CONTENTS- PART I

The Visakhapatnam Port Trust in recognition of the importance of safety and security of port area as first priority set up a core group committee for preparation of Disaster plan as per the recommendation of the National Disaster Management Plan. Our scope of plan covers the area of port and all the emergencies as per the act.

1.4 VISION

To maintain Visakhapatnam Port safer and disaster resilient by a holistic, pro-active, technology driven approach that involves all stakeholders and port users so that a culture of prevention, preparedness and mitigation is imbibed.

Further, to assist local, state and national authorities, so that Visakhapatnam Port's response complements that of authorities in providing assistance to affected populations during natural disasters.

1.5 TIME FRAMES

EVENT SCENARIOS

Probability: Low-once in 10-50yrs; Moderate=once in 2-10yrs; High=once annually
Impact/Preparedness/Risk Threat: 0=Very Low / 1=Low / 2= Moderate / 3 = High

Event/Scenario Spectrum	**Early warning**	**Probability of occurrence**	**Duration Impact**	**Impact on property**	**Impact on People**	**Time to Restore Facilities**	**Risk Threat Probability**
Cyclone	96-12 Hrs.	Very Low	0	0	0	12- 24 hrs.	Moderate
Floods	4-2 hrs.	Very Low	1	1	2	12-36 hrs.	Very Low
Earthquake	nil	Very Low	1	1	2	12-36 hrs.	Very Low
Tsunami	6-1 h	Very Low	1	1	2	12-24 hrs.	Very Low
Marine Accident							
Collision	< 1min	Low	<1hr	2	0	4 h	Moderate
Grounding	<1 min	Low	1-48h	2	0	1-48 hrs.	Moderate
Fire/Explosion	< 1min	Low	0.5-12 h	2	1	1-96 hrs.	Moderate

Event/Scenario Spectrum	Early warning	Probability of occurrence	Duration Impact	Impact on property	Impact on People	Time to Restore Facilities	Risk Threat Probability
Oil Pollution	<5 mins	Low	1-72 h	1	1	1-30 d	Moderate
Transport Accident							
Road	< 1min	Low	< 5 min	0.1	0.1	< 2 h	Moderate
Rail	< 1min	Low	< 5 min	0.05	0.1	1-48 h	Low
Function Failure							
Elec sub station	< 1min	Mod	24 h	0	0	12-48 h	Low
Pipelines failure	< 1min	Mod	1-24 h	0	0	12-48 h	Low
Fire station failure	< 1min	Mod	1-24 h	0	0	12-48 h	Low
Water system	< 1min	Mod	1-24 h	0	0	12-48 h	Low
Communications	< 1min	Mod	1-24 h	0	0	12-48 h	Low
Medical facilities	< 1min	Mod	1-24 h	0	0	12-48 h	Low
Human related							
Labour Action/ Strike	24 h	Mod	< 24 h	0	0	12-48 h	Low
Civil disturbance	< 12 h	Mod	< 24 h	0	0	12-48 h	Low
Terrorism & War							
State of War	< 48 h	Low	1- 10 d	2	2	12-96 h	Mod
Bomb Threat	< 1 h	Mod	1-3 d	2	3	12-96 h	High
Hostage Threat	< 1 h	Mod	1 – 3 d	1	3	12-48 h	High
Terrorist attack	Nil	Mod	1- 3 d	1	3	> 48 h	High

