

*Disaster Management Plan***5. Duties of IRT**

Designated Officer	Role	Duties	Alternate Officer
Harbour Master	Site Incident Controller	During Emergency shall proceed to the scene & communicate & collect all information from the Master of the Tanker, Berth Manager and Terminal Manager.	Dock Master
		Conduct initial Briefing.	
		Report the situation to the CIC/CMG and assist CIC in assessing the incident.	
		Initiate DMP.	
		Assess the condition of site and take decision on evacuation in consultation with CIC.	
		Alert vessels within the vicinity.	
		Extend all necessary help to the Master of the ship.	
		Instruct the Asst. Manager (Fire and Safety) to keep the fixed fire fighting installation in a state of readiness & activate if required.	
		Instruct Dock Master/ Marine Engineer(s) to keep tugs ready for fire fighting.	
Coordinate with all functional heads to take actions.			
Dock Master	Port Control Room Coordinator	Shall monitor the communication on VHF/any other communication medium & convey and relay messages on the advice from CIC /SIC.	Duty Supervisor
		Responsible for organizing tugs for rescue.	
		Hire additional crafts as necessary.	
		Maintain Log of events.	
Master of the tanker	In Charge of fire fighting operation on board vessel	Coordinate with action group leader and will be responsible for shutting down all cargo operation on board in coordination with terminal In Charge.	Chief Officer of Tanker
		Shall unberth the vessel as per the instruction of SIC, if required.	
Terminal	Cargo Work	Shall be responsible of shutting	

Disaster Management Plan

Managers- BPCL and Deepak Fertilizer		down of cargo operation & coordinating with JNPT and rendering necessary assistance to the SIC by providing additional emergency equipment as required.	Assistant Terminal Manager
Asst. Manager (Fire and Safety)	Fire Coordinator	Shall take orders from the SIC.	Station Officer
		Lead the fire fighting team and mobilize fire tenders, men & fire-fighting equipment to the scene & extend all necessary support to the Master of the vessel/Terminal Manager/Berth Manager.	
		Inform SIC for arrangement of any additional equipment as required.	
Dy. Manager (Safety)	Marine Pollution Control Coordinator	Shall take orders from the SIC. Assist in evacuation of the personnel to the assembly point or as directed by SIC.	Safety Inspector
		Conduct clean- up work during and after the emergency as quick as possible.	
Sr. Commandant- CISF	Security and Evacuation	Shall take orders from the SIC.	Dy. Commandant- CISF
		Cordon off the area.	
		Controls & Directs gate security and traffic in the area.	
		Shall facilitate evacuation, transport, first aid and rescue of personnel from the scene at the time of emergency.	
		Control the entry of unauthorized persons and vehicles.	
		Check for entry of emergency vehicles Liaise with the State Police.	
Responsible the head count of the personnel.			
Chief Manager (Traffic)	Traffic Coordinator	Shall take orders from SIC and assist Manager SWB.	Asst. Manager (Traffic)
		Regulate the traffic in the area.	
Chief Manager (Port, Planning and Development)	Civil Coordinator	Inform MPCB and other environmental agencies and take necessary guidance.	Manager (I, II)
		Shall mobilize and dispatch sufficient number of vehicles to the site of emergency.	

Disaster Management Plan

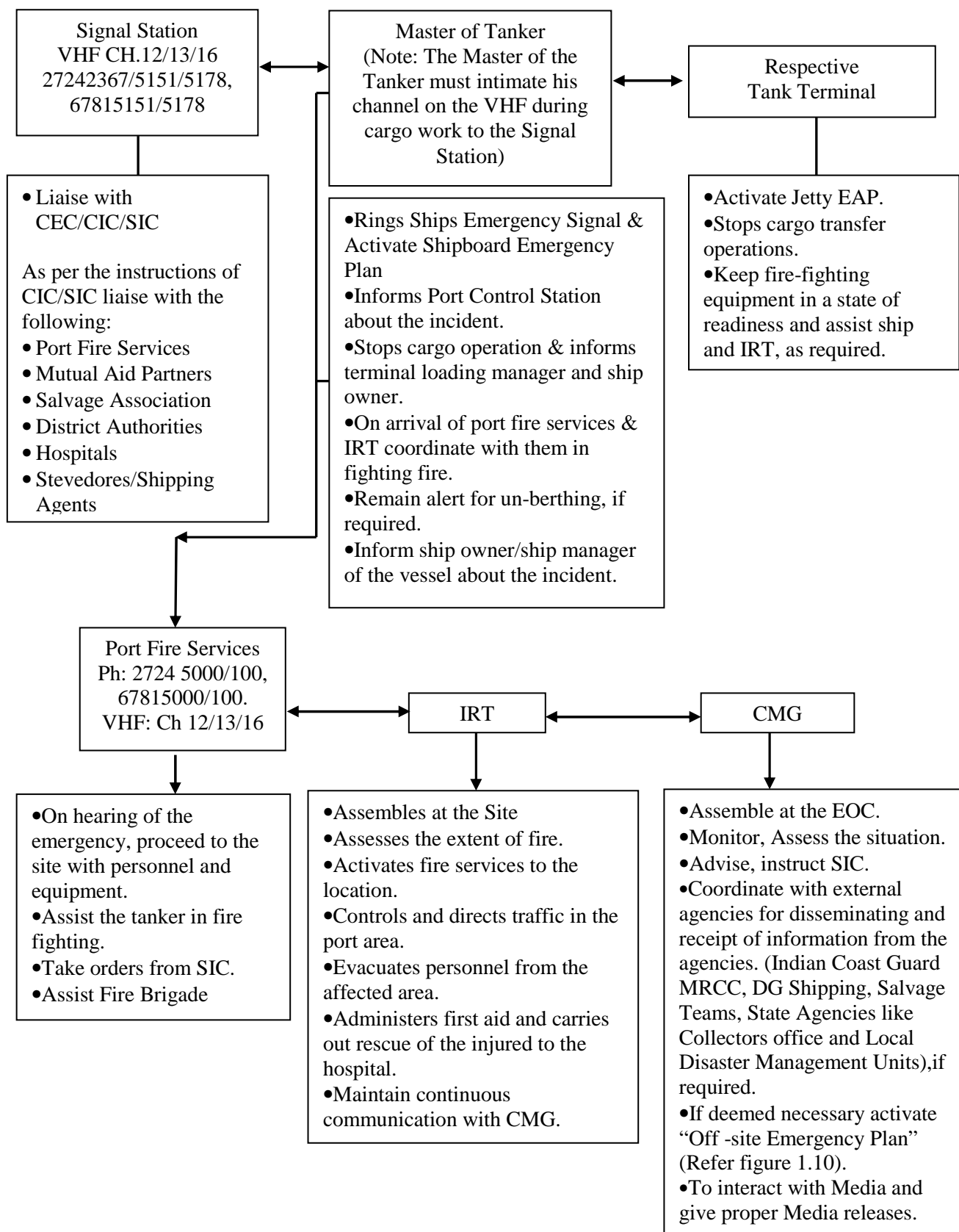
		Shall be responsible to carry out urgent civil works as required.	
Chief Manager (Mechanical &Electrical)	In charge of Electrical Installation	Shall be responsible for uninterrupted electrical supply to vital equipment and utility at the berth.	Asst. Engineer
		Shall remain alert on duty for any electrical isolation of equipment during emergency.	
Sr. Dy. Chief Medical Officer	Medical Coordinator	Shall be responsible to organize and keep first aid team with ambulance & necessary medicines to attend to any injured person at the site of the accident.	Alternate Officer
		Shall coordinate with the local hospitals.	
Duty Pilot	In Charge of Pilotage	Shall be ready on site for taking the ship out of berth and be ready for providing any assistance on site.	Standby Pilot
Manager (Marine Engg.)	ME Coordinator	Responsible for organizing tugs for rescue.	Sr. Dy. Manager (Marine Engg.)
		Hire additional crafts as necessary.	

S6: Scenario 6**Part A:**

1. **Fire /Explosion at Shallow Water Berth (SWB) during handling of Chemicals – on Ship or Ashore.**
2. **Precautions:** MSDS, SOP of terminal and berthing and un-berthing procedure.
3. **Impact Zone:** Refer **Appendix E** and Risk Assessment report.
Consequence analysis indicates that the MTBE leak from pipeline would cover approx. 500 meters for Vapor cloud explosion (VCE) scenario.
4. **Resources required:** Organizational setup enumerated in Figure S6.2 and major material and equipment resources as given in **Appendix B**.

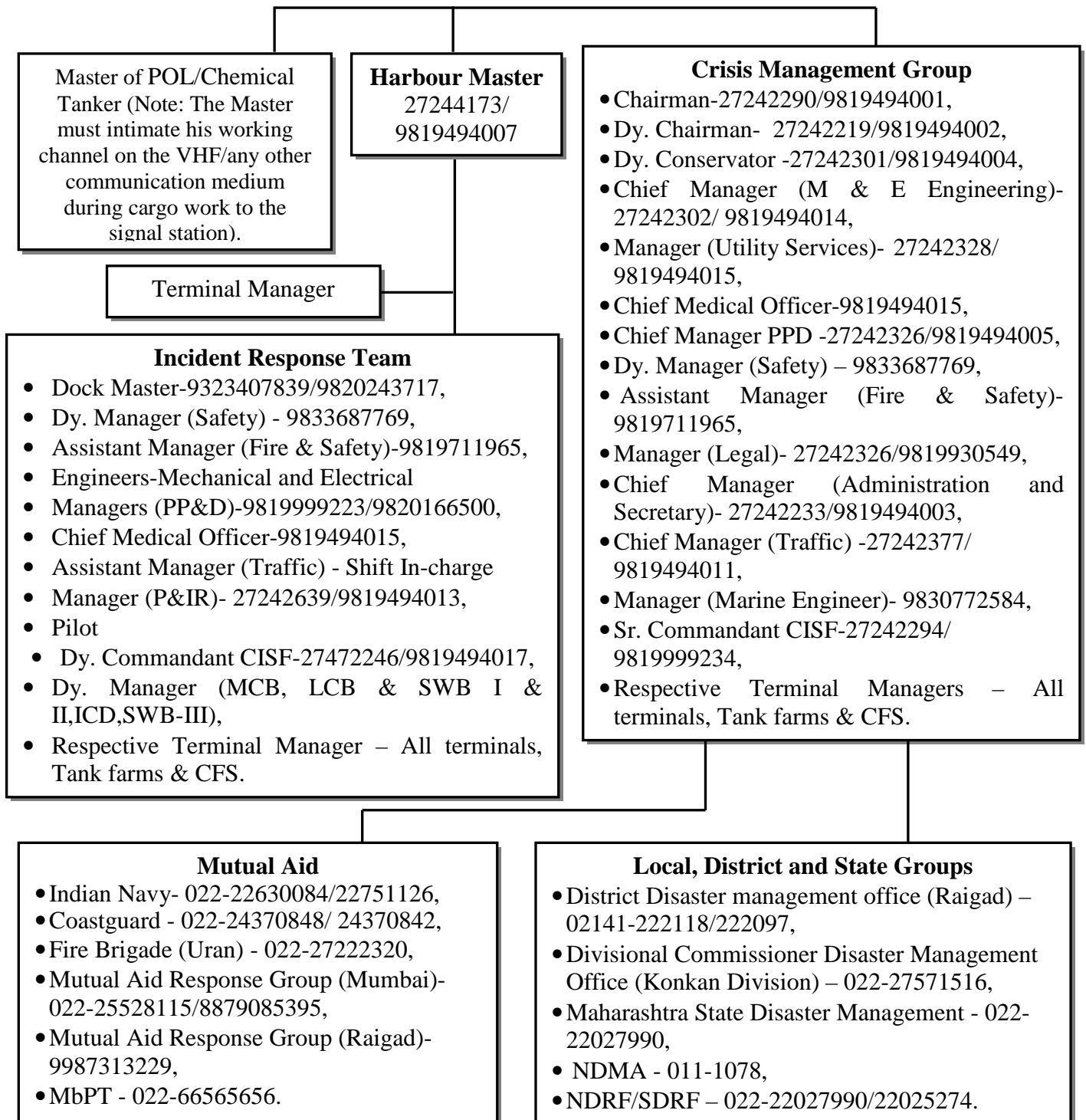
Disaster Management Plan

Figure S6.1: Action Flow Chart



Disaster Management Plan

Figure S6.2: Action group



Disaster Management Plan

Part B: Action Plan

The vessel upon berthing terminal will follow standard procedures. However, in a less likely scenario a leak from the pipeline system may occur at the jetty leading to self-detection by vessel personnel or by the terminal automatic alarm system. Further in a more unlikely situation due to a possible ignition the leakage might catch fire and leading to explosion. The following action will be required

1. The Master of the Ship (Alternate: Chief Officer)

Response Action	Contact
a. Should raise ships emergency alarm and activate ship board emergency action plan.	
b. Stop Chemical transfer operation (as per SOP of the ship).	
c. Terminal, Vessel in the vicinity and Port should be informed of any incident on the ship without delay.	<ul style="list-style-type: none"> • Terminal • Port Control Station
d. Personnel to remain stand by to disconnect hoses.	
e. Shall be responsible for fighting the fire with ships own resources as well as with the available support from IRT.	
f. Also, to remain prepared to un-berth the ship to the safe area (high sea).	
g. The siren should be continued till the ship is taken to a safe location as per CIC instructions.	

2. The terminal persons tasked with Chemical cargo operations at the Jetty should

Response Action	Contact
a. Activate Jetty EAP (prepared by the terminal) and inform JNPT.	Port Control Station
b. Shut off isolation valve on Chemical pipeline at the berth (action as per SOP of the terminal).	
c. Area should be cordoned off.	
d. Pour foam/dry chemical powder on Chemical spillage to reduce rate of vaporization.	
e. Assist IRT and provide all necessary equipment.	
f. He will direct operation staff.	
g. Coordinate with the ship in-charge/C&F agents/stevedores.	

3. Deputy Conservator (Alternate: Harbour Master)

Response Action	Contact
a. Assess the level of disaster and activate the DMP.	
b. Establish EOC and be stationed to review & assess possible developments to determine the most necessary course of action.	

Disaster Management Plan

c. Give necessary instructions to SIC and Port Control Station & arrange for external aid as necessary.	<ul style="list-style-type: none"> • SIC • Port Control Station
d. Review the situation and accordingly inform to the Chairman/ Dy. Chairman.	<ul style="list-style-type: none"> • Chairman • Dy. Chairman
e. Assess the condition of site and of potential affected area and take decision on evacuation in consultation with SIC.	<ul style="list-style-type: none"> • SIC
f. Be in constant touch with District and Local Administration for rescue and relief operation.	
g. Terminate the response and debrief before allowing normal operation.	

4. The Port Control Station

Response Action	Contact
a. Gather information related to the weather conditions. Monitor the wind directions and accordingly convey the message to CIC/SIC and F& SO.	<ul style="list-style-type: none"> • CIC • SIC • F&SO
b. Liaise with Master of the Vessel/Pilot.	<ul style="list-style-type: none"> • Master of the Vessel • Pilot
c. Listening watch to be maintained on VHF channel-16 and walkie-talkie channel-12.	
d. Notify to CIC, SIC and the vessels moving into, through and inside the port. Keep CIC/SIC informed of all the messages received by telephone, VHF sets or by messenger.	<ul style="list-style-type: none"> • CIC • SIC
e. Notify the other Authorities and stakeholders within Port as per instructions of CIC/SIC.	<ul style="list-style-type: none"> • Navy • Coastguard • Stakeholders
f. Notify the information to the owner of the vessel as per the instruction of CIC/SIC/ Master of the Vessel.	

5. The Fire-fighting personnel should

Response Action	Contact
a. Raise Alarm (siren)	
b. Start the pumps as per the requirement	
c. Use water sprays and portable nozzles to maintain curtain.	
d. Open the valves of the monitors and direct the jet on the seat of fire.	
e. Inform fire officers to arrange for fire-fighting tug and Marine Engineer to arrange for tugs , as required.	<ul style="list-style-type: none"> • F&SO • Marine Engineer
f. In case of fire onboard assist Master in fighting fire as per Masters Instructions.	

Disaster Management Plan

g. Ensure all the ignition sources in the vicinity are extinguished if fire has not occurred.	
h. If the fire is under control and extinguished, give all clear signal.	

6. Duties of IRT

Designated Officer	Role	Duties	Alternate Officer
Harbour Master	Site Incident Controller	During Emergency shall proceed to the scene & communicate & collect all information from the Master of the Tanker, Berth Manager and Terminal Manager.	Dock Master
		Conduct initial Briefing.	
		He will report the situation to the CIC/CMG and assist CIC in assessing the incident.	
		Initiate DMP.	
		Alert vessels within the vicinity.	
		Assess the condition of site and take decision on evacuation in consultation with CIC.	
		Extend all necessary help to the Master of the ship to fight the fire.	
		Instruct the Asst. Manager (Fire and Safety) to keep the fixed fire fighting installation in a state of readiness & activate if required.	
		Instruct Dock Master/ Marine Engineer(s) to keep tugs ready for fire fighting.	
		Coordinate with all functional heads to take actions.	
Dock Master	Port Control Room Coordinator	Shall monitor the communication on VHF/any other communication medium & convey and relay messages on the advice from CIC /SIC.	Duty Supervisor
		Responsible for organizing tugs for rescue.	
		Hire additional crafts as necessary.	
		Maintain Log of events.	
Tank Terminal Manager	Cargo Work	Shall be responsible of shutting down of cargo operation & coordinating with JNPT and	Assistant Terminal

Disaster Management Plan

		rendering necessary assistance to the SIC by providing additional fire fighting & emergency equipment as required.	Manager
Asst. Manager (Fire and Safety)	Fire Coordinator	Shall take orders from the SIC.	Station Officer
		Lead the fire fighting team and mobilize fire tenders, men & fire-fighting equipment to the scene & extend all necessary support to the Master of the vessel/Terminal Manager/Berth Manager for fire fighting.	
		Inform SIC for arrangement of any additional equipment as required.	
Dy. Manager (Safety)	Marine Pollution Control Coordinator	Shall take orders from the SIC. Ensure responsible actions for containing the run off fire water and other water from the damaged units.	Safety Inspector
		Assist in evacuation of the personnel to the assembly point or as directed by SIC.	
		Conduct clean- up work during and after the emergency as quick as possible.	
Sr. Commandant-CISF	Security and Evacuation	Shall take orders from the SIC.	Dy. Commandant-CISF
		Cordon off the area.	
		Controls & Directs gate security and traffic in the area.	
		Shall facilitate evacuation, transport, first aid and rescue of personnel from the scene at the time of emergency.	
		Control the entry of unauthorized persons and vehicles.	
		Check for entry of emergency vehicles.	
		Liaise with the Police authorities.	
Responsible the head count of the personnel.			
Chief Manager (Traffic)	Traffic Coordinator	Shall take orders from SIC and assist Manager LCB.	Asst. Manager (Traffic)

Disaster Management Plan

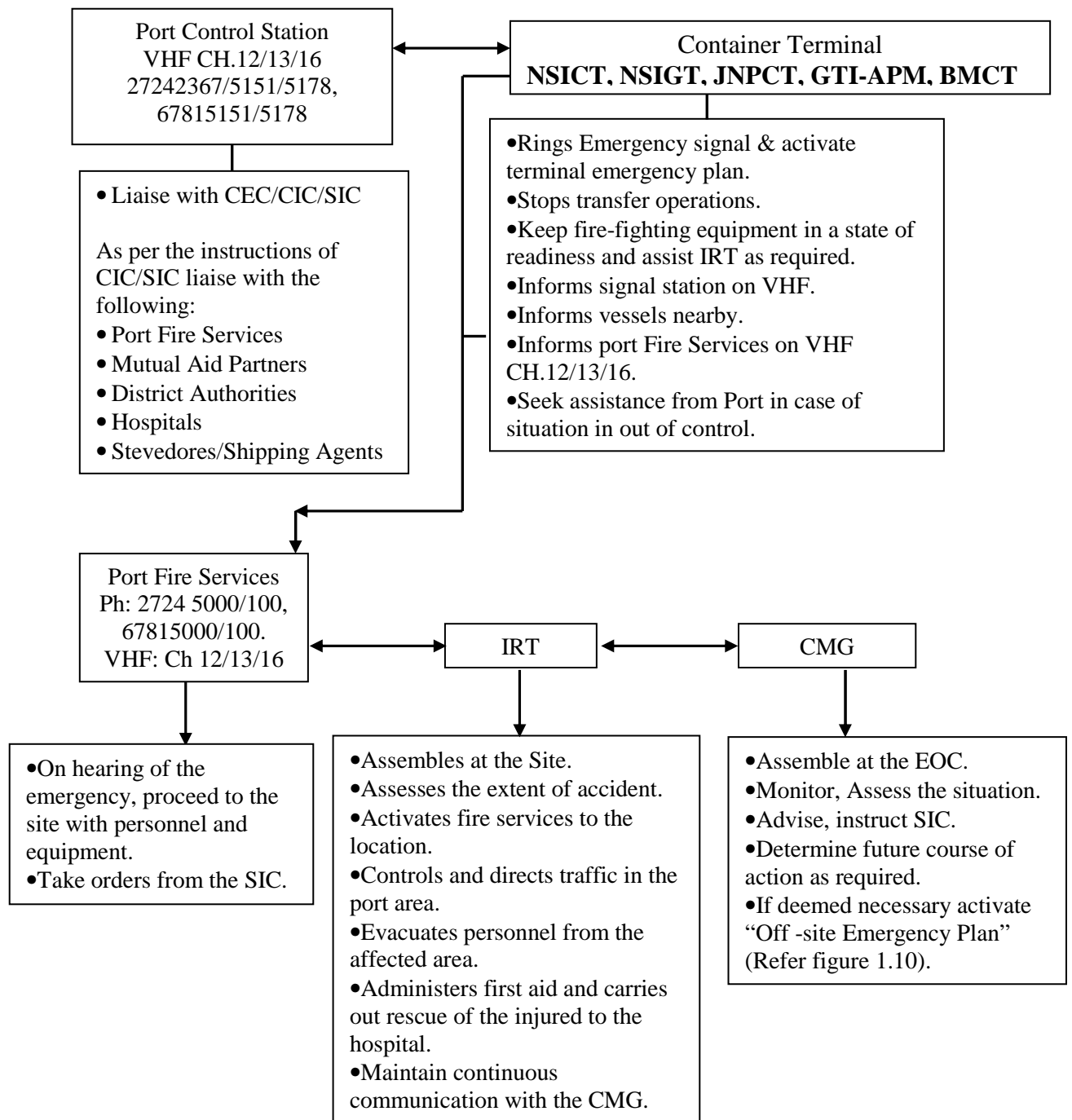
		Submits consolidated list of dangerous goods in port including tankers in port and tank farms in port area.	
		Regulate the traffic in the area.	
Chief Manager (Port, Planning and Development)	Civil Coordinator	Inform MPCB and other environmental agencies and take necessary guidance.	Manager (I, II)
		Shall mobilize and dispatch sufficient number of vehicles to the site of emergency.	
		Shall be responsible to carry out urgent civil works as required.	
Chief Manager (Mechanical & Electrical)	In charge of Electrical Installation	Shall be responsible for uninterrupted electrical supply to vital equipment and utility at the berth.	Asst. Engineer
		Shall remain alert on duty for any electrical isolation of equipment during emergency.	
Sr. Dy. Chief Medical Officer	Medical Coordinator	Shall be responsible to organize and keep first aid team with ambulance & necessary medicines to attend to any injured person at the site of the accident.	Alternate Officer
		Shall coordinate with the local hospitals.	
Duty Pilot	In Charge of Pilotage	Shall be ready on site for taking the ship out of berth and be ready for providing any assistance on site.	Standby Pilot
Manager (Marine Engg.)	ME Coordinator	Responsible for organizing tugs for combating the fire and rescue.	Sr. Dy. Manager (Marine Engg.)
		Hire additional crafts as necessary.	

S7: Scenario 7**Part A**

- 1. Damage due to Crane Accidents (Container drop/crane fall) at Container Terminal- NSICT, NSIGT, JNPCT, GTI-APM, BMCT.**
- 2. Precautions:** Trained personnel for operation of crane, SOP of the terminal.
- 3. Impact Zone:** Surrounding area.
- 4. Resources required:** Organizational setup enumerated in Figure S7.2 and major material and equipment resources as given in **Appendix B**.

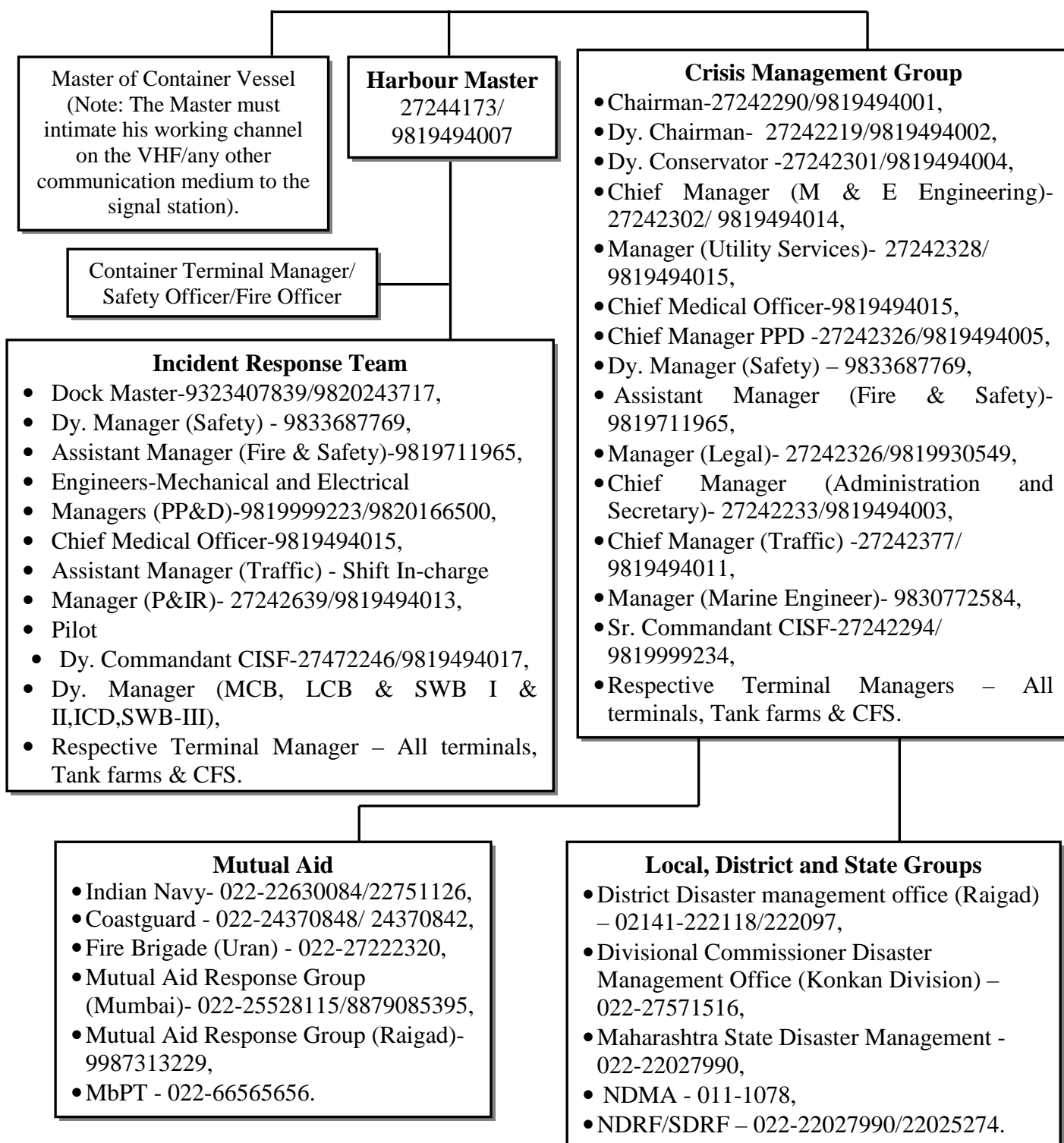
Disaster Management Plan

Figure S7.1: Action Flow Chart



Disaster Management Plan

Figure S7.2: Action group



*Disaster Management Plan***Part B: Action Plan**

1. The crane operator
 - a. Should raise emergency alarm and inform Terminal Manager and Port Control Station.

2. The terminal person at the Jetty should

Response Action	Contact
a. Activate EAP (prepared by the terminal) and inform JNPT and ask for assistance.	• Port Control Station
b. Area should be cordoned off.	
c. Stop transfer operations at the berth.	
d. Manage Truck movements.	
e. Assist IRT and Master of the Ship and provide all necessary equipment.	
f. He will direct operation staff.	
g. Interview operator and witnesses.	
h. Survey and cost damage to port installation. Complete maritime accident report. Give press reports.	
i. Distribute final report to concerned authorities.	

3. Deputy Conservator (Alternate: Harbour Master)

Response Action	Contact
a. Will be stationed at the EOC to review & assess possible developments to determine the most necessary course of action.	
b. He will give necessary instructions to SIC & arrange for external aid as necessary.	
c. Provide assistance to the Terminal.	

4. The Port Control Station

Response Action	Contact
a. Gather information regarding the incident and accordingly convey the message to CIC/SIC and F& SO.	• CIC • SIC • F& SO
b. Liaise with Master of the Vessels/Pilot.	• Master of the Vessels • Pilot
c. Listening watch to be maintained on VHF channel-16 and walkie-talkie channel-12.	
d. Keep CIC/SIC informed of all the messages received by telephone, VHF sets or by messenger.	• CIC • SIC
e. Notify the other Authorities and stakeholders within Port as per instructions of CIC/SIC.	• Navy • Coastguard

Disaster Management Plan

- Stakeholders

5. Duties of IRT

Designated Officer	Role	Duties	Alternate Officer
Harbour Master	Site Incident Controller	During Emergency shall proceed to the scene & communicate & collect all information from the crane operator/terminal manager.	Dock Master
		Assess and report the situation to the CIC/CMG (if required).	
		Alert vessels/trucks within the vicinity.	
		Instruct the Asst. Manager (Fire & Safety) to keep the fire fighting installation in a state of readiness & activate if required.	
Dock Master	Port Control Room Coordinator	Shall monitor the communication on VHF/any other communication medium & convey and relay messages on the advice from CIC/SIC.	Duty Supervisor
		Shall prepare vessels to vacate from berth (if required).	
		Responsible for organizing tugs for rescue. Instruct Pilot/Marine Engineers.	
		Hire additional crafts as necessary.	
		Maintain Log of events.	
Asst. Manager (Fire & Safety)	Fire Coordinator	Shall take orders from the SIC.	Station Officer
		Mobilize fire tenders, men & fire fighting equipments to the scene & extend all necessary support in case of fire.	
Dy. Manager (Safety)	Marine Pollution Control Coordinator	Investigate the incident and provide necessary guidance.	Safety Inspector
		Assist in Rescue.	
Sr. Commandant-CISF	Security Officer	Controls & Directs traffic in the area.	Dy. Commandant-CISF
		Shall supervise evacuation of personnel from the scene at the time of emergency.	

Disaster Management Plan

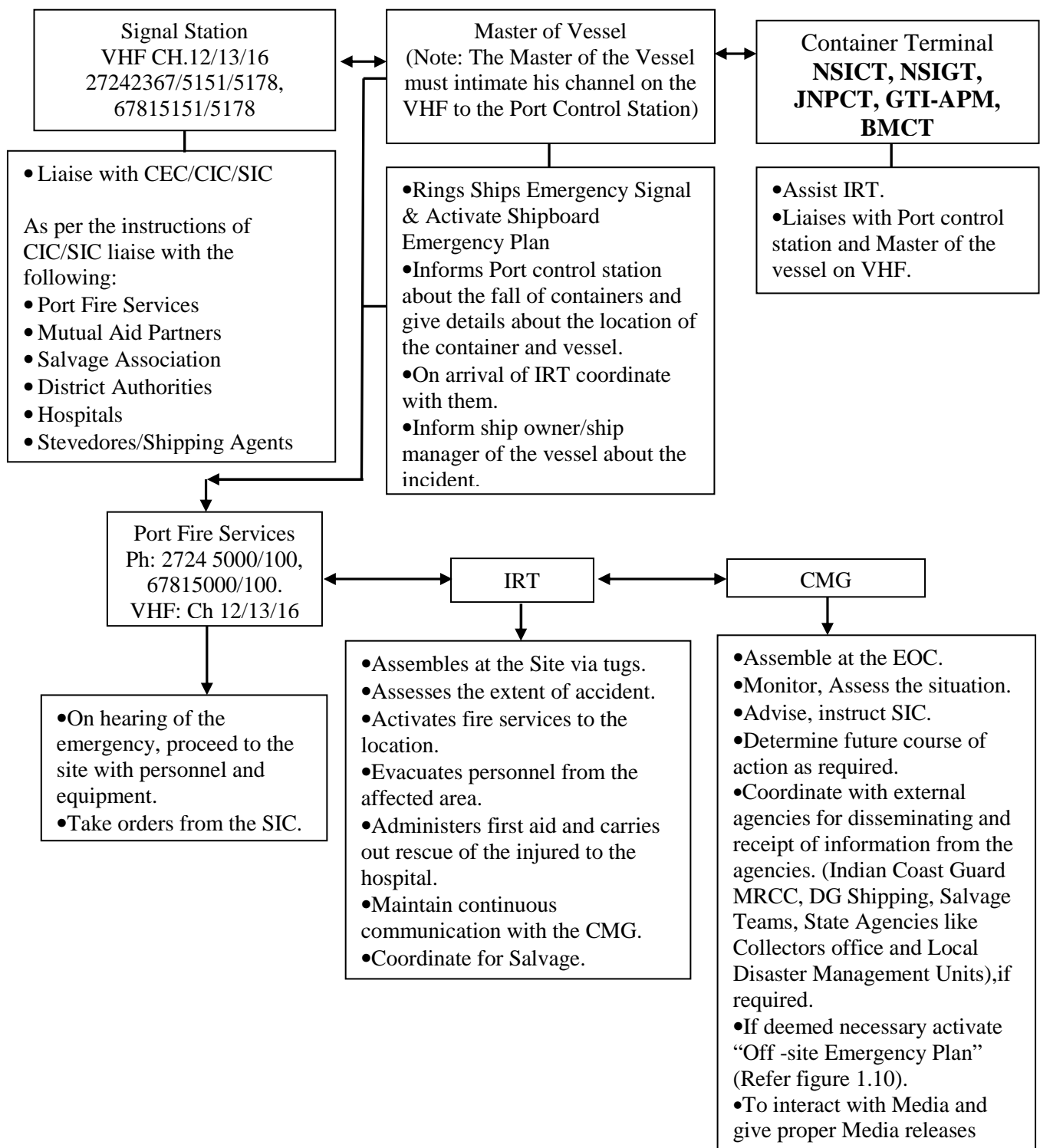
Chief Manager (PPD)	Civil Coordinator	Immobilizes faulty crane, informs manufacturer representative, port workshop superintendent / surveyor to inspect and investigate.	Manager (I, II)
Chief Manager (Mechanical & Electrical)	In-charge of Electrical Installation	Shall be responsible for Electrical supply to vital equipment and systems.	Asst. Engineer
		Arrange additional alternative shore cranes-power supply, wire slings blocks, shackles etc.	
Sr. Dy. Chief Medical Officer	Medical Coordinator	Shall be responsible to organize and keep first aid team with ambulance & necessary medicines to attend to any injured person at the site of the accident.	Alternate Officer
Chief Manager (Traffic)	Traffic Coordinator	Shall mobilize and dispatch sufficient number of vehicles to the site of emergency.	Asst. Manager (Traffic)
		Coordinates with SIC and Terminal manager.	
Duty Pilot	In-Charge of Pilotage	Shall be ready on site for providing any assistance.	Standby Pilot
Manager (Marine Engg.)	ME Coordinator	Responsible for organizing tugs for combating the fire and rescue.	Sr. Dy. Manager (Marine Engg.)
		Assist Dock Master.	

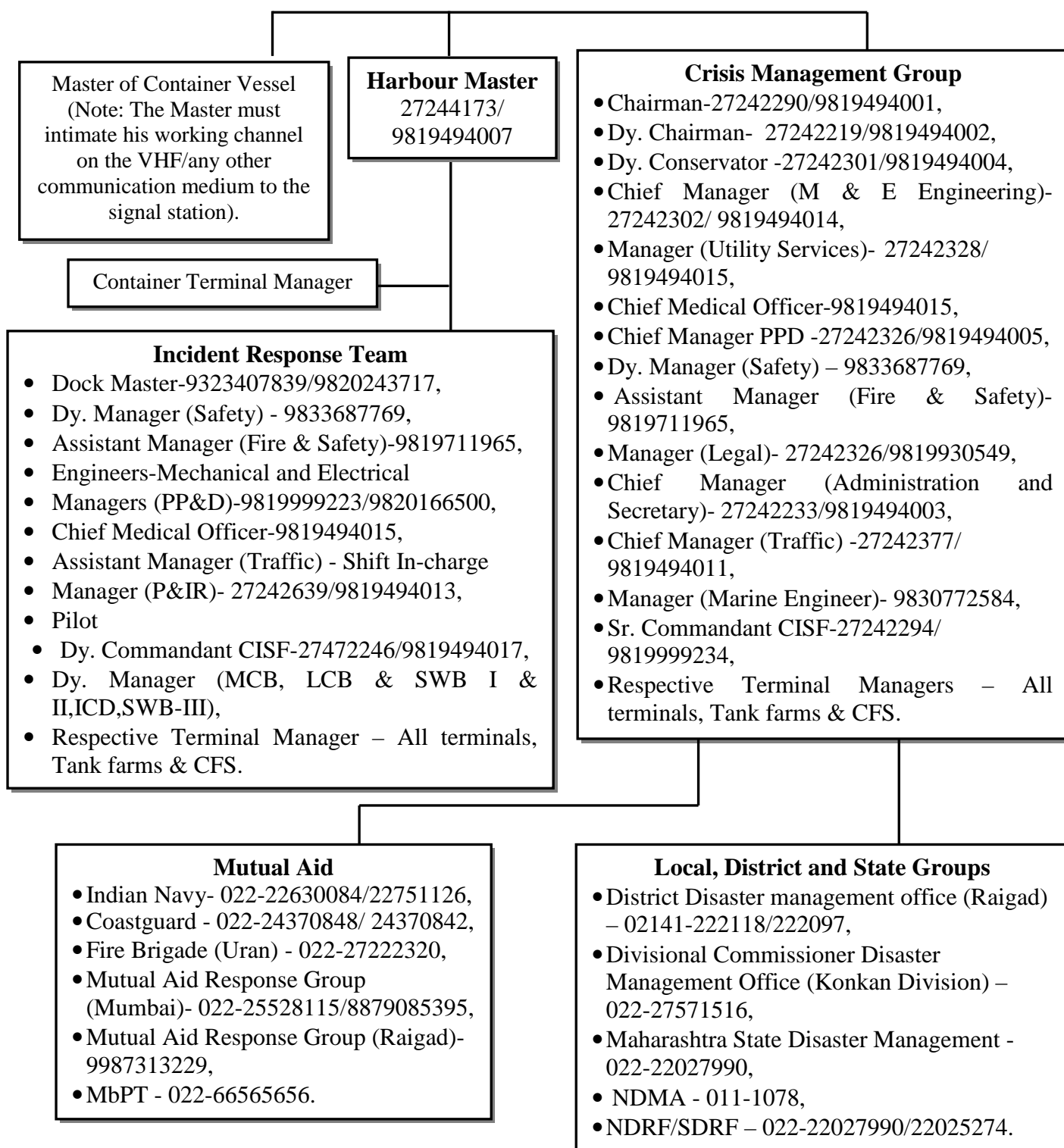
S8: Scenario 8**Part A:**

- 1. Containers falling into water in case of extreme weather, vessel collision or grounding.**
- 2. Precautions:** Navigational Aid, Designated Pilots, Continuous monitoring and communication with the Port Control Centre and Pilot. Depending on the level of incidents involving containers falling and their recovery will require a team of tugs and floating cranes apart from measures such as medical assistance to the stricken vessel. Offsite plan in terms of alerting the fishing vessels and normal shipping traffic, coast guard and Indian navy will have to be activated. Port will remain in touch with vessel and provide assistance within its jurisdiction. Near coastal villages and township authorities need to be alerted. The type of cargo hazardous/ non-hazardous is to be ascertained and communicated by the concerned vessel to the port. Temporary closure of navigation in vicinity of the incident may be required. Radars deployed for monitoring and reporting the floating containers by nearby vessels in port zone. Wreck marking incase of sink age of container will be required.
- 3. Impact Zone:** Incident Location and vicinity of the coastline involved.
- 4. Resources required:** Organizational setup enumerated in Figure S8.2 and major material and equipment resources as given in **Appendix B**.

Disaster Management Plan

Figure S8.1: Action Flow Chart



*Disaster Management Plan***Figure S8.2:** Action group

*Disaster Management Plan***Part B: Action Plan****1. The Master of the Vessel (Alternate: Chief Officer)**

Response Action	Contact
a. Should raise ships emergency alarm and activate ship board emergency action plan.	
b. Terminal, Vessel in the vicinity and Port should be informed of any incident on the ship without delay.	<ul style="list-style-type: none"> • Terminal • Vessel in the vicinity • Port Control Station
c. Details of the location and type of the container and vessel, type of cargo and quantity and time of incident should be given to the Port control station and the terminal.	
d. Inform ship owner/ship manager of the vessel about the incident.	