2. HAZARD, RISK, VULNERABILITY & CAPACITY ANALYSIS

2.1 DISASTER RISKS, VULNERABILITIES AND CHALLENGES.

VISAKHAPATNAM PORT – AREA VULNERABILITY & THREAT MATRIX

X = Slightly Vulnerable, XX = Moderately Vulnerable, XXX = Highly Vulnerable

Threats	**Vessel Accidents Collision Grounding**	**Fire Explosion on board vessel/ashore**	**Fire & Explosion Manifold Pipeline, Tank farm**	**Oil & Chemical Pollution**	**Personnel injury: Accident Rail, Road, On board ship**
Respondent Agencies	D.C. Visakhapatnam Port Trust DG Shipping Min. of Shipping	Visakhapatnam Port Trust Fire Service Visakhapatnam Fire Brigade Mutual Aid Response Group Police, Min. of Shipping	Visakhapatnam Port Trust Fire Service Oil Companies Visakhapatnam Fire Brigade Mutual Aid Response Group Police Min. of Shipping	Visakhapatnam Port Trust (CFO) Control Room Oil Companies Coast Guard, Visakhapatnam Corporation Distt. Collector Min. of Shipping	C.M.O, Visakhapatnam Port Trust Police
Vulnerable Areas					
Vessel Movement	----	------	-----	------	-------
Channel	xxx	xx	----	xxx	x
At Berth	x	xx	xx	xxx	xx

Threats	Vessel Accidents Collision Grounding	Fire Explosion on board vessel/ashore	Fire & Explosion Manifold Pipeline, Tank farm	Oil & Chemical Pollution	Personnel injury: Accident Rail, Road, On board ship
Storage-	----	----	----	----	----
Transfer					
Oil Transfer	---	xx	xx	xx	x
Cargo Transfer	----	----	----	----	----
Trucks, Trains	----	---	----	x	xx
Crane- Shore/Ship	----	xx	----	x	xx
Services	----	----	---	---	----
Access Gates	----	x	x	x	x
Emergency Generators	----	x	---	---	x
Electric Substations	----	x	---	---	x
Train siding Locos, Wagons,	---	----	---	---	xx
Fire station	----	----	---	----	----
Port tugs, crafts,	x	x	---	x	x
Administration Building & Parking	---	---	---	---	---
Customs Area	---	----	---	---	x
Port Employees' Quarters	----	x	----	---	---

Threats	Terrorism Bomb, War, Arson	Technical Failures Power, Transport Communication Infrastructure	Occupational Accidents Strikes	Cyclone Floods	Tsunami Earth Quake
Respondent agencies	Visakhapatnam Port Trust CISF, Police, Coast Guard, Navy, Control Room Min. of Shipping	Visakhapatnam Port Trust	Visakhapatnam Port Trust, CISF Police, Min. of Shipping	Visakhapatnam Port Trust, Dist. Collector, Control Room, Min. of Shipping	Visakhapatnam Port Trust, Distt Collector, Control Room Min. of Shipping
Vulnerable Areas					
Vessel Movement					
Channel	xxx	--	--	xx	x
At Berth	xx	x	x	xx	x
Storage- Transfer					
Oil Transfer	xxx	x	x	xx	--
Cargo Transfer					
Trucks, Trains	xxx	x	xx	xx	--
Crane- Shore/Ship	x	x	xx	xx	--
Services					
Access Gates	xxx	xxx	xx	xx	--
Emergency Generators	xx	x	--	x	--
Electric Substations	xx	x	--	xx	--
Train siding Locos, Wagons,	x	x	x	x	--
Fire station	--	x	--	x	--
Port tugs, crafts,	x	x	x	xx	--

Threats	Terrorism Bomb, War, Arson	Technical Failures Power, Transport Communication Infrastructure	Occupational Accidents Strikes	Cyclone Floods	Tsunami Earth Quake
Administration Building & Parking	x	x	--	x	--
Customs Area & Weigh Bridge	--	x	--	x	--
Port Employees' Quarters	x	x	--	x	--

VISAKHAPATNAM PORT TRUST

PART II

EMERGENCY CONTINGENCY PLAN

CONTENTS- PART II

CENTRAL DISASTER MANAGEMENT GROUP- BASIC FUNCTIONS

Team Leader : Chairman / Dy Chairman
Members: Dy Chairman , Secretary, FA & CAO, Chief Engineer, CME , Traffic Manager, Materials Manager, Chief Medical Officer, Commandant-CISF, Commandant – Coast Guard.
Basic Functions
1-Monitor and analyze reports from the On Site Action team and identify the area/population at risk
2-Activate the Response Plan and arrange the Alert siren.
3-Support the Action Group with materials, equipment, information and human resources
4- Implement changes in the current mode of action if deemed necessary
5-Adjust the Disaster classification of the incident and actuate the Central Control Room
6- Coordinate with external organizations, State Govt. as deemed necessary
7- Make the necessary arrangements and funds for evacuation, transportation, food & supplies
8-Make media statements and reports to MOS.