2. Port Control Station should

Response Action	Contact
a. Gather information related to the vessel position, container position and time of incident.	
b. Notify to CIC, SIC and the vessels moving into, through and near the casualty and inside the port.	<ul style="list-style-type: none"> • CIC • SIC • Navy • Coastguard • DG Shipping
c. Gather information about the weather and tide and notify CIC/SIC.	

3. Deputy Conservator (Alternate: Harbour Master)

Response Action	Contact
a. Assess the level of disaster and activate the DMP.	
b. Establish EOC and be stationed to review & assess possible developments to determine the most necessary course of action.	
c. Give necessary instructions to SIC and Port Control Station & arrange for external aid as necessary.	<ul style="list-style-type: none"> • SIC • Port Control Station
d. Review the situation and accordingly inform to the Chairman/ Dy. Chairman.	<ul style="list-style-type: none"> • Chairman • Dy. Chairman
e. Decide on clearing of ships in close proximity to the incident location.	
f. Be in constant touch with District and Local Administration for rescue and relief operation.	

Disaster Management Plan

g. Terminate the response and debrief before allowing normal operation.

4. Duties of IRT

Designated Officer	Role	Duties	Alternate Officer
Harbour Master	Site Incident Controller	During Emergency shall proceed to the scene & communicate & collect all information from the crane operator/terminal manager.	Dock Master
		Assess and report the situation to the CIC/CMG (if required).	
		Initiate DMP.	
		Alert vessels within the vicinity.	
		Extend all necessary help to the Master of the vessel.	
		Instruct Dock Master/ Marine Engineers to keep tugs ready.	
		He will coordinate with all functional heads to take actions.	
Dock Master	Port Control Room Coordinator	Shall monitor the communication on VHF/any other communication medium & convey and relay messages on the advice from CIC/SIC.	Duty Supervisor
		Shall prepare vessels to vacate from berth (if required).	
		Responsible for organizing tugs, mooring boats and Pilots. Instruct Marine Engineers.	
		Hire additional crafts as necessary.	
		Assist SIC and maintain Log of events.	
Container Terminal Manager	Terminal Fire Coordinator	Provide assistance to port and vessel.	Assistant Officer
Dy. Manager (Safety)	Marine Pollution Control Coordinator	Investigate the incident and provide necessary guidance.	Safety Inspector
		Assist in Rescue.	
Sr. Commandant-	Security Officer	Controls & Directs traffic in the area.	Dy. Commandant-

Disaster Management Plan

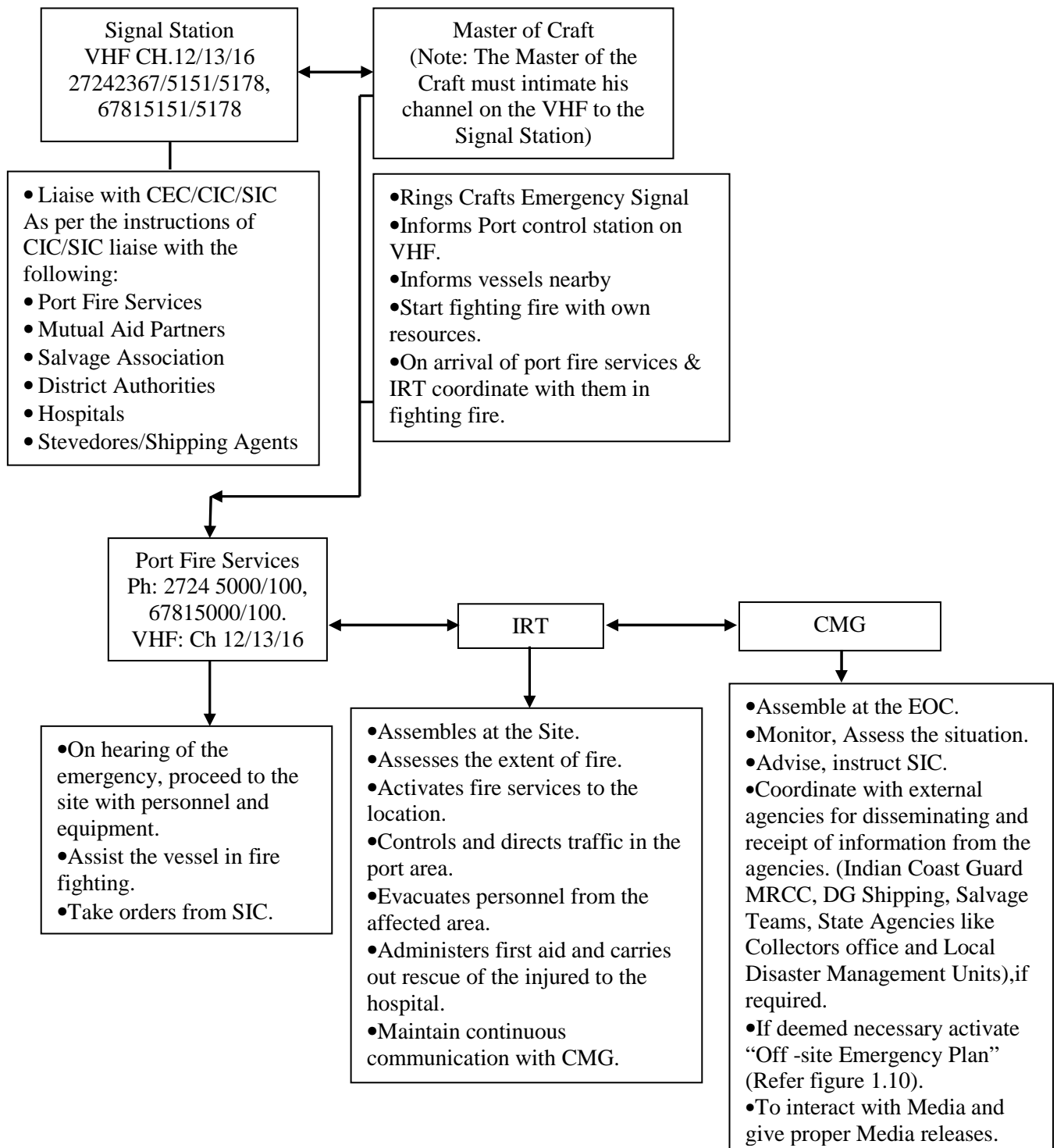
CISF		Shall supervise evacuation of personnel from the scene at the time of emergency.	CISF
Chief Manager (PPD)	Civil Coordinator	Liaise with SIC.	Manager (I, II)
Chief Manager (Mechanical & Electrical)	In-charge of Electrical Installation	Arrange for specialized equipment if required as per the instruction of the SIC.	Asst. Engineer
Sr. Dy. Chief Medical Officer	Medical Coordinator	Shall be responsible to organize and keep first aid team with ambulance & necessary medicines to attend to any injured person at the site of the accident.	Alternate Officer
Chief Manager (Traffic)	Traffic Coordinator	Coordinates with Terminal manager.	Asst. Manager (Traffic)
		Shall mobilize and dispatch sufficient number of vehicles to the site of emergency.	
Duty Pilot	In-Charge of Pilotage	Shall be ready on site for providing any assistance and be ready for providing any assistance on site.	Standby Pilot
Manager (Marine Engg.)	ME Coordinator	Responsible for organizing tugs for combating the fire and rescue.	Sr. Dy. Manager (Marine Engg.)
		Assist Dock Master.	

S9: Scenario 9**Part A**

- 1. Fire in Engine room of Floating Craft**
- 2. Precautions:** Crew trained for Fire Fighting, Periodic Maintenance and Inspection, House Keeping.
- 3. Impact Zone:** Craft and immediate surroundings.
- 4. Resources required:** Organizational setup enumerated in Figure S9.2 and major material and equipment resources as given in **Appendix B**.

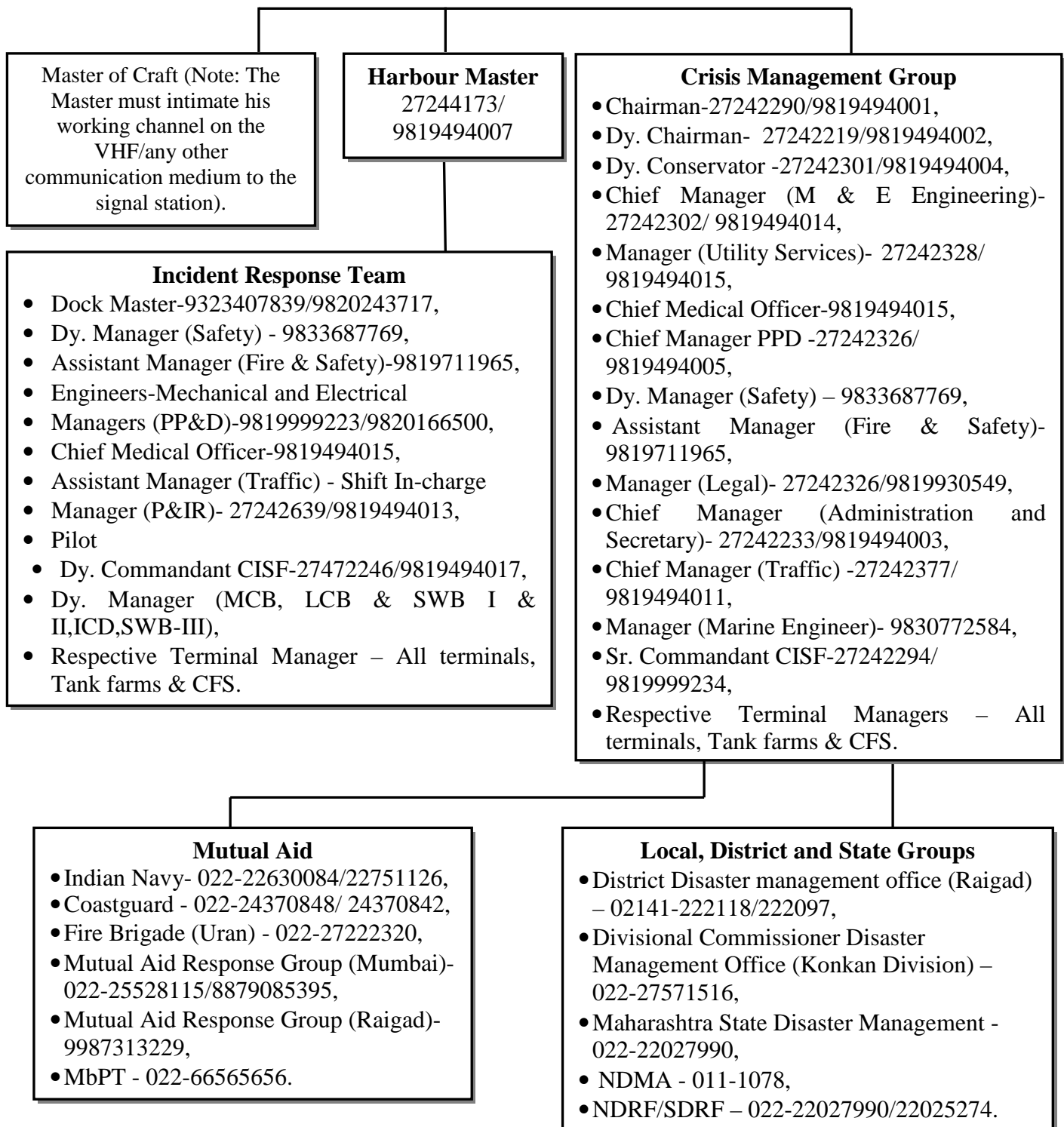
Disaster Management Plan

Figure S9.1: Action Flow Chart



Disaster Management Plan

Figure S9.2: Action group



*Disaster Management Plan***Part B: Action Plan****1. The Master of the Craft**

Response Action	Contact
a. Should raise crafts emergency alarm and activate craft board emergency action plan.	
b. Vessel in the vicinity and Port should be informed of any incident on the craft without delay. Try to keep craft away from any vessel/craft in the vicinity.	<ul style="list-style-type: none"> • Vessel in the vicinity • Port Control Station
c. Shall be responsible for fighting the fire with craft own resources as well as with the available support from IRT.	

2. Port Control Station should

Response Action	Contact
a. Gather information related to the vessel position, and time of incident.	
b. Notify to CIC, SIC and the vessels moving into, through and near the casualty and inside the port.	<ul style="list-style-type: none"> • CIC • SIC • Navy • Coastguard • DG Shipping
c. Gather information about the weather and tide and notify CIC/SIC.	<ul style="list-style-type: none"> • CIC • SIC

3. Deputy Conservator (Alternate: Harbour Master)

Response Action	Contact
a. Assess the level of disaster and activate the DMP.	
b. Establish EOC and be stationed to review & assess possible developments to determine the most necessary course of action.	
c. Give necessary instructions to SIC and Port Control Station & arrange for external aid as necessary.	<ul style="list-style-type: none"> • SIC • Port Control Station
d. Review the situation and accordingly inform to the Chairman/ Dy. Chairman.	<ul style="list-style-type: none"> • Chairman • Dy. Chairman
e. Decide on clearing of ships in close proximity to the incident location.	
f. Be in constant touch with District and Local Administration for rescue and relief operation.	
g. Terminate the response and debrief before allowing normal operation.	

*Disaster Management Plan***4. The Fire-fighting Personnel (F &ASO-I) should (Alternate: F &ASO-II)**

Response Action	Contact
a. Collect the information from Port Control Station and SIC.	<ul style="list-style-type: none"> • SIC • Port Control Station
b. Assist Master in fighting fire as per Masters Instructions.	
c. He will mobilize fire fighting tugs, personnel & fire fighting equipments to the scene & extend all necessary support in case of fire, if required.	
d. Assist in evacuation of the personnel as directed by SIC.	
e. Inform SIC for arrangement of any additional equipment as required.	

5. Duties of IRT

Designated Officer	Role	Duties	Alternate Officer
Harbour Master	Site Incident Controller	During Emergency shall proceed to the scene & communicate & collect all information from the master of the craft.	Dock Master
		He will report the situation to the CIC/CMG.	
		Alert vessels/craft within the vicinity.	
		Extend all necessary support to the Master of the craft to fight the fire.	
Dock Master	Port Control Room Coordinator	Instruct the Asst. manager (Fire and Safety) to keep the fire fighting installation and fire fighting tugs in a state of readiness & activate if required.	Duty Supervisor
		Shall monitor the communication on VHF/any other communication medium & convey and relay messages on the advice from CIC/SIC.	
		Responsible for organizing tugs for rescue.	
		Hire additional crafts as necessary.	
Asst. Manager (Fire & Safety)	Fire Coordinator	Assist SIC and maintain Log of events.	Station Officer
		Shall take orders from the SIC.	
		Lead the fire fighting team and mobilize fire tenders, men & fire-fighting equipment to the scene &	

Disaster Management Plan

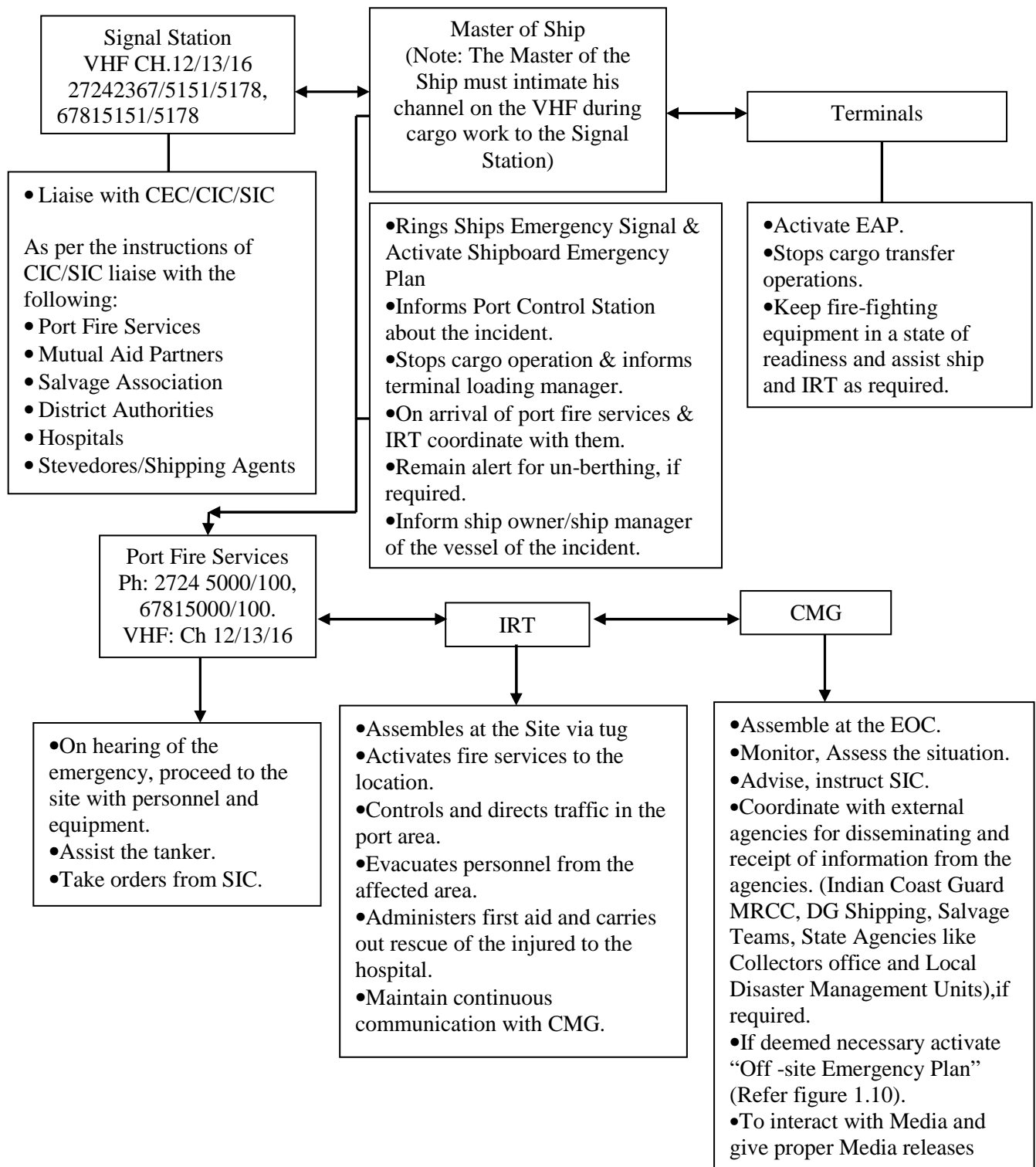
		extend all necessary support to the master of the craft for fire fighting.	
		Inform SIC for the arrangement of any additional equipment as required.	
Dy. Manager (Safety)	Marine Pollution Control Coordinator	Shall take orders for SIC.	Safety Inspector
		Ensure safely rescue of the Master of the craft.	
		Conduct cleanup work during and after the emergency as quick as possible.	
Sr. Commandant- CISF	Security and Evacuation	Controls & directs traffic in the area.	Dy. Commandant-t CISF
		Cordon off the area.	
		Shall supervise evacuation of personnel from the scene at the time of emergency.	
Chief Manager (PPD)	Civil Coordinator	Liaise with SIC.	Manager (I, II)
Chief Manager (Mechanical & Electrical)	In-charge of Electrical Installation	Shall be responsible for Electrical supply to vital equipment and systems at the berth.	Asst. Engineer
Sr. Dy. Chief Medical Officer	Medical Coordinator	Shall be responsible to organize and keep first aid team with ambulance & necessary medicines to attend to any injured person at the site of the accident.	Alternate Officer
Chief Manager (Traffic)	Traffic Coordinator	Shall prepare vessels (in the vicinity) to vacate from berth.	Asst. Manager (Traffic)
		Shall mobilize and dispatch sufficient number of vehicles to the site of emergency.	
		Coordinates with ship owners/agents/stevedores.	
Duty Pilot	In-Charge of Pilotage	Shall be ready on site for taking the ship out of berth, if required.	Standby Pilot
		Shall be ready for providing any assistance on site.	
Manager (Marine Engg.)	ME Coordinator	Responsible for organizing tugs for combating the fire and rescue.	Sr. Manager (Marine Engg.)
		Hire additional crafts as necessary.	

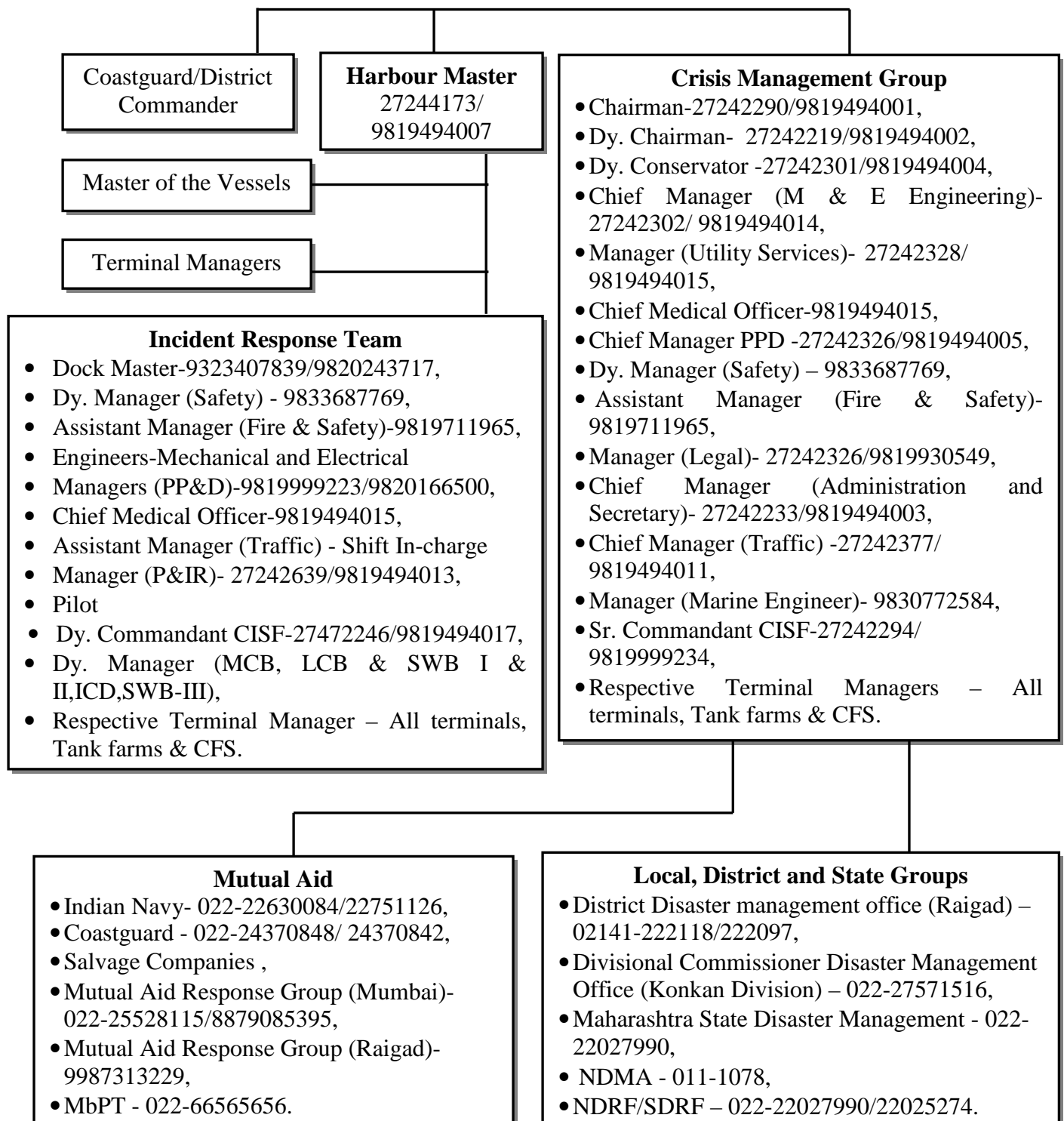
S10: Scenario 10**Part A**

- 1. Ship Grounding/Collision within JNPT port limit.**
- 2. Precautions:** Navigational Aid, Designated Pilots, Continuous monitoring and communication with the Port Control Centre and Pilot.
- 3. Impact Zone:** Navigational Channel and Anchorage area.
- 4. Resources required:** Organizational setup enumerated in Figure S10.2 and major material and equipment resources as given in **Appendix B**.

Disaster Management Plan

Figure S10.1: Action Flow Chart



*Disaster Management Plan***Figure S10.2:** Action group

*Disaster Management Plan***Part B: Action Plan****1. The Masters of the Vessels (Alternate: Chief Officers)**

Response Action	Contact
a. Should raise ships emergency alarm and activate ship board emergency action plan including evacuation of the personnel.	
b. Vessel in the vicinity, Terminal and Port should be informed of any incident on the craft without delay.	<ul style="list-style-type: none"> • Terminal • Vessel in the vicinity • Port Control Station
c. Shut down transfer operation (if at berth).	
d. Take appropriate damage control measures in case of flooding including leak stoppage and pumping out, vessel list correction etc.	
e. Estimate the extent of under water damage, sounding of tanks and actions for the refloating of the vessel.	
f. Shall be responsible for fighting the fire (in case of fire) with vessels own resources as well as with the available support from IRT.	

2. The Port Control Station

Response Action	Contact
a. Liaise with Master of the Vessel/Pilot and gather the information about the type of vessels involved in the incident, cargo and location of the incident and convey the message to CIC/SIC.	<ul style="list-style-type: none"> • Master of the vessel • Pilot • CIC • SIC
b. Gather information related to the weather conditions. Monitor the wind directions and accordingly convey the message to CIC/SIC and F& SO.	<ul style="list-style-type: none"> • CIC • SIC • F&SO
c. Listening watch to be maintained on VHF channel-16 and walkie-talkie channel-12.	
d. Notify to CIC, SIC and the vessels moving into, through and inside the port. Keep CIC/SIC informed of all the messages received by telephone, VHF sets or by messenger.	<ul style="list-style-type: none"> • CIC • SIC
e. Notify the other Authorities and stakeholders within Port as per instructions of CIC/SIC.	<ul style="list-style-type: none"> • Indian Navy • Coastguard • Stakeholders
f. Notify the information to the owner of the vessel as per the instruction of CIC/SIC/ Master of the Vessel.	

*Disaster Management Plan***3. Deputy Conservator (Alternate: Harbour Master)**

Response Action	Contact
a. Assess the level of disaster and activate the DMP and OSCP.	
b. Establish EOC and be stationed to review & assess possible developments to determine the most necessary course of action.	
c. Give necessary instructions to SIC and Port Control Station & arrange for external aid as necessary.	<ul style="list-style-type: none"> • SIC • Port Control Station
d. Review the situation and accordingly inform to the Chairman/ Dy. Chairman.	<ul style="list-style-type: none"> • Chairman • Dy. Chairman
e. Decide on clearing of ships in close proximity to the incident location.	
f. Be in constant touch with District and Local Administration for rescue and relief operation.	
g. Terminate the response and debrief before allowing normal operation.	

4. Duties of IRT

Designated Officer	Role	Duties	Alternate Officer
Harbour Master	Site Incident Controller	During Emergency, he shall proceed to the affected location & communicate & collect all necessary information's from the Master of the ship.	Dock Master
		Report the situation to the CIC/CMG.	
		Activate Port DMP and OSCP.	
		In case of fire on board the vessel after collision or contact he will extend all necessary help to the Master of the ship.	
		Instruct Dock Master/ Marine Engineer(s) to keep tugs ready for fire-fighting.	
		Alert other vessels within the vicinity.	
		Ascertain oil pollution- leak source, if any.	
		Obtain information regarding stability and hull stress of the vessel.	

Disaster Management Plan

		<p>If vessels have blocked or a possibility of blocking the channel, in co-ordination with the Master, the vessel shall be taken to berth / anchorage.</p> <p>In case of grounding, make arrangements through Dock Master/ Marine Engineers/Pilots to proceed to the spot and to take soundings, plot them in a chart and to ascertain the location of grounding damage on the hull.</p> <p>Depending on the way the vessel is grounded and the available high tide on the day, all advance preparations should be made to commence the towing operation at least two hours before the high water or as advised by CIC/SIC.</p> <p>Inform MOEF and MPCB approved parties for safe disposal and providing reception facilities for Oil/Sludge. Also, inform Salvage association.</p>	
Dock Master	Port Control Room Coordinator	<p>Shall be ready for taking the instructions from CIC/SIC and evacuate/move/shift the vessel from the area.</p> <p>If possible, accompany SIC to inspect the vessel.</p> <p>Plot exact location of the incident.</p> <p>Responsible for organizing tugs for rescue. Instruct Marine Engineers.</p> <p>Hire additional crafts as necessary.</p>	Duty Supervisor
Dy. Manager – Safety	Marine Pollution Control Coordinator	<p>Supervise and direct personnel to follow the instructions given by SIC.</p> <p>Report to SIC and seek advice if in doubt.</p> <p>Lead the response team and support personnel in combating the disaster by deploying booms and other equipments.</p> <p>Coordinate with the party involved in disposal of the Oil/sludge in a</p>	Safety Inspector

Disaster Management Plan

		safe manner.	
		Liaise with the OSRO team and coordinate with the team in combating the disaster by taking necessary actions as per the OSCP.	
		Maintain records of the claims.	
Asst. Manager (Fire & Safety)	Fire Coordinator	Shall take orders from the SIC. Mobilize fire tenders, men & firefighting equipment to the scene & extend all necessary support to the master of the vessel for firefighting. Coordinate with the party involved in disposal of the Oil/sludge in a safe manner.	Station Officer
Sr. Dy. Chief Medical Officer	Medical Coordinator	Shall be responsible to organize and keep first-aid team with ambulance & necessary medicines to attend to any injured person.	Alternate Officer
Chief Manager (PP&D)	Civil Coordinator	Inform MPCB as per the instruction of CIC/SIC and other environmental agencies about the incident for getting necessary guidance. Instruct the contractors to carry out urgent civil works as required. Hire the barges for collecting the spilled oil and coordinate with the parties involved in the safe disposal of the oil/sludge.	Manager (I, II)
Chief Manager (Traffic)	Traffic Coordinator	Coordinates with ship owners/agents/stevedores. Regulate Traffic in the vicinity.	Asst. Manager (Traffic)
Duty Pilot	In Charge of Pilotage	Shall monitor the communication on VHF & convey and relay messages on the advice from CIC/SIC. He will maintain Log of events.	Standby Pilot
Manager (Marine Engg.)	ME Coordinator	Responsible for organizing tugs for shifting the vessel to the anchorage area if required.	Sr. Dy. Manager (Marine Engg.)

S11: Scenario 11**Part A****1. Blockage of Navigational Channel due to Grounding/sinking of vessel (Wreckage).**

Note: It is assumed in this case all actions to rescue safely the vessel in approach channel have not been successful and the vessel has touched bottom in the approach channel.

2. Precautions: Navigational Aid, Designated Pilots, Continuous monitoring and communication with the Port Control Centre and Pilot.

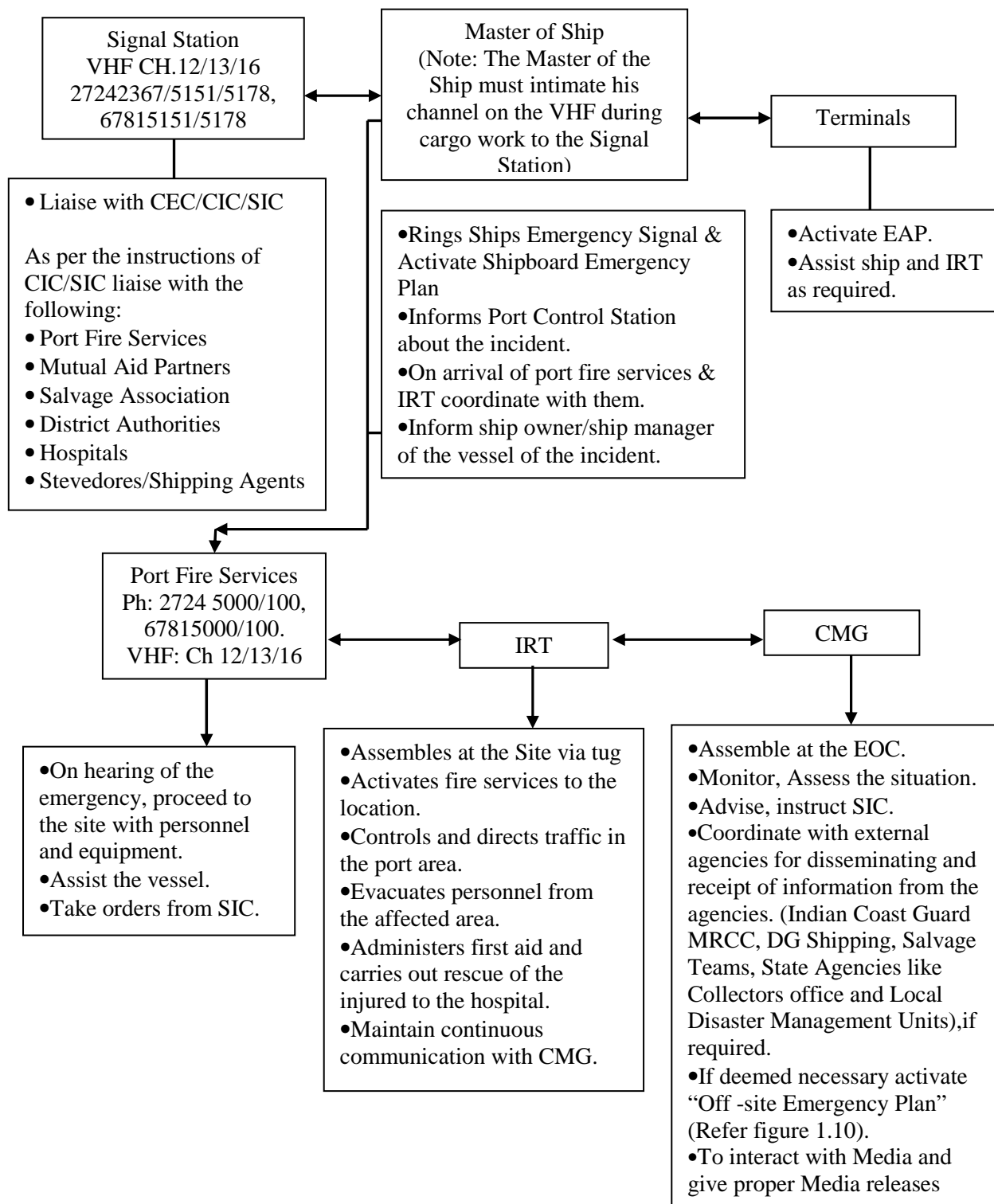
3. Impact Zone: Navigational Channel.

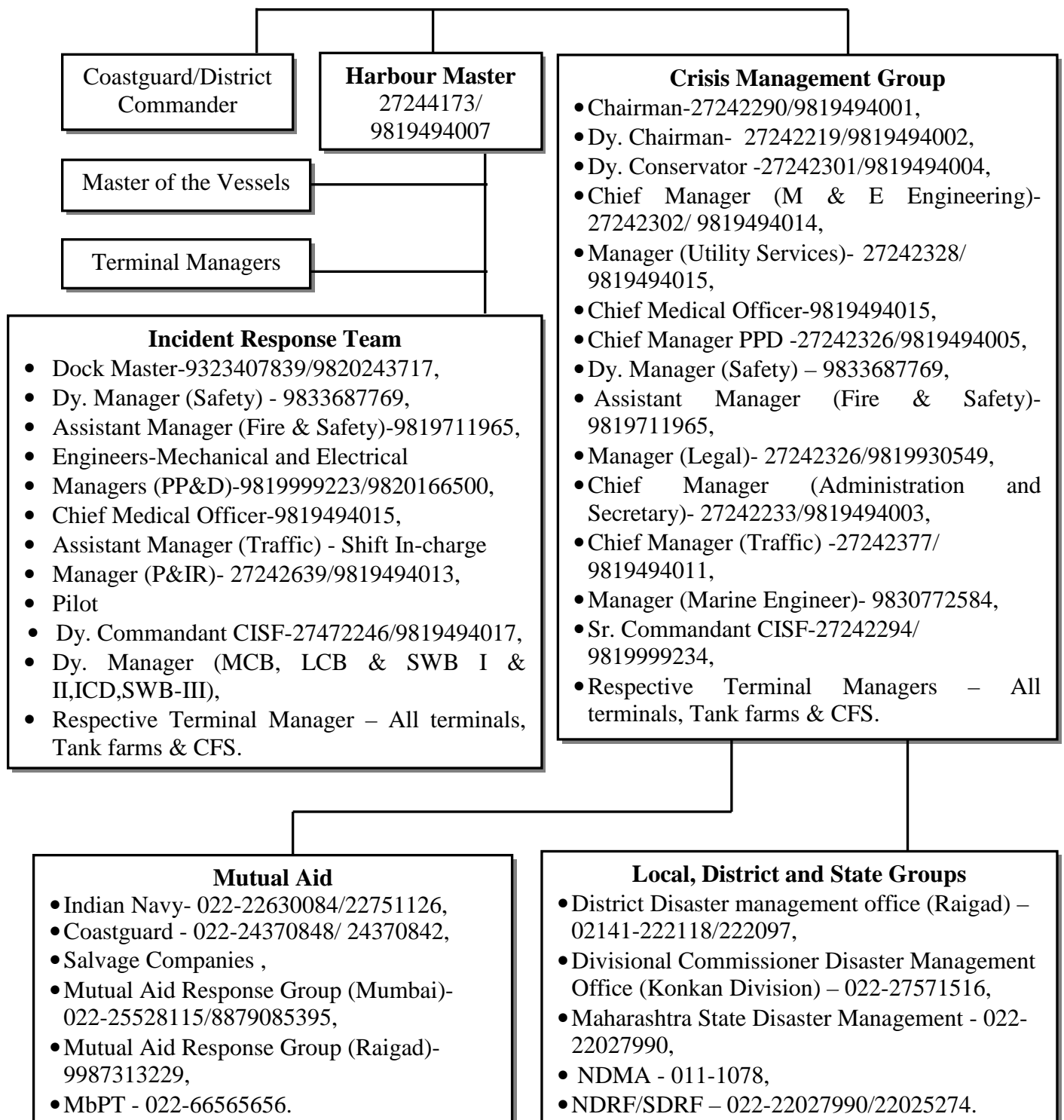
4. Resources required: Organizational setup enumerated in Figure S11.2 and major material and equipment resources as given in **Appendix B**.

5. Note: *Under the Indian Ports Act, 1908, if a ship is wrecked, stranded or sunk within the port limits, the Conservator of the Ports or in the absence of such an office, the Harbour master may give notice to the owner of the vessel “to raise, remove or destroy the vessel within such period as may be specified in the notice and to furnish such adequate security to the satisfaction of the conservator to ensure that the vessel shall be raised, removed or destroyed within the said period”. If the owner does not comply and act upon the notice, the conservator may raise, remove or destroy the property and claim the compensation from the owner. Mostly, the salvage activity will be done by private salvors in agreement with the Port Trust. Within the port limits, the capacity of the party to carry out salvage, the methods used to raise or remove or destroy the vessel is subjected to the expert opinion of the deputy conservator of the port. Normally, the court will not interfere with these technical decisions.*

Disaster Management Plan

Figure S17.1: Action Flow Chart



*Disaster Management Plan***Figure S17.2:** Action Group

*Disaster Management Plan***Part B: Action Plan****1. The Master of the Vessel (Alternate: Chief Officer)**

Response Action	Contact
a. Should raise ships emergency alarm and activate ship board emergency action plan.	
b. Terminal, Vessel in the vicinity and Port should be informed of any incident on the ship without delay.	<ul style="list-style-type: none"> • Terminal • Vessel in the vicinity • Port Control Station
c. Having raised the alarm, the Master will be responsible for taking all immediate steps to safeguard his ship. As soon as possible he is to establish the extent of grounding and damage to the vessel. He is to ascertain whether the hull has been breached and likely risk of pollution and flooding.	
d. The Master will provide the Port Authority with details of the incident as quickly as possible and will make regular and frequent reports on the progress of the incident. This is to include position of grounding, damage sustained, pollution or risk of pollution, draft of the vessel prior to grounding and soundings at grounding area, cargo on board and location, and any further information that may be at hand.	<ul style="list-style-type: none"> • Port Control Station

2. Port Control Station should

Response Action	Contact
a. Gather information related to the vessel type, position and time of incident.	
b. Liaise with Master of the Vessel/Pilot.	<ul style="list-style-type: none"> • Master of the vessel • Pilot
c. Notify to CIC, SIC and the vessels moving into, through and near the casualty and inside the port.	<ul style="list-style-type: none"> • CIC • SIC • Navy • Coastguard
d. Notify the information to the owner of the vessel.	

3. Deputy Conservator (Alternate: Harbour Master)

Response Action	Contact
a. Establish EOC and be stationed to review & assess possible developments to determine the most necessary course of action.	
b. Assess the level of disaster and activate the DMP.	
c. Give necessary instructions to SIC and Port Control	<ul style="list-style-type: none"> • SIC

Disaster Management Plan

Station & arrange for external aid as necessary.	<ul style="list-style-type: none"> • Port Control Station
d. Review the situation and accordingly inform to the Chairman/ Dy. Chairman.	<ul style="list-style-type: none"> • Chairman • Dy. Chairman
e. Launches and rescue craft will be sent to scene of Emergency. If required they will bring necessary personnel and equipment to site.	<ul style="list-style-type: none"> • Dock Master • Marine Engineers
f. Oil Pollution: He will be responsible to activate the Port OSCP on receipt and assessment of the information gathered. He will instruct the IRT and Master of Vessel about the precautionary measures and necessary actions to limit the extent of pollution.	<ul style="list-style-type: none"> • Coastguard
g. Evacuation: Assessment of condition of site of potential affected area and decision taken for evacuation should be taken in consultation with SIC and Master of Vessel.	
h. Salvage and or floating of the vessel will be controlled by either the CIC or person assigned by him. All operations will have to be sanctioned by the CIC before implementation.	<ul style="list-style-type: none"> • Salvage Company
i. Coordinate with external agencies/authorities.	<ul style="list-style-type: none"> • Indian Navy • Coastguard
j. Be in constant touch with District and Local Administration for rescue and relief operation.	
k. CIC, once the DMP is activated and underway will ensure that, at frequent intervals, issue, through Radio and via the telephone and Media, situation reports and information updates.	
l. Press Liaison A press office will be set up and regular briefings organized and promulgated. The DC and representatives from each emergency service will attend as circumstances permit to brief media concerns. Where necessary, the P.R. teams from Port will be alerted to ensure fullest briefings on all aspects of the emergency.	
m. Terminate the response and debrief before allowing normal operation.	

NOTES ON SALVAGE:

- *If required inform a reputable Salvage Company;*
- *Thoughts should be given to adding ballast to secure vessel in bad weather;*
- *Secure topside openings;*
- *Topside survey;*
- *Underwater survey with a diver noting all damage on plan of vessel;*

Disaster Management Plan

- *Information on the seabed using diver and soundings;*
- *Based on survey, draft, stability, condition of vessel openings, cargo, fuel, water etc.;*
- *Other removable weights;*
- *Refloating plan must be agreed taking into consideration, draft, stability, a clear passage off (may have to dredge a channel); safety of personnel, fire, pollution (may have to remove bunkers and cargo);*
- *Availability of tugs, bunkering vessels, divers, salvage companies;*
- *CIC in control of salvage, Salvor in command, all plans approved by CIC.*

4. Duties of IRT

Designated Officer	Role	Duties	Alternate Officer
Harbour Master	Site Incident Controller	<p>During Emergency, proceed to the affected location & communicate & collect all necessary information's from the Master of the ship.</p> <p>Discuss with the Master or owner for refloating or salvaging of the vessel. Endeavour to obtain from owners/agents a General Arrangement Plan of the vessel and, if appropriate the Cargo Plan.</p> <p>Gather information from Port Control Station regarding position and time.</p> <p>He will report the situation to the CIC/CMG.</p> <p>Activate Port DMP and OSCP.</p> <p>Commence search and rescue operation immediately.</p> <p>He will instruct Dock Master to keep tugs ready.</p> <p>Alert other vessels within the vicinity and the movement of other vessels into, through and near the location should be stopped.</p> <p>Assistance may be sought from other suitable and available vessels.</p> <p>Inform Salvage association and instruct Dock Master to coordinate.</p> <p>In the case of a capsized vessel, make arrangements to hold the</p>	Dock Master

Disaster Management Plan

		<p>vessel in position if drifting would place her in grave danger and, on completion of rescue operations, secure the vessel in position or remove and secure her at some other safe location, whichever is safest and possible, until such time as salvage operations can be undertaken.</p> <p>When clear to do so, arrange for the capsized or sunken vessel to be marked with appropriate buoy(s) and lights, to warn other vessels of her position.</p> <p>Discuss with the Master, owner or agent plans for righting, refloating or salvaging the vessel. Action in this regard is particularly important where the vessel is obstructing fairways, channels or approaches to berths.</p> <p>Ascertain oil pollution- leak source, if any.</p> <p>Inform the MoEF & MPCB approved private parties for safe disposal and providing reception facilities for Oil/Sludge.</p>	
Dock Master	Port Control Room Coordinator	<p>Plot exact location of the incident.</p> <p>Assist in monitoring of other vessels and communicating with the Master and restricting them to enter the emergency location.</p> <p>Allow vessels directly involved in rescue operations within the vicinity.</p> <p>Responsible for Organizing tugs for search and rescue.</p> <p>Hire additional crafts as necessary.</p> <p>Arrange for the marking arrangements with appropriate buoy(s) and lights.</p> <p>Instruct the oil pollution response team to maintain a state of readiness and standby.</p> <p>Assist Salvage association and SIC.</p>	Duty Supervisor

Disaster Management Plan

		Liaise with the OSRO team and coordinate with the team in combating the disaster by taking necessary actions as per the OSCP.	
Pilot/ Marine Engineer	In Charge of Pilotage	Shall be ready for taking the instructions from CIC/SIC and evacuate/move/shift the vessel from the area.	Standby Pilot
		Shall monitor the communication on VHF & convey and relay messages on the advice from CIC/SIC.	
		Responsible for organizing tugs for shifting the vessel to the anchorage area if required.	
Dy. Manager – Safety	Marine Pollution Control Coordinator	Shall take orders from the SIC.	Safety Inspector
		Extend all necessary support to the Master of the vessel for search and rescue operation.	
		Make arrangements for oil pollution combat personnel and equipment.	
		Coordinate with the party involved in disposal of the Oil/sludge in a safe manner.	
		Supervise and direct personnel to follow the instructions given by SIC.	
		Report to SIC and seek advice if in doubt.	
		Maintain records of the claims.	
Asst. Manager (Fire & Safety)	Fire Coordinator	Shall take orders from the SIC.	Station Officer
		Mobilize fire tenders, men & firefighting equipment to the scene & extend all necessary support to the master of the vessel for firefighting.	
		Coordinate with the party involved in disposal of the Oil/sludge in a safe manner.	
Sr. Dy. Chief Medical Officer	Medical Coordinator	Shall be responsible to organize and keep first-aid team ready with ambulance & necessary medicines to attend to any injured person.	Alternate Officer
Chief Manager (PP&D)	Civil Coordinator	Inform MPCB as per the instruction of CIC/SIC and other	Manager (I, II)

Disaster Management Plan

		environmental agencies about the incident for getting necessary guidance.	
		Instruct the contractors to carry out urgent civil works as required.	
		Hire the barges for collecting the spilled oil and coordinate with the parties involved in the safe disposal of the oil/sludge.	
Chief Manager (Traffic)	Traffic Coordinator	Coordinates with ship owners/agents/stevedores.	Asst. Manager (Traffic)
		Regulate water traffic in the vicinity.	
Sr. Commandant- CISF	Security and Evacuation	Controls & direct traffic in the area.	Dy. Commandant- CISF
		Shall cordon off the area.	
		Shall supervise evacuation of personnel from the scene at the time of emergency.	
		Allow vehicles which are directly involved in rescue operations within the vicinity of the rescue operations.	

Disaster Management Plan

S12: Scenario 12**Part A**

- 1. Emergency/Disaster within the facility (Reliance/IMC/GBL/Deepak Fertilizer/Suraj Agro/IOCL/Bharat Shell tank farms).**
- 2. Precautions:** MSDS, SOP, House Keeping,
- 3. Impact Zone:** Facility area and neighboring facility/facilities.
- 4. Resources required:** As per facility DMP.

Part B: Action Plan

1. Activate facility EAP.
2. Alert staff within the facility as well as the neighboring facility.
3. Inform Port signal station and CIC/SIC.
4. Inform neighboring and mutually aid partners.
5. Gather as much information as possible pertaining to the nature and scope of the impending or possible emergency.
6. Assist and advice the external Emergency services as appropriate.

If there is a potential to affect other Port operators

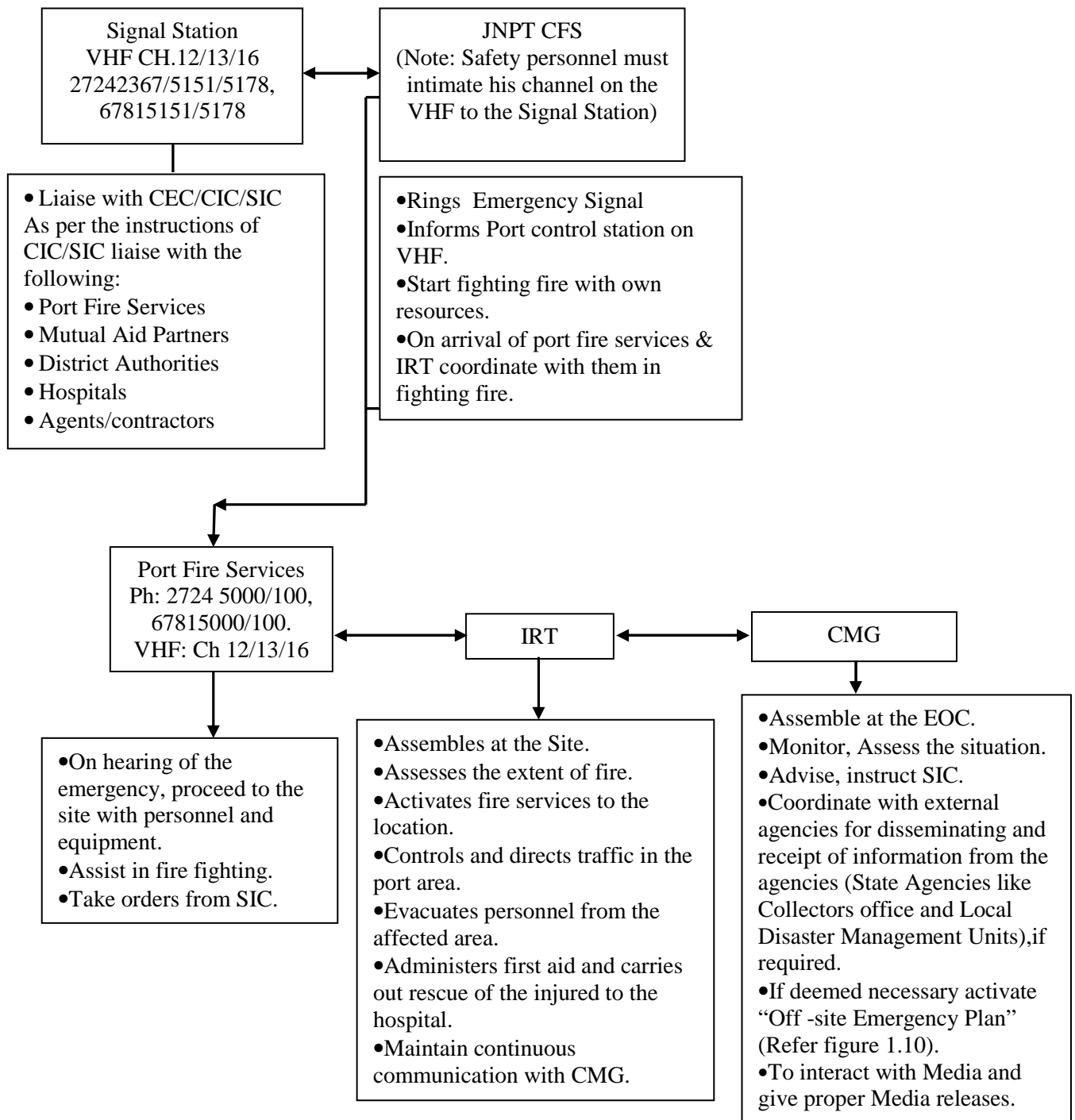
1. Notify CIC/SIC/Signal Station as appropriate and seek help.
2. Notify neighboring facilities as appropriate and seek help.

S13: Scenario 13**Part A**

1. **Fire in CFS - Warehouse.**
2. **Precautions:** Protected/covered Electrical installations, Fire fighting systems, trained personnel to combat fire, No smoking zone, House Keeping.
3. **Impact Zone:** Warehouse and immediate area.
4. **Resources required:** Organizational setup enumerated in Figure S13.2 and major material and equipment resources as given in **Appendix B.**

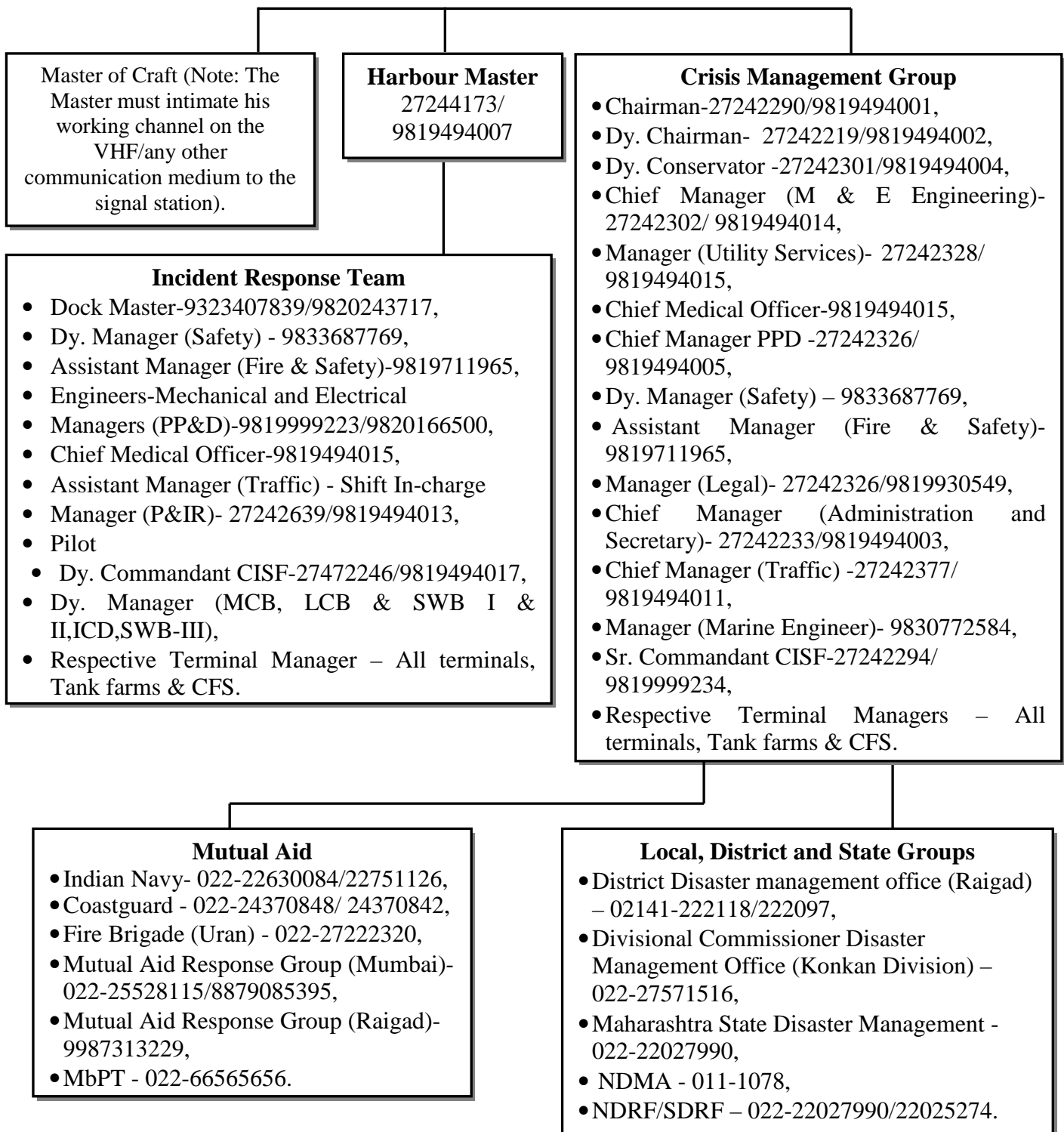
Disaster Management Plan

Figure S13.1: Action Flow Chart



Disaster Management Plan

Figure S13.2: Action group



*Disaster Management Plan***Part B: Action Plan****1. The safety personnel of CFS**

Response Action	Contact
a. Should raise emergency alarm and activate emergency action plan.	
b. Vehicles in the vicinity and Port should be informed of any incident without delay.	<ul style="list-style-type: none"> • Vehicles in the vicinity • Port Control Station
c. Shall be responsible for fighting the fire with own resources as well as with the available support from IRT.	

2. Port Control Station should

Response Action	Contact
a. Gather information related to the fire and time of incident.	
b. Notify to CIC and SIC.	<ul style="list-style-type: none"> • CIC • SIC
c. Gather information about the wind direction and notify CIC/SIC.	<ul style="list-style-type: none"> • CIC • SIC

3. Deputy Conservator (Alternate: Harbour Master)

Response Action	Contact
a. Assess the level of disaster and activate the DMP.	
b. Establish EOC and be stationed to review & assess possible developments to determine the most necessary course of action.	
c. Give necessary instructions to SIC and Port Control Station & arrange for external aid as necessary.	<ul style="list-style-type: none"> • SIC • Port Control Station
d. Review the situation and accordingly inform to the Chairman/ Dy. Chairman.	<ul style="list-style-type: none"> • Chairman • Dy. Chairman
e. Coordinate with external agencies/authorities.	<ul style="list-style-type: none"> • Local Authorities
f. Be in constant touch with District and Local Administration for rescue and relief operation.	
g. Terminate the response and debrief before allowing normal operation.	

4. The Fire-fighting Personnel (F &ASO-I) should (Alternate: F &ASO-II)

Response Action	Contact
a. Collect the information from Port Control Station and SIC.	<ul style="list-style-type: none"> • SIC • Port Control Station

Disaster Management Plan

b. Assist CFS in fighting fire.	
c. He will mobilize fire fighting tenders, personnel & fire fighting equipments to the scene & extend all necessary support in case of fire, if required.	
d. Assist in evacuation of the personnel as directed by SIC.	
e. Inform SIC for arrangement of any additional equipment as required.	

5. Duties of IRT

Designated Officer	Role	Duties	Alternate Officer
Harbour Master	Site Incident Controller	During Emergency shall proceed to the scene & communicate & collect all information.	Dock Master
		Assess and report the situation to the CIC/CMG.	
		Extend all necessary support to fight the fire.	
		He will instruct the Asst. manager (Fire and Safety) to keep the fire-fighting equipment and fire fighting tenders in a state of readiness & activate if required.	
Dock Master	Port Control Room Coordinator	Shall monitor the communication on VHF/any other communication medium & convey and relay messages on the advice from CIC/SIC.	Duty Supervisor
		Assist SIC and maintain Log of events.	
Dy. Manager (Safety)	Marine Pollution Control Coordinator	Shall take orders for SIC.	Safety Inspector
		Ensure safely rescue of personnel and labors.	
		Ensure cleanup work during and after the emergency as quick as possible.	
Sr. Commandant-CISF	Security and Evacuation	Controls & directs traffic in the area.	Dy. Commandant-CISF
		Cordon off the area.	
		Shall supervise evacuation of personnel from the scene at the time of emergency.	
Chief Manager (PPD)	Civil Coordinator	Liaise with SIC.	Manager (I, II)
Chief Manager	In-charge of	Shall be responsible for Electrical	Asst. Engineer

Disaster Management Plan

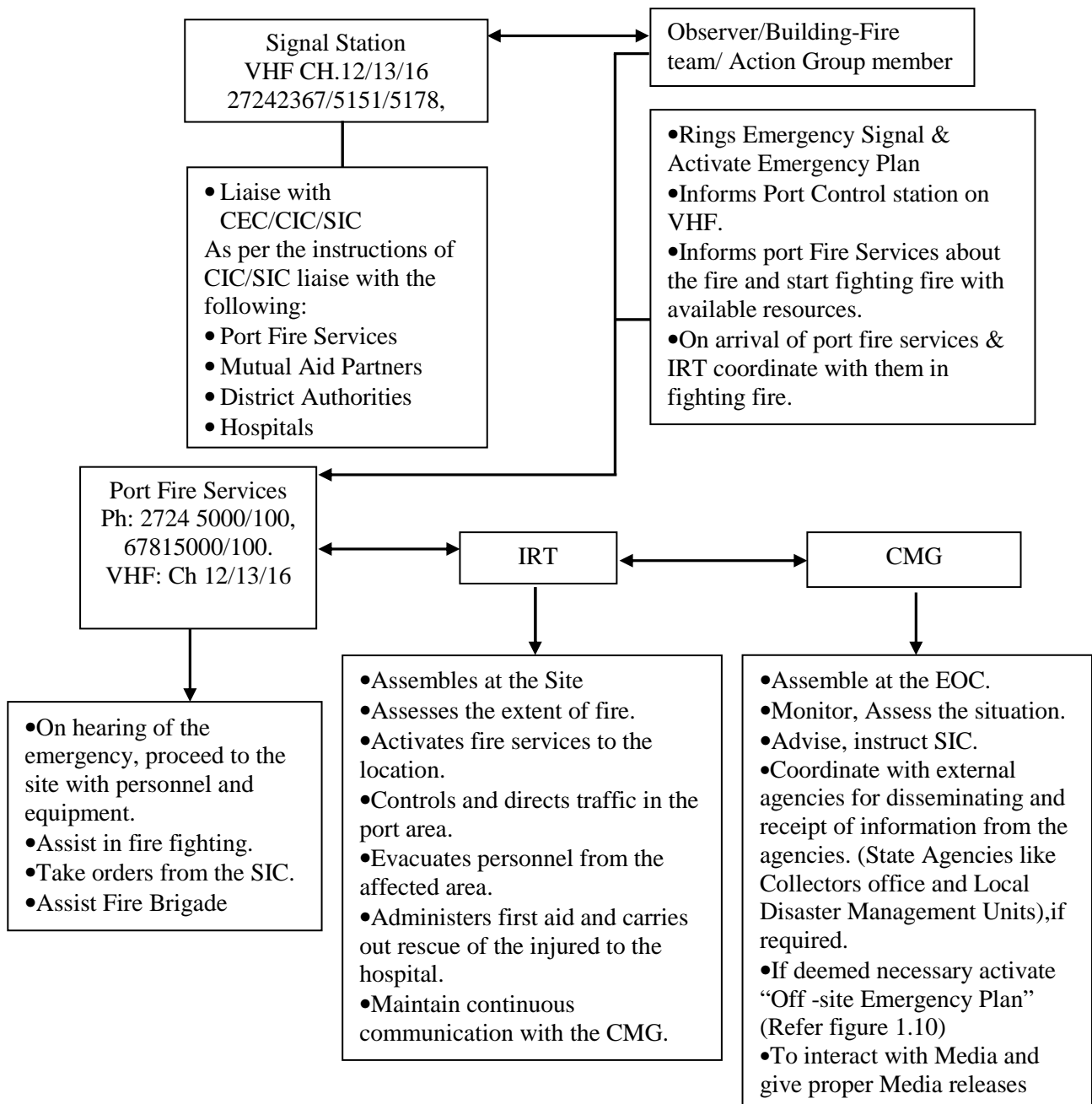
(Mechanical & Electrical)	Electrical Installation	supply to vital equipment and systems.	
Sr. Dy. Chief Medical Officer	Medical Coordinator	Shall be responsible to organize and keep first aid team with ambulance & necessary medicines to attend to any injured person at the site of the accident.	Alternate Officer
Chief Manager (Traffic)	Traffic Coordinator	Shall mobilize and dispatch sufficient number of vehicles to the site of emergency. Coordinates with SIC/CIC.	Asst. Manager (Traffic)

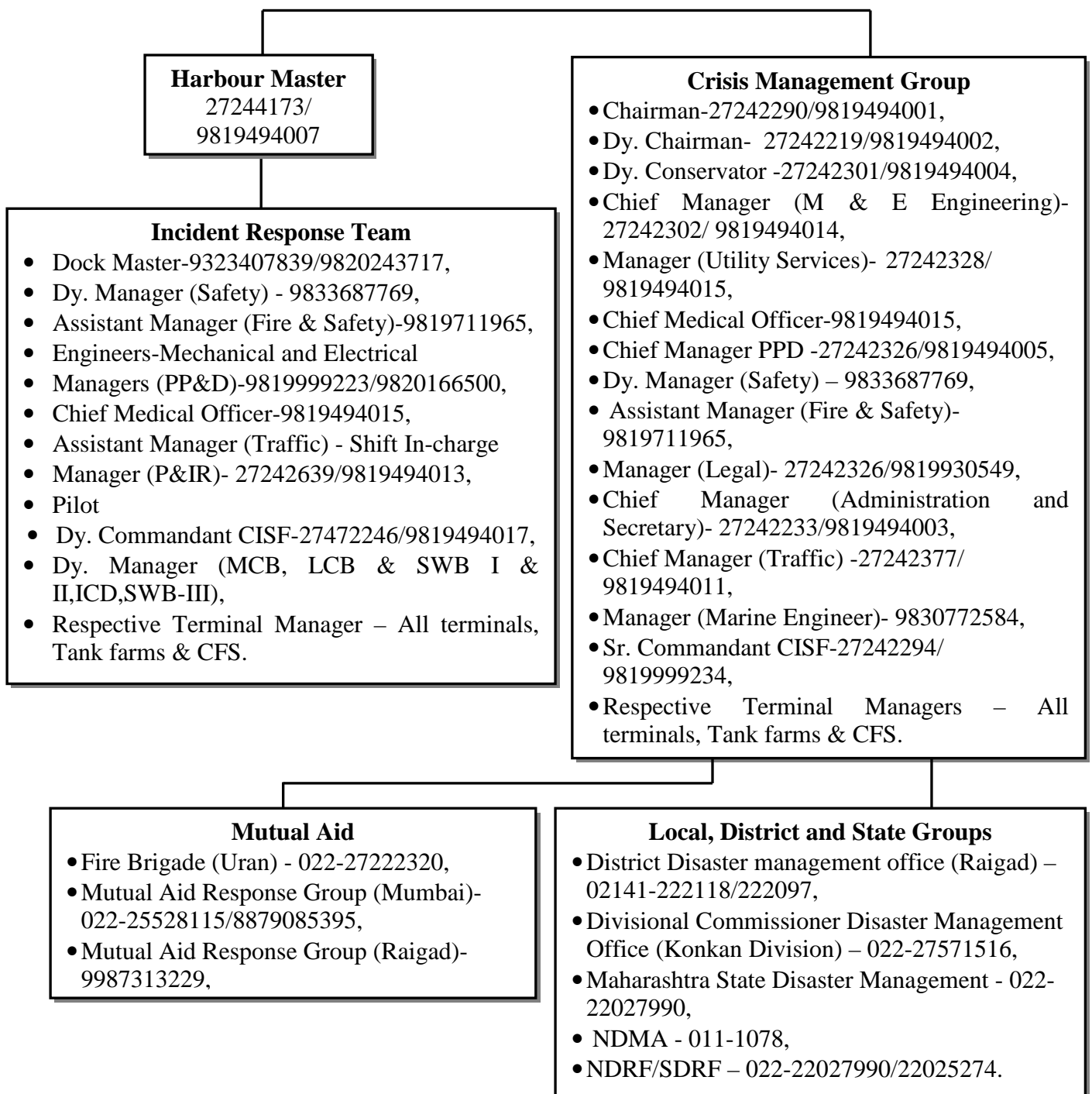
S14: Scenario 14**Part A**

- 1. Fire in Port Administration building/PUB/Customs House/Port Operation Centre.**
- 2. Precautions:** Smoke and Fire Detection system, Fire fighting system, trained personnel to combat fire, No Smoking zone, and Protected/covered Electrical installations.
- 3. Impact Zone:** Administration building/PUB/Customs House/Port Operation Centre.
- 4. Resources required:** Organizational setup enumerated in Figure S14.2 and major material and equipment resources as given in **Appendix B**.

Disaster Management Plan

Figure S14.1: Action Flow Chart



*Disaster Management Plan***Figure S14.2: Action Group**

*Disaster Management Plan***Part B: Action Plan****1. The Observer/ Building-Fire team/ Action Group member**

Response Action	Contact
a. Shout "Fire Fire Fire" and should raise alarm.	
b. Port Control Station should be informed of any incident without delay.	<ul style="list-style-type: none"> • Port Control Station
c. If fire is in the Port Control Station , inform F &SO and SIC	<ul style="list-style-type: none"> • F &SO • SIC
d. If trained, try to extinguish the fire and try to evacuate people.	

2. Deputy Conservator (Alternate: Harbour Master)

Response Action	Contact
a. Assess the level of disaster and activate the DMP.	
b. Establish EOC and be stationed to review & assess possible developments to determine the most necessary course of action.	
c. Give necessary instructions to SIC and Port Control Station & arrange for external aid as necessary.	<ul style="list-style-type: none"> • SIC • Port Control Station
d. Review the situation and accordingly inform to the Chairman/ Dy. Chairman.	<ul style="list-style-type: none"> • Chairman • Dy. Chairman
e. Assess the condition of site take decision on evacuation in consultation with SIC.	
f. Be in constant touch with District and Local Administration for rescue and relief operation.	
g. Terminate the response and debrief before allowing normal operation.	

3. The Fire-fighting Personnel (F& ASO –I) (Alternate : F& ASO –II) should

Response Action	Contact
a. Raise Alarm (siren)	
b. Collect the information about the exact location of the fire and people trapped in the building. Ensure safe evacuation of the people in the affected area to a safe location.	
c. He will lead the team and mobilize fire tenders, personnel & fire fighting equipments to the scene & extinguish the fire.	
d. If the fire is out of control, convey the message to CIC/SIC and seek assistance from Mutual aid partners or other organizations.	<ul style="list-style-type: none"> • CIC • SIC
e. Open the water curtain valve to protect shore installations	

Disaster Management Plan

from heat radiation.	
f. Control cleanup work during and after the emergency as quick as possible.	
g. If the fire is under control and extinguished, give all clear signal	

4. Duties of IRT

Designated Officer	Role	Duties	Alternate Officer
Harbour Master	Site Incident Controller	During Emergency shall proceed to the scene & communicate & collect all information.	Dock Master
		Assess and report the situation to the CIC/CMG.	
		Instruct the Asst. Manager (Fire & Safety) to keep the fire-fighting equipment in a state of readiness & activate if required.	
Dock Master	Port Control Room Coordinator	Shall monitor the communication on VHF/any other communication medium & convey and relay messages on the advice from CIC/SIC.	Duty Supervisor
		Maintain Log of events.	
Dy. Manager (Safety)	Marine Pollution Control Coordinator	Shall take orders from the SIC.	Safety Inspector
		Ensure safe evacuation of the people in the affected area to a safe location.	
		Control cleanup work during and after the emergency as quick as possible.	
Sr. Commandant-CISF	Security and Evacuation	Shall supervise evacuation of personnel from the scene at the time of emergency.	Dy. Commandant-CISF
		Cordon off the area.	
		Coordinate with Police and Fire Brigade.	
Chief Manager (PPD)	Civil Coordinator	Assist SIC.	Manager (I, II)
Chief Manager (Mechanical & Electrical)	In-charge of Electrical Installation	Shall be responsible for Electrical supply to vital equipment and systems.	Asst. Engineer
Chief Manager (Traffic)	Traffic Coordinator	Provide necessary assistance to CIC/SIC.	Asst. Manager (Traffic)

Disaster Management Plan

		Shall mobilize and dispatch sufficient number of vehicles to the site of emergency.	
		Control and Directs Traffic in the affected area.	
Sr. Dy. Chief Medical Officer	Medical Coordinator	Shall be responsible to organize and keep first aid team with ambulance & necessary medicines to attend to any injured person.	Alternate Officer
Duty Pilot	In-Charge of Pilotage	Shall be ready for providing any assistance on site.	Standby Pilot

S15: Scenario 15**Part A:****1. War and Terrorism.**

2. Precautions: Trained Security Personnel, CCTV and Continuous Vigilance including radioactive detectors and intelligence from designated local and national agencies.

3. Impact Zone: Entire port.

4. Resources required: Intelligence inputs from agencies and organizational setup enumerated in Figure S15.2 and major material and equipment resources as given in **Appendix B**.

Part B: Action Plan

When war like situation is developed or during the declaration of war the priority is to be given to all important/critical areas to remain vigilant to prevent sabotage, to remain ready to combat emergency and to keep normal operation going.

B.1 Prior Emergency Situation (after warnings/inputs)

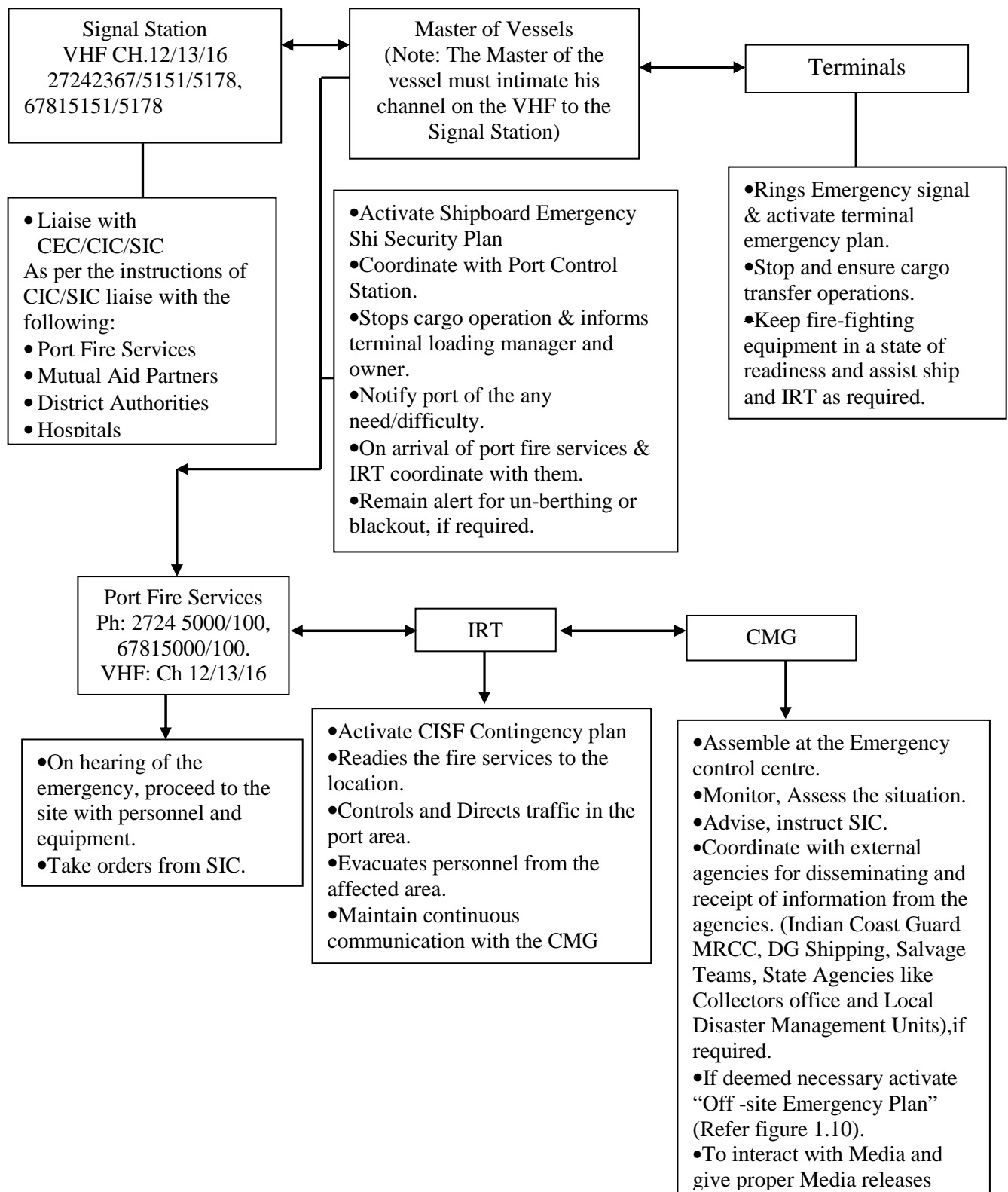
- Set up Crisis management centre and manned continuously.
- CMG to declare plan/guideline to be followed which could be based on CISF Contingency Plan/Government of India/Statutory bodies/Indian Navy/Air Force/Government of Maharashtra etc. instructions.
- CMG to ensure utmost vigilance in identified area to ensure the adequate resources in terms of security personnel, experts in handling equipment, trained manpower, and flood lights, earth moving equipment, mobile cranes, and rescue crafts are available to guard all gates, roads etc. In case of any unidentified/unauthorized person is found, he must be handed over to police.
- CMG to ensure that evacuation plan is prepared and backup systems such as power generator, communication equipment, and safety systems are working. CMG should also ensure that all required manpower such as electricians/technicians/laborer is available all time.
- All terminals should be informed.
- No movement of the vessels in the port vicinity will be allowed.

B.2 During Emergency

- CMG to adopt relevant DMP to combat the emergency.
- In case of an enemy attack inform relevant authorities & internal security to defend installations till the external support arrives.
- When additional security (army/BSF) arrives, situation is to be handled jointly.
- CMG to ensure sufficient supply of food and water.
- All vessels inside the port and at the anchorage will observe blackout as per the instruction of CMG.

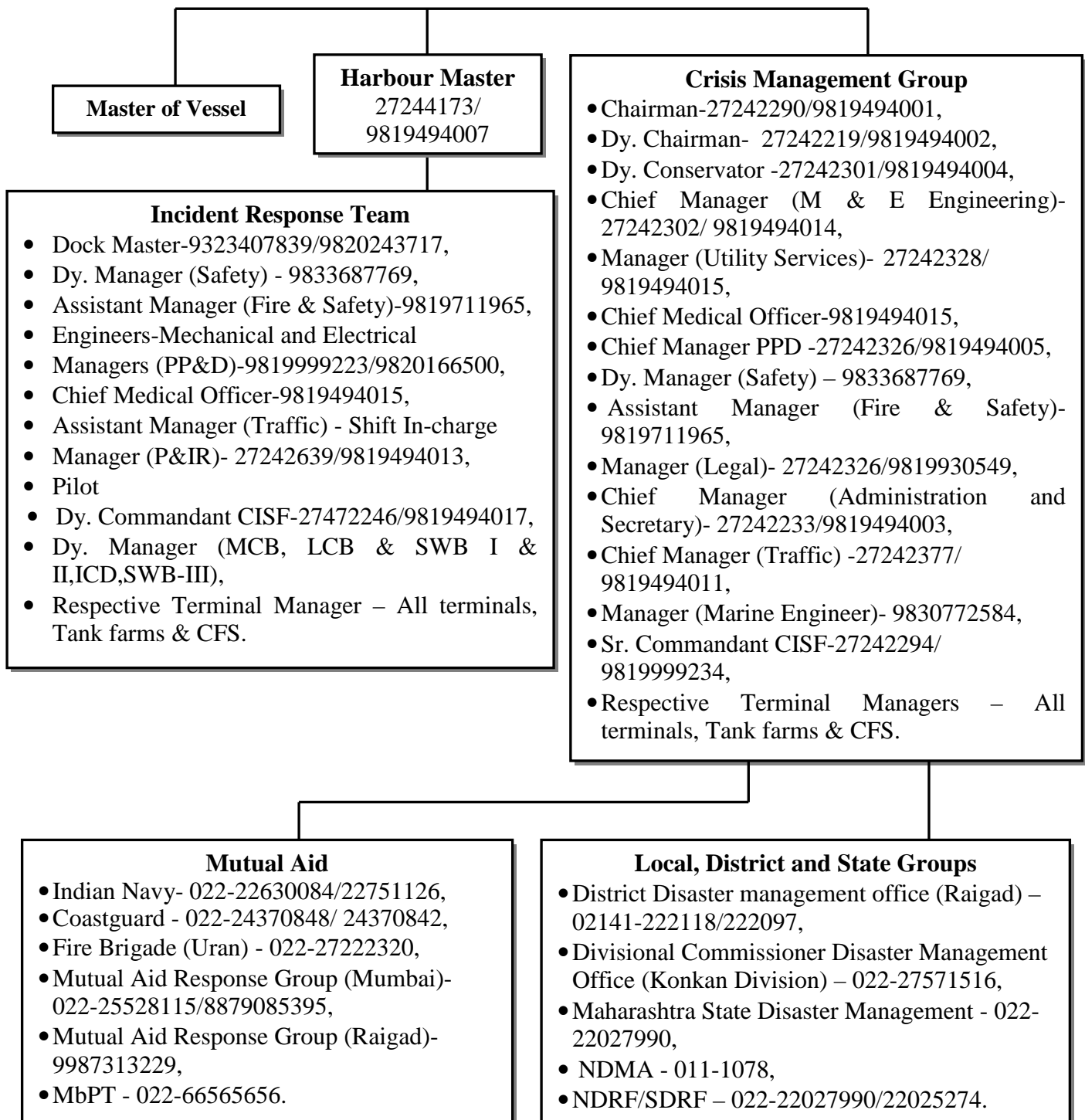
Disaster Management Plan

Figure S15.1: Action Flow Chart



Disaster Management Plan

Figure S15.2: Action group



*Disaster Management Plan***Part B: Action Plan****1. Deputy Conservator (Alternate: Harbour Master)**

Response Action	Contact
a. Assess the situation and activate the DMP.	
b. Establish EOC and be stationed to review & assess possible developments to determine the most necessary course of action.	
c. Give necessary instructions to SIC and Port Control Station & arrange for external aid as necessary.	<ul style="list-style-type: none"> • SIC • Port Control Station
d. Review the situation and accordingly inform to the Chairman/ Dy. Chairman.	<ul style="list-style-type: none"> • Chairman • Dy. Chairman
e. Be in constant touch with District and Local Administration for rescue and relief operation.	
f. Terminate the response and debrief before allowing normal operation.	