ON SITE ACTION GROUP - BASIC RESPONSIBILITIES

Team Leader:- Harbour Master / Senior Pilot
Members:-Control room-Sr. pilot, Chief Fire Officer, Dy Comdt. CISF , Exec. Engineer (Electrical) Addl. TM, Dy Chief Med. Officer.
Basic Functions
1- Assess & classify Incident:-nature-location- severity-casualties-resource requirement – time to control
2- Activate elements of the disaster management plan, arrange alert signal in liaison with DC
3-Conduct search, rescue and evacuation operations. Provide medical Aid
4- Manage incident operations and terminate plan, Arrange for re-Entry and restoration

EMERGENCY CLASSIFICATION

Level 1. It is an Incident within the port and is of a minor nature with a low level of personnel injury, interruption to work, damage level and loss of capability. It can be handled by the Port Trust Staff involving Marine and other depts. The Emergency Management group leader is the Dept Head. E.g. Building/Shed Fire, Elec Supply disruption, labour accident, vessel accidents

Level 2;- It is an Incident within the port area and is of a limited and moderate level of personnel injury, possible death(s),interruption of work, damage to port ..Besides Port resources, outside assistance may be required. The Disaster Management group leader is the Chairman, VPT.

E.g. Gas Leaks, Chemical/Oil Spills, Terminal Fires/ Explosions

Level 3:- It is a disaster of a severe and critical nature and could have a high level of personnel injury (and deaths), interruption to work, damage to port and loss of capability. It affects the port and possibly adjacent areas. Besides Port resources, assistance from outside agencies is required. If incident affects VPT, group leader is chairman, VPT and if it affects outside PPT , then information will be given to District Collector depending on the intensity.

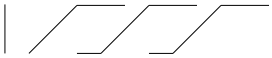
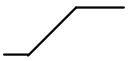
E.g. Gas Leaks, Chemical/Oil Spills, Fires/ Explosions & Cyclones

INCIDENT/REQUIREMENT SCENARIOS	LEVEL I – ACTION BY	LEVEL II & III –ACTION BY
Vessel–Grounding-Shifting-Evacuation	HM	HM + Salvage efforts + Navy + Coast Guard
Casualties	CMO	Port + District + State
Fire & Explosion on Vessel or Terminal	CFO	CFO + District (Fire wing) + CDMG
Fire & Explosion at Shed	CFO , TM	CFO + District (Fire wing) + CDMG
Oil or Chemical Spill	CFO	CFO +Central disaster Magmt. Group+ outside agencies
Toxic Gas Leakage	CFO	Central disaster Magmt. Group +District/ state assistance + outside agencies
Cyclone, tsunami, flood etc	Dy. Conservator	National disaster Management group + CDMG + District + state
Electric Supply breakdown	SE (Elect.)	CDMG + District + State

CENTRAL DISASTER MANAGEMENT GROUP - RESPONSIBILITIES

Position	Port Position	Alternative
Chief Emergency Controller	**Chairman**	**Dy. Chairman**
Monitors Disaster Management action Plan and a state of emergency preparedness is maintained at all times. Authorizes release of required funds. Leads Central Disaster Management group to direct operations from the emergency control center.		
For industrial disasters, confirms level of crisis, monitors the shutting down, evacuation and other operations as necessary. Directs activation of the Central Control room at emergency level 2 and 3		
Activates the off-site emergency plan if the disaster is spreading to/from outside Port boundary in liaison with Dy chairman, DC,TM and CFO		
Approves information to the media		
Liaises with the Secretary, Jt. Secy (Ports) of the MOS (Ministry of shipping)		
Confirms the termination of the emergency.		
Leads the Central Disaster Management Group, monitors the early restoration of facilities and port activities,		
Provides timely required status reports to the Secretary MOS		