2. Duties of IRT

Designated Officer	Role	Duties	Alternate Officer
Harbour Master	Site Incident Controller	During Emergency shall communicate & collect all information.	Dock Master
		Report the situation to the CIC/CMG.	
		Extend all necessary help to CISF as and when required.	
		Ensure that there is blackout at the port and the vessels at the anchorage area as per the guidance and instruction of CMG/CIC.	
Dock Master	Port Control Room Coordinator	Shall be ready for taking the instructions from CIC/SIC and evacuate/move/shift the vessel from the area.	Duty Supervisor
Master of the vessel	In-Charge of fire fighting operation on board vessel	Be ready to take the vessel out of the port as per the instructions of CIC/SIC.	Chief Officer of vessel
		Coordinate with IRT leader and will be responsible for shutting down all cargo operation on board in coordination with terminal In-Charge.	
Terminal Managers	Cargo Work	Shall be responsible of shutting down of cargo operation &	Assistant Terminal

Disaster Management Plan

		<p>coordinating with JNPT and rendering necessary assistance to the SIC by providing additional fire fighting & emergency equipment as required.</p> <p>Arrange to protect cargo in vicinity from damage.</p> <p>Submits consolidated list of dangerous goods in port – Vessels in port.</p> <p>Coordinates with ship in-charge/C & F agents/stevedores.</p>	Manager
Asst. Manager (Fire & Safety)	Fire Coordinator	<p>Shall take orders from the SIC.</p> <p>Keep the fire –fighting installation in a state of readiness and be in continuous liaison with SIC/CIC.</p>	Station Officer
Dy. Manager (Safety)	Marine Pollution Control Coordinator	Ensure all employees (port and contract) within port shifted to safe locations.	Safety Inspector
Sr. Commandant- CISF	Security and Evacuation	<p>Act as per the CISF Contingency plan.</p> <p>Controls & Directs traffic in the area.</p> <p>Shall supervise evacuation of personnel from the scene at the time of emergency.</p>	Dy. Commandant - CISF
Sr. Manager (PPD)	Civil Coordinator	Assist SIC.	Manager (I, II)
Chief Manager (Mechanical & Electrical)	In-charge of Electrical Installation	<p>Arrange for specialized equipment if required as per the instruction of the SIC.</p> <p>Take orders from CIC/SIC with regards to power supply and shutdown.</p>	Asst. Engineer
Sr. Dy. Chief Medical Officer	Medical Coordinator	Shall be responsible to organize and keep first aid team with ambulance & necessary medicines to attend to any injured person at the site of the accident.	Alternate Officer
Berth Managers	Traffic Coordinator	<p>Shall prepare vessels to vacate from berth.</p> <p>Arrange to protect cargo in vicinity from damage.</p>	Dy. Manager - Berths

Disaster Management Plan

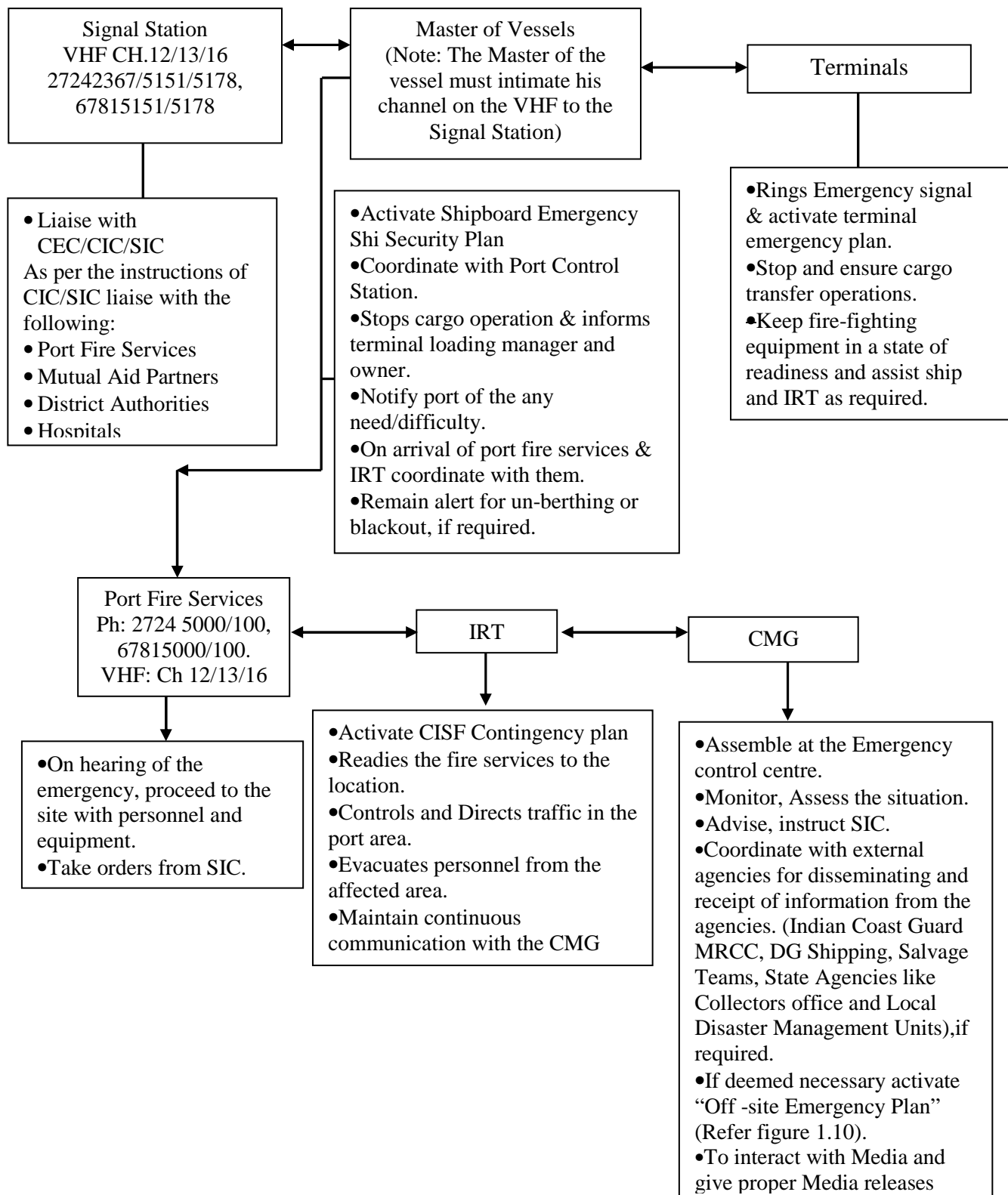
		Submits consolidated list of dangerous goods in port – Vessels in port.	
		Coordinates with ship owners/agents/stevedores.	
Chief Manager (Traffic)	Traffic Coordinator	Submits consolidated list of dangerous goods in port-tank farms in port area.	Asst. Manager (Traffic)
		Coordinates with the tank truck contractors.	
		Ensure sufficient numbers of vehicles are available.	
		Controls traffic in the JNPT area.	
Duty Pilot	In-Charge of Pilotage	Shall be ready on site for taking the ship out of berth and be ready for providing any assistance on site.	Standby Pilot
Manager (Marine Engg.)	ME Coordinator	Responsible for organizing tugs for shifting the vessel to the anchorage area.	Sr. Dy. Manager (Marine Engg.)

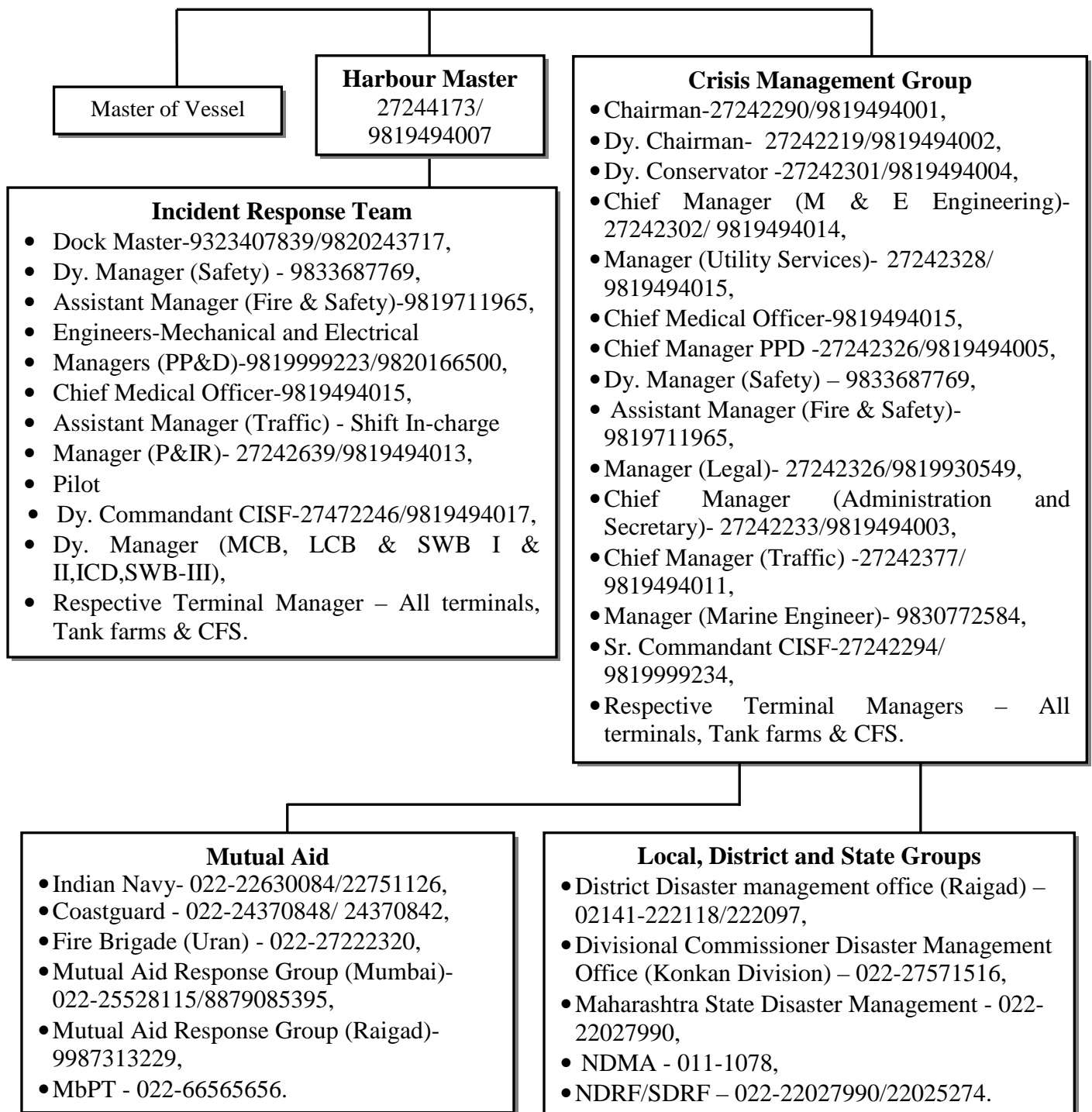
S16: Scenario 16**Part A****1. Bomb Threat**

- 2. Precautions:** Trained Security Personnel, CCTV and Continuous Vigilance including radioactive detectors.
- 3. Impact Zone:** Entire port.
- 4. Resources required:** Organizational setup enumerated in Figure S16.2 and major material and equipment resources as given in **Appendix B**.

Disaster Management Plan

Figure S16.1: Action Flow Chart



*Disaster Management Plan***Figure S16.2:** Action group

*Disaster Management Plan***Part B: Action Plan****1. The Observer**

Response Action	Contact
a. Port Control Station/CISF should be informed without delay.	<ul style="list-style-type: none"> • Port Control Station

2. CISF Should

Response Action	Contact
a. Gather the information as per CISF bomb threat checklist.	
b. Should Implement/activate CISF Contingency Plan and search operation as per the message received of the location.	
c. Identify the location and cordon off the area.	
d. Assist District Police and Bomb Squad as required.	
e. All terminals should be informed.	
f. Port should be shut down and people inside the port should be taken to a safe location.	

3. Deputy Conservator (Alternate: Harbour Master)

Response Action	Contact
a. Assess the situation and activate the DMP.	
b. Establish EOC and be stationed to review & assess possible developments to determine the most necessary course of action.	
c. Give necessary instructions to SIC, CISF and Port Control Station & arrange for external aid as necessary.	<ul style="list-style-type: none"> • SIC • CISF • Port Control Station
d. Review the situation and accordingly inform to the Chairman/ Dy. Chairman.	<ul style="list-style-type: none"> • Chairman • Dy. Chairman
e. Be in constant touch with District and Local Administration for rescue and relief operation.	
f. Terminate the response and debrief before allowing normal operation.	

*Disaster Management Plan***4. Duties of IRT**

Designated Officer	Role	Duties	Alternate Officer
Harbour Master	Site Incident Controller	During Emergency shall communicate & collect all information.	Dock Master
		Ensure that the identified location is cordoned off and the people are evacuated.	
		Report the situation to the CIC/CMG.	
		Extend all necessary help to CISF as and when required.	
Dock Master	Port Control Room Coordinator	Shall be ready for taking the instructions from CIC/SIC and evacuate/move/shift the vessel from the area.	Duty Supervisor
Master of the vessel	In-Charge of fire fighting operation on board vessel	Be ready to take the vessel out of the port as per the instructions of CIC/SIC.	Chief Officer of vessel
		Coordinate with IRT leader and will be responsible for shutting down all cargo operation on board in coordination with terminal In-Charge.	
Terminal Managers	Cargo Work	Shall be responsible of shutting down of cargo operation & coordinating with JNPT and rendering necessary assistance to the SIC by providing additional fire fighting & emergency equipment as required.	Assistant Terminal Manager
		Arrange to protect cargo in vicinity from damage.	
		Submits consolidated list of dangerous goods in port – Vessels in port.	
		Coordinates with ship in-charge/C & F agents/stevedores.	
Asst. Manager (Fire & Safety)	Fire Coordinator	Shall take orders from the SIC.	Station Officer
		Keep the fire –fighting installation in a state of readiness and be in continuous liaison with SIC/CIC.	
Dy. Manager (Safety)	Marine Pollution	Ensure all employees (port and contract) within port shifted to safe	Safety Inspector

Disaster Management Plan

	Control Coordinator	locations.	
Sr. Commandant-CISF	Security and Evacuation	Act as per the CISF Contingency plan.	Dy. Commandant - CISF
		Controls & Directs traffic in the area.	
		Shall supervise evacuation of personnel from the scene at the time of emergency.	
Sr. Manager (PPD)	Civil Coordinator	Assist SIC.	Manager (I, II)
Chief Manager (Mechanical & Electrical)	In-charge of Electrical Installation	Arrange for specialized equipment if required as per the instruction of the SIC.	Asst. Engineer
		Take orders from CIC/SIC with regards to power supply and shutdown.	
Sr. Dy. Chief Medical Officer	Medical Coordinator	Shall be responsible to organize and keep first aid team with ambulance & necessary medicines to attend to any injured person at the site of the accident.	Alternate Officer
Berth Managers	Traffic Coordinator	Shall prepare vessels to vacate from berth.	Dy. Manager - Berths
		Arrange to protect cargo in vicinity from damage.	
		Submits consolidated list of dangerous goods in port – Vessels in port.	
		Coordinates with ship owners/agents/stevedores.	
Chief Manager (Traffic)	Traffic Coordinator	Submits consolidated list of dangerous goods in port-tank farms in port area.	Asst. Manager (Traffic)
		Coordinates with the tank truck contractors.	
		Ensure sufficient number of vehicles is available.	
		Controls traffic in the JNPT area.	
Duty Pilot	In-Charge of Pilotage	Shall be ready on site for taking the ship out of berth and be ready for providing any assistance on site.	Standby Pilot

Disaster Management Plan

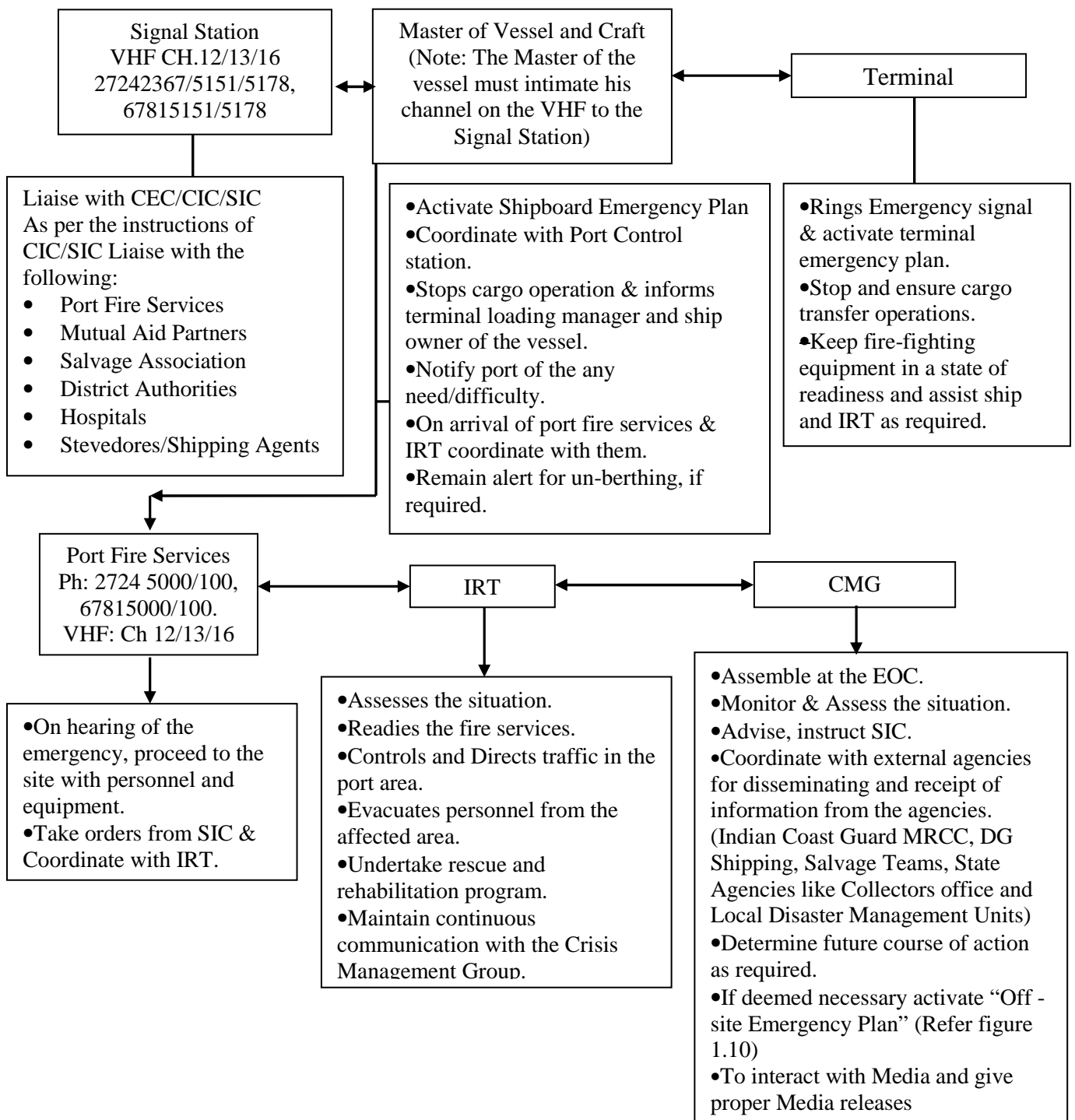
Manager (Marine Engg.)	ME Coordinator	Responsible for organizing tugs for shifting the vessel to the anchorage area.	Sr. Dy. Manager (Marine Engg.)
---------------------------	-------------------	--	---

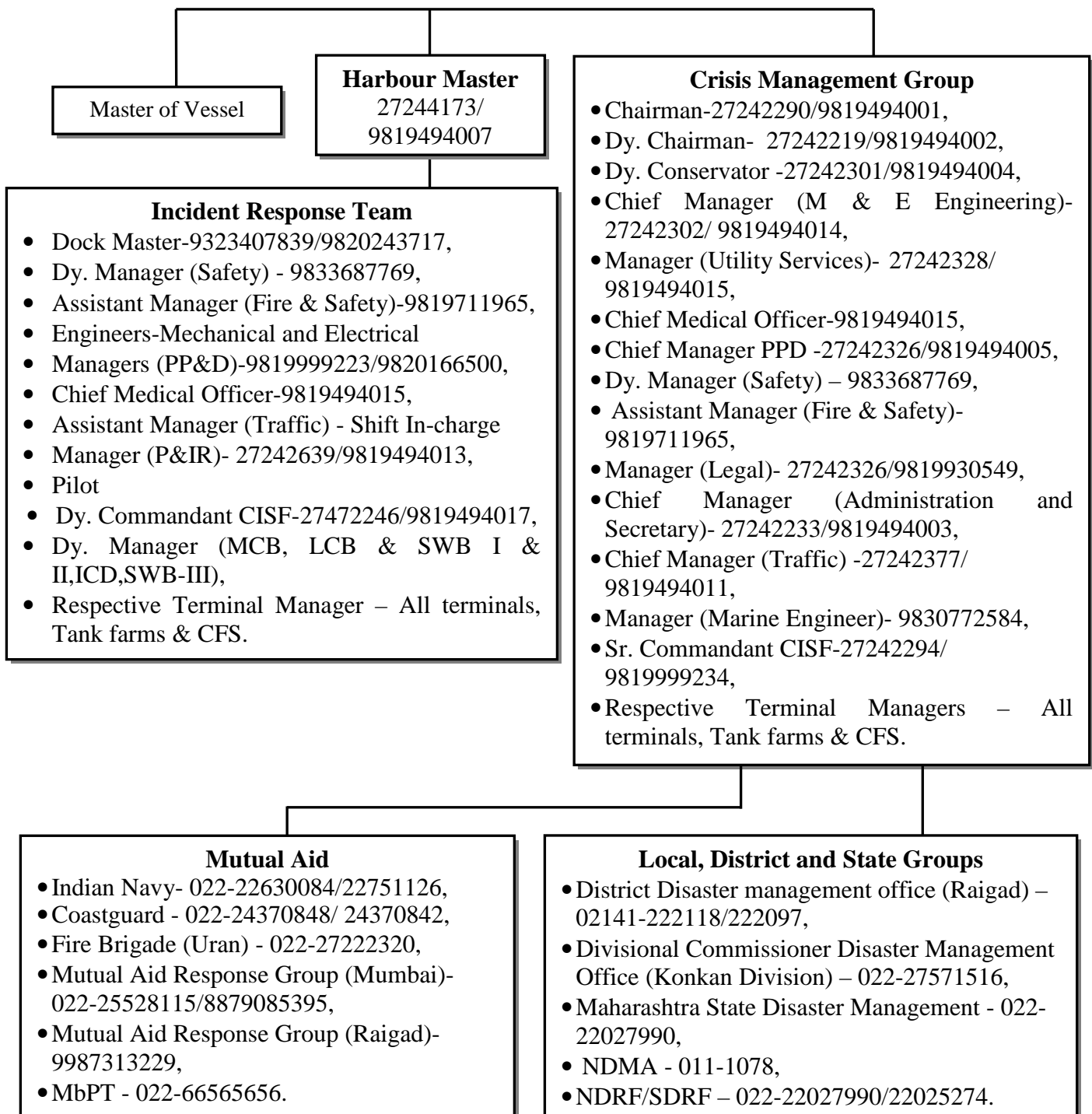
S17: Scenario 17**Part A:**

- 1. Natural Disaster (Cyclone, Earthquake, Flood, Tsunami)**
- 2. Precautions:** Continuous weather monitoring, Early warning system.
- 3. Impact Zone:** Entire port.
- 4. Resources required:** Refer Figure S17.2 and **Appendix B**.

Disaster Management Plan

Figure S17.1: Action Flow Chart



*Disaster Management Plan***Figure S17.2:** Action group

*Disaster Management Plan***Part B: Action Plan****1. The Port Control Station**

Response Action	Contact
a. Gather information related to the vessel type and position in the port limit.	
b. Gather information related to the weather conditions by liaising with competent agencies for issuing warnings as mentioned in section 9.2.3 and other media. Monitor the weather map either through Internet or Television and record approximate position of the weather and information about its movement as given in the news.	
c. Liaise with Master of the Vessel/Pilot.	
d. Ensure that both IT and Civil telephones, one VHF and one walkie-talkie all are operational in the Port control centre. Listening watch to be maintained on VHF channel-16 and walkie-talkie channel-12.	
e. Notify to CIC, SIC and the vessels moving into, through and inside the port. Keep CIC/SIC informed of all the messages received by telephone, VHF sets or by messenger.	<ul style="list-style-type: none"> • CIC • SIC
f. Notify the other Authorities and stakeholders within Port as per instructions of CIC/SIC.	<ul style="list-style-type: none"> • Navy • Coastguard • Stakeholders
g. Notify the information to the owner of the vessel as per the instruction of CIC/SIC/ Master of the Vessel. Pass the information to various Port departments and other Port related organizations through telephones and VHF.	<ul style="list-style-type: none"> • Terminal Operators
h. Inform the Dock Master/Marine Engineer of any buoys or crafts or any Port installation is seen adrift.	<ul style="list-style-type: none"> • Dock Master • Marine Engineer
i. Hoist signals or raise alarms, as per the warnings received by the competent agencies for issuing warnings. (for warning signals refer section 9.2.3)	
j. On behalf of Chairman / Dy. Chairman, the control centre should liaise with Revenue/Police/Health. Administration/Municipal Corporation for additional assistance.	

2. The Master of the Vessel (Alternate : Chief Officer)

Response Action	Contact
a. Should raise ships emergency alarm and activate ship board emergency action plan.	
b. Having raised the alarm, the Master will be responsible for taking all immediate steps to safeguard his ship.	
c. The Master will provide the Port Authority with details of	<ul style="list-style-type: none"> • Port Control

Disaster Management Plan

the vessel.	Station
d. Should follow the instruction of the CIC/SIC and be in continuous liaison with the CIC/SIC/Port control station.	<ul style="list-style-type: none"> • CIC • SIC • Port Control Station
e. Should be in a state of readiness to take the vessel out of the port.	

3. The terminal personnel should

Response Action	Contact
a. Activate EAP (prepared by the terminal) and inform JNPT.	<ul style="list-style-type: none"> • Port Control Station
b. Shall be responsible of shutting down of cargo operation (as per Terminal SOP) & coordinate with JNPT and Master of the Vessel and rendering necessary assistance to the SIC and vessel by providing emergency equipment as required.	
c. Submit consolidated list of dangerous goods in port – Vessels in port. Make arrangements to protect cargo.	
d. Assist IRT and provide all necessary equipment.	<ul style="list-style-type: none"> • SIC
e. He will direct operation staff. Coordinate with the ship in-charge/C&F agents/stevedores.	

4. Deputy Conservator

Response Action	Contact
a. Activate the DMP.	
b. Establish EOC and be stationed to review & assess possible developments to determine the most necessary course of action.	
c. Give necessary instructions to SIC and Port Control Station & arrange for external aid as necessary.	<ul style="list-style-type: none"> • SIC • Port Control Station
d. Review the situation and accordingly inform to the Chairman/ Dy. Chairman.	<ul style="list-style-type: none"> • Chairman • Dy. Chairman
e. Consult with Chairman / Dy. Chairman and decide on clearing of ships as soon as the cyclone is confirmed to pass in close proximity to the Port.	
f. Plan movements of vessels such that the vessels are cleared in shortest possible time.	
g. Coordinate with external agencies/authorities such as Indian Navy and Coastguard.	<ul style="list-style-type: none"> • Indian Navy • Coastguard
h. Be in constant touch with District and Local Administration for rescue and relief operation.	

Disaster Management Plan

- i. Terminate the response and debrief before allowing normal operation.

5. Duties of IRT

Designated Officer	Role	Duties	Alternate Officer
Harbour Master	Site Incident Controller	During Emergency shall proceed to the scene & communicate & collect all information.	Dock Master
		Take over the charge of control centre and ensure the action plan is promulgated as per the instructions of CIC.	
		Inform and ask Masters to keep their ships ready to proceed to the sea at short notice as per the instruction of CIC.	
		Ensure port control, hoists appropriate storm signal as per the situation.	
		Report the situation to the CIC & the CMG.	
		Keep rescue team ready with rubber boats, Life jackets etc.	
		Inform ships alongside berths to double up their moorings and provide shore gang assistance.	
		Ensure that the hazardous cargoes are shifted out of the port or secured/stored in a safe manner.	
		Ensure that the operations are brought back to normal after the termination of the emergency procedure.	
Dock Master	Port Control Room Coordinator	Shall monitor the communication on VHF/any other communication medium & convey and relay messages on the advice from CIC/SIC.	Duty Supervisor
		Instruct Marine engineers to secure tugs and workboats.	
		He will maintain LOG of events.	
Asst. Manager (Fire & Safety)	Fire Coordinator	Shall take orders from the SIC.	Station Officer
		Keep fire tenders and fire-fighting equipment in a state of readiness.	

Disaster Management Plan

		<p>Ensure the Fire tugs is properly manned and secured with double ropes and engines running in idling condition.</p> <p>Responsible for mobilizing fire tenders, men & fire fighting equipments to the scene & extend all necessary support.</p> <p>Ensure hazardous cargo out are kept at a sheltered or safe location.</p> <p>The port Fire & Safety Officer will make announcement in the township and the adjoining habitats area indicating the precautionary measures to be taken.</p> <p>Liaise with State Fire brigade for any assistance.</p>	
Dy. Manager (Safety)	Marine Pollution Control Coordinator	<p>Ensure workers within perimeter of safety dangerous / chemical tank farms shifted to safer perimeters.</p> <p>All other workers to move out of port area.</p>	Safety Inspector
Sr. Commandant-CISF	Security and Evacuation	<p>Controls & Directs traffic in the area.</p> <p>Shall supervise evacuation of personnel from the scene at the time of emergency.</p> <p>Ensure that all barges / small vessels are directed to go to the sheltered area.</p> <p>The fishing trawlers and fishing crafts to be sent to safer place.</p> <p>Till normality is restored, arrangement will be made for thorough checks on all out-going vehicles to guard against pilferage.</p> <p>Round the clock patrolling duty shall be introduced along the electric lines to guard against the removal of copper wires which are likely to be grounded during cyclone.</p>	Dy. Commandant-CISF

Disaster Management Plan

		A special task force to be set up by the CISF for the rescue operation.	
Chief Manager (Traffic)	Traffic Coordinator	Submits consolidated list of dangerous goods in port-tank farms in port area.	Asst. Manager (Traffic)
		Coordinators with the tank truck contractors.	
		Ensure availability of vehicles and mobilize and dispatch sufficient number of vehicles to the site during emergency.	
		Controls traffic in the JNPT area.	
Chief Manager (PPD)	Civil Coordinator	All types of cranes, forklifts, heavy earth moving equipment to be secured in a safe manner.	Manager (I, II)
		Keep enough number of cement bags ready as per SIC instructions.	
		Diesel engines for raw water and clean water, all pump house equipment and all generator sets meant for water supply shall be tried out and kept ready.	
		As soon as the contingency plan is made operational all the water tanks should be filled up and standby arrangement for supply of water to be made.	
Chief Manager (Mechanical & Electrical)	In-charge of Electrical Installation	Shall be responsible for Electrical supply to vital equipment and systems at the berth.	Asst. Engineer
		All Sub Stations, Power Control rooms will be manned round the clock.	
Sr. Dy. Chief Medical Officer	Medical Coordinator	Shall be responsible to organize and keep first aid team with ambulance & necessary medicines to attend to any injured person.	Alternate Officer
Duty Pilot	In-Charge of Pilotage	Shall be ready on site for taking the ship out of berth or will not bring the ship to berth as per the instruction given by CIC/SIC.	Standby Pilot

Disaster Management Plan

		<p>Inform the Masters of all vessels at the berths to double the moorings and to keep engine ready to proceed out to sea if situation warrants.</p> <p>Decision regarding moving ships to the anchorage will be taken depending on the strength of the wind likely to be encountered and number of vessels in the Port.</p> <p>Maintain a close liaison and co-ordination with the Operations In-charge.</p> <p>Take all necessary steps for the safety of the Port crafts.</p> <p>Ensure all other crafts are placed at safe place and properly secured excepting one pilot launch and one stand by launch used for inspection and emergency duties.</p> <p>Ensure all barges will be secured at safe place along with emergency squad will make frequent round (minimum two hourly) to check the safety of Port Crafts.</p> <p>Fender and extra lengths of ropes/wires will be kept ready so as to attend to any craft whose moorings may part.</p> <p>Inform the signal station immediately in the event any craft is seen adrift or any other Port installation is seen in danger. Arrange an Emergency Maintenance team.</p>	
Manager (Marine Engg.)	ME Coordinator	<p>Responsible for organizing tugs for combating the fire and rescue.</p> <p>Hire additional craft as necessary.</p>	Sr. Dy. Manager (Marine Engg.)
Floating Craft		Masters will shift their respective crafts at suitable places as directed by the Harbour Master and will secure them suitably with additional moorings.	

Disaster Management Plan

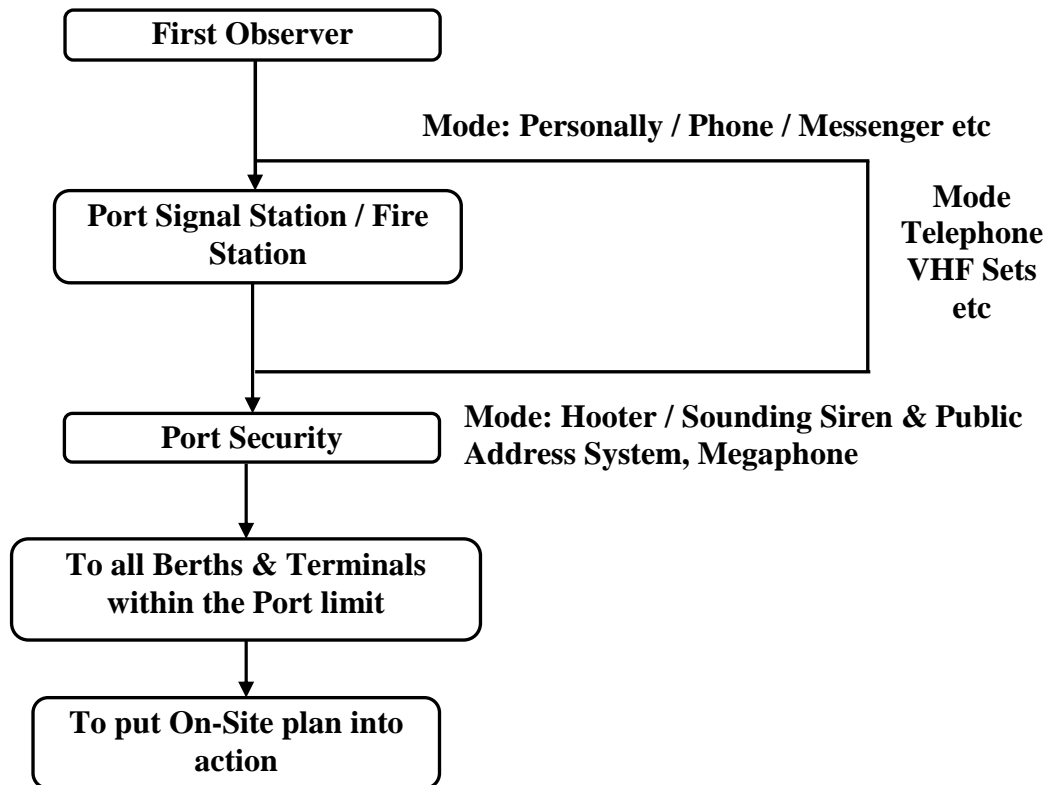
		<p>Masters of respective crafts will be responsible for proper securing and safety.</p> <p>Masters will keep the engines of their crafts ready to proceed at short notice as per the instructions of the Operation In-charge.</p> <p>Extra fenders will be kept ready on board the Tug for use as required.</p> <p>Engine room entrance doors, sky lights etc. of all the floating crafts to be kept shut.</p> <p>The Floating Crafts shall be in constant touch with Signal Station.</p>	
Workshops		Workshop should be manned continuously and should be ready with all the necessary equipment to attend during emergency.	
Material Management		<p>During cyclonic season sufficient stock of stores like AC sheets, J.Hooks, screw hinges, gunny bags, tarpaulins, ropes and wires for Port Crafts, diesel oil, kerosene oil, hurricane lantern, kerosene lamps, torch lights with batteries and bulbs, electrical items etc. is kept.</p> <p>All the materials which are likely to get damaged in rain are covered with tarpaulin.</p> <p>Store Supdt. and store keeper along with other staff required to issue materials.</p>	
Data Entry and Storage Cell		<p>Start downloading isobaric internet pictures and reports 6 hourly after Signal No.1 and 3 hourly after signal 3.</p> <p>Give copy to CIC and SIC and they in turn will apprise the Deputy Chairman and Chairman.</p>	

9.4 ACTIVATION OF RESPONSE PLAN

9.4.1 Prevention/Protection action implementation plan

Following is the typical Prevention/Protection action plan.

Figure 9.1: Action Implementation Plan



The person who observes the emergency first is called as the First Observer. The First Observer, noticing an unusual occurrence like a fire /gas release /collapse of structure etc., should immediately notify the Signal Room with available means of communication and also contact the concerned Officer of the area in person.

He would:

1. Raise alarm
2. Call fire station and signal station and pass on following information:
 - Introduce himself
 - State briefly the type of emergency
 - Give the location of the incident.
3. Proceed to a safe place. However, he would return to the location of the incident and place himself in a safe area cross-wind to the wind direction and standby to give assistance if he is part of the action group.

After receiving information from the First Observer, the Signal Station would notify all the key personnel of the Port and also direct the security personnel to activate

Disaster Management Plan

Siren and will subsequently announce on the available means of Public Address System (say fire jeep which is fitted with PA system) as follows:

- Location of the emergency.
- Type of the emergency.
- Severity of emergency.

After hearing siren or the public announcement, all concerned personnel (identified in the plan) would move to their respective positions and will begin actions as documented in the plan.

SITE CONTROL PROCEDURE		
Site Control should be established for every site where access is to be controlled. This includes the EOC, sites of shoreline cleanup, waste storage, response vessel mooring areas or any site containing hazards or hazardous materials		
Task	Action	Status
1	Identify perimeter of the “Hot” (secure or prohibited) zone. This may be:	
	i Oiled shoreline. (Note: This zone should contain all hazards and sensitive areas where access should be restricted).	
	ii Response vessels.	
	iii Area around the incident.	
	iv EOC	
2	Identify the “Hot” zone perimeter by sign-posting or establishing a cordon.	
3	Identify the “Warm” (exclusion, controlled or support) zone. (Note: This is a non-contaminated/ non-hazardous zone). For e.g.:	
	i Area behind beach including all areas used for support (shelter, canteen, car park).	
	ii Jetty.	
iii Any water area established to exclude non-response vessels.		
4	Identify the “Warm” zone perimeter by sign-posting or establishing a cordon.	
5	Establish any required “Hot” zone perimeter facilities. For example (i) and (ii) this may include:	
	i Decontamination facility.	
ii Temporary waste storage.		
6	Establish “Warm” zone perimeter facilities. Generally this is site security.	
7	Establish support facilities within Warm zone as required	

Note 1 Entry to a Hot Zone should be restricted to:

- Personnel involved in the on-site work.
- Personnel equipped with appropriate protective gear.
- Personnel who have undergone correct training and induction.

Note 2 The Warm Zone surrounds the Hot Zone and is the zone and is generally:

Disaster Management Plan

- The area from which personnel and equipment are deployed.
- The perimeter where site control is exercised i.e. the entry points to the Hot Zone.
- Restricted to those people who operate in the Hot Zone and those who support them.

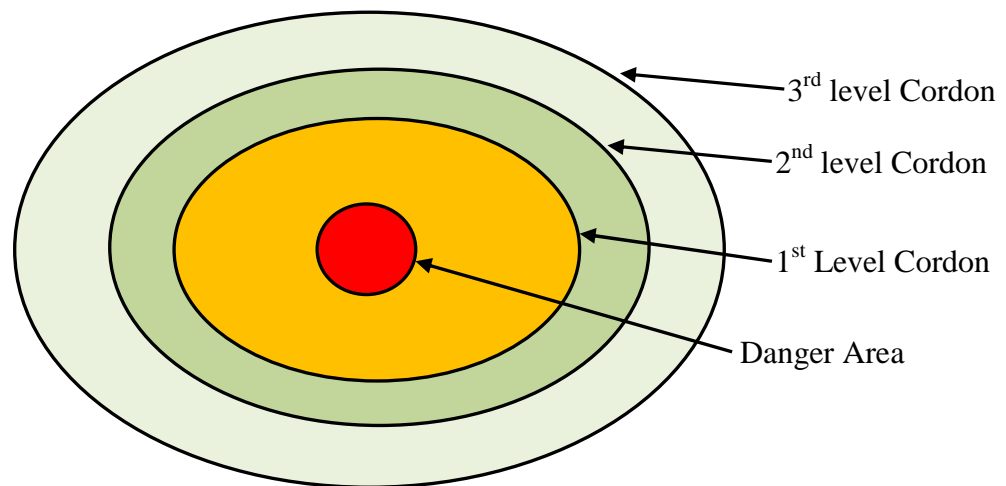
Note 3 The Cold Zone is all public or otherwise unrestricted areas, i.e. those areas outside of the controlled site.

PLANNING MEETING SCHEDULE & PREPARATION OF THE INCIDENT ACTION PLAN (IAP)						
Phase/ Task	Action		Responsibility	Check		
Meeting	1	Briefing on situation.		CIC or others as nominated.		
		a	Current situation			
			i		Incident location	
		ii	Resources mobilized			
		b	Predicted situation:			
			i		Trajectory/Dispersion	
			ii		Resources at potential risk	
	2	State Aim of Response.				
	3	Develop and rank response objectives based on protection priorities.		CIC		
	4	Develop Strategies and Tactics.		CIC and all Coordinators		
5	Identify necessity for obtaining any permit (e.g. dispersant use).		CIC			
6	Prepare Draft Incident Action Plan.		CIC			
7	Determine need and location of Advanced Operations Centres or Staging Areas.		CIC and all Coordinators			
8	Approve and Document IAP.		CIC			

Process to be repeated throughout the response as scenario, objectives, strategies or tactics change.

9.4.2 Mechanism for access control and isolation of the Danger area

1. All gates and landing jetties should be guarded,
2. Unauthorized person should not be allowed to the restricted area,
3. Authorized person will be entering the zone with all the necessary PPEs,
4. The area should be cordoned off during operation,
5. Proper signage board and warning should be displayed at the place of the operation,
6. Fire fighting facilities and other required resources should be available till the operation is terminated,
7. The restricted areas should be under surveillance at all times.

Figure 9.2: Isolation of Danger Area

- Danger/Hazardous area
- 1st Level Cordon off
 - Site Control point
 - Ambulance
 - Casualty Clearing point
- 3rd Level Cordon off
 - Traffic Control

Note: Positions will depend on the wind directions

9.4.3 Evacuation

1. On blast of Disaster warning siren, the workers will assemble at the respective assembly points to be transported to the refugee centers.

2. The assembly point earmarked at JNPT are as follows

Table 9.3: Assembly Points

Sr. No	Assembly Points
1.	CT Shift in-charge office
2.	In front of POC building
3.	POC Canteen building
4.	In front of Administration building
5.	Shallow Water Berth No.1
6.	TT Maintenance Section
7.	Office of Dy. Manager (LCB & SWB I & II)
8.	ICD Building
9.	E-7 Substation
Sr. No	BPCL Jetty - Assembly Points
1.	Jetty Control Room/Pump House building
2.	Near Liquid Cargo Jetty Entry Gate
3.	At the South west corner of Loading Berth

Disaster Management Plan

APM Terminal – Assembly Points	
1.	Front House of GTI House
2.	Behind Eng. Workshop
3.	Central gate Complex
4.	Rail Head – ICD
5.	Wharf (Near Central Orange House)
6.	Yard 1U near South bridge starting
7.	ODC gate
8.	TDC
9.	Marshalling Yard
DP World Terminal – Assembly Points	
1.	Wharf office (NSICT wharf office and NSIGT wharf office)
2.	Old Canteen
3.	E6 substation
4.	Operations center
5.	ICD Office
6.	Gate complex
BMC Terminal – Assembly Points	
1.	Wharf office
2.	Workshop
3.	Admin Building
4.	Gate Complex
5.	Rail Goomti (near sub station1)
6.	Rail Office

3. The vehicle-carrying victim should be given the first priority in traffic movement.
4. While assessing the evacuation route, constant communication link should be maintained with the EoC as well as with the individual assembly point station from where the evacuation is to be undertaken.
5. As far as possible people should be advised not to use their vehicles since any breakdown of the same on the evacuation route would act as an obstacle to the vehicles being used for evacuation.

9.4.3.1 Evacuation Routes

In case of a general emergency one of the first duties of the CIC is to alert outside authorities and advise them about the actions that should be taken to protect the

Disaster Management Plan

public, if any. The most significant risk affecting the local population is that of a toxic materials release.

The evacuation route could be by two ways

- a. Land
- b. Sea

9.4.4 Temporary Shelters

In the event of an impending disaster the affected population would have to be transported to intermediate temporary shelter. The temporary shelters identified for Port are schools and colleges located at Port Area and City.

9.4.4.1 Gathering & Rehabilitation centers

Table 9.4: Gathering and Rehabilitation centers

Centres	Location
Multipurpose Hall	JNPT Township
JNPT Hospital	
St. Mary's JNP School	
JNP Vidyalaya	
Officers and Staff club	

Administration department shall ensure adequate quantity of water supply at all the temporary evacuation centres.

CMO shall ensure that necessary medicine and medical assistance at the temporary evacuation centres is available.

Administration department shall take care of the requirement for food for the evacuees in the temporary evacuation centres. For supply of food packets, etc., they shall immediately contact the agencies (**Appendix C**) of the area.

As a part of emergency relief Port Trust to consider 500 gm of rice per day per adult and 250 gm of rice per day per child. Relief of this scale should be catered to by consent of collector for a period of 3 days whereas a relief of 7 days could be obtained with the approval of Relief commissioner.

Extension of relief beyond 15 days could be sought from the State Government or Central Government.

Apart from the above, if required, he may contact the hotels (**Appendix C**) for supply of food packets.

9.4.5 Transportation

9.4.5.1 Vehicle Pool

As soon as this Emergency Action comes into force, the vehicle pool is formed. The pool shall be controlled by Administration Department. Refer **Appendix B** for list of vehicles.

Apart from the Port vehicles, The Engineers shall hire vehicles with spark arrestors from other available sources for emergency work. Refer **Appendix B** for list of private vehicles.

Engineers should ensure the availability of the drivers and vehicles and report compliance to the Deputy Chairman/Dy. Conservator. All vehicles whether it is of

Disaster Management Plan

Port Trust or hired should be parked in the location as designated by Deputy Conservator from where it can be taken readily for immediate use.

9.4.5.2 Contact with Railways & State Road Transport Corporation

SIC should ensure for the smooth movement of workers/employees for which he may get in touch with the concerned officers and apprise them about the situation so that the movement of staff is not suffered.

9.4.6 Generator Sets

Wherever generator sets are required, CM (M&EE) officers shall be contacted, who shall immediately hire/procure or provide from whatever sources.

9.4.7 Decontamination

Additional issues in relation to decontamination of the public may arise at some hazardous materials incidents. Decontamination in this context refers to a range of procedures employed to remove hazardous materials from people and equipment. It includes terms such as:

- Clinical decontamination, meaning medical treatment by health professionals of patients affected by or contaminated with hazardous materials;
- Emergency decontamination, when time does not allow for the deployment of specialist resources and it is judged imperative that decontamination of people is carried out as soon as possible;
- Personnel decontamination meaning the decontamination of uninjured exposed persons;
- Mass decontamination is the procedure deployed where significant numbers of persons are deemed to require decontamination, beyond the normal decontamination capacity; and
- Equipment decontamination is the procedure used to clean the specialist equipment/protective suits which personnel use in dealing with hazardous material incidents.

The need for decontamination of individuals will be established by the On-Site Coordinator, in association with the other Controllers of Operations. The Medical Service Executive has responsibility for providing clinical decontamination and medical treatment to casualties affected by hazardous materials. The fire services have responsibility for providing other forms of physical decontamination of persons at the site. The Medical Service Executive will be responsible for decontamination where required to protect health service facilities, such as hospitals, from secondary contamination. Where emergency decontamination of the public is required, the fire service may use its fire-fighter decontamination facilities, or improvised equipment may be used prior to the arrival of dedicated equipment. Where persons have to undergo this practice it should be carried out under the guidance of medical personnel. It should be noted that emergency contamination carries risks for vulnerable groups, such as the elderly and the injured.

9.4.8 Medical Facilities

Depending on the nature of the emergency, it may be necessary to alert medical facilities within and outside the port.

Medical facilities likely to be used will need to be informed

- The nature and location of the emergency,

- The likelihood or number of casualties,
- Whether medical staff are required at the location of the emergency,
- Actual details of the casualties, including the names, as soon as these are known.

9.4.8.1 First Aid Centers

First Aid treatments provided at the port and the Port ambulance placed at every First Aid centers and hired vehicles, can be used for taking the person to the medical centre. Refer **Appendix B**.

9.4.9 SEARCH AND RESCUE MECHANISM

Search and Rescue mechanism shall start as soon as the public warning signal has been issued and should be carried out as per the instructions of CIC/SIC.

9.4.10 Resource Management

Resources available with the port should be used effectively during the emergencies. The equipment should always be maintained, inspected and tested periodically. Resources available with the JNPT for the preparedness program can be found in **Appendix B**.

9.5 LOGISTICS/SERVICE DELIVERY MECHANISM

The required/necessary equipment and assistance during various types of emergency can be requested from the Local Industry crisis groups, district crisis group MoU signed with Oil Industries and Tank farms association operating in port. Additional resources available for disaster relief with the various departments in the Raigarh District can be found from IDRN (Refer **Appendix B**)

10. RECOVERY AND RECONSTRUCTION

10.1 RESPONSIBILITY FOR TERMINATING THE RESPONSE

The decision to terminate a response is taken by the CIC in consultation with the JNPT Chairman or CMG.

10.2 CONDITIONS FOR TERMINATION

10.2.1 Marine Response Operations should be terminated when:

- Oil has been recovered to the extent practicable; or
- The surface oil slick has broken up; or
- The oil slick has gone out to sea and is beyond the range of response options, and is unlikely to return; or
- Oil has impacted shorelines and is no longer on the water.

In the last case marine response resources must remain on standby and equipment maintained at the ready until shoreline response operations have been completed.

10.2.2 Shoreline Response Operations should be terminated when:

- All accessible shorelines are clean to the extent practicable.
- Cleanup is having no further net beneficial effect or having a deleterious effect on the shoreline or associated plants or animals.

Shoreline cleanup operations may be terminated only upon the instruction of the **MPCB/Coastguard**.

10.2.3 Land Spill Response Operations should be terminated when:

- Chemical has been recovered to the extent possible,
- Area has been declared “Risk or Hazardous” free.
- Source of leakage is stopped and the condition of the area is safe for operation.

Land spill cleanup operations may be terminated only upon the instruction of the **MPCB and PNGRB**.

10.2.4 Fire Extinguishing operation should be terminated when:

- Fire has been completely extinguished,
- Area has been declared as “Risk or Hazardous or Smoke’ free area.

10.2.5 Response action can also be terminated as per the Warning signals given by the agencies (Refer 9.2.3).

10.3 STAND-DOWN PROCEDURES

10.3.1 Return of Equipment

Upon completion of the response, the SIC (or delegate) will:

- Arrange recovery of all equipment, and unused materials.
- Ensure that all equipment is cleaned.
- Ensure that all equipment is returned to the owner.

10.3.2 Debrief

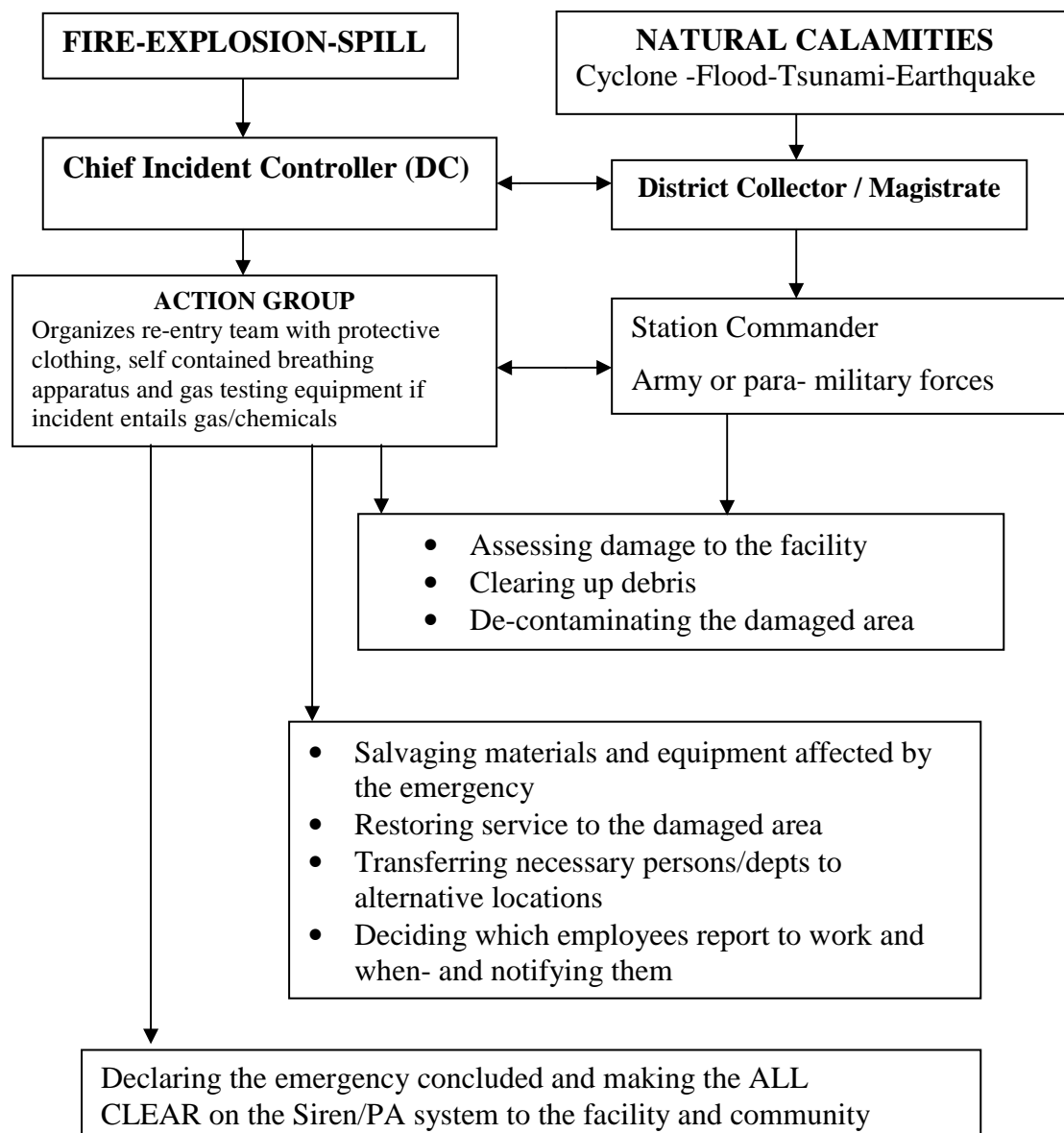
The SIC may hold a post-spill debriefing. Debriefing should address:

- Spill causes (if known) and future prevention methods.
- Speed of response activation.
- Effectiveness or suitability of strategies, tactics and equipment.
- Health and Safety issues (if any).
- Any other issues required to be communicated.
- Damage in terms of life, injury and loss of property should be assessed.

10.3.3 Incident Report

The Chairman JNPT and relevant authority may request the preparation of an Incident Report. This should follow the debrief outline or other format as specified.

Figure 10.1: DE-ACTIVATION OF THE PLAN-RECOVERY-RESTORATION



Note: -For natural calamities etc at the District level-the District collector or District magistrate will make the necessary initiative through the paramilitary group. The

Disaster Management Plan

Port Chairman or CIC may also request para military personnel to assist when the accidents have originated at the port premises.

Specific procedures for recovering from an emergency and re-entering the facility can hardly be provided, since they will have to be determined on a case by case basis, depending on the type of accident and the severity of the damage suffered. However, provision would be made for the following:

1. Inspecting the damaged area
2. Declaring the emergency concluded and making the "all clear" known to the facility employees and the community
3. Deciding which employees would report to work and notifying them
4. Beginning an investigation into the causes of the emergency
5. Assessing the damage to the facility
6. Transferring necessary operations to alternative locations
7. Decontaminating the damaged area
8. Restoring services to the damaged area
9. Clearing up the debris
10. Salvaging material and equipment affected by the emergency
11. Restoring the parts of the facility affected by the emergency
12. Determining responsibilities and instituting possible insurance and damage claims.

10.3.4 Cost recovery

1. All records of costs must be collated for submission to the relevant insurer.
2. For expenses incurred assisting third parties, costs should be kept and submitted to relevant authority.

10.4 DAMAGE, LOSS AND NEED ASSESSMENT

10.4.1 Initial Damage Assessments

Following any major disaster, rapid assessment of damage is important for restoring the facilities, resuming Port operations and cost recovery. In certain cases e.g. terrorism and security related, thorough site or damage assessment is not possible immediately after an event. Access to, and assessment of Port facilities and its contents may be delayed for a period of time. The delays may be due to possible loss of structural integrity, necessary forensic investigation, or the existence or potential existence of toxic or hazardous materials.

Immediately following a disaster and as soon as it is safe to do so, the CISF or other designated team shall conduct a preliminary damage and environmental assessment by conducting a drive-through of all Port facilities. Damage will be noted in enough detail to allow it to be communicated to assess whether conditions are such that the Damage Assessment Team can be allowed entry and to prioritize recall of Key Personnel and begin developing action plans for recovery.

10.4.2 Secondary Damage Assessments/Temporary Repairs

Once the affected site is approved for entry, a Damage Assessment Team assembled by the Engineering Department will conduct a more thorough assessment of damage to facilities and utilities. This assessment will focus on those assets needed to facilitate a rapid recovery such as electric power, communications and transportation. The assessment should also identify any potential environmental issues that require

immediate attention. Damage should be noted in enough detail to allow it to be communicated to begin developing action plans for recovery. At this time the actions will be initiated for recall of personnel and authorizing the purchase of materials and services needed to begin making repairs to critical systems or addressing environmental hazards. Local utility companies need to be contacted at this time for anticipated schedules for restoration of critical utility services.

10.4.3 Assessment of Damage to Navigational Channel

The assessment of damage to the Navigation Channel is under the jurisdiction of the Indian Navy and Hydrographic department of Survey of India. Assessment of damage to the berthing area portion of the channel is under the jurisdiction of the terminal owner/operator. Assessment of damage to Aids to Navigation is under the jurisdiction of the Port. The Harbormaster or other designated personnel will provide status report the condition of the channel to the Deputy Conservator.

10.4.4 Potential loss estimates analyzed include

- Physical damage to residential and commercial buildings, schools, critical facilities, and infrastructure.
- Economic loss, business interruptions, repair and reconstruction costs.
- Social impacts, including estimates of shelter requirements, displaced households, and population exposed to scenario floods, earthquakes and cyclone Short Term Reconstruction.
- The decision to rehabilitate or abandon port structures depends on the extent of damage, importance of the structure, and limits on its use. Aspects of an inspection may include:
 - An underwater inspection by divers to check for possible demolition damage or deterioration of footings.
 - An inspection of the piling at low water from a boat to check for decay, borer attack, or other damage. The stringers and deck are examined from below to determine the need for repair.
 - Breakwaters, jetties, or seawalls are inspected for damage. If breached, such structures are repaired to avoid scour and further damage.
 - Assessment of facilities by civil engineers and surveyors to ensure compliance with local building and architectural codes and to ensure that damaged or repaired buildings are safe for occupancy.

In the event of a terrorist act at the port, reconstruction planning should also take into account the interests of security representative, and the need to collect evidence.

10.5 REPAIR/RESTORATION PHASE

The repair and restoration phase of recovery must be a coordinated effort between all departments. Collectively, decisions will have to be made regarding the priority and order of repairs considering:

- Health and safety issues;
- Available cash flows;
- Spending authority;
- Bidding requirements;
- Contractor availability;

- Customer requirements;
- Lease/contract requirements; and
- Insurance claim management.

10.6 RECOVERY PLANNING

10.6.1 Short-term recovery planning

Short-term recovery planning runs parallel to short term response, and begins during and immediately after an incident

10.6.2 Medium-term recovery planning

In the medium-term recovery planning, port will engage in contracting and setting up for largescale reconstruction and reconstitution operations. This may include financial planning, contracting, and the formation of joint venture agreements to assist in long-term business continuity.

Initial reconstruction of damaged or destroyed facilities begins, as structural and civil engineers rehabilitate existing port structures. They use appropriate methods of lightering and port construction to handle cargo.

The reconstruction activities which may require an Environmental Impact Assessment are as follows:

- a. Debris Removal
- b. Emergency Protective Measures
- c. Repair to Pre-Disaster Condition
- d. Modification, Expansion, and Mitigation Projects
- e. New Construction and Ground Disturbance

Sr. no. (d) Above has been included so as to undertake proactive mitigation steps as part of “**Build-Back-Better**” of the Sendai Framework.

10.6.3 Long-term recovery planning

In the event that a part of the entirety of a port becomes unusable or requires rebuilding, the long-term reconstruction considerations will be taken by MoS GoI taking into account the financial planning and resources that may be involved in the process. This may include budgetary support.

10.7 RE-OPENING OF BERTHS TO VESSELS

After the channel to the Port has been re-opened and the Port infrastructure is found to be in sound condition, the Port will be in a position to begin accepting request for berthing. This will require coordination between the Port, ship pilots, customers, tenants and private terminals.

Areas of consideration for prioritizing the calling vessels include:

- Available depth in the channel/draft of vessel;
- Condition of facilities to receive the vessel;
- Availability of labor to offload/load cargo;
- Is vessel carrying a critical feedstock for area manufacturing?
- Is vessel carrying commodities that can be used in recovery?

10.8 RAIL-WAGON DELIVERIES

After the Port has found the terminal rail infrastructure in sound condition, the Port will be in a position to begin accepting rail car deliveries. This will again require coordination between the Port, rail authority, customers, tenants and private terminals.

11. BUDGETARY PROVISIONS

11.1 JNPT FINANCIAL ARRANGEMENT IN CASE OF DISASTER

11.1.1 Insurance of Port Assets

In view of incidents like Earthquake, Tsunami, Cyclones, etc. and also directives received from Ministry as well as report of the Committee constituted by IPA, the Port finalized the comprehensive Port Package Policy w.e.f. March, 2006 after valuation of certain Port's Assets by an Independent Valuer. The comprehensive Port package policy comprises Insurance cover for the following properties:

1. Building, Shed and other structure inside port
2. Roads, Culverts, Bridges & Fencing walls in the port area/vicinity
3. VTMS, Navigational aids & Fire fighting aids
4. Berths, Docks & Jetties
5. Port Equipment & Plant & Machineries
6. Oil Pipeline
7. Electrical Installations
8. IT Infrastructure

The Comprehensive Port Package Policy number is 12030022180900000002 (The New Indian Insurance Co. Ltd.) with validity from 01.07.2018 to 30.06.2019.

The above policy also covers terrorism (Endt. No 12030022180983000001)

12. PLAN MANAGEMENT

12.1 DEVELOPMENT, APPROVAL, IMPLEMENTATION, REVIEW AND REVISION

- This plan is developed in accordance with the template issued by MoS GoI and guidelines of NDMP (2019) and structured to suit the port organization. The implementation will be undertaken by the office of the Deputy Conservator in association with various stakeholders. It is understood that lessons learned from previous near disaster/disaster situations have been studied and cognizance of the aftereffect of these disasters noted. Understanding of risk and preventive measures has thus been analyzed and mitigation plan prepared. Prioritization of risks has been done in the HRVCA section.
- Plan would be circulated to all stakeholders.
- Regular Drills/exercises would be conducted to test the efficacy of the plan and check the level of preparedness.
- NDRF, SDRF, BARC (for nuclear and radiological emergencies only) and other agencies e.g. civil defense, local govt. departments would be integrated into the plan.
- Review and updating of the plan would be carried out annually as per Disaster Management Act, 2005 Section 37.
- Consequent to any change/modification, the Dy. Conservator/Harbour master is responsible for reviewing, updating and maintaining the DMP.

REFERENCES

1. Data and documents provided by JNPT and various terminals within JNPT.
2. 'National Disaster Management Guidelines' issued by National Disaster Management Authority (NDMA), Govt. of India.
3. Disaster Management Act, 2005.
4. National Disaster Management Plan, 2019.
5. Post 2015- Global Framework.
6. PM of India outline- Point agenda for Disaster Risk Reduction.
7. IMO publication 'Manual on Oil Spill Risk Evaluation and Assessment of Response Preparedness' 2010 edition, London, UK.
8. IMO publication 'Manual on oil pollution – Section IV – Combating oil spills', 2nd edition, 2005, London, UK.
9. IMO, Evaluation of accidental oil spills from bunker tanks submitted by INTERTANKO, Sub-committee on ship design and equipment, 46th session, 5 December 2002.
10. ITOPF (1985) 'Effects of marine oil spills', Technical information paper No. 10, London, UK.
11. ITOPF (1986) 'Fate of marine oil spills', Technical information paper No. 11, London, UK.
12. International Safety Guide for Oil Tankers and Terminals (ISGOTT), 5th Edition, London, UK.
13. IMO publication 'Manual on oil pollution – Section V – Administrative aspects of oil pollution response', 2nd edition, 2009, London, UK.
14. Port and Harbour Risk Assessment and Safety Management System in New Zealand prepared for Maritime Safety Authority of New Zealand, 2004.
15. Internet sites of CG (www.indiancoastguard.nic.in), IMO (www.imo.org), ITOPF (www.itopf.com)
16. IMO publication 'Revised Recommendations on the Safe Transport of Dangerous Cargoes and related activities in Port Areas', ISBN: 9789280114720, 2007.
17. Bureau of Indian Standards (BIS) 'Hazard identification and risk analysis – Code of practice, IS 15656:2006'.
18. Port of Geelong Emergency Management Plan, 2012.

Disaster Management Plan

19. Operational Risk Assessment of Port of London May 2001 by Port of London Authority.
20. National Oil Spill Disaster Contingency Plan, Presentation by Mr. Hebbar Director (Environment), Coast Guard Headquarters.

APPENDIX A

RESPONSE SUPPORT DIRECTORY

Aircraft: Surveillance	Will be deployed by the resource agencies if required.
Dispersant: H&S	Refer Material Safety data Sheets (MSDS) for the available dispersants.
Environmental Information	Local Forest & Environment dept. may provide reliable and useful information.
Equipment:	MOU should be made with operators of the Port estate.
Equipment: State	The equipment available in Maharashtra (Raigarh) is listed in IDRN (www.ndmindia.nic.in) database.
Equipment: Fire fighting	Appendix B lists the fire fighting response equipment held with JNPT and the stakeholders within port.
Equipment: Oil Port	Appendix B lists the pollution response equipments held with JNPT and the stakeholders within port.
International Assistance	International Assistance can be obtained through OSRL & EARL.
Oil Spill Weathering Modeling	JNPT has to utilize available INCOIS facility.
Oil Spill Trajectory Modeling (OSTM)	JNPT has to utilize available INCOIS facility.
Personal: Local	Refer to Directory in Appendix C for JNPT personnel.
Personal: State	Support service personnel from state may be obtained through the CMG Coordinator. Contact details are given in Appendix C .
Personal: National	Support service from National Response Team (NRT) may be requested through Ministry of Home Affairs (see Appendix C).

APPENDIX B RESOURCES

B.1 JNPT Fire fighting details:

Sea water Fire Fighting facility (installed at Container berth, Container yards, shallow water berth and utility area)		
Main Pump	01 nos.	Electrical Motor Driven Main Pump VERTICAL TURBINE type (Saline Water) Compatible and capable to deliver 4550 lpm (273 m ³ /hr) at 145 psi head. The pump is coupled to TEFC motor of suitable HP with speed of 1450 rpm
Diesel Engine Pump	01 nos.	Diesel Engine Driven Pump set VERTICAL TURBINE type (Saline Water) Compatible and capable to deliver 4550 lpm (273 m ³ /hr) at 145 psi
Jockey Pump	01 nos.	Electrical Motor Driven Jockey Pump VERTICAL TURBINE type (Saline Water) Compatible and capable to deliver 250 lpm (40 m ³ /hr) at 145 psi head. The pump is coupled to TEFC motor of suitable HP with speed of 2900 rpm
Fire Hydrant points	92 nos.	Single Headed Hydrant Valve (Above Ground) as per IS 5290
Fire Monitors	04 no.	Water Monitor made out of seamless steel tubes, hot dip galvanized, 63mm flanged inlet 32 mm nozzle bore, gunmetal ball bearing, swivel joint with locking arrangement permitting 360 Deg. horizontal, 80 - 145 Deg. vertical transverse, conforming to IS:8442

HAZBUND area		
Fire Pump	01 nos.	
Fire Hydrant points	02 nos.	Double Headed Hydrant Valve (Above Ground) as per IS 5290
Fire plastic water tank	04 nos.	Capacity 10,000 ltr

Administration building		
Main Pump	01 nos.	Electrical Motor Driven , 2250 lpm at 70m head conforming to IS 1520
Diesel Engine pump	01 nos.	Diesel Engine Driven Pump set of 2250 lpm at 70m Head conforming to IS 1520
Jockey pump	01 nos.	Electrical Motor Driven Jockey Pump 180 lpm at 70 m. head conforming to IS: 1520
Fire Hydrant points	27 nos.	Headed Hydrant Valve (Above Ground) as per IS 5290
Fire Hose reel	17 nos.	30 m. long 20 mm (nominal internal) dia. water hose Thermoplastic (Textile reinforced) Type - 2 as per IS :

Disaster Management Plan

		12585
4 way fire brigade connection	02 nos.	for 150 mm dia. MS pipe connection, conforming to IS 904
79 ⁰ C sprinklers	50 nos.	installed at car parking area only
Fresh water tank	04 nos.	25000 ltr each
Submersible pump	01 nos.	5 hp , for priming the tank with required pipeline

Total Gas flooding system (FS125) UL approved at CTCC located at POC building and P.M.C located at administration building

CTC located at POC building

Cylinder with discharge valve 120 ltr (centralized)	04 nos.	Room vide and ceiling vide
Cylinder with discharge valve 65 ltr	01 no	Modular – floor vide
Discharge nozzles	25 nos.	
Multi criteria detectors	25 nos.	
Optical detectors	25 nos.	
Hooters	12 nos.	
Manual abort & release set	04 nos.	
Response Indicator	30 nos.	

PMC located at Administration building

Cylinder with discharge valve 100 ltr (centralized)	04 nos.	Room vide and ceiling vide
Cylinder with discharge valve 42 ltr	01 nos.	Modular – floor vide
Discharge nozzles	21 nos.	
Multi criteria detectors	20 nos.	
Optical detectors	20 nos.	
Hooters	08 nos.	
Manual abort & release set	04 nos.	
Response Indicator	20 nos.	

Guest House no. 2

Main Pump	01 nos.	Electrical Motor Driven , 1600 lpm at 70m head conforming to IS 1520
Jockey pump	01 nos.	Electrical Motor Driven Jockey Pump 180 lpm at 70 m. head conforming to IS: 1520

Disaster Management Plan

Fire Hydrant points	14 nos.	Single Headed Hydrant Valve (Above Ground) as per IS 5290
2 way fire brigade connection	02 nos.	150 mm dia. MS pipe connection, conforming to IS 904 with NRV, for external hydrant system
2 way fire brigade connection	01 nos.	with NRV , direct to Fire Water Tank
Addressable Photoelectric Smoke Detectors	92 nos.	
Addressable Heat Detectors	08 nos.	
Addressable Manual Call point	16 nos.	
Addressable Hooters	16 nos.	
Response Indicator	47 nos.	
Fresh water tank	04 nos.	Capacity 25000 ltr each

Port User building		
Main Pump	01 nos.	Electrical Motor Driven , 1800 lpm at 70m head ,synchronous speed 1500 RPM, conforming to IS 1520
Diesel Engine Pump	01 no	Diesel Engine Driven Pump set of 1800 lpm at 70m head ,synchronous speed 1500 RPM, conforming to IS 1520
Jockey pump	01 nos.	Electrical Motor Driven Jockey Pump 180 lpm at 70 m. head conforming to IS: 1520
Fire Hose reel	08 nos.	30 m. long 20 mm (nominal internal) dia. water hose Thermoplastic (Textile reinforced) Type - 2 as per IS : 12585
4 way fire brigade connection	02 nos.	for 150 mm dia. MS pipe connection, conforming to IS 904
Addressable Photoelectric Smoke Detectors	320 nos.	Wireless
Addressable Heat Detectors	30 nos.	Wireless
Addressable Manual Call point	20 nos.	Wireless
Addressable Address speaker	06 nos.	Wireless with LCD
Fibre Plastic water tank	02 nos.	Capacity 50000 ltr each
Clean gas agent (NAF)	250 nos.	

Disaster Management Plan

P IV) fire extinguisher. (2 kg.)		
CO ₂ 4.5 kg. Fire extinguishers	60 nos.	
68 ⁰ c side wall sprinklers	600 nos.	
68 ⁰ c pendant type sprinklers	500 nos.	

High Velocity Water Spray System (HVWSS) for 4 MVA Transformer located at Electric sub-station – E – 6A

Main Pump	01 no	97m ³ /hr capacity 70 MWC head 1500 rpm electric motor driven
Jockey Pump	01 no	capacity 10.8 m ³ /hr at 70 MWC head 2900 rpm
Automatic deluge valve	01 no	with Water motor gang, Basic trim and Electrical trims etc.
Spray Nozzle brass	35 nos.	
Q.B. Detector 79 ⁰ C	28 nos.	
Water Storage Tanks	05 nos.	Capacity 10000 ltr

High Velocity Water Spray System (HVWSS) for 02 Nos. 5 MVA Transformer located at Electric sub-station – E -6A

Main Pump	01 no	171m ³ /hr capacity 70 MWC head electric motor driven
Jockey Pump	01 no	10.8 m ³ /hr at 88 MWC head, electric motor driven
Automatic deluge valve	02 nos.	with Water motor gang, Basic trim and Electrical trims etc
Spray Nozzle brass	85 nos.	
Q.B. Detector 79 ⁰ C	65 nos.	
Water Storage Tanks	04 nos.	Capacity 25000 ltr

High Velocity Water Spray System (HVWSS) for one no. 10 MVA and 02 Nos. 5 MVA Transformers located at Electric sub-station – E – 7 using existing Sea water fire pumps and fire hydrant line

Automatic deluge valve	02 nos.	with Water motor gong, basic trim and electrical trims etc.
Spray Nozzle brass	126 nos.	
Q.B. Detector 79 ⁰ C	96 nos.	

Hospital Building

Main Pump	01 no	Electrical Motor Driven , 2850 lpm at 70m head conforming to IS 1520
-----------	-------	--

Disaster Management Plan

Diesel Engine Pump	01 no	Diesel Engine Driven Pump set of 2850 lpm at 70m Head conforming to IS 1520
Jockey pump	01 no	Electrical Motor Driven Jockey Pump 180 lpm at 70 m. head conforming to IS: 1520
Fire hydrant points	27 nos.	Single Headed Hydrant Valve (Above Ground) as per IS 5290
Fire Hose reel	09 nos.	30 m. long 20 mm (nominal internal) dia. water hose Thermoplastic (Textile reinforced) Type - 2 as per IS : 12585
4 way fire brigade connection	01 no	for 150 mm dia. MS pipe connection, conforming to IS 904
79 ⁰ C Sprinklers	950 nos.	
Addressable Photoelectric Smoke Detectors	540 nos.	wireless
Addressable Heat Detectors	32 nos.	wireless
Addressable Manual Call point	32 nos.	wireless
Strobe Cum Speaker	40 nos.	
Fresh water tank	04 nos.	Capacity 25000 ltr each
Submersible pump	01 no	5 hp , for priming the tank with required pipeline

JNPT Fire service Organization chart (existing strength)

Asst. Manager (Fire & Safety)	01
Station Officer	01
Sub Officers	07
Sr. Driver Cum Pump Operators	02
Driver cum Pump Operators	04
Firemen	36

Portable fire extinguisher installed at different location of JNPT area and JNPT township

Location	Clean agent	Water (Stored pressure) 9 ltr.	CO ₂ 2 kg	CO ₂ 3 kg	CO ₂ 4.5 kg	CO ₂ 6.8 kg	ABC 2 kg	ABC 5 kg	DCP 5 kg	DCP 10 kg	DCP 22.5 kg	FOAM	TOTAL
Workshop				3	3	1			3	2			12
Auto Garage				5					3			1 (45 ltr)	9
Main Store					4				7	2			13
Bulk Area				29	1	1			2		3		36
Sub-Station (PORT)				12	7	8			2				29
POC Area		1		9	14	3		1					28

Disaster Management Plan

Cont. Terminal C/T Gate			1		1				2	2			06
ICD, RMGC **		1		1	7				2	1			12
C/T.(RTGC) **			3	20	1	-	-	-		-	-	-	24
QC (C/T) **			11	20	05	05	-	-	15	5	-	-	61
Administration Building		33		24	2	2	1		01	02			65
Guest House **	30	12			3				1	2			48
Training centre **	25												25
Hospital		23		15	7		1		2	02			50
IES School (Primary)		10				2	4		3				19
IES School (Secondary)		9	2	3	1	2	8		3				28
St. Mary's School		6		3	1	2	8		3				23
E/Sub-station (Township)					1	11			6	1			19
MP Hall , CLUB Township		4	10						2				16
Training Hostel (Township)					2	1			1	2			6
CISF Barrack		2		3		3				2		2 (9 ltr)	12
PUB Building **	250			1	43								294
Total Ext. on site	305	101	27	148	103	41	22	1	58	23	3	3	835
Fire station Full exting. **	09	19	8	7	23	26	4	6	7	12	6		127
Fire station. Empty exting. **		02											02
Extinguisher gone for Refilling	09	12	10	11	16	14		14	27	13			126
Total extinguishers	323	134	45	166	142	81	26	21	92	48	9	3	1090

Mobile fire fighting system

Sr. No.	Equipment/System	Quantity
1.	<p>Fire Water Tenders :- MH-43-U-572, MH-43-U-573 Water tank capacity: 6000 ltr Pump discharge capacity – 2000 lpm The pump is centrifugal type, multi pressure having output capacity of 2000 LPM at 7 Kg/cm² (normal pressure) and 300 LPM at 35 kg/cm² (high pressure) at 3 meters suction lift at NTP conditions. PRIMER: Automatic reciprocating piston primer capable of lifting water from 7 meters depth at a rate of 30cm/sec at NTP.</p>	02 nos.
2.	<p>Fire Foam Tender :- MH-43-U-571 Water tank capacity: 3000 ltr</p>	01no.

Disaster Management Plan

	Foam Tank Capacity: 800 ltr DCP Fire Extinguishers (70 kg) :02 nos. CO ₂ Fire Extinguishers (22.5 kg) :04 nos. Pump discharge capacity – 2000 LPM	
3.	Multipurpose Fire Tender- MH-43-P-0040 Water tank capacity: 3000 ltr Foam Tank Capacity: 800 ltr DCP Vessel : 500 kg CO ₂ Fire Extinguishers (22.5 kg) : 04 nos. Pump discharge capacity – 2000 LPM	01no.
4.	Hazmat Cum Emergency Rescue Tender :- MH-43-G-0101 With several type of life saving equipments, cutting, spreading, lifting tools and water mist system to combat small fires, Light Mast with Generator facility.	01no.
5.	Self-Contained Breathing Apparatus Sets :- (Open circuit type with positive pressure) Air cylinder Capacity – 1800 ltr Working Duration – 45 min. Spare cylinders - 11nos.	22 Sets
6.	Fire proximity suits	06 nos.
7.	Total portable Fire Extinguishers (different type and capacity to tackle all types of fires during incipient stage.	1239 nos.

JN Port – Self Contained Breathing Apparatus Sets

Apparatus	Capacity &/ Specifications	Quantity
Air Cylinder	1800 ltr	22
Spare cylinders	Working duration – 45 min	11
Fire Proximity suits	--	04
Fire Entry Suits	--	02
Chemical handling PVC suits	--	10

B.2 Tank Terminal Fire fighting details**B.2.1 Suraj Agro Tank terminal**

Sr. No.	Equipment/System	Quantity
1.	Water storage capacity	500 KL
2.	Fire pump	2 nos. (1 electrical driven, 1 diesel driven)
3.	Jockey pump	1 no.
4.	No. of Single Hydrant Points	14 nos.
5.	No. of Double Hydrant Points	04 nos.
6.	Monitors	06 nos.

Disaster Management Plan

7.	No. of Fire Hose Boxes	16 nos.
8.	Fire Hoses RRL type with Male/Female couplings	18 nos. (15m)
9.	Foam pourer system is provided to all tanks	(Presently non-functional)

B.3 Shell India Tank terminal

Sr. No.	Equipment/System	Quantity
1.	Water storage capacity	
2.	Fire pump	1 no. (diesel driven)
3.	Jockey pump	1 no.
4.	Sprinkler system in tank loading bay	
5.	Portable extinguishers	
6.	Water Monitors	

B.4 Reliance Tank terminal**B.4.1 Fire Water Pumps and Pump House**

Pump Detail	Flow Rate	Quantity	Pressure
Main Pumps	273 m ³ / hr	2 nos.	10.5 kg/cm ²
Jockey Pump	20 m ³ / hr	1 no.	10.5 kg/cm ²

B.4.2 Fire Water Ring Main

Existing fire hydrant system comprises of double outlet hydrants and water monitors at different locations along the periphery of the dyke-walls and single outlet hydrants on the upper floor of sub-station and Administration Building.

B.4.3 Water Monitors and Foam MOVs

Sr. No.	Monitor No.	Location	Sr. No.	Foam MOVs
1	WM1	Bet.T102/T109	1	T 101
2	WM2	Bet.T101/T102	2	T 102
3	WM3	Bet.T101/T106	3	T 106
4	WM4	Bet.T106/T116	4	T 107
5	WM5	Near BPH	5	T 108
6	WM6	Near TLPH	6	T 109
7	WM7	Near T110	7	T 110

B.4.4 Automatic Fire Detection System

Terminal has automatic fire detection system installed at various locations.

The system comprises of the following elements

1. Heat sensing cable,
2. Thermal detectors,
3. Heat Detectors/Smoke Detectors,

Disaster Management Plan

4. Manual Call Points,
5. Fire Alarm Panel (Security Gate),
6. Fire Alarm Hooter,
7. F&G detection system,
8. Manual Electronic Siren.