Disaster Warning Alarm and Evacuation Signals

TSUNAMI - TYPE-HIGH PITCHED CONTINIOUS WAILING SIREN 5 Sec.  1 Sec.
FIRE /EXPLOSION/BOMB TYPE-LONG SIREN FOLLOWED BY SHORT SIREN 10 Sec. 3 Sec.
GENERAL EVACUATION ALARM FOR TOXIC/RADIATION LEAKAGES / NATURAL CALAMITIES TYPE-HIGH PITCHED RINGING ALARM AT SHORT INTERVALS 
C- ALL CLEAR SIGNAL TYPE:-LONG CONTINIOUS SIREN FOR 90 SECONDS 

Competent Agencies

List of agencies competent for issuing warning or alert is given below:

Competent agencies for issuing warnings

Disaster	**Agencies**
Earthquakes	IMD, MERI,BARC
Floods	Meteorology Department, Irrigation Department, Central Water Commission
Cyclones	Meteorology Department, Irrigation Department, IMD, INCOIS
Tsunami and Storm Surge	INCOIS
Epidemics	Public Health Department
Road Accidents	Police
Industrial and Chemical accidents	Industry, Police, MARG, DISH, BARC,AERB
Fires	Fire Brigade, Police

5.1 PORT RISK HAZARDOUS PRODUCTS STORAGE FACILITIES

COMPANY	LOCATION	NO OF TANKS	CAPACITY	PRODUCTS HANDLED
BPCL-VISAKHA	VIZAG	15	79,441 KL	ETHANOL, FO, LDO, HSD, BIO-DIESEL, MS
IOCL	VIZAG	28	1,40,797 KL	HFHSD, HSD, MS, LDO, LVFO, NFO-380, BFO-180, BFO-380, ATF, ETHANOL, JP-5, BIO-DIESEL
HPCL	STORAGE CAPACITIES	33	1,78,054.5 KL	HSD, NAPHTHA, MS, SKO, SOFT, ATF, ETHANOL, MTO, DIESEL, BIODIESEL, SLOP
CIL	VIZAG	3	27,500 KL	MOLTEN SULPHUR, SULPHURIC ACID, PHOSPHORIC ACID
IMC		1	10,000 KL	SULPHURIC ACID
IMC LIMITED	VISAKHAPATNAM	6	12,555.084 KL	S/ACID
HPCL	VISAKH	12	96,381 KL	HSD, HFHSD, CLO, LDO, LSHS, FO180, VLSFO, SLOP TANK, BITUMEN-VG40, BITUMEN-VG30, BITUMEN-VG10, JBO, LUBE OIL
HPCL REFINERY	ATF AREA	33	12,78,099.7 KL	CRUDE, NAPHTHA, E III MS, E IV MS, DRY SLOP, WET SLOP, E IV HSD, SKO, ATF
HPCL REFINERY	REFINERY AREA	77	8.88,870.6 KL	CRUDE, NAPHTHA, ISOMERATE, MS, HWO, DRY. SLOP, WET SLOP, MTO, HSD, LS HFHSD, LDO, JBO, CUTTER, FO, LSHS, IFO, BITUMEN, VGO, HSSR
NALCO		1	GROSS 7368M^3 NET 6896M^3	CAUSTIC SODA

5.2 VISAKHAPATNAM PORT TRUST – AREA VULNERABILITY & THREAT MATRIX

X=slightly vulnerable: xx=moderately vulnerable: xxx=highly vulnerable

Threats Vulnerable Areas	Vessel Accidents Collision Grounding Fire Explosion	Land Transport Personnel; Accident Rail Road	Fire & Explosion Manifold Pipeline	Toxic Gas Leakage Pipeline Manifold	Pollution Oil Chemical	Terrorism Bomb War Arson Cyber	Technical Failures Power, Transport Communication Infrastructure	Occupational Accidents Strikes	Cyclone - Floods	Tsunami Earth Quake
Vessel Movement										
Approach Channel	xx				x	x	x	x		X
Coal Berths	x	x	x	x	x	x	x	x	x	x
Oil Tanker Berth	x	x	xx	x	x	x	x	x	x	x
LNG Berth	x	x	xxx	xx	x	xx	x	x	x	x
Fertilizer Berth	x	x	x	x	x	x	x	x	x	x
Boat Train Pier	x	x	x		x	x	x	x	x	x
Gen Cargo Berths	x	x	x		x	x	x	x	x	x
Cargo Transfer										
Oil pipe lines			xx		xx	xx	xx	x	x	x
Ammonia/ph.acid			xx	xx	xx	xx	xx	x	x	x
pipeline										
Trucks/Mobile eqmt			x		x	x	x	x	x	x
Train tracks-Roads						x			x	x
Cranes & Ship Loaders						x	x	x	x	x
Bulk cargo conveyor system						x	x	x	x	x

Threats Vulnerable Areas	Vessel Accidents Collision Grounding Fire Explosion	Land Transport Personnel; Accident Rail Road	Fire & Explosion Manifold Pipeline	Toxic Gas Leakage Pipeline Manifold	Pollution Oil Chemical	Terrorism Bomb War Arson Cyber	Technical Failures Power, Transport Communication Infrastructure	Occupational Accidents Strikes	Cyclone - Floods	Tsunami Earth Quake
SERVICES	------	----	------	-----	------	------	------	------	-----	----
Control gates			x			xx		x	x	x
Emergency Generators			x			x	x	x	x	x
Electric Substations			x			x	x	x	x	x
Train siding Locos, Wagons,			x			x	x	x	x	x
Signal station-electronic means commn			x			x	x	x	x	x
Fire station 1 & 2			x			x	x	x	x	x
Port tugs, crafts, dredger	x	x	x		x	x	x	x	x	x
ADMINISTRATION	------	----	------	-----	------	------	------	------	-----	----
Administration Building & Parking			x	x		x	x	x	x	x
Customs Area & Weigh Bridge			x	x		x	x	x	x	x
Port officers & CISF Quarters			x	x		x			x	x

EVENT SCENARIOS -VISAKHAPATNAM PORT TRUST

Probability-Low-once every 10-50yrs:: moderate=once every 2-10yrs; High=once annually
Impact/Preparedness/Risk Threat 0=Very Low 1=Low 2=moderate 3=High

EVENT/ SCENARIO SPECTRUM	Early warning	Probability of Occurrence	Duration Impact	Impact on property	Impact on people	Time to Restore Facilities	RISK THREAT
Cyclone	96h-12h	Low	N/A	1	**1**	N/A	Moderate
Floods	96h-12h	Low	N/A	**1**	**1**	N/A	Low
Earthquake/Tsunami	5-8h	**low**	**N/A**	**1**	**1**	N/A	Low
V/L Accident							
Collision	< 1min	Low	<1hr	0	0	4 h	Low
Grounding	< 1min	Low	2-4hr	0	0	4 h	Low
Fire/Explosion	< 1min	Low	0.5-12h	1-2	1-2	12-96h	Moderate
Transport Accident							
Rail	< 1min	Mod	< 1min	0	1	6-48h	Low
Road Accident	< 1min	Mod	< 1min	0	1	<1h	Low
Pollution-							
Gas Release-Ammonia	< 1min	Low	1-24h	0.1	2	2-30d	Low
Phos /sulph acid spill	< 1min	Low	1-12h	0.1	1	2-4d	Low
Oil Spill	< 30min	Low	1-12h	1	1	1-2d	Low
Fire-Admin Building	< 10min	Low	1-72 h	1	1	12-96h	Low
Parking/Gates	< 1min	Low	1-12h	0	1	12-96h	Low
Function Failure							
Elec sub station	< 1min	Low	1-24h	0	0	12-48h	Low
Emergency Generator	< 1min	Low	1-24h	0	0	12-48h	Low
Pipelines failure	< 1min	Low	1-24h	0	0	12-48h	Low
Evacuation routes	< 1min	Low	1-24h	0	0.2	12-48h	Low
Fire Alarm failure	< 1min	Low	1-24h	0	0	12-48h	Low
Fire station failure	< 1h	Low	1-24h	0	0	12-48h	Low
Water system	< 1h	Low	1-24h	0	0	12-48h	Low