B.5 IMC Tank terminal

Sr. No.	Equipment/System	Quantity
1.	Jockey Pump	02
2.	Fire Engine	04
3.	Sprinkler system	Provided to all tanks
4.	Sprinkler system	TLFS-I & TLFS-II
5.	Foam Pourer	Provided to all tanks
6.	Water tanks	03
7.	Foam tanks	03
8.	Double hydrant	25
9.	Water cum foam monitor	21
10.	Fire Extinguisher	189
11.	Small fire hose boxes	14
12.	Eye wash shower	04
13.	Foam trolley	03
14.	Mobile water cum foam monitor	02
15.	Hydro carbon detectors	04
16.	Gas meter	02
17.	Fire bucket stands	05
18.	SCBA sets	02 nos. (01 spare cylinder)
19.	Public Address system	02
20.	First Aid box	03
21.	UHF sets for communication	13
22.	Total fire water tanks	03
23.	Total fire water tank capacity	7600 KL
24.	Total foam tanks	03
25.	Total foam available in tanks	6255 ltr
26.	Total foam suction solution available in terminal including tank	8000 ltr

*Disaster Management Plan***B.6 IOCL Tank terminal****B.6.1 Fire fighting facilities**

Water Tank				
Tank No.	Diameter (m)	Height (m)	Capacity (KL)	Total Water Storage KL
18	16	15	2854	11300
19	16	15	2854	
20	24	15	5600	
No of F/E	Pump		Engine	
	KL/hr	Head	HP	RPM
1	616	105	355	2100
2	616	105	355	2100
3	616	105	355	2100
4	616	105	355	2100
5	616	105	355	2100
6	616	105	355	2100
No of Jockey Pump	Pump		Motor	
	KL/hr	Head(M)	KW	RPM
1	171	125	90	2900
2	171	125	90	2975

B.6.2 Fixed fire-fighting equipment covering all activities /operating areas

Sr. No.	Equipment/System	Quantity
1.	Water Monitor	17 nos.
2.	Water cum Foam Monitors	8 nos.
3.	Double head hydrants	39 nos.
4.	HVLR	2 nos.
5.	Portable HVLR	3 nos.
6.	MEFG	3 nos.

B.7 GBL Tank terminal**B.7.1 Fire Fighting Facility**

Terminal fire fighting system comprises of fixed and portable fire fighting equipments as following:

Disaster Management Plan

- a) Fire Hydrant Network – All around the terminal boundary and hazardous operating area consisting of fire hydrant valves & monitors, Medium Velocity Water Sprinkler System are available.
- b) Diesel Generators: presently a hired Diesel generator set is available.

Sr. No.	Equipment/System	Quantity
1.	Water storage capacity	2000 KL
2.	Fire fighting pump	2 nos. (1 electrical driven, 1 diesel driven), 410 m ³ /hr
3.	Jockey pump	1 no., 25 m ³ /hr
4.	No. of Double Hydrant Points	35 nos.
5.	Water cum foam Monitor	1 no.
6.	No. of Fire Hose Boxes	35 nos.

B.8 DFPCL Tank terminal

B.8.1 Details of Fire Fighting

<p>1. Fire Fighting systems installed</p>	<p>a. Fire hydrant system</p> <p>b. Manual open water sprinkler system for</p> <ul style="list-style-type: none"> ➤ Ammonia loading bay – Old ➤ Ammonia tank top portion <p>c. Manual water curtain system for</p> <ul style="list-style-type: none"> ➤ Ammonia loading bay – New ➤ Ammonia transfer pump ➤ Ammonia compressor room ➤ Ammonia receiver <p>d. Automatic smoke detection and alarm system at Terminal control room</p>
<p>2. Details of Fire pumps</p> <p>a. Electrical driven Fire main pump</p> <p>b. Diesel engine driven stand-by pump</p> <p>c. Electrical driven Jockey pump</p>	<p>Q=171 m³/hr, H=70m</p> <p>As above</p> <p>Q=11 m³/hr, H=70m</p>
<p>3. Water Storage Capacities</p> <p>a. Fire water tanks-2Nos.</p> <p>b. Type</p>	<p>Capacity: 300 m³ each.</p> <p>Above ground mild steel storage tanks.</p>
<p>4. Hydrant Accessories</p> <p>a. Single Hydrant</p> <p>b. Double Hydrant Points</p> <p>c. Water Monitors</p> <p>d. Hose boxes containing hoses and</p>	<p>9 nos.</p> <p>33 nos.</p> <p>3 nos.</p> <p>9 nos.</p>

Disaster Management Plan

nozzle	
5. Other Details	
a. Fire Jeep	1 no.
b. Manual call points (MCP)	15 nos.
c. Smoke detectors	12 nos.
d. Heat detectors	5 nos.
e. Ammonia detectors	8 nos.
f. DCP Fire Extinguishers	27 nos..
g. Foam type Fire Extinguishers capacity 9 L.	1 no.
h. CO ₂ type Fire Extinguishers	16 nos.
i. Fire Brigade inlet	1 no.
j. Fire Bucket	17 nos.
k. SCBA	05 nos.

B.8.2 Location of Ammonia Detectors

Sr. No.	Location of Detector	No. of Detector
1.	Near Marine unloading arm at Jetty	02
2.	Near Ammonia transfer Pump area	01
3.	In ammonia compressor house	01
4.	At ammonia unloading bay 1 to 4	01
5.	At ammonia unloading bay 5 to 7	01
6.	Near ammonia tank outlet nozzles area	01
7.	At ammonia tank top	01

B.9 Fire fighting facility of Liquid Cargo Berth (BPCL)

The fire fighting facility of the BPCL liquid cargo jetty has been provided in line with OISD 156.

Sr. No.	Fire fighting details	
1.	Fire water pumps	3 nos. main + 2 nos. as standby (880 m ³ /hr each)
2.	Jockey pump	1 no. main + 1 no. as standby (72 m ³ /hr each)
3.	Tower Monitors	06 nos. (2×12 m : 3000 LPM, 2×20 m : 6000 LPM and 2×20 m : 7570 LPM)
4.	Water curtain nozzles	10 nos. (2 nos. 6000 LPM each, 8 nos. 4000 LPM each)
5.	No. of Double Hydrant Points	19 nos.
6.	Foam tank (SS)	3 nos. (15 m ³ each)
7.	Foam pumps	4 nos. (15 m ³ /hr each)
8.	Oil Combat System:	Slop tank: 1 no. (11 KL) Oil dispersant spray units: 2 nos. Oil sorbents: pillows (50 nos.) Oil containment boom: 240 meters
9.	Manual Call Points (MCP)	18 nos.

Disaster Management Plan

10.	Gas detectors	07 nos.
11.	Fire extinguishers DCP/CO ₂	34 nos.
12.	Hose boxes	18 nos.

B.10 Container Terminal Fire fighting details**B.10.1BMCT Terminal**

Description	Wharf Pump House	Admin Pump House
Jockey Pump capacity	180 lpm at head of 180 m	180 lpm at head of 200 m
Main pump capacity	4560 lpm at head of 180 m	2850 lpm at head of 200 m
Diesel pump	4560 lpm at head of 180 m	2850 lpm at head of 200 m

B.10.1.1 Fire fighting system in terminal and infra building

Sr. No.	Equipment/system
1.	Fire hydrant system in container yard and infra building
2.	Fire hose reel drum in each floor in the infra building and yard
3.	4-way fire brigade inlet
4.	Sprinkler system
5.	Smoke detector
6.	Heat detector and Multi sensor detector
7.	Fire alarm control panel
8.	Manual call point
9.	Fire hydrant pump
10.	Fire sprinkler pump
11.	Fire jockey pump
12.	Fire diesel pump and panel
13.	Fire booster pump
14.	Pressure release valve
15.	PA system
16.	Hooter
17.	Central battery system panel
18.	Annunciation panel
19.	Sand buckets

B.10.1.2 Fire extinguishers installed on equipment and utilities

Sr. No.	Type	Equipment	Quantity
1.	CO ₂	QC	11
2.	CO ₂	RTGC	4
3.	CO ₂	RMGC	10
4.	CO ₂	Empty container handler	1
5.	CO ₂	Reach stacker	1

Disaster Management Plan

6.	NOVEC 1203 fire suppression system	IT server room	2
7.	Nitrogen injection fire protection system	Substation 1, transformers	3
8.	DCP	Placed as required	--
9.	Trolley mounted foam fire extinguisher	Hazardous Bund	1

B.11APM Terminal

Sr. No.	Description	Quantity
Fire Hydrant system		
1.	Hydrant valve external wharf area	31
2.	Hydrant valve external yard area	65
3.	Hose reel drum	10
4.	Hose boxes with RRL hose	40
Fire pump system- wharf area		
1.	Main pump hydrant	1
2.	DG pump set	1
3.	Jockey pump set	1
Fire alarm system		
1.	Fire alarm panel	1
2.	Smoke detector	197
3.	Manual call point	8
4.	Hooter	10
GTI Pump house		
1.	Main pump hydrant	1
2.	DG pump set	1
3.	Jockey pump set	1
4.	Hydrant valve internal	2
5.	First aid hose reel drum	2
6.	Hose boxes with canvas hose	2

B.12Resources for combating Oil spill**B.12.1 JNPT**

Sr. No	Items	Quantity	Weight/Dimensions
1.	Oil Spill dispersant kept on board tugs and in stock	5300 ltr	2800 ltr on board tugs 2500 ltr in stock
2.	Oil absorbent pads	30 no. 100 no.	40 * 50 cm each 15'' * 19'' each
3.	Oil absorbent pillows	05 no. 100 no.	30 * 50 cm each 18'' * 18'' each

Disaster Management Plan

4.	Oil absorbent socks	15 no. 105 no.	08 * 120 cm each 3" * 8" each
5.	Saw dust	2500 kg	50 bags of 50 kg each

B.12.2 Bharat Petroleum Corporation Ltd. (Operator of Liquid Cargo handling berths)

Sr. No	Items	Quantity
1.	Oil boom	240 m
2.	Oil dispersant spray system	02 nos.
3.	Oil absorbent pillows	200 nos.
4.	Oil spill dispersant	1800 ltr

B.12.3 Nhava Sheva International Container Terminal (DP World)

Sr. No	Items	Quantity	Weight/Dimensions
1.	Oil boom	12 pieces	3" diameter * 8 feet
2.	Oil absorbent pads	20 packets * 10 each	50cm * 50cm
3.	Long handle deck brushes, heavy duty	4 pieces	40 cm brush length
4.	Long handle cane booms, suitable for liquid	4 pieces	
5.	Saw dust	200 kg	20 bags of 10 kg each
6.	Hand booms suitable for liquids	2 pieces	
7.	Long handle shovel (Non spark)	4 pieces	
8.	Hand held plastic scoops	4 pieces	
9.	Plastic bags (Heavy duty)	250 nos.	
10.	Empty oil drums with lids	4 no.	200 ltr
11.	Oil Spill chemical dispersant	5 drums	20 ltr
12.	Oil resistant gloves	4 pairs	
13.	Fire extinguishers foam type	2 nos.	9 ltr each
14.	Plastic buckets	4 nos.	10 ltr each
15.	Plastic funnels	4 nos.	
16.	Rags, general use	20 kg	
17.	Sawdust bags	60 bags	
18.	Sand bags	60 bags	
19.	Scoop	12 pieces	
20.	Eye Protective Goggles	10 pieces	
21.	Rubber Hand Gloves	12 pieces	
22.	Oil Spill Containment Boom	12 pieces	

Disaster Management Plan

23.	Long handle coir broom	12 pieces	
24.	Absorbent pads	100 pieces	
25.	Dust Mask	50 pieces	
26.	Shovel	10 pieces	
27.	Cotton Bags		

B.12.4 APM Terminal

Sr. no	Description	Quantity	Weight/ Dimensions
1.	Oil Absorbent Socks	6 boxes (6 pieces per box)	7.6 cm * 244 cm
2.	Oil Absorbent pillow	2 boxes (16 pieces per box)	18" * 18"
3.	Oil Absorbent pads	2 boxes (32 pieces per box)	9" * 9"
4.	Booms	9 bales (4 per bale)	8" * 10"
5.	Perforated rolls	6 bales (1 per bale)	46cm * 38cm
6.	Sheets	2 bales (100 Sheets per bale)	38cm * 48cm
7.	Sweep – sorbent roll, bonded to a P.P Rope	2 bales (1 per bale)	30.5 m * 48 cm

B.13 JN Port - Response Craft

Response crafts	Craft Name/From	Description	Response capability
Speed Boat (Owned)	JNPT	1 no.	Pilot Launch
		2 nos.	VIP launches
Speed Boat (Hired)		4 nos.	Pilots launches
		2 nos.	Patrolling
Speed boat	Catamaran -NSICT III	01 no.	With LSA and Fire fighting appliances
Speed boat	Catamaran- NSICT IV	01 no.	
Hired Tugs (8 nos.)	M/S Tag Offshore ltd.	2 no. -50 tonnes Bollard Pull	All tugs have fire fighting equipments and are equipped to deploy booms for spraying oil spill dispersants
	M/S Ocean Sparkle ltd.	1 no. – 60 tonnes Bollard Pull	
		2 nos. tonnes Bollard Pull	
		3 no. tonnes Bollard Pull	

*Disaster Management Plan***B.14 JN Port - IMO OPRC level trained Responders**

Name	Designation	Contact no	IMO OPRC level ½
Mr. J.P Raval	Dy. Manager (Safety)	9833687769	IMO OPRC Level1
Mr. S.G. Saxena	Asst. Manager (Fire & Safety)	9819711965	IMO OPRC Level1
Mr. Manish Shukla	Asst. Manager (Proc)	9920036602	IMO OPRC Level1 &2
Mr. D.G Dhande	Safety Inspector	9076405137	IMO OPRC Level1

In addition to above all, Fire & Safety and MCPC Staff is trained in IMO OPRC level 1.

B.15 First Aid Post

Post Number	Location
First Aid Post No.1 - With ambulance service	Fire station
First Aid Post No.2 - With ambulance service	Ambulance Room near CT Shift office
First Aid Post No.3	BT Office
First Aid Post No.4	CT Sub Store
First Aid Post No.5	Auto Garage
First Aid Post No.6	Main Stores
First Aid Post No.7	Workshop
First Aid Post No.8	Port Control Room
Private Terminals	
GTI –APM	GTI House - Paramedic centre and Ambulance
NSICT - DP World	Paramedic Centre

B.16 Port Vehicle and Hired Vehicle

Vehicle	Quantity
Port Vehicle	
Car	5
Jeep	1
Hired	
Bus	28
Car & Jeep	16 &5
Car & Jeep	16 &6
Car & Jeep	14 &4
Cars 7 Jeep	15 &4
Mini Lorry	

*Disaster Management Plan***B.17 EMERGENCY CONTROL ROOM EQUIPMENT**

Sr. No	Equipment	Quantity
1.	Emergency Lights and torches	6
2.	Radio	1
3.	Computer	1
4.	Printer	1
5.	Telephone-one for in; other for outgoing calls	2
6.	White board and colored marker pens	1
7.	Flip charts	1
8.	Portable PA sets	2
9.	Walkie Talkies	6
10.	Binoculars	1
11.	Copy of EAP	2
12.	Table –seating	1
13.	Tables for equipment	4
14.	Chairs	10

B.18 Required resources for the identified Emergencies

The following table shows the risks identified in this plan and the key resources that may be required during emergencies arising from each risk.

Disaster Management Plan

Identified Risk	First Aid/ Medical equipment	Lifting equipment/ Fork lift	Cranes	High angle rescue equipment	Boats/ Vessels	Fire Fighting equipment	Communications	Oil Containment/ cleanup equipment	Others
Marine casualty (Collision/Grounding)	√				√		√		PPE, Ambulance
Fire or Explosion on a vessel at berth	√	√	√		√	√	√		Ambulance, vehicles, PPE, Equipment for cordoning, torch light
Fire or Explosion on a vessel on the water	√				√	√	√		Ambulance, vehicles, PPE, Equipment for cordoning, torch light
Oil Spill					√		√	√	PPE
Utility Failure							√		PPE, Generator, Lightings, torch light
Dangerous Goods spill (other than oil)	√				√	√	√	√	PPE, Dangerous good container/cleanup equipment, Equipment for cordoning, torch light
Gas dispersion	√					√	√		PPE, Equipment for cordoning, torch light
Crane Collapse/Container fall	√	√	√	√	√		√		PPE, Equipment for cordoning, torch light
Terrorist incident	√	√	√	√	√	√	√		Ambulance, vehicles, Equipment for cordoning, torch light
Bomb Threat	√					√	√		
Cyclone /Severe Storm/Tsunami	√	√	√	√	√	√	√		
Flooding	√	√			√		√		
Earthquake	√	√				√	√	√	PPE, torch light, ambulance, vehicles

B.19 Mutual Aid Agreement

All Port operators/agencies/institutions, where possible, will supply resources to support emergency response operations when requested by CEC/CIC/SIC or whole of Port Emergency Operation Centre as per the Mutual Aid Agreement.

B.20 Resource Inventory (IDRN)

India Disaster Resource Network is an online inventory designed as a decision making tool for the Government administration and crisis managers to coordinate effective emergency response operations in the shortest possible time.

The Ministry of Home Affairs, Government of India has developed a web-based database of resource named India Disaster Resource Network (IDRN). This database contains information about equipment (such as boats, bulldozers, etc), manpower (divers, swimmers, etc) and critical supplies (oxygen cylinder, fire fighting foams, etc) required during the response.

Resources which are available with the various departments in the Raigarh District are uploaded in IDRN.

Disaster Management Plan



COUNTRY WIDE DISASTER MANAGEMENT RESOURCE INVENTORY - QUERY RESULT

(DISTRICT WISE INVENTORY)

Sl.No DEPARTMENT/AGENCY DETAILS DESCRIPTION OF RESOURCE QUANTITY

..RAIGARH DISTRICT of MAHARASHTRA STATE

Resource Name - First aid kits

Sl.No	DEPARTMENT/AGENCY DETAILS	DESCRIPTION OF RESOURCE	QUANTITY
1	DEPT NAME:Tahasil Office, Tala DEPT ADDR:Tahasil Office, Tala , Dist. Raigad,,Pin Code: CONTACT PERSON: , Mr. D B Sawant CONTACT NO.:02140-269317, 02140-269324, 02140-202090, 9422379528 EMAIL ID:tahasilata@gmail.com	RESOURCE DESC:First aid kits LOCATION:Tahasil Office Tala PHC AVAILABLE TIME:January to December SOURCE:Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	1-Box
Total no. of First aid kits available			1-Box

Resource Name - Vaccines

Sl.No	DEPARTMENT/AGENCY DETAILS	DESCRIPTION OF RESOURCE	QUANTITY
1	DEPT NAME:Tahasil Office, Tala DEPT ADDR:Tahasil Office, Tala , Dist. Raigad,,Pin Code: CONTACT PERSON: , Mr. D B Sawant CONTACT NO.:02140-269317, 02140-269324, 02140-202090, 9422379528 EMAIL ID:tahasilata@gmail.com	RESOURCE DESC:Vaccines LOCATION:Tahasil Office Tala PHC AVAILABLE TIME:January to December SOURCE:Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	10-Box
Total no. of Vaccines available			10-Box

Resource Name - Set of rope tackle (3 sheave - 2 sheave)

Sl.No	DEPARTMENT/AGENCY DETAILS	DESCRIPTION OF RESOURCE	QUANTITY
1	DEPT NAME:Roha Muncpal Council DEPT ADDR:Roha, Tal. Roha Dist. Raigad,,Pin Code: CONTACT PERSON: , Balasaheb Chavan CONTACT NO.:02194-235520, 02194-234078, 02194-234607, 9921512632 EMAIL ID:	RESOURCE DESC:Set of rope tackle (3 sheave - 2 sheave LOCATION:Treatment Plant AVAILABLE TIME:January to December SOURCE:Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	50-Meter
2	DEPT NAME:Roha Muncpal Council DEPT ADDR:Roha, Tal. Roha Dist. Raigad,,Pin Code: CONTACT PERSON: , Mr. Balasaheb Chavan CONTACT NO.:02194-235520, 02194-234078, 02194-234607, 9921512632 EMAIL ID:	RESOURCE DESC:Set of rope tackle (3 sheave - 2 sheave LOCATION:Treatment Plant AVAILABLE TIME:January to December SOURCE:Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	50-Meter
Total no. of Set of rope tackle (3 sheave - 2 sheave) available			100-Meter

Resource Name - Gas Cutters

Sl.No	DEPARTMENT/AGENCY DETAILS	DESCRIPTION OF RESOURCE	QUANTITY
1	DEPT NAME: Private DEPT ADDR:Private,,Pin Code: CONTACT PERSON: , NOT Available CONTACT NO.:NOT Available, -, -, EMAIL ID:	RESOURCE DESC:Not Available LOCATION:Parvel Taluka AVAILABLE TIME:January to December SOURCE:Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	31-Nos
2	DEPT NAME:Tahasil Office, Mahad DEPT ADDR:Tahasil Office, Mahad, Tal. Mahad Dist. Raigad,,Pin Code: CONTACT PERSON: , Mr.Sandip Kadam CONTACT NO.:02145-222142, 02145-222689, , 9561120083 EMAIL ID:tahsilmahad@gmail.com	RESOURCE DESC:two LOCATION:Mahad AVAILABLE TIME:January to December SOURCE:Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	2-Nos
3	DEPT NAME:Tahasil Office, Pen DEPT ADDR:Tahasil Office, Pen Dist. Raigad,,Pin Code: CONTACT PERSON: , Mrs. Sukeshini Pagare	RESOURCE DESC:Gas Cutters LOCATION:Espat Industries, Ltd AVAILABLE TIME:January to December SOURCE:Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	3-Nos

Disaster Management Plan

CONTACT NO.:02143-252036, , , 9867112317			
EMAIL ID:			
Total no. of Gas Cutters available			36-Nos
Resource Name - Bolt cutters (Shears)			
1	DEPT NAME:Police DEPT ADDR:Murud police station,,Pin Code: CONTACT PERSON: , P.I. Murad CONTACT NO.:02144-284033, 02144-274106, , EMAIL ID:	RESOURCE DESC:Bolt cutters (Shears) LOCATION:Work shop AVAILABLE TIME:January to December SOURCE:Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	2-Nos
2	DEPT NAME:Police DEPT ADDR:Murud police station,,Pin Code: CONTACT PERSON: , P.I. Murad CONTACT NO.:02144-284033, 02144-274106, , EMAIL ID:	RESOURCE DESC:Bolt cutters(Shears) LOCATION:work shop AVAILABLE TIME:January to December SOURCE:Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	2-Nos
Total no. of Bolt cutters (Shears) available			4-Nos
Resource Name - Electric Drill			
1	DEPT NAME:Revenue department /tahsil office roha DEPT ADDR:tahsil office roha,,Pin Code: CONTACT PERSON: , Shri. Gopinath R. Thombre CONTACT NO.:02140-243928, 02141-242202, , 9422381296 EMAIL ID:	RESOURCE DESC:Electric Drill LOCATION:M.I.D.C. Dhatav AVAILABLE TIME:January to December SOURCE:Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	1-Nos
2	DEPT NAME:Tahasil Office, Pen DEPT ADDR:Tahasil Office, Pen Dist. Raigad,,Pin Code: CONTACT PERSON: , Mrs. Sukeshini Pagare CONTACT NO.:02143-252036, , , 9867112317 EMAIL ID:	RESOURCE DESC:Electric Drill LOCATION:Ispat Industries, Ltd AVAILABLE TIME:January to December SOURCE:Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	3-Nos
3	DEPT NAME:Tahsil Khalapur DEPT ADDR:Tahasil Office, Khalapur, Tal. Mahad Dist. Raigad,,Pin Code: CONTACT PERSON: , Mr. Ramnath Karhad CONTACT NO.:02192-275048, 02192-275008, , 9960660088 EMAIL ID:	RESOURCE DESC:Electric Drill LOCATION:Uttam Steel Co. AVAILABLE TIME:January to December SOURCE:Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	5-Nos
Total no. of Electric Drill available			9-Nos
Resource Name - Chipping Hammer			
1	DEPT NAME:Roha Municipal Council DEPT ADDR:Roha, Tal. Roha Dist. Raigad,,Pin Code: CONTACT PERSON: , Balasaheb Chavan CONTACT NO.:02194-235520, 02194-234078, 02194- 234607, 9921512632 EMAIL ID:	RESOURCE DESC:Chipping Hammer LOCATION:Town hall AVAILABLE TIME:January to December SOURCE:Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	2-Nos
2	DEPT NAME:Tahasil Office, Pen DEPT ADDR:Tahasil Office, Pen Dist. Raigad,,Pin Code: CONTACT PERSON: , Mrs. Sukeshini Pagare CONTACT NO.:02143-252036, , , 9867112317 EMAIL ID:	RESOURCE DESC:Chipping Hammer LOCATION:Ispat Industries, Ltd AVAILABLE TIME:January to December SOURCE:Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	2-Nos
Total no. of Chipping Hammer available			4-Nos
Resource Name - Cutters-Battery			
1	DEPT NAME:Tahasil Office, Murud DEPT ADDR:Tahasil Office, Murud, Dist. Raigad,,Pin Code: CONTACT PERSON: , Mr. Panmand CONTACT NO.:02144-274026, 02144-274084, , 7744815403 EMAIL ID:murudtah@yahoo.com	RESOURCE DESC:Cutters-Battery LOCATION:Salav AVAILABLE TIME:February to December SOURCE:Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	1-Nos
Total no. of Cutters-Battery available			1-Nos
Resource Name - Jack with 5 ton lift			
1	DEPT NAME:Murud Janjira, Municipal council DEPT ADDR:Murud, Dis- Raigad,,Pin Code: CONTACT PERSON: , chief officer CONTACT NO.:02144-274022, 02144-274769, , EMAIL ID:	RESOURCE DESC:Jack with 5 ton lift LOCATION:present at departent AVAILABLE TIME:January to December SOURCE:Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	1-Nos
2	DEPT NAME:Police	RESOURCE DESC:Jack with 5 ton lift	

Disaster Management Plan

	DEPT ADDR: Murud police station,, Pin Code: CONTACT PERSON: , P.I. Murad CONTACT NO.: 02144-284033, 02144-274106, , EMAIL ID:	LOCATION: present AVAILABLE TIME: January to December SOURCE: Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	1-Nos
3	DEPT NAME: Tahasil Office, Pen DEPT ADDR: Tahasil Office, Pen Dist. Raigad,, Pin Code: CONTACT PERSON: , Mrs. Sukeshini Pagare CONTACT NO.: 02143-252036, , 9867112317 EMAIL ID:	RESOURCE DESC: Jack with 5 ton lift LOCATION: Ispat Industries, Ltd AVAILABLE TIME: January to December SOURCE: Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	2-Nos
4	DEPT NAME: Tahsil Khalapur DEPT ADDR: Tahasil Office, Khalapur, Tal. Mahad Dist. Raigad,, Pin Code: CONTACT PERSON: , Mr. Uttam Kumbhar CONTACT NO.: 02192-275048, 02192-275008, , 9975655375 EMAIL ID:	RESOURCE DESC: Jack with 5 ton lift LOCATION: Uttam Steel Co. AVAILABLE TIME: January to December SOURCE: Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	6-Nos
Total no. of Jack with 5 ton lift available			10-Nos

Resource Name - Sledge hammer

1	DEPT NAME: Police DEPT ADDR: Murud police station,, Pin Code: CONTACT PERSON: , P.I. Murad CONTACT NO.: 02144-284033, 02144-274106, , EMAIL ID:	RESOURCE DESC: Sledge hammer LOCATION: present AVAILABLE TIME: January to December SOURCE: Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	1-Nos
2	DEPT NAME: Tahasil Office, Pen DEPT ADDR: Tahasil Office, Pen Dist. Raigad,, Pin Code: CONTACT PERSON: , Tahasilidar CONTACT NO.: 02143-252036, , EMAIL ID:	RESOURCE DESC: Sledge hammer LOCATION: Ispat Industries, Ltd AVAILABLE TIME: January to December SOURCE: Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	3-Nos
Total no. of Sledge hammer available			4-Nos

Resource Name - Heavy Axe

1	DEPT NAME: Police DEPT ADDR: Murud police station,, Pin Code: CONTACT PERSON: , P.I. Murad CONTACT NO.: 02144-284033, 02144-274106, , EMAIL ID:	RESOURCE DESC: Heavy Axe LOCATION: present AVAILABLE TIME: January to December SOURCE: Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	1-Nos
2	DEPT NAME: Revenue department /tahsil office roha DEPT ADDR: tahasil office roha,, Pin Code: CONTACT PERSON: , Shri. Gopinath R. Thombre CONTACT NO.: 02140-243928, 02141-242202, , 9422381296 EMAIL ID:	RESOURCE DESC: Heavy axe LOCATION: M.I.D.C. Dhataw AVAILABLE TIME: February to December SOURCE: Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	3-Nos
Total no. of Heavy Axe available			4-Nos

Resource Name - Single sheave snatch block

1	DEPT NAME: Home guars DEPT ADDR: zilla homeguard mukhyalay, raigad alibag,, Pin Code: CONTACT PERSON: , Mr. Rajabhau Pawar CONTACT NO.: 02141-222014, 02141-222012, 02141-222015, 9821343933 EMAIL ID:	RESOURCE DESC: Single sheave snatch block LOCATION: present at department AVAILABLE TIME: January to December SOURCE: Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	1-Nos
Total no. of Single sheave snatch block available			1-Nos

Resource Name - Set of rope tackle (3 sheave - 2 sheave)

1	DEPT NAME: Home guars DEPT ADDR: zilla homeguard mukhyalay, raigad alibag,, Pin Code: CONTACT PERSON: , K D Patil CONTACT NO.: 02141-222014, 02141-222012, 02141-222015, EMAIL ID:	RESOURCE DESC: Set of rope LOCATION: present at department AVAILABLE TIME: January to December SOURCE: Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	3-Nos
2	DEPT NAME: Home guars DEPT ADDR: zilla homeguard mukhyalay, raigad alibag,, Pin Code: CONTACT PERSON: , Mr. Rajabhau Pawar CONTACT NO.: 02141-222014, 02141-222012, 02141-222015, 9821343933 EMAIL ID:	RESOURCE DESC: set of rope LOCATION: present at department AVAILABLE TIME: January to December SOURCE: Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	3-Nos
3	DEPT NAME: M.S.E.B.Mahad	RESOURCE DESC: set of rope tackle	2-Nos

Disaster Management Plan

	DEPT ADDR: M.S.E.B.Mahad,, Pin Code: CONTACT PERSON: , Sub Divisional Engineer CONTACT NO.: NOT Available, , , EMAIL ID:	LOCATION: M.S.E.B.Mahad AVAILABLE TIME: January to December SOURCE: Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	
Total no. of Set of rope tackle (3 sheave - 2 sheave) available			8-Nos
.Resource Name - Gloves-Rubber, Tested up to 25, 000 volt			
1	DEPT NAME: M.S.E.D.C.L. Alibag DEPT ADDR: Alibag, Dr.Pant Nagar, Alibag,, Pin Code: CONTACT PERSON: , Executive Engineer CONTACT NO.: 02141-225822, 02141-226322, , EMAIL ID: eealibag@gmail.com	RESOURCE DESC: Gloves-Rubber, Tested up to 25, 000 volt--Hand Gloves LOCATION: With Field Staff AVAILABLE TIME: January to December SOURCE: Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	109-Nos
2	DEPT NAME: Revenue department /tahsil office roha DEPT ADDR: tahsil office roha,, Pin Code: CONTACT PERSON: , Mrs. Urmila Patil CONTACT NO.: 02140-243928, 02141-242202, , 9130799939 EMAIL ID:	RESOURCE DESC: Gloves-Rubber up to 25, 000 volt LOCATION: M.I.D.C. Dhataw AVAILABLE TIME: January to December SOURCE: Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	2-Nos
Total no. of Gloves-Rubber, Tested up to 25, 000 volt available			111-Nos
.Resource Name - Stretcher harness (set)			
1	DEPT NAME: M.S.E.B.Mahad DEPT ADDR: M.S.E.B.Mahad,, Pin Code: CONTACT PERSON: , Sub Divisional Engineer CONTACT NO.: NOT Available, , , EMAIL ID:	RESOURCE DESC: Not Available LOCATION: M.S.E.B.Mahad AVAILABLE TIME: January to December SOURCE: Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	1-Nos
2	DEPT NAME: Revenue department /tahsil office roha DEPT ADDR: tahsil office roha,, Pin Code: CONTACT PERSON: , Mrs. Urmila Patil CONTACT NO.: 02140-243928, 02141-242202, , 9130799939 EMAIL ID:	RESOURCE DESC: Stretcher harness (set) LOCATION: M.I.D.C. Dhataw AVAILABLE TIME: January to December SOURCE: Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	2-Nos
Total no. of Stretcher harness (set) available			3-Nos
.Resource Name - Inflatable Light Tower			
1	DEPT NAME: Collector Office Raigad Alibag DEPT ADDR: Revenue,Alibag, Pin Code: 402201 CONTACT PERSON: Mr.Sagar Pathak , Dist Disaster Management Officer CONTACT NO.: 02141227449, 02141222097, , 9763646326 EMAIL ID: sagarpathak99@gmail.com	RESOURCE DESC: Inflatable Light Tower LOCATION: Collector Office AVAILABLE TIME: January to December SOURCE: Govt ENTERED ON: 5/31/2018(MM/DD/YY)	2-Nos
2	DEPT NAME: Tahasildar Alibag DEPT ADDR: Tahasil Office Alibag, Near District Court, Alibag District Raigad,Alibag, Pin Code: 402201 CONTACT PERSON: Tahasildar , Tahasildar CONTACT NO.: 02141222054, , , 9260320820 EMAIL ID:	RESOURCE DESC: Inflatable Light Tower LOCATION: Tahasil Office AVAILABLE TIME: January to December SOURCE: Govt ENTERED ON: 6/1/2018(MM/DD/YY)	1-Nos
3	DEPT NAME: Tahasildar Murud DEPT ADDR: Tahasil Office Murud,Murud, Pin Code: CONTACT PERSON: Tahasildar , Tahasildar CONTACT NO.: 02144274026, , , 9527557687 EMAIL ID:	RESOURCE DESC: Inflatable Light Tower LOCATION: Tahasil Office AVAILABLE TIME: January to December SOURCE: Govt ENTERED ON: 6/1/2018(MM/DD/YY)	1-Nos
4	DEPT NAME: Tahasildar Pen DEPT ADDR: Tahasil Office Pen,Pen, Pin Code: CONTACT PERSON: Tahasildar , Tahasildar CONTACT NO.: 02143252036, , , 9527557687 EMAIL ID:	RESOURCE DESC: Inflatable Light Tower LOCATION: Tahasil Office AVAILABLE TIME: January to December SOURCE: Govt ENTERED ON: 6/1/2018(MM/DD/YY)	1-Nos
Total no. of Inflatable Light Tower available			5-Nos
.Resource Name - Electric Generator (10 kv)			
1	DEPT NAME: Tahasil Office, Karjat DEPT ADDR: Tahasil Office, Karjat,, Pin Code: CONTACT PERSON: , Mr. G.R. Girase CONTACT NO.: 02148-222037, 02148-222174, , 9322152781 EMAIL ID:	RESOURCE DESC: Electric Generator (10 kv) LOCATION: Dahiwali AVAILABLE TIME: January to December SOURCE: Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	1-Nos
2	DEPT NAME: Tahasil Office, Mhasala DEPT ADDR: Tahasil Office, Mhasala, Dist. Raigad,, Pin Code: CONTACT PERSON: , Mr. Virendr Visave CONTACT NO.: 02149-232224, 02149222436, ,	RESOURCE DESC: Electric Generator (10 kv) LOCATION: Dahilvali, Mudre Khurd, Kadav AVAILABLE TIME: January to December SOURCE: Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	3-Nos

Disaster Management Plan

	8888992211 EMAIL ID:		
Total no. of Electric Generator (10 kv) available			4-Nos
.Resource Name - Trucks - Aerial Lift			
1	DEPT NAME:Tahasil Office, Managaon DEPT ADDR:Tahasil Office, Managaon Dist. Raigad,,Pin Code: CONTACT PERSON: , Mr. Mahesh Sagar CONTACT NO.:02140-262632, , 9767944999 EMAIL ID:	RESOURCE DESC:Trucks - Aerial Lift LOCATION:Tahasil Office, Managaon AVAILABLE TIME:January to December SOURCE:Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	27-Nos
Total no. of Trucks - Aerial Lift available			27-Nos
.Resource Name - Dumper			
1	DEPT NAME:Tahasil Office, Karjat DEPT ADDR:Tahasil Office, Karjat,,Pin Code: CONTACT PERSON: , Mr. Ravi Baviskar CONTACT NO.:02148-222037, 02148-222174, , 9892871493 EMAIL ID:	RESOURCE DESC:Dumper LOCATION:In Karjat Block AVAILABLE TIME:January to December SOURCE:Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	57-Nos
2	DEPT NAME:Tahasil Office, Managaon DEPT ADDR:Tahasil Office, Managaon Dist. Raigad,,Pin Code: CONTACT PERSON: , Mr. Mahesh Sagar CONTACT NO.:02140-262632, , 9767944999 EMAIL ID:	RESOURCE DESC:Dumper LOCATION:Managaon AVAILABLE TIME:January to December SOURCE:Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	3-Nos
3	DEPT NAME:Tahasil Office, Mhasala DEPT ADDR:Tahasil Office, Mhasala, Dist. Raigad,,Pin Code: CONTACT PERSON: , Mr. Virendr Visave CONTACT NO.:02149-232224, 02149-232436, , 8888992211 EMAIL ID:	RESOURCE DESC:Dumper-Private LOCATION:In Karjat Block AVAILABLE TIME:January to December SOURCE:Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	57-Nos
Total no. of Dumper available			117-Nos
.Resource Name - Earth movers			
1	DEPT NAME:Tahasil Office, Managaon DEPT ADDR:Tahasil Office, Managaon Dist. Raigad,,Pin Code: CONTACT PERSON: , Mr. Mahesh Sagar CONTACT NO.:02140-262632, , 9767944999 EMAIL ID:	RESOURCE DESC:Earth movers LOCATION:Managaon AVAILABLE TIME:January to December SOURCE:Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	5-Nos
Total no. of Earth movers available			5-Nos
.Resource Name - Lifebuoy			
1	DEPT NAME:Tahasil Office, Managaon DEPT ADDR:Tahasil Office, Managaon Dist. Raigad,,Pin Code: CONTACT PERSON: , Mr. Mahesh Sagar CONTACT NO.:02140-262632, , 9767944999 EMAIL ID:	RESOURCE DESC:Lifebuoy LOCATION:Managaon AVAILABLE TIME:January to December SOURCE:Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	1-Nos
2	DEPT NAME:Tahasil Office, Mhasala DEPT ADDR:Tahasil Office, Mhasala, Dist. Raigad,,Pin Code: CONTACT PERSON: , Mr. Virendr Visave CONTACT NO.:02149-232224, 02149-232316, , 8888992211 EMAIL ID:	RESOURCE DESC:Lifebuoy LOCATION:Mhasala AVAILABLE TIME:January to December SOURCE:Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	1-Nos
Total no. of Lifebuoy available			2-Nos
.Resource Name - Life Jackets			
1	DEPT NAME:Tahasil Office, Mhasala DEPT ADDR:Tahasil Office, Mhasala, Dist. Raigad,,Pin Code: CONTACT PERSON: , Mr. Virendr Visave CONTACT NO.:02149-232224, 02149-232316, , 8888992211 EMAIL ID:	RESOURCE DESC:life jacks LOCATION:Mhasala AVAILABLE TIME:January to December SOURCE:Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	2-Nos
2	DEPT NAME:Tahasil Office, Tala DEPT ADDR:Tahasil Office, Tala , Dist. Raigad,,Pin Code: CONTACT PERSON: , Mr. D B Sawant	RESOURCE DESC:Life Jackets LOCATION:Tahasil Office Tala AVAILABLE TIME:January to December	1-Nos

Disaster Management Plan

	CONTACT NO.: 02140-269317, 02140-269324, 02140-202090, 9422379528 EMAIL ID: tahasitala@gmail.com	SOURCE: Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	
Total no. of Life Jackets available			3-Nos
.Resource Name - High Rise Buildings - fire fighting team			
1	DEPT NAME: Tahasil Office Khalapur DEPT ADDR: Tahasil Office Khalapur,, Pin Code: CONTACT PERSON: , Tahasilidar CONTACT NO.: 02192-275048, -, -, EMAIL ID:	RESOURCE DESC: Not Availble LOCATION: NA AVAILABLE TIME: January to December SOURCE: Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	8-Nos
Total no. of High Rise Buildings - fire fighting team available			8-Nos
.Resource Name - Stretcher normal			
1	DEPT NAME: Tahasil Office, Mhasala DEPT ADDR: Tahasil Office, Mhasala, Dist. Raigad,, Pin Code: CONTACT PERSON: , Mr. Virendr Visave CONTACT NO.: 02149-232224, 02149-232316, , 8888992211 EMAIL ID:	RESOURCE DESC: Stretcher normal LOCATION: Mhasala & Khamgaon AVAILABLE TIME: January to December SOURCE: Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	2-Nos
Total no. of Stretcher normal available			2-Nos
.Resource Name - Portable oxygen cylinders			
1	DEPT NAME: Tahasil Office, Mhasala DEPT ADDR: Tahasil Office, Mhasala, Dist. Raigad,, Pin Code: CONTACT PERSON: , Mr. Virendr Visave CONTACT NO.: 02149-232224, 02149-232316, , 8888992211 EMAIL ID:	RESOURCE DESC: Portable oxygen cylinders LOCATION: Mhasala AVAILABLE TIME: January to December SOURCE: Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	3-Nos
Total no. of Portable oxygen cylinders available			3-Nos
.Resource Name - Water filter			
1	DEPT NAME: Tahasil Office, Mhasala DEPT ADDR: Tahasil Office, Mhasala, Dist. Raigad,, Pin Code: CONTACT PERSON: , Mr. Virendr Visave CONTACT NO.: 02149-232224, 02149-232316, , 8888992211 EMAIL ID:	RESOURCE DESC: Water filter Hygine LOCATION: mhasala, khamgaon, mendadi AVAILABLE TIME: January to December SOURCE: Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	3-Nos
Total no. of Water filter available			3-Nos
.Resource Name - 4 wheel drive vehicle			
1	DEPT NAME: Tahasil Office Khalapur DEPT ADDR: Tahasil Office Khalapur,, Pin Code: CONTACT PERSON: , Tahasilidar CONTACT NO.: 02192-275048, , , EMAIL ID:	RESOURCE DESC: Not Availble LOCATION: Tahasil Office Khalapur AVAILABLE TIME: January to December SOURCE: Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	1-Nos
2	DEPT NAME: Tahasil Office, Allbag DEPT ADDR: Tahasil Office, Allbag Dist. Raigad,, Pin Code: CONTACT PERSON: , Mrs. Sharada Powar CONTACT NO.: 02141-222054, 02141-222554, , 9270014945 EMAIL ID:	RESOURCE DESC: 4 wheel drive vehicle- Sumo LOCATION: Tahasil Office, Allbag AVAILABLE TIME: January to December SOURCE: Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	1-Nos
3	DEPT NAME: Tahasil Office, Managaon DEPT ADDR: Tahasil Office, Managaon Dist. Raigad,, Pin Code: CONTACT PERSON: , Mr. Mahesh Sagar CONTACT NO.: 02140-262632, , , 9767944999 EMAIL ID:	RESOURCE DESC: 4 wheel drive vehicle LOCATION: Managaon AVAILABLE TIME: January to December SOURCE: Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	1-Nos
4	DEPT NAME: Tahasil Office, Tala DEPT ADDR: Tahasil Office, Tala , Dist. Raigad,, Pin Code: CONTACT PERSON: , Mr. D B Sawant CONTACT NO.: 02140-269317, 02140-269324, 02140-202090, 9422379528 EMAIL ID: tahasitala@gmail.com	RESOURCE DESC: jeep LOCATION: Tahasil Office Tala AVAILABLE TIME: January to December SOURCE: Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	2-Nos
Total no. of 4 wheel drive vehicle available			5-Nos