List of Local Industries – Phone Numbers

S. No.	Name	Office Phone
1	M/s. Hindustan Shipyard Limited	0891- 2577437
2	M/s. Hindustan Petroleum Corp. Ltd.	0891- 2895000/2895100
3	M/s. Coromandel Fertilizers Ltd.	0891- 2578400
4	Visakhapatnam Steel Plant	0891- 2518431
5	M/s. BHPV Limited	0891- 2517381
6	M/s. NALCO	0891- 2561432/35
7	M/s. East India Petroleum Ltd.	0891- 2578168
8	M/s. Andhra Petro Chemicals Ltd.	0891- 2578342
9	M/s. R.C.L.	0891- 2740500
10	M/s B.P.C.L.	0891- 2577528
11	M/s. I.O.C. Ltd.	0891- 2578300/302
12	M/s. I.M.C. Ltd.	0891- 2751250/2755612
13	M/s. ESSAR Steel Ltd.	0891- 2876300/2523213
14	M/s. Visakha Container Terminal Ltd.	0891- 2502164/40
15	M/s. SAIL	0891- 2704074/2563611
16	M/s. ONGC	0891- 2567833
17	M/s. NTPC	089247274
18	M/s. NMDC	0891- 25623943/262945
19	M/s. SALPG	0891- 2748928/29

CONTACT DETAILS OF NDRF OFFICERS

Force Head Quarters

Name	Designation	Address	Telephone No.	Fax No.	E-Mail
Shri S N Pradhan (IPS)	Director General	Directorate General, NDRF, 6th Floor, NDCC-II Building, Jai Singh Road, New Delhi - 110001	011-23438020, 011-23438119	011-23438091	dg.ndrf@nic.in
Shri Amrendra Kumar Sengar (IPS)	Inspector General	-- Do --	011-23438021	011-23438091	ig.ndrf@nic.in
Ms Nishtha Upadhyay	Financial Advisor	-- Do --	011-24368148	011-23438091	--
Mr. Mohsen Shahedi	Deputy Inspector General (Proc/Prov)	-- Do --	011-23438022	011-23438091	digprov-ndrf@nic.in
Shri Manoj Kumar Yadav	Deputy Inspector General (Trg/Pro /Academy/NCDC/East & North East Sector)	--Do--	011-23438140	011-23438091	dig.es.ndrf@nic.in
Shri Randeep Kumar Rana	Deputy Inspector General (Estt/ Ops / North-West Sector)	--Do--	011-23438023	011-23438091	dig.ns.ndrf@nic.in
Shri K K Singh	Deputy Inspector General (Adm/Works/South Sector)	-- Do --	011-23438185	011-23438091	dig.ss.ndrf@nic.in
Shri V V N Prasanna Kumar	Commandant (PROC/PROV/NDRR)	-- Do --	011-23438183	011-23438091	--
Dr. Amit Murari	CMO (SG)	-- Do --	011-23438091	011-23438091	cmo-ndrf@gov.in
Shri Muneesh Kumar	Second-in-Command (Works & Proc)	--Do--	--	011-23438091	--

Shri Daulat Ram Chaudhary	Second-in-Command (ADM)	--Do--	--	011-23438091	hq.ndrf@nic.in
Shri Pranshu Srivastava	Deputy Commandant (Trg)	--Do--	011-23438138	011-23438091	hq.ndrf@nic.in
Shri Rakesh Ranjan	Deputy Commandant (OPS)	--Do--	011-23438024	011-23438091	hq.ndrf@nic.in
Shri Surendar Kumar	Deputy Commandant (Engineer)	--Do--	--	011-23438091	--
Shri Krishan Kumar	AC (IT/COMN/PRO)	--Do--	011-23438024	011-23438091	krishan.0405@gov.in
Shri Bhawani Singh	AC(ADM & SO to DG)	--Do--	011-23438118	011-23438091	dc.adm.ndrf@nic.in
Shri S Raghavindra	AC/MIN	--Do--	011-23438091	011-23438091	hq.ndrf@nic.in
Control Room	--	--Do--	011-23438091, 011-23438136	011-23438091	hq.ndrf@nic.in

NDRF
Units

Name	Designation	Address	Telephone No.	Fax No.	Mobile No.	Unit Control Room No.	E-Mail
Sh. R S Gill	Officiating Commandant	1st BN NDRF, Patgaon PO - Azara,Distt. Kamrup Metro, Guwahati-781017	0361-2840027	0361-2849080	--	0361-2840284 09401048790 09435117246	assam01-ndrf[at]nic[dot]in
Sh. Nishit Upadhyay	Commandant	2nd BN NDRF, Near RRI Camp. Haringhata, Mohanpur, Nadia, (West Bengal) Pin - 741246	033-25875032	033-25875032	-	033-25875032 09474061104 09474116775	wb02-ndrf[at]nic[dot]in
Sh. Jacob Kispotta	Commandant	3rd BN NDRF, PO-Mundali, Cuttack - Odisha Pin - 754013	0671-2879710	0671-2879711	--	0671-2879711 09437581614	ori03-ndrf[at]nic[dot]in
Ms. Rekha Nambiyar	Commandant	4th Bn NDRF, PO - Suraksha Campus , Arrakonam , Distt. Vellore Tamilnadu-631152	04177-246269	04177-246594	--	04177-246594 09442140269	tn04-ndrf[at]nic[dot]in
Sh. Anupam Srivastava	Commandant	5th Bn NDRF, Sudumbare Taluka, Distt - Maval Pune (Maharashtra) Pin - 412109	02114-247010	02114-247008	--	02114-247000 09422315628	mah05-ndrf[at]nic[dot]in
Sh. A. K. Tiwari	Commandant	6th Bn NDRF, Jarod Camp,Teh-Wagodia, Vadodara, Pin - 391510	02668-274470	02668-274245	--	02668-274245 09723632166	guj06-ndrf[at]nic[dot]in
Sh. Ravi Kumar Pandita	Commandant	7th Bn NDRF, Bibiwala Road, Bhatinda (Punjab) Pin 151001	0164-2246193	0164 - 2246570	--	0164-2246193 0164-2246570	pun07-ndrf[at]nic[dot]in

Sh. P.K.Srivastava	Commandant	8th Bn NDRF, Kamla Nehru Nagar, Ghaziabad (UP) Pin - 201002	0120-2766013	0120 - 27666012	--	0120-2766618 09412221035	up08-ndrf[at]nic[dot]in
Sh. Vijay Sinha	Commandant	9th Bn NDRF, Bihata Patna, Bihar Pin - 801103	06115-253942	06115-253939	--	06115-253939 08544415050 09525752125	patna-ndrf[at]nic[dot]in
Mr. Zahid Khan	Commandant	10th Bn NDRF, ANU Campus, Nagarjuna Nagar, Guntur (AP) Pin - 522510	0863-2293178	0863-2293050	--	0863-2293050 08333068559	ap10-ndrf[at]nic[dot]in
Sh. A.K.Singh	Commandant	11 th Bn NDRF, Sanskritik Sankul, Maqbool Alam Road, Varanasi, UP - 221002	0542-2501201	0542 - 2501101	--	0542-2501101 08004931410	up-11ndrf[at]gov[dot]in
Sh. Rajesh Thakur	Commandant	12 th Bn NDRF, Itanagar, Arunachal Pardesh791112	0360-2277109	0360-2277106	--	0360-2277104 09485235464	bn12[dot]ndrf[at]gov[dot]in