Disaster Management Plan

.Resource Name - Truck			
1	DEPT NAME:Tahasil Office, Karjat DEPT ADDR:Tahasil Office, Karjat,,Pin Code: CONTACT PERSON: , Mr. Ravi Baviskar CONTACT NO.:02148-222037, 02148-222174, , 9892871493 EMAIL ID:	RESOURCE DESC:Truck LOCATION:In Karjat Block AVAILABLE TIME:January to December SOURCE:Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	65-Nos
2	DEPT NAME:Tahasil Office, Tala DEPT ADDR:Tahasil Office, Tala , Dist. Raigad,,Pin Code: CONTACT PERSON: , Mr. D B Sawant CONTACT NO.:02140-269317, 02140-269324, 02140-202090, 9422379528 EMAIL ID:tahasilata@gmail.com	RESOURCE DESC:Truck LOCATION:Tahasil Office Tala AVAILABLE TIME:January to December SOURCE:Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	10-Nos
Total no. of Truck available			75-Nos
.Resource Name - Mini Bus			
1	DEPT NAME:Tahasil Office, Karjat DEPT ADDR:Tahasil Office, Karjat,,Pin Code: CONTACT PERSON: , Mr. Ravi Baviskar CONTACT NO.:02148-222037, 02148-222174, , 9892871493 EMAIL ID:	RESOURCE DESC:- Mini Bus LOCATION:Hungaon AVAILABLE TIME:January to December SOURCE:Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	1-Nos
Total no. of Mini Bus available			1-Nos
.Resource Name - Tractor			
1	DEPT NAME:Tahasil Office, Karjat DEPT ADDR:Tahasil Office, Karjat,,Pin Code: CONTACT PERSON: , Mr. Ravi Baviskar CONTACT NO.:02148-222037, 02148-222174, , 9892871493 EMAIL ID:	RESOURCE DESC:Tractor LOCATION:In Karjat Block AVAILABLE TIME:January to December SOURCE:Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	102-Nos
2	DEPT NAME:Tahasil Office, Managaon DEPT ADDR:Tahasil Office, Managaon Dist. Raigad,,Pin Code: CONTACT PERSON: , Mr. Mahesh Sagar CONTACT NO.:02140-262632, , , 9767944999 EMAIL ID:	RESOURCE DESC:Tractor LOCATION:Managaon AVAILABLE TIME:January to December SOURCE:Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	11-Nos
Total no. of Tractor available			113-Nos
.Resource Name - V-SAT			
1	DEPT NAME:Tahasil Office, Tala DEPT ADDR:Tahasil Office, Tala , Dist. Raigad,,Pin Code: CONTACT PERSON: , Mr. D B Sawant CONTACT NO.:02140-269317, 02140-269324, 02140-202090, 9422379528 EMAIL ID:tahasilata@gmail.com	RESOURCE DESC:V-SAT LOCATION:Tahasil Office Tala AVAILABLE TIME:January to December SOURCE:Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	1-Nos
Total no. of V-SAT available			1-Nos
.Resource Name - Mobile Phone CDMA			
1	DEPT NAME:Tahasil Office, Mhasala DEPT ADDR:Tahasil Office, Mhasala, Dist. Raigad,,Pin Code: CONTACT PERSON: , Mr. Virendr Visave CONTACT NO.:02149-232224, 02149222436, , 8888992211 EMAIL ID:	RESOURCE DESC:Mobile Phone CDMA LOCATION:Mhasala AVAILABLE TIME:January to December SOURCE:Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	1-Nos
Total no. of Mobile Phone CDMA available			1-Nos
.Resource Name - Plastic drums			
1	DEPT NAME:Tahasil Office Khalapur DEPT ADDR:Tahasil Office Khalapur,,Pin Code: CONTACT PERSON: Tahasilidar CONTACT NO.:02192-275048, -, -, EMAIL ID:	RESOURCE DESC:Not Availble LOCATION:Tahasil office Khalapur AVAILABLE TIME:January to December SOURCE:Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	1-Nos
Total no. of Plastic drums available			1-Nos
.Resource Name - Office building			

Disaster Management Plan

1	DEPT NAME: Collector Office Raigad Allbag DEPT ADDR: Revenue,Allbag, Pin Code: 402201 CONTACT PERSON: Mr.Sagar Pathak , Dist Disaster Management Officer CONTACT NO.: 02141227449, 02141222097, , 9763646326 EMAIL ID: sagarpathak99@gmail.com	RESOURCE DESC: Office Building LOCATION: Collector Office AVAILABLE TIME: January to December SOURCE: Govt ENTERED ON: 5/31/2018(MM/DD/YY)	1-Nos
Total no. of Office building available			1-Nos
Resource Name - Search and Rescue Teams for Collapsed Structures			
1	DEPT NAME: Tahasil Office, Tala DEPT ADDR: Tahasil Office, Tala , Dist. Raigad,, Pin Code: CONTACT PERSON: , Mr. D B Sawant CONTACT NO.: 02140-269317, 02140-269324, 02140-202090, 9422379528 EMAIL ID: tahasitala@gmail.com	RESOURCE DESC: Search and Rescue Teams for Collapsed Structures LOCATION: NA AVAILABLE TIME: July to September SOURCE: Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	20-Persons
Total no. of Search and Rescue Teams for Collapsed Structures available			20-Persons
Resource Name - General physician			
1	DEPT NAME: Tahasil Office, Tala DEPT ADDR: Tahasil Office, Tala , Dist. Raigad,, Pin Code: CONTACT PERSON: , Mr. D B Sawant CONTACT NO.: 02140-269317, 02140-269324, 02140-202090, 9422379528 EMAIL ID: tahasitala@gmail.com	RESOURCE DESC: General physician LOCATION: NA AVAILABLE TIME: January to December SOURCE: Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	1-Persons
Total no. of General physician available			1-Persons
Resource Name - Vaccines			
1	DEPT NAME: Tahasil Office, Mhasala DEPT ADDR: Tahasil Office, Mhasala, Dist. Raigad,, Pin Code: CONTACT PERSON: , Mr. Virendr Visave CONTACT NO.: 02149-232224, 02149222436, , 8888992211 EMAIL ID:	RESOURCE DESC: Vaccines LOCATION: mhasala, khamgaon, mendadi AVAILABLE TIME: January to December SOURCE: Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	100-Sets
Total no. of Vaccines available			100-Sets
Resource Name - Chlorine tablets			
1	DEPT NAME: Tahasil Office, Tala DEPT ADDR: Tahasil Office, Tala , Dist. Raigad,, Pin Code: CONTACT PERSON: , Mr. D B Sawant CONTACT NO.: 02140-269317, 02140-269324, 02140-202090, 9422379528 EMAIL ID: tahasitala@gmail.com	RESOURCE DESC: Chlorine tablets LOCATION: Tahasil Office Tala PHC AVAILABLE TIME: January to December SOURCE: Govt LAST UPDATED ON: 7/29/2015(MM/DD/YY)	1000-Tablets
Total no. of Chlorine tablets available			1000-Tablets

APPENDIX C

EMERGENCY CONTACT NUMBERS

Emergency Control Centre (Port Control room or Chamber of Chief Manager – Admin block & Secy. or as directed by the Chairman)

27245151/67815151/27245178/67815178/27242367 or VHF Channel – 13

➤ IMPORTANT PHONE NUMBERS

1. FIRE: 2724 5000, 27245100, 67815000, 67815100
2. MEDICAL: 27473565, 27473538, 27473568, 67813568, 24743560, 67813560
3. AMBULANCE ROOM: 27245200, 67815200
4. SECURITY - CISF CONTROL ROOM: 27244545, 67814545, 27242354 (Direct)
5. OFFICE LIQUID CARGO BERTH: 27245075
6. SHIFT INCHARGE (CONTAINER TERMINAL): 27245013, 27245037, 67815013, 67815037
7. POC CONTROL ROOM: 2724 2367, 27245178, 27245151, 67815178, 67815151
8. MASTER UNIT SUB STATION (MUSS); 27244691, 67814691, 27869496

Designation	EPABX	Direct		RC Office, Mumbai
	Office	Office	Mobile	
Chairman	27244001/ 6784001	27242290	9819494001	22832458
Deputy Chairman	27244011/ 67814011	27242219	9819494002	22045372
Deputy Conservator	27244171/ 67814171	27242301	9819494004	---
Harbour Master	24274173/ 67814173	27242334	27710513/ 9819494007	---
Dock Master – I	27245175/ 67815175	---	9323407839	---
Dock Master - II	27245175/ 67815175	---	9820243717	---
Chief Manager (Finance)	27244081/ 67814081	27242241	9769769100	---
Chief Manager (M&E Engineering)	27244181/ 67814181	27242302	27564505/ 9819494014	---
Chief Manager (Traffic)	27244191/ 67814191	27242377	27472661/ 9819494011	---
Chief Manager (Administration) & Secretary	27244021/ 67814021	27242233	9819494003	---
Sr. Dy. Chief Medical Officer	27473565/27243552	---	27472980/ 9819494015	---
Chief Manager (Port Planning & Development)	27244156/ 67814156	27242326	9819494005	---

Disaster Management Plan

Manager (P & IR)	27244023	27242639	27472314/ 9819494013	---
Manager (Finance) – I	27244087	---	25205241/ 9867385341	---
Manager (Main Container Berth)	27245003/ 67815003	---	9819999226	---
Manager (Liquid Cargo Berths & Shallow water berths I & II)	27244191/ 67814191	27242377	27719349/ 9819494010	---
Manager (Utility services)	27244196/ 67814196	27242328	27743137/ 9819494015	---
Manager (ICD & SWB III)	27245005/ 67815005	---	9820160457	---
Manager (Port equipment maintenance) – I	27245001/ 67815001	---	9819494918	---
Manager (Materials)	27244198/ 67814198	---	9819999227	---
Manager (C&C) & MR	27244699/ 67814699	---	9819999227	---
Manager (Marine Engineer)	27245166/ 67815166	---	9830772584	---
Manager (Legal)	27244068/ 67814068	27242326	9819930549	---
Manager (Admin.)	27244025/ 67814025	---	9820618326	---
Manager (Estate)	27244066/ 67814066	---	9819999231	---
Manager (PPD) –I	27244160/ 67814160	---	9819999223	---
Manager (PPD) –II	27244158/ 67814158	---	9820166500	---
Manager (MS)	27244038/ 67814068	27242317	9833673162	---
Dy. Manager (MS)	27244038/ 67814038	---	9820864080	---
Dy. Manager (Safety)	27245205/ 67815205	---	9833687769	---
Asst. Manager (Fire & Safety)	27245173/ 67815173	---	9819711965	---
Master unit sub-station (MUSS), JNPT	27244691/ 67814697	27869496	---	---
Shift In-Charge (CT)	27245013/ 67815013	---	---	---
JNPT Hospital	27473568/67813568/	---	---	---

Disaster Management Plan

	24743560/67813560			
Ambulance Room – Shift Office	27245200/ 67815200	---	---	---
Fire Station	27245000/67815000/ 272451000/67815100	---	---	---
Port Control Station	27245151/67815151/ 27245178/67815178	27242367	Marine VHF Channel No. 13	---
JNPT township main gate	27243570/ 67813570	---	---	---
JNPT Pump house	27245179/ 67815179	---	---	---

CISF Unit			
	EPABX	Direct	Contact
CISF Control station	27244545/ 67814545	27242354	---
Sr. Commandant (CISF)	27244216/ 67814216	27242294	9819999234
Dy. Commandant (CISF)	27244222/ 67814222	---	27472246/ 9819494017
Asst. Commandant (CISF)	27244222/ 67814222	---	27472323
Asst. Commandant (CISF)	27244682/ 67814682	---	9757090291
Central gate Complex -CISF	27244682/ 67814682	27242354	---
North Gate Complex – CISF	27245195/ 67815195	24272362	---
South gate Complex – CISF (ODC gate)	27274681/ 67814681	---	---
Admn. Building Reception – CISF	27244218/ 67814218	---	---
CISF line township	27472275/ 27472356	---	---

NDRF – 5th Battalion					
Name & Designation	Address	Contact	Fax no.	Mobile	Unit control room no
Sh. Anupam- Commandant	5 th Battalion NDRF, Sudumbare Taluka,Dist –	02114- 247010	02114 - 24700 8	0942231562 8	02114- 247000

Disaster Management Plan

	Maval, Pune Maharashtra - 412109				
--	--	--	--	--	--

Port users handling Dangerous Cargo	Contact	Fax
JNPCT		022 27244020
NSICT & NSIGT – DP World	5590 1234	5590 2415
GTI-APM	6681 1000	6681 1110
BMCT		
BPCL office	9049271609/ 27240835/ 27872011	
BPCL jetty (Lilli Marine)	9987072586/ 27240366/ 27242490	
IOCL	65162131/32	
IOTL	65162135/1992	
IMC	9004879994/ 27240875 9004897868/ 27240864	
GBL	9552546101 27241460/ 27242136/39	
RIL	67277200/ 27242001/ 27242091	
Suraj Agro ltd.	27241869/ 27240409	
Bharat Shell	9833366183 27241461	
Deepak Fertilizer ltd.	9892814356 27242097/ 27242117	
CFS		

Hospitals	
Name	Contact
JNPT – Hospital	27473568/538/67813568
L.T.M.G. Hospital, Sion, Mumbai	24076381 / 24063000/24092020
J.J. Hospital, Byculla, Mumbai	02071173180/433
KEM Hospital, Parel, Mumbai	+91-22-24107000
G.T. Hospital, Mumbai	22621465
Civil Hospital, Thane	022- 25472582

Disaster Management Plan

Palvi Hospital, Uran	27222561
MGM Hospital, CBD, Belapur, Navi Mumbai	022-27576703/27581060/61/62
Lifeline , Panvel	61567000/7003
Civil Hospital , Alibag, Dist – Raigad	02141-222667
NMMC, Vashi	27899901/9906
MGM, Vashi	61526666/66464748

Specialist Teams	Contact Number
Commander Coast Guard, ICG Western Region –Mumbai	022-24370848/ 24370842 Fax: 022-24333727/ 24322534/24301455
Disaster Management Unit (Mumbai)	9923693163/9167533885/ 9552229069/9404739083
NDMA – Raigad	02141-222118/227449/ 222079/9763646326

Salvage Company	Contact Number
M/s. Sealord Diving & Salvage Pvt. Ltd.	+91-22-27682825/ 9833413650/9967336422
i-Marine Infratech (India) Pvt. Ltd.	+91-22-40561222

Experts	
Name of Body	Telephone No / Fax No
Nautical Advisor cum addl. DG (Nautical)	022-25752009 jayakumar-dgs@nic.in
DG Shipping, Mumbai	022-25752005 022-25752010 / 25752011 amitabh.kumar63@nic.in
Indian Register of Shipping, Mumbai	022-30519400 / 25703611 ho@irclass.org
IIT – Mumbai	022-2572 2545 / 2572 3480
Cyclone Detection Radar, IMD Mumbai	022-22150517/ 22174707 patoddgm_rmcmumbai@yahoo.co.in
Area Cyclone Warning Centre (ACWC) – Colaba, Mumbai	022-22150431 / 22160824 acwc.mumbai@gmail.com
Ministry of Environment & Forest (MoEF), Admin, New Delhi	011-24695370 ylvarma.edu@nic.in
The National Environmental Engineering & Research Institute (NEERI), Nagpur	0712-2249999 / 660 / 2244900
Directorate of Maharashtra Fire Services, Mumbai	022-26677555 / 26677666 info@mahafireservice.gov.in
Ministry of Petroleum & Natural Gas	011-23382426 / 23383100
Port Health Officer (PHO), JNPT user building, Sheva, JNPT	022-27242592 / 022-27241373 phonhevasheva@gmail.com

Disaster Management Plan

National Institute of Ocean Technology (NIOT), Chennai	044-66783300 / 22460275 / 22460645
National Ship Design and Research Centre, Visakhapatnam	0891-2578360 / 2577754 nsdrc@itpvis.ap.nic.in
Chief Controller of Explosives, Nagpur Joint Chief Controller of Explosives, CBD Belapur, Navi Mumbai	0712-2510248 022-27575946 / 27575946 / 27564941 explosives@explosives.gov.in jtccemumbai@explosives.gov.in
Inspectorate Dock Safety, Navi Mumbai,	022-24060510 / 22623391 idsjnpt@gmail.com idsjnpt@dglasli.nic.in bsc@dglasli.nic.in
Inspectorate Dock Safety, Mumbai	022-22692180 / 56565511 / 56565558 022-22613391 idsmumbaigov@gmail.com idsmumbai@dglasli.nic.in vjg@dglasli.nic.in
MPCB - Mumbai	022-24020781 / 24014701 022-24023516
MPCB - Navi Mumbai (SRO Talaja)	022-27572740 / 27571586 srotaloja@mpcb.gov.in
MPCB - Navi Mumbai (RO Raigad)	022-27572739 / 27571586 ronavimumbai@mpcb.gov.in mpcbnavimumbai@mpcb.goc.in

Government Services

Name of the Authority & Address	Telephone number
Asst. Director (Safety), Inspectorate Dock Safety, MbPT OSC building, 3 rd floor, Opp. GPO, P.D. Mello Road, Mumbai – 400 038.	022-2269 2180/66565511/58/ 09892098006 Fax No. – 02-2261 3391 idsmumbaigov@gmail.com idsmumbai@dglasli.nic.in vjg@dglasli.nic.in
Asst. Director (Safety), Inspectorate Dock Safety, POC Canteen Building, Ground floor JNPT, Navi Mumbai - 400707	022-24060510 / 07387146786 idsjnpt@gmail.com idsjnpt@dglasli.nic.in bsc@dglasli.nic.in
Director General, Factory Advice Service & Labour Institute, Central Labour Institute, N.S. Mankikar Marg, Sion, Mumbai – 400022.	022-24060502 Fax: 407 1986 fasli@dglasli.nic.in
Maharashtra Pollution Control Board, Mumbai	022-24020781/782/783 ms@mpcb.gov.in
Regional Officer, MPCB, CBD, Navi Mumbai.	roraiad@mpcb.gov.in mpcbraiad@mpcb.gov.in
Chief Controller of Explosives A Block CGO Complex Fifth floor,	(0712)2510248 explosives@explosives.gov.in

Disaster Management Plan

Seminary Hills Nagpur – 440006	
Joint Chief Controller of Explosives A-1 and A-2 Wing, 5th Floor, C.G.O. Complex, CBD Belapur, Navi Mumbai – 400614	022-27575946, 27575946,27564941 jtccemumbai@explosives.gov.in
Directorate of Industrial Safety and Health	+91-22-26572504 dirdish.mum-mh@gov.in
District Collector, Raigad, Alibag	+91-2141-222001/222118 collector.raigad@maharashtra.gov.in
Home Guard, Raigad, Alibag	2141 – 222012 rai.hg-mh@nic.in
Municipal Commissioner, Navi Mumbai CBD, Belapur, Navi Mumbai	+91-22-27567070
Municipal Commissioner, Thane	+91-22-25336523/29 mc@thanecity.gov.in
MSEB, Uran	022-27222388
District Collector, Thane	+91-22-25347444 collector.thane@maharashtra.gov.in
Tahsildar, Uran, Raigad	022 27222352
Relief Commissioner of Maharashtra	022-22025274/9920044125 Fax: 22026712 acs.r@rmaharashtra.gov.in
Director (DM), SDMA	022-22026868/712/8007902145 Fax: 22020454 dir.dm@maharashtra.gov.in

Transport

Divisional Controller, Raigarh	02143-252289
Divisional Controller, Thane	022-25331132

Civil Defense

Commandant General Home Guards & Director Civil Defence	022-22842423/22022246 dghg.2014@gmail.com
Director & Fire Adviser	022-26677555/26670438/439 directormfs@mahafireservice.gov.in
Dy. Controller of Civil Defence, Uran	022- 27221355/27222343
Air Force Station (SHEVA)	27241370/71/72

Fire Services

Fire Stations	Office number
Port Fire Station	9879711965/ 2227245173/ 2725000/ 27245100
Uran Nagar Corporation	27222320
ONGC fire station	27212237

Disaster Management Plan

Fire Station – Belapur	9967023096/ 27572111
Fire Station – New Panvel	9892492241/ 27452337
Fire Station – Old Panvel	9341158443/ 27461500
Fire Station – Vashi	27660101
Fire Station – Mumbai	23076111/23086181
Fire Station – Taloja MIDC	8108077791/ 27401055
Fire Station – Kalamboli	9867725004/ 27420138
Mumbai Port Trust	022 66565656

Police	
Superintendent of Police, Raigad, Alibag	02141 – 222093
Police Commissioner, Thane	022-25344499/ 9773199678
Commissioner of Police, Navi Mumbai, CBD, Belapur, Navi Mumbai	022-27561099/ 8474820686/8424820665
Traffic Police, Navi Mumbai CBD, Belapur, Navi Mumbai	7738393839/ 8424820665 / 8424820686
Police Control Room, Mumbai	22620111/ 22621855/22621983/ 22625020/22641449/100
Police Control Room, Raigad	02141 – 222100
Police Station, Sheva, Uran (Port Division)	022-27220642/ 27222366/ 9870117903
Nhava Sheva – Jaskhar	27472264/27471012

Water Supply	
Water Supply Station, JNPT	27242243
Maharashtra Jeevan Pradhikaran	+91-22-22026249/ 22835247/22025354
Supdt. Engineer, MWSSB, Thane	25427855
Executive Engineer, MWSSB, Panvel	27453632

First Aid Post		
Post Number	Location	Contact
First Aid Post No.1 With ambulance service	Fire station	27245000 / 27245100 67815000 / 67815100
First Aid Post No.2 With ambulance service	Ambulance Room near CT Shift office	27245200 / 67815200
First Aid Post No.3	BT Office	27244687 / 27244689 67814687 / 67814689
First Aid Post No.4	CT Sub Store	27245032 / 67815032
First Aid Post No.5	Auto Garage	27245159 / 67815159
First Aid Post No.6	Main Stores	27245136 / 67815136

Disaster Management Plan

First Aid Post No.7	Workshop	27245146 / 67815146
First Aid Post No.8	Port Control Room	27245151 / 27245178 67815151 / 67815178
Private Terminals		
GTI –APM	GTI House - Paramedic centre and Ambulance	9821669309
NSICT – DP World	Paramedic Centre	8879419343

Raigad District Help line numbers	
Services	Helpline numbers
Coastal Security	1093 (helpline number)
Fire Service	101
Police	100
Ambulance	102
Medical Advice Service, Govt. of Maharashtra	104
Emergency and Disaster Management	108/1077
Maritime SAR Emergency services to Indian Coast Guards	1554

OSRO Particulars (Outsourced)	
Operators Name	Sadhav Shipping Limited
Address	521, Loha Bhavan, P. D'Mello Road, Masjid (East), Mumbai – 400 009.
Phone No	2348 25 24
Fax	2348 25 26
Email	shipping@sadhav.com

School		
Name Of School	Tel No	Address
IES JNP Vidyalaya	022-27472646/ 27472647/ 27472645	Sheva, Navi Mumbai -400707
St. Mary's JNP School	022-27470555	Sector 2,JNPT Township, Sheva, Navi Mumbai 400707

Food Supply Agency		
Sr. No	Name of the Food Supply Agency	Contact
1.	Janardhan Shetty	8879658834

Disaster Management Plan

Hotel		
Sr. No	Name of the Hotel	Tel No.
1.	Raj Vikas Residency	9867763004

PORT VEHICLES			
Vehicle	Qty	Details	Contact No & Email
Car	5	Vehicles under Control of Administration Department	--
Jeep	1	--	--
HIRED VEHICLES			
Bus	28	M/s. Vikas Travels, R-502,MIDC,TTC Area, Rabale, Navi Mumbai-400701	022-27692910/ 9322296750 kbjoshi@vikastravels.co.in
Car & Jeep	16 &5	M/s. Abhijeet travels, Office No.5,Coorporate park, At: Sonari, Post-JNPT township,Uran, Navi Mumbai -400707	022-27247000/2847/ 9820675807
Car & Jeep	16 &6	M/s. Tannu transport & Travels, 410 , Matru Chayya, Tal:Uran, Dist:Raigad,Navi Mumbai -400702	022-27231506/ 9870089169
Car & Jeep	14 &4	M/s. Asha Trasport, At: Jaskhar, Post- JNPT Township, Uran, Navi Mumbai-400707	9833583583
Cars 7 Jeep	15 &4	M/s. Dessam Travel Corporation,375/11,Ram Nivas Bldg., Gr. Floor, Agripada, Mumbai -400011	022-27472030/ 23012975/ 9594829262
Mini Lorry		M/s. Tannu Transport & Travels,410,Matru Chayya,Tal:Uran,Dist:Raigad, Navi Mumbai -400702	022-27231506/ 9870089169

AMBULANCES		
Sr. no	Name of the Institution	Contact
1.	Ganesh Mohite (Private)	9322891871,9323002896
2.	Life Line Hospital, Panvel	27458171
3.	Shekapaksha Karyalay, Panvel	27453701
4.	Uran Municipal Corporation	27222320/27220460

APPENDIX D

ANTIDOTES AND FIRST AID TREATMENT

D.1 USE OF ANTIDOTES FOR SELECTED POISONING

POISON	ANTIDOTE	MECHANISM	ADULT DOSE	PEDIATRIC DOSE	CAUTIONS
Methanol, Ethylene glycol	Ethyl alcohol 5% solution (Abbott)	Inhibit Metabolism to toxic products	Loading dose (LD) 0.6mg/kg maintenance dose (MD) 109 mg/kg/hr. For oral or nasogastric administration use 5% ethanol	Same as adult	Adjust to achieve ethanol blood level of 100-200 mg% (22-24 mm ol/L)
Cyanide	Cyanide Antidote kit (Lilly) Any 1 nitrite pearls	Converts Felt in Haemoglobin to Felt so CN can attach to methoemoglobin and freely to chrome oxidase.	Break pearls, one at a time and hold them under the patients nose for 15-30 sec each minute until sodium nitrate ready, then stop.	Same as adult	Observe for hypotension. Avoid m H bg of over 30%.
	Sodium nitrate 3% in 10 ml ampoules.	As for amyl nitrate	10 ml of 3% solution (300mg) 1.v slowly over 3-5 mts.	6-8 ml/m ² (or 0.3 ml/kg) over 3-5 mts; do not exceed 10 ml.	As per Amylnitride. Excessive amounts may result in fatal methofatal methomoglobin mia.
	Sodium thiosulphate	Provides excess sulphur to accelerate	50 ml. Of a 25% solution give over a 10mt period.	30-40 ml/m ² (or 1.65 ml/kg)	

Disaster Management Plan

	25% in 50 ml ampoules.	metaglobism of CN to thiocyanate, a non toxic product.			
Metals Arsenic, lead, Mercury	Dimercaprol (BAL) 100 mg/ml in 3 ml ampoules.	Chelates metal to firm inte	35 mg/kg deep 1.M. every 4 hrs for 2 days; then every 4 – 12 hrs for upto 7 days	500 mg/m ² (or 24 mg/kg) 24 hrs. undivided doses every 4 hrs. for 5 days.	Observe for hypert-ens tachycardia headache and nausea
	Dimercaprol (BAL) 100 mg/ml in 3 ml ampoules	Chelates metal to firm inte	50-75 mg/kg/4 hrs deep 1.M. in 2 divided doses or by slow 1.v infusion (total dose over 12.24 hrs) for upto 5 days. No more than 500 mg/kg/course	1000 mg/m ² (or 50 mg/kg) 24 hrs deep 1.M undivided doses every 8-12 hrs for 3-5 days to max. of 2 gms.	Proteinuric, hematuria, hyper calcemi fever, lacimation and myalgias may occur.
	Panicillamine (cuprimine)	-do-	250 mg/given orally 4 times daily for 5-10 days	600 mg/M ² (0.30/kg/24 hrs. orally in 2 equally divided doses to max. of 1 gm.	Leokopenia, thrombosis topenia and raphroti like syndrome may develop.
POISON	ANTIDOTE	MECHANISM	ADULT DOSE	PEDIATRIC DOSE	CAUTIONS
Narcotics	Naloxone	Competitive	0.4-2 mg 1.V Push: repeat as	0.01 mg/kg 1.V	Administration

Disaster Management Plan

	(Narcan)	antagonism for re- ceptor sites	needed to 10 mg.	push: repeat as needed	to an addict may cause a withdrawal syndrome.
Nitrate	Methylele Blue (1% soln.)	Reduces methomoglo- bin to haemoglobin	1.2 mg/kg 1.v 1% soln. Over 5-1	Same as adult	Treatment is not necessary unless methemoglobin is 730 soln. And other fluids may turn blue avoid extravasations.
Hydrogen Fluoride	Antidote	2 to 5 CC – 10% solution of Calcium gluconate beneath affected part			--
Chlorine	Antidote	Administer oxygen Tablets (1) VOX (2) DIOVOL (3) AMINOFFILLIN INJECTION (1) Decadron (2) Benasol (3) Deriffillin (4) Siquil			
Organo Phosphorous Compounds PARA. ETHION- ENDO-	Antidote MALATHIO N, PHURATE, SULPHON ETC.	Administer Atropin PAM Injection	Sulphate		
AMMONIA	Antidote	ADMINISTER OXYGEN, GIVE WARMILL, THOROUGHLY WASH THE			

	First Aid	AFFECTED PART APPLY 0.9 TO 1% ALUM WATER OR 5% SOLN. OF ACETIC, CITRIC, TARTARIC & SULPHONIC ACID. TAKE THE VICTIM TO FRESH AIR IF OXYGEN NOT AVAILABLE.	
--	-----------	--	--

D.2 SOME COMMON INDUSTRIAL EXPOSURES AND THEIR FIRST AID TREATMENT

Sr. no	EXPOSURE	EXAMPLE	TYPE OF INJURY	FIRST AID ACTIONS
I.	IRRITANT CASES	Acid/Alkali Vapours, Ammonia, Chlorine, Dimethyl Sulphate, Flourine, Hydrogen Chloride, Hydrogen Sulphide, Isocyanates, Methyl Bromide, Oxides of Nitrogen (No2) Ozone, Phosgene, Phosphine, Phosphorous Oxychloride, Phtalic Anhydride, Silane, Sulphur dioxide, sulphuric acid, C.S. Acid oleum.	Throat, Nose, Eye and Lung Inflammation with possible fluid collection in lung following large exposures.	<ol style="list-style-type: none"> 1. Removal from exposure 2. Maintain airway 3. Oxygen 6 L/min. 4. Physician Referral 5. Beware of possible 12-24 hr delayed onset of lung symptoms.
II.	ACID/ALKALI SKIN OR EYE CONTACT	Hydrochloric Acid, Hydrofluoric Nitric, Sulphuric, Acetic, Phosphoric, Aqua-Regia (HCL+ HNO3) Oxalic Acid, C.S. Acid, Ammonia, Sodium Hydroxide, Potassium Hydroxide, Calcium Chloride, Sodium Sulphide, Calcium Sulphate.	Skin or Eye Corrosion Destruction.	<ol style="list-style-type: none"> 1. Immediate wash with copious water or buffered salt solution irrigation of contact area for no less than 15 minutes usually longer. 2. Remove contaminated clothing. 3. Physician referral if symptoms persist, large painful area of burn, or evidence of eye-injury (pain, Persistent redness vision loss). 4. Usually specific neutralizing chemicals are unnecessary if water irrigation is prompt and copious. An

Disaster Management Plan

				exception is Hydrofluoric acid in which calcium gluconate gel or injections are effective.
III	HYDRO-CARBON SOLVENTS	Aliphatics-Hexane, Aromatics-Toluene, Xylene, Ketones NEK Esters-N-Butyl-Acetate, Ethers-Dioxide, Chlorinated-Trichloro-ethane, Perchloroethylene, chlorobenzenes, Preons.	Temporary depression in Brain function (like "high% of drunkenness)	<ol style="list-style-type: none"> 1 Removal from Exposure 2 Decontamination (remove contaminated clothing and wash any contaminated parts if body) 3 Observation until patient regains normal function. 4 Physician referral if condition worsens, vital signs (Pulse, respiratory rate blood pressure) are unstable patient losses consciousness of large exposure.

APPENDIX E

CONSEQUENCE ANALYSIS RESULTS

1. Toxic dispersion from Leakage of Acrylonitrile tank container at APM terminal with wind speed **2 m/s**, **F** stability class and **5 m/s**, **D** stability class.



2. Vapor cloud explosion from Rupture of Acrylonitrile tank container at APM terminal with wind speed **2 m/s** and **F** stability class.



Disaster Management Plan

3. Vapor cloud explosion from leakage of Benzene tank container at JNPCT with wind speed 2 m/s and F stability class.



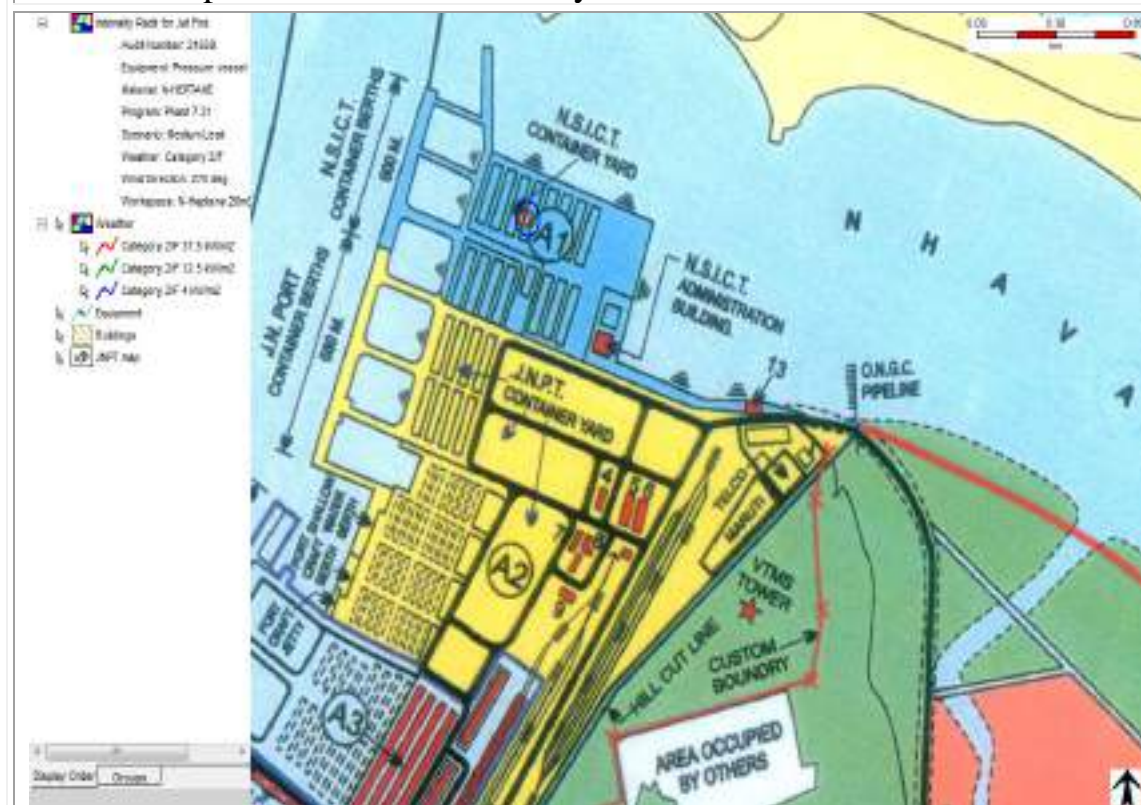
4. Toxic dispersion from leakage of Carbon disulphide tank container at JNPCT with wind speed 2 m/s and F stability class.



5. Toxic dispersion from leakage of Propylene oxide tank container at DP world terminal with wind speed 2 m/s and F stability class.



6. Jet fire from leakage of N-Heptane tank container at DP world terminal with wind speed 2 m/s and F stability class.



Disaster Management Plan

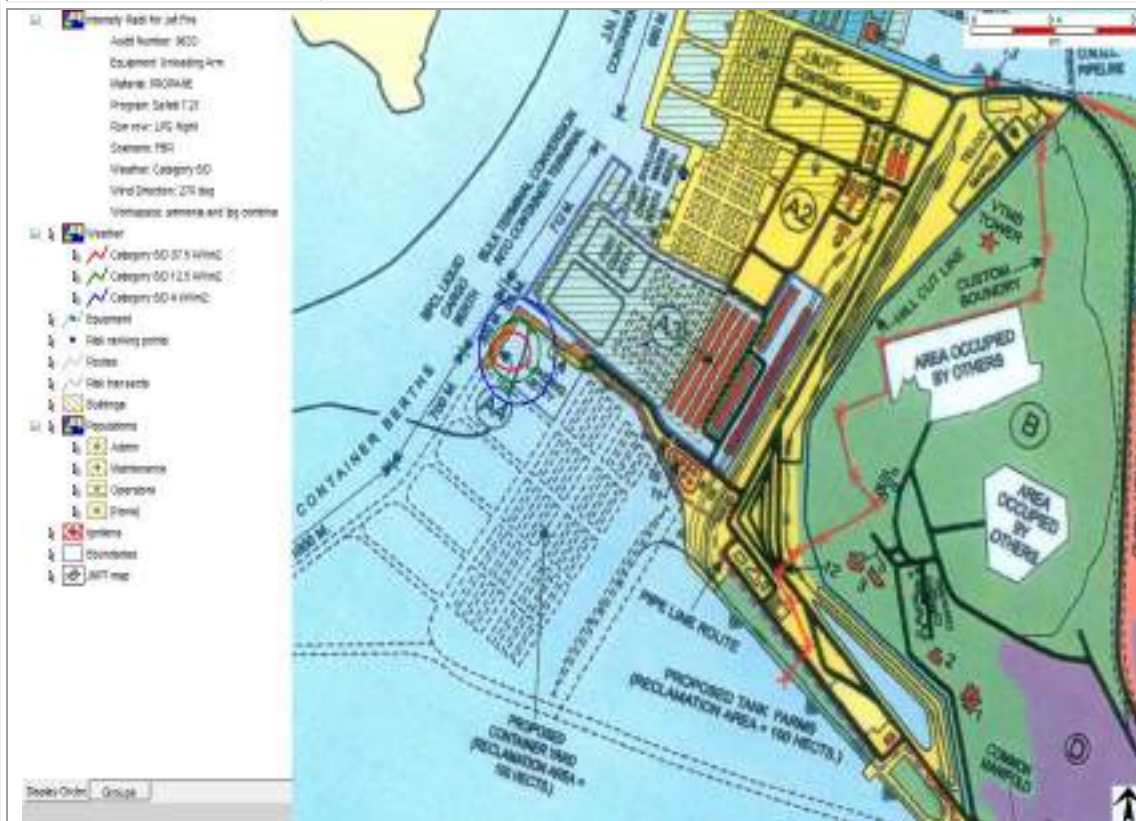
7. Toxic dispersion from leakage of Acrolein tank container at BMCT terminal with wind speed **2 m/s** and **F** stability class.



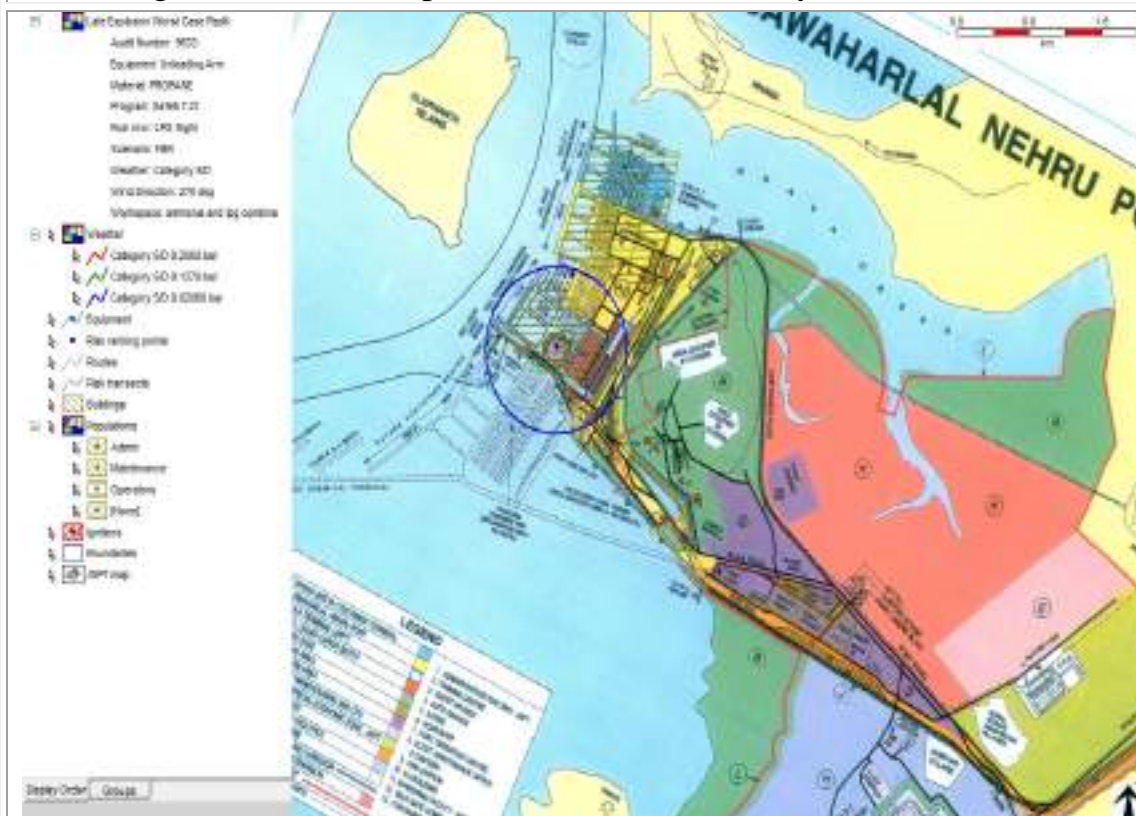
8. Toxic dispersion from leakage of Acrylonitrile tank container at BMCT terminal with wind speed **2 m/s** and **F** stability class.



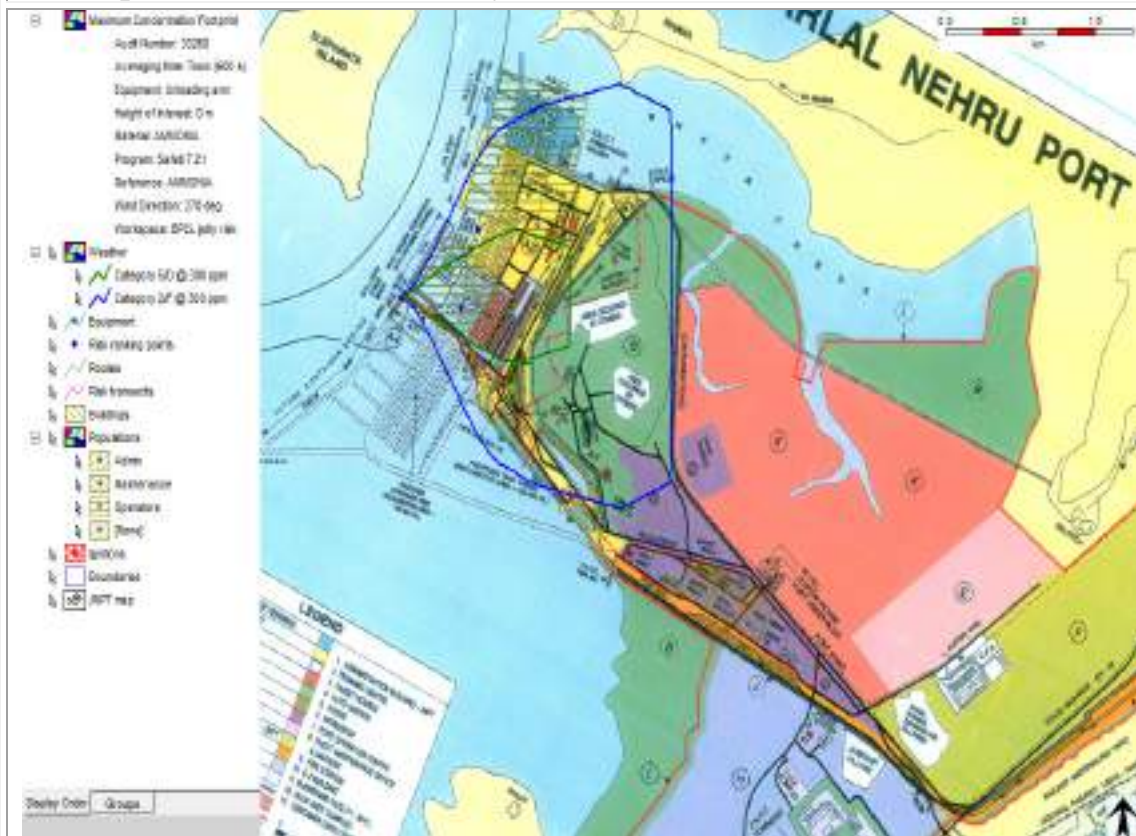
9. Jet fire from Full Bore Rupture of LPG unloading arm with wind speed **5 m/s** and **D** stability class at BPCL LCB.



10. Late Vapor Cloud Explosion from Full Bore Rupture of LPG unloading arm with wind speed **5 m/s** and **D** stability class at BPCL LCB.



11. Toxic Dispersion from Small leak of Ammonia unloading arm with wind speed 2 m/s and F stability class at BPCL LCB.



12. Jet fire from Full bore rupture of MS unloading arm with wind speed 5 m/s and D stability class at BPCL LCB.

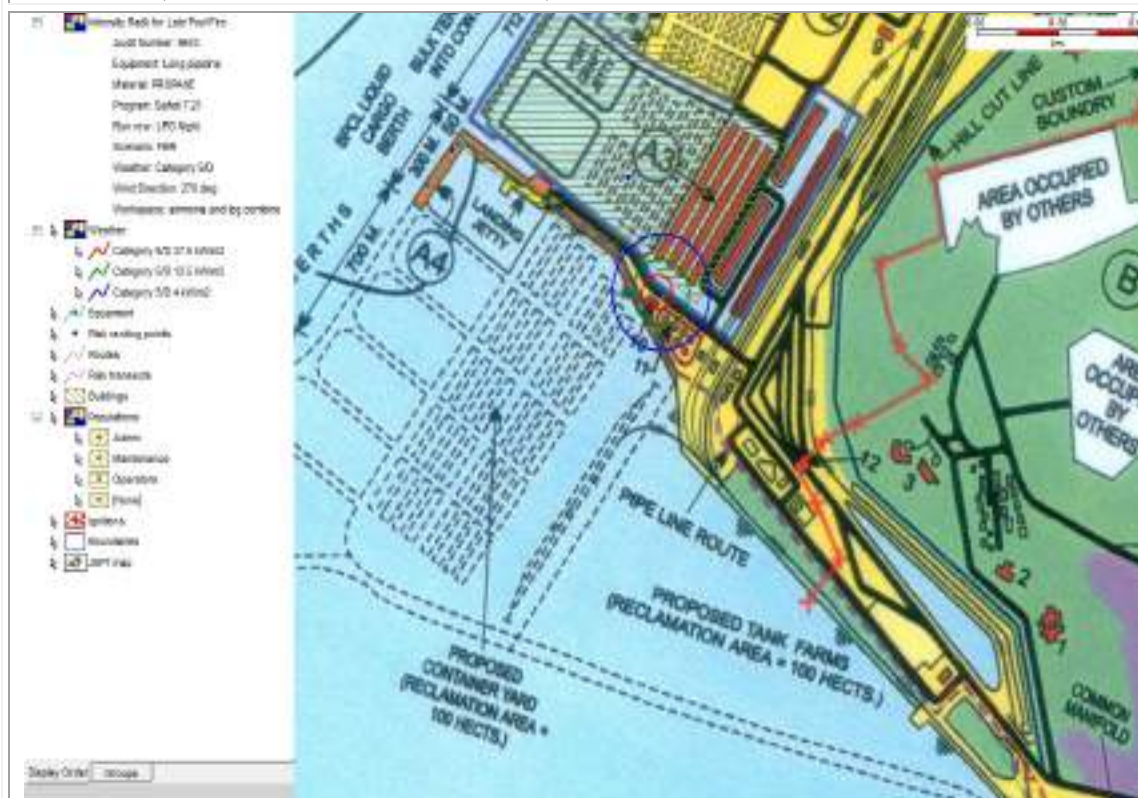


Disaster Management Plan

13. Flash fire from Full bore rupture of Naphtha unloading arm with wind speed **5 m/s** and **D** stability class at BPCL LCB.

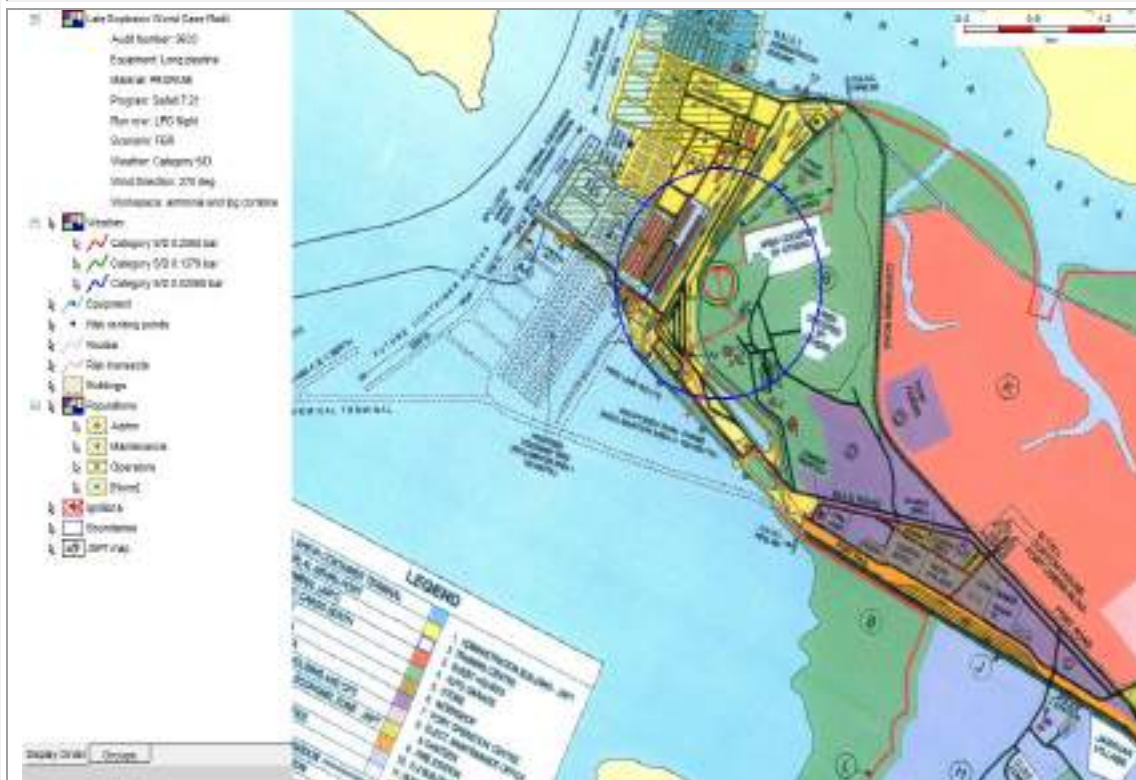


14. Pool fire from Full Bore Rupture of 12" LPG pipeline from jetty to storage terminal with wind speed **5 m/s** and **D** stability class at pipeline corridor (1000 m from BPCL LCB).



Disaster Management Plan

15. Vapor Cloud Explosion from Full Bore Rupture of 12”LPG pipeline from jetty to storage terminal with wind speed **5 m/s** and **D** stability class at pipeline corridor (1000 m from BPCL LCB).



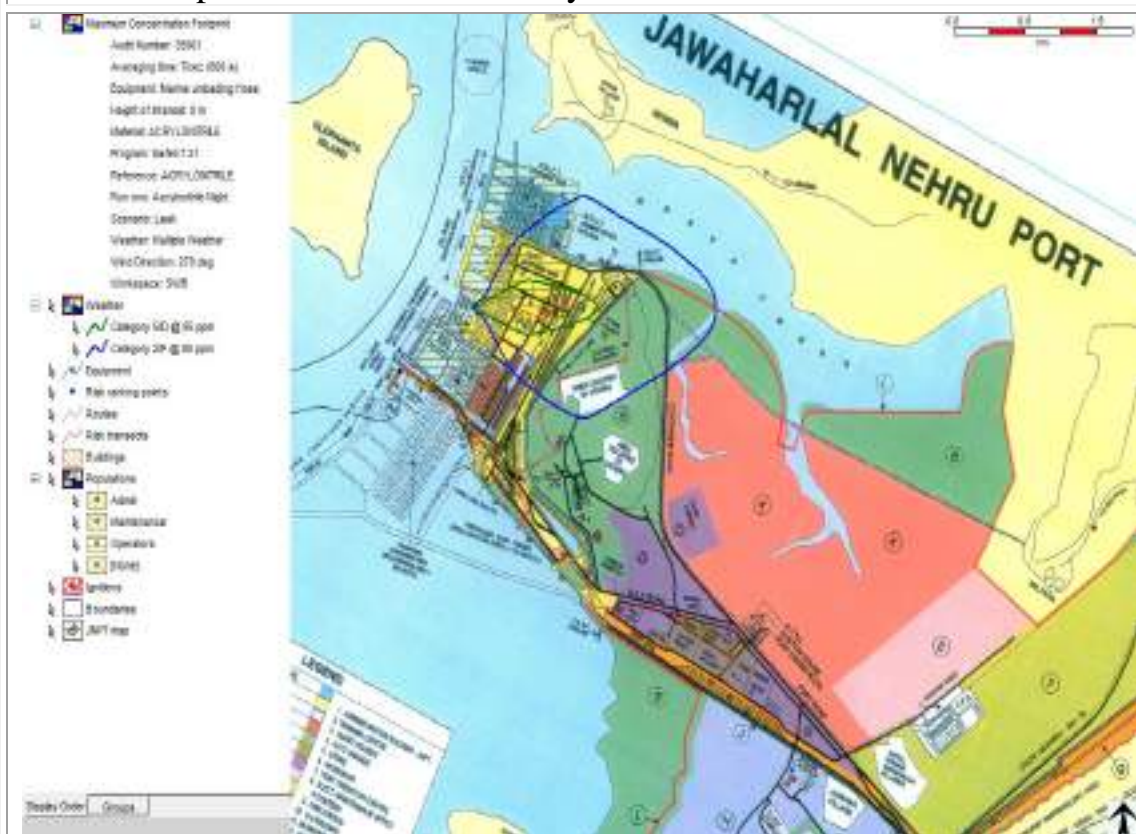
16. Jet fire from Full bore rupture of Crude oil unloading arm with wind speed **5 m/s** and **D** stability class at BPCL LCB.



17. Jet fire from Full bore rupture of Acetone flexible hose at SWB with wind speed 2 m/s and F stability class.



18. Toxic dispersion from Leakage of Acrylonitrile flexible hose at SWB with wind speed 2 m/s and F stability class.



19. Toxic dispersion from Full bore rupture of Benzene flexible hose at SWB with wind speed **2 m/s** and **F** stability class.



20. Flash fire from Full bore rupture of Cyclohexane flexible hose at SWB with wind speed **5 m/s** and **D** stability class.



21. Flash fire from Full bore rupture of Propylene flexible hose at SWB with wind speed **5 m/s** and **D** stability class.

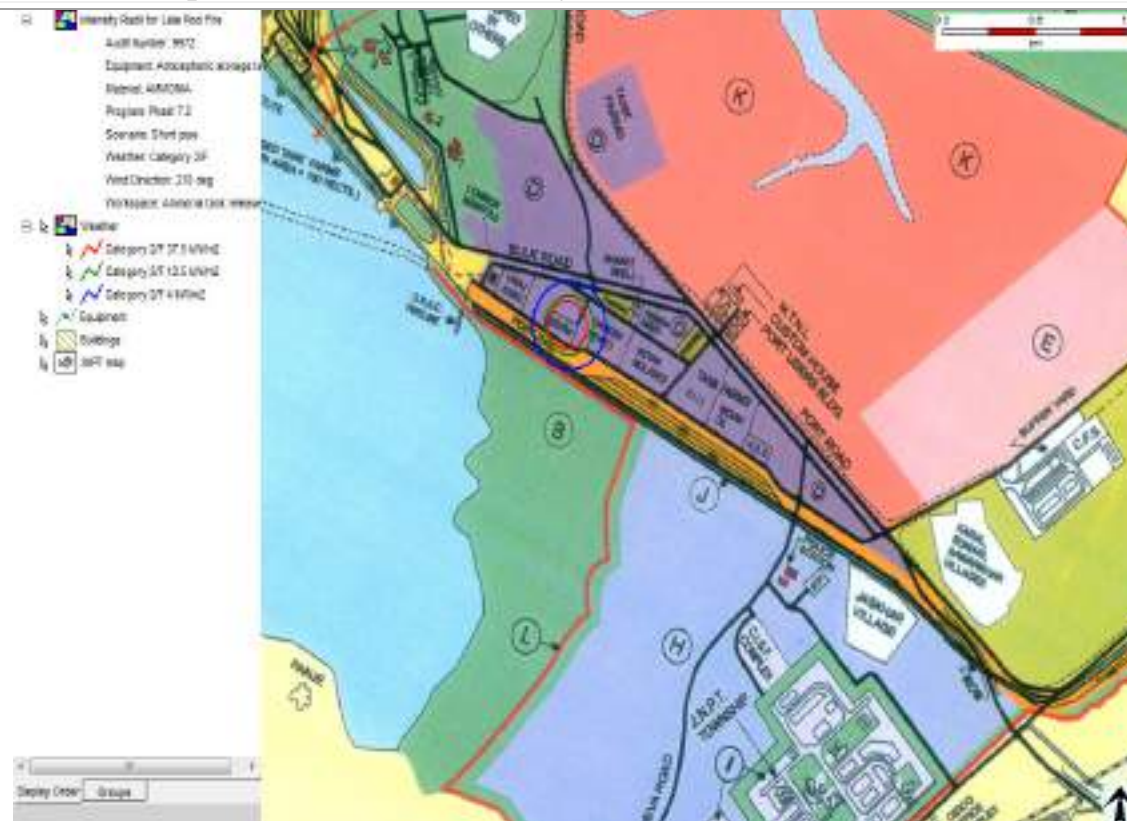


22. Jet fire from Full bore rupture of Toluene flexible hose at SWB with wind speed **2 m/s** and **F** stability class.

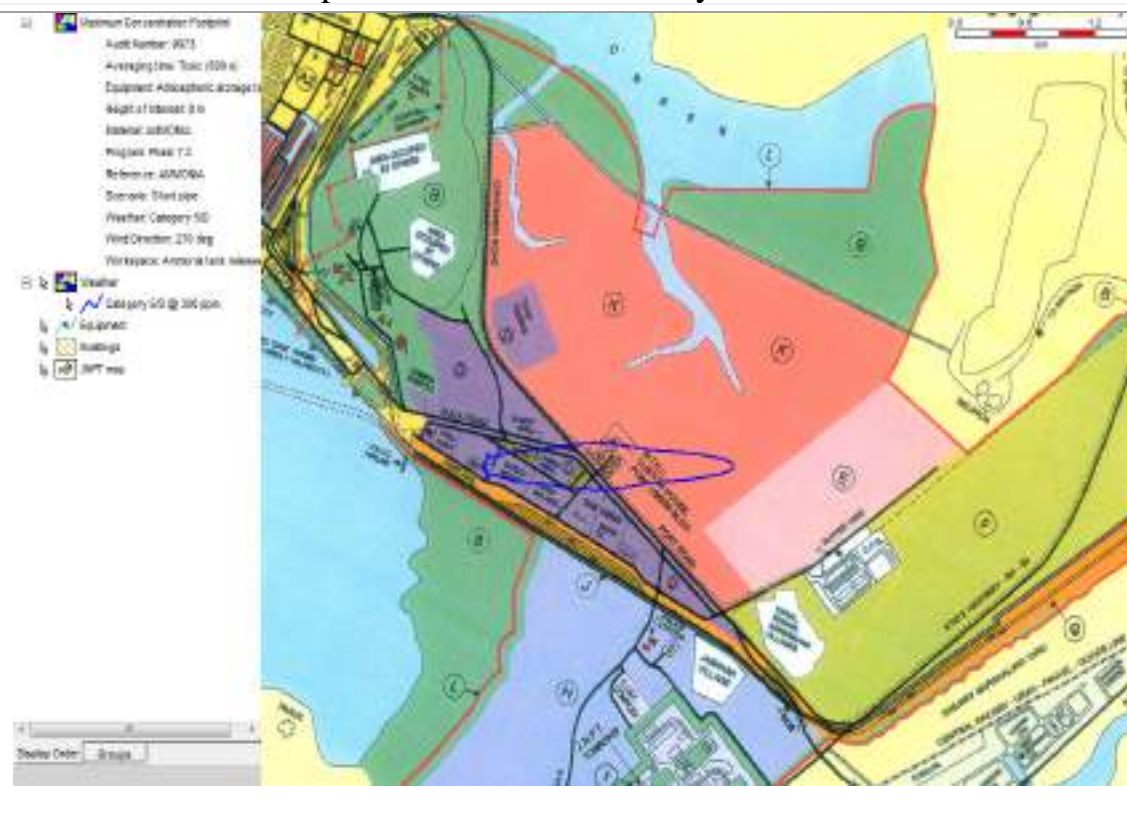


Disaster Management Plan

23. Pool fire from Leakage of Ammonia tank at Dipak fertilizer terminal with wind speed **2 m/s** and **F** stability class.



24. Toxic dispersion from Leakage of Ammonia tank at Dipak fertilizer terminal with wind speed **5 m/s** and **D** stability class.

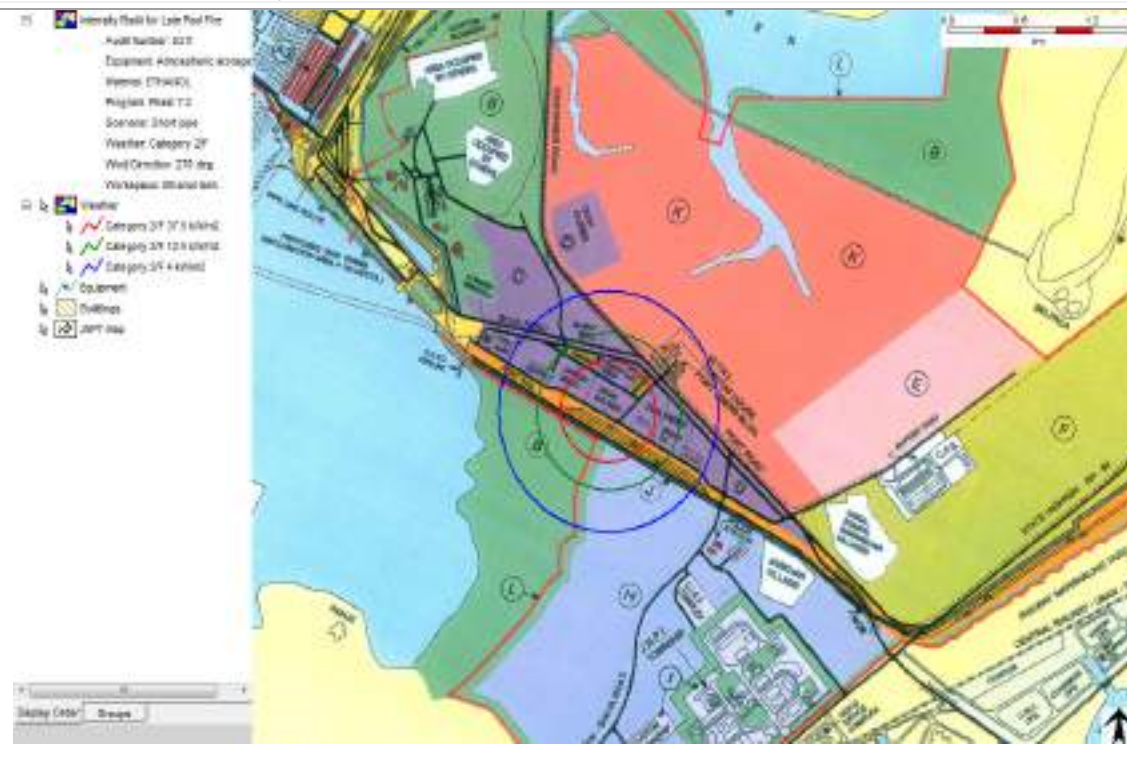


Disaster Management Plan

25. Jet fire Leakage of Butyl acrylate tank at IMC terminal with wind speed **2 m/s** and **F** stability class.

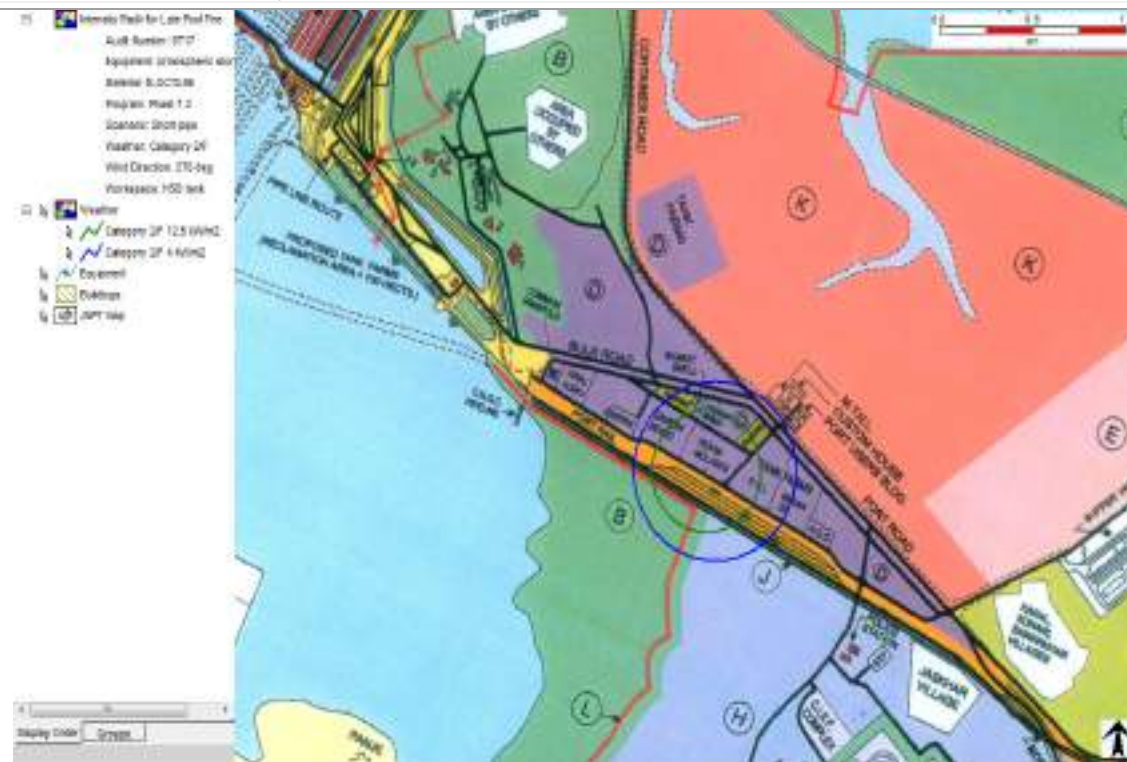


26. Pool fire Leakage of Ethanol tank at IMC terminal with wind speed **2 m/s** and **F** stability class.



Disaster Management Plan

27. Pool fire Leakage of HSD tank at IMC terminal with wind speed 2 m/s and F stability class.



28. Pool fire Leakage of Styrene monomer tank at IMC terminal with wind speed 2 m/s and F stability class.

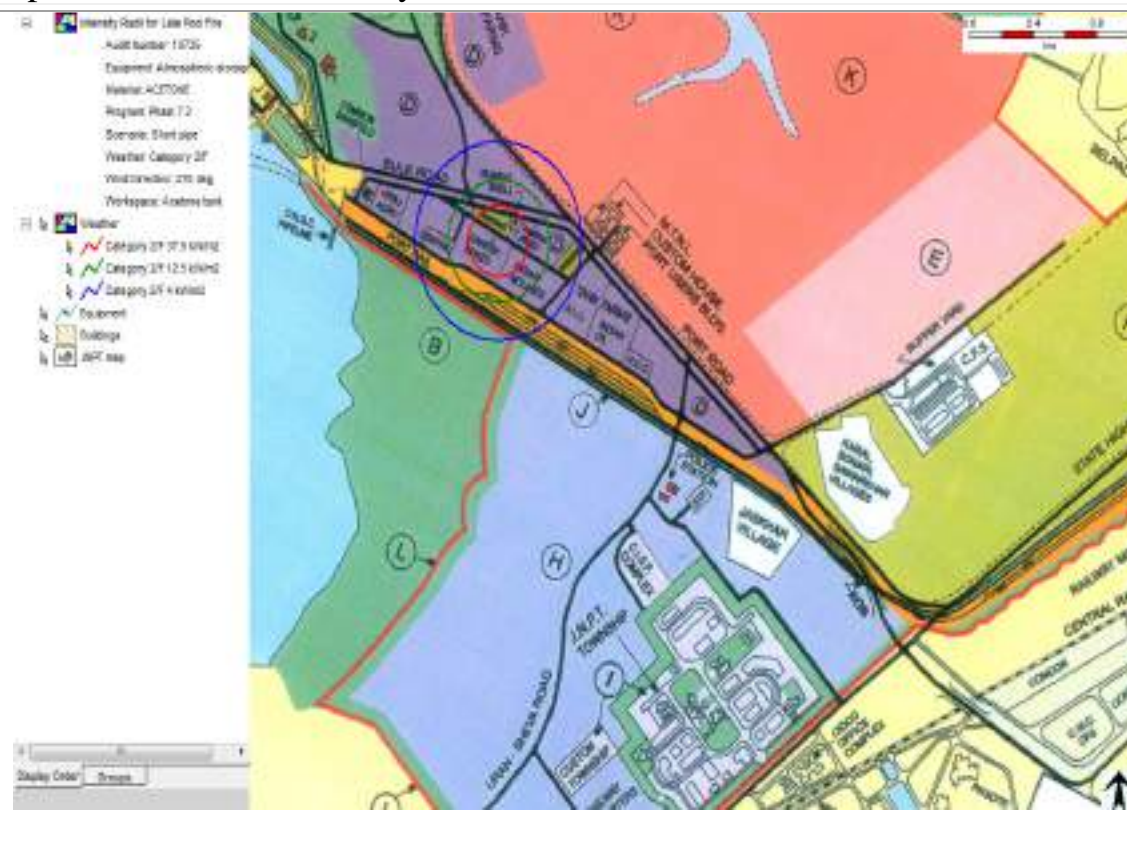


Disaster Management Plan

29. Toxic dispersion from Leakage of Acetic acid tank at GBL terminal with wind speed **5 m/s** and **D** stability class.



30. Pool fire from Leakage of Acetone tank at GBL terminal with wind speed **2 m/s** and **F** stability class.

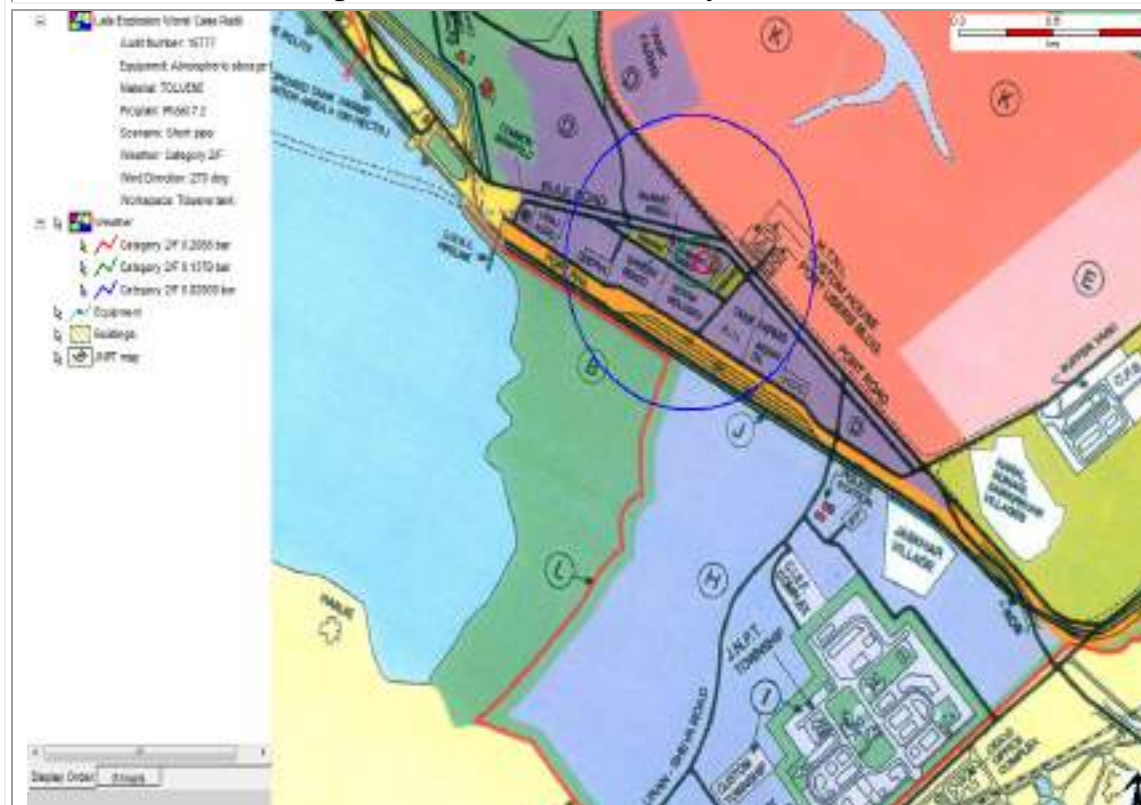


Disaster Management Plan

31. Pool fire from Leakage of Aniline tank at GBL terminal with wind speed **2 m/s** and **F** stability class.



32. Vapor cloud explosion from Leakage of Toluene tank at GBL terminal with wind speed **2 m/s** and **F** stability class.



Disaster Management Plan

33. Flash fire from Leakage of MS tank at RIL terminal with wind speed **2 m/s** and **F** stability class.



34. Vapor cloud explosion from Leakage of Naphtha tank at RIL terminal with wind speed **2 m/s** and **F** stability class.



Disaster Management Plan

35. Flash fire from Leakage of ATF tank at IOCL terminal with wind speed **2 m/s** and **F** stability class.



36. Vapor cloud explosion from Leakage of MS tank at IOCL terminal with wind speed **2 m/s** and **F** stability class.



Part II

ENSURING BUSINESS CONTINUITY OF JNPT

In the case of Level 2 and Level 3 disasters where serious disruptions in port business is possible due to collapse and damage to infrastructure and services in addition to human casualties, the process of recovery is conducted by undertaking a business impact analysis (BIA).

The Port EOC will provide the initial response to a major disaster and stakeholders will have unique function that requires individual recovery and restoration efforts. Each stakeholder is expected to maintain their respective business recovery plan for use and activation.

1. OBJECTIVES AND PLANNING CONSIDERATIONS FOR BUSINESS CONTINUITY OF THE PORT

1.1 Objectives

- Preserving the lives and safety of human capital.
- Returning ports to business operations as quickly and efficiently as possible.
- Preservation of cargo flows and of maritime supply chains.
- Developing partnerships between the public and private sector to improve the resiliency.
- Assessing and determining resources available to mitigate economic impacts of an incident on the port and its businesses.
- Determining how to create redundant and resilient power, water, sanitation, and data storage systems.
 - To provide a framework to include operations and logistics of the port recovery efforts.
 - To identify the areas that need to be addressed and that should be considered within the existent processes in place.

1.2 Planning considerations

- JNPT will consider short-, medium-, and long-term priorities to better organize and improve recovery. In case of major incident or following a natural disaster resulting in stoppage of port operations, a BIA will be undertaken. Priority areas will be identified for short term recovery amounting to approx. 30 % capacity of cargo handling, medium term recovery amounting to approx. 70 % capacity of cargo handling and long-term recovery for 100 % capacity cargo handling. These figures will be based on BIA.
- Local priorities would be taken into account when determining where to focus recovery efforts.
- Potential priority areas include
 - Oil Terminal
 - Break bulk cargo loading/unloading areas, and
 - Container loading/unloading areas.
- Assess the port functions, both internally and externally, to determine which staff, materials, procedures and equipment are absolutely necessary to keep the port operating.

- Review or create business process flow charts.
 - Identify operations critical to survival and recovery.
 - Include emergency payroll, expedited financial decision-making and accounting systems to track and document costs in the event of a disaster.
 - Establish procedures for succession of management. Include at least one stand by person
- Create a contact list for existing critical business contractors and others that the port can use in an emergency.

2. SHORT-TERM RECOVERY PLANNING

Short-term recovery planning runs parallel to short term response, and begins during and immediately after an incident.

2.1 Damage Assessment and Prioritization of Restoration Work

Tasks during initial damage assessment will include the following.

- Assessment of Engineering Assets
- Assessment of Current Condition of Facilities
- Assessment of Utility Infrastructure

2.2 Mitigation efforts that assist in damage assessment might include the following.

- Conducting Vulnerability Analysis
- Documentation of Replacement Costs
- As-Built Building Plans, Specifications and Other Facility Records
- Determining, positioning, and planning for assistance to obtain Critical Recovery Resources

Note: In relation to Oil Spill following an incident the OSCP will be brought into effect and immediate containment and recovery of oil will be undertaken.

Immediately following an incident, port will undertake assessment along with construction specialists, civil and structural engineers to assess the infrastructure. This inspection will determine a partial/complete loss of an asset.

2.3 Aspects of an inspection may include the following:

- An underwater inspection by divers to check for possible demolition damage or deterioration of footings.
- An inspection of the piling at low water from a boat to check for damage. The stringers and deck are examined from below to determine the need for repair.
- Breakwaters, jetties, or seawalls are inspected for damage.
- Assessment of facilities by civil engineers to ensure compliance with local building and architectural codes and to ensure that damaged or repaired buildings are safe for occupancy.

3. MEDIUM-TERM RECOVERY PLANNING

In medium-term recovery planning, the port will engage in contracting and setting up for reconstruction and resumption of operations at an affected site. This may include financial planning, contracting and the formation of mutual aid agreements to assist in business continuity.

3.1 Mutual Assistance

The port may include the recovery operations plans, provisions for the pooling of recovery and business resources (heavy lift equipment, for example), and pre-positioning where needed. Additionally, port may consider creating mutual assistance plans and documents specifying actions that will be undertaken. Thus, creating a mechanism for redeployment of inter-terminal infrastructure that may be already available.

Port may require to develop an alternate operational logistics support plan for cargo diversion that addresses diversion of cargo in an incident at the port. It may also explore the agreements with Railways/CONCOR regarding goods movement in the event of an incident.

In case of damage to road infrastructure, port may also consider examining alternative transportation routes to and from the port and also within the port itself.

Additionally, given the intermodal nature of goods movement and transit from the port to consumers, it may consider examining intermodal transportation hubs at the port premises and at any inland port. Consulting and engaging trucking companies and freelance truckers will also be undertaken when formulating recovery plans.

3.2 Medium-term reconstruction projects include:

- Expedient repair of existing structures.
- Repair of unloading facilities e.g. quay cranes, loading arms
- Continuing work on highways, railways and storage facilities outside the wharf area.

3.3 Marketing and Communications

Post-incident, port may consider publishing press releases and advertisements to demonstrate to the public that the port is open for business and still functional.

4. LONG-TERM RECOVERY PLANNING

The lessons learned from earthquake damage to Kandla Port during Bhuj earthquake 2001 reveals damage to jetties, piles and RCC structures such as warehouse, the signal control tower and office building. Similarly, Paradip Port on the eastern coast suffered prolonged shut down and damage to roads, uprooting of trees and damage to civil infrastructures. In such an eventuality occurring at JNPT steps to restore the functioning of the affected cargo berths and control stations will need extensive repair and rehabilitation measures. This may include assessment and short- and medium-term measures as discussed earlier to provide temporary relief and alternate sites for cargo handling and VTMS. For full recovery certain steps as listed below will be required.

- Determining the financial impact of the emergency on the port and the budget needed for recovery, including insurance reimbursement and non-reimbursement issues, and central govt. assistance;
- Building relationships with emergency management and first responders based on unmet coordination needs;
- Initiating public relations activities to rebuild confidence in the transit operation on the part of customer and the community as a whole.
- Administering a comprehensive cargo movement recovery policy.
- Provide support for Construction & Maintenance, repair, alteration and reconstruction of port facilities and infrastructure.

Disaster Management Plan

- Laying out of plans and specifications and other contract documents necessary for the construction of new facilities and for any modifications to existing port facilities by engineering dept.
- Maintenance and repair of extensive damage to port buildings and properties.
- Assessment of environmental impacts of reconstruction projects and determining mitigation measures as appropriate by Environment dept.