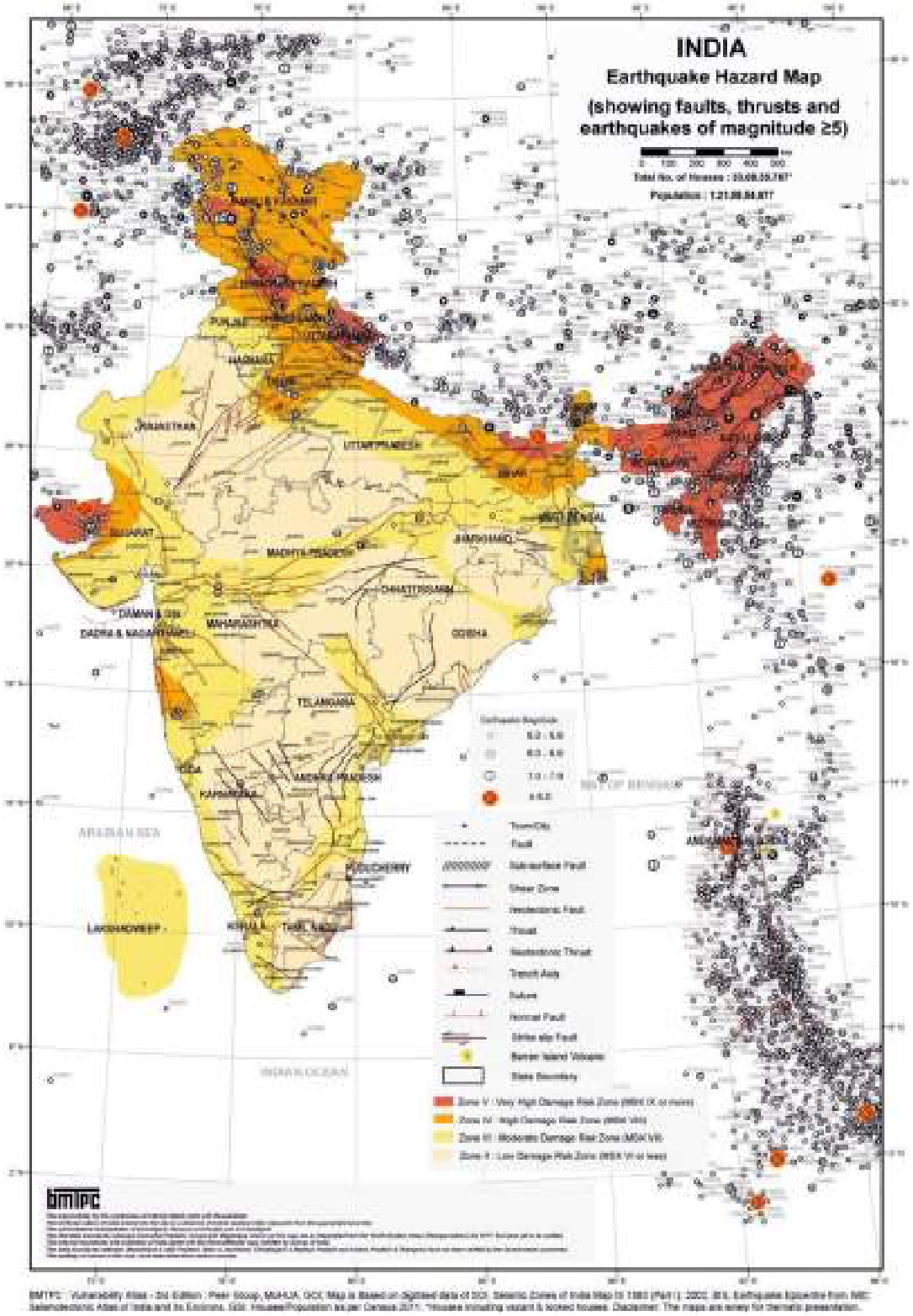
NDRF
RRCs

Name of RRC	Landline Number	Mobile Number
NDRF RRC, Port Blair, Andaman	03192289174	09442112269
NDRF RRC, Adayar, Chennai	04424420269	09442112269
NDRF RRC, Vizag Steel Plant, Vishakhapatnam, Andhra Pradesh	--	08333068565 08333068560
NDRF RRC, Fire Station Mahadevapura, Bengluru, Karnatka	--	09482978719 09482978715
NDRF RRC, Shaikpet Sport Complex, Hyderabad, Telangana	04023565666	08333068536 08333068547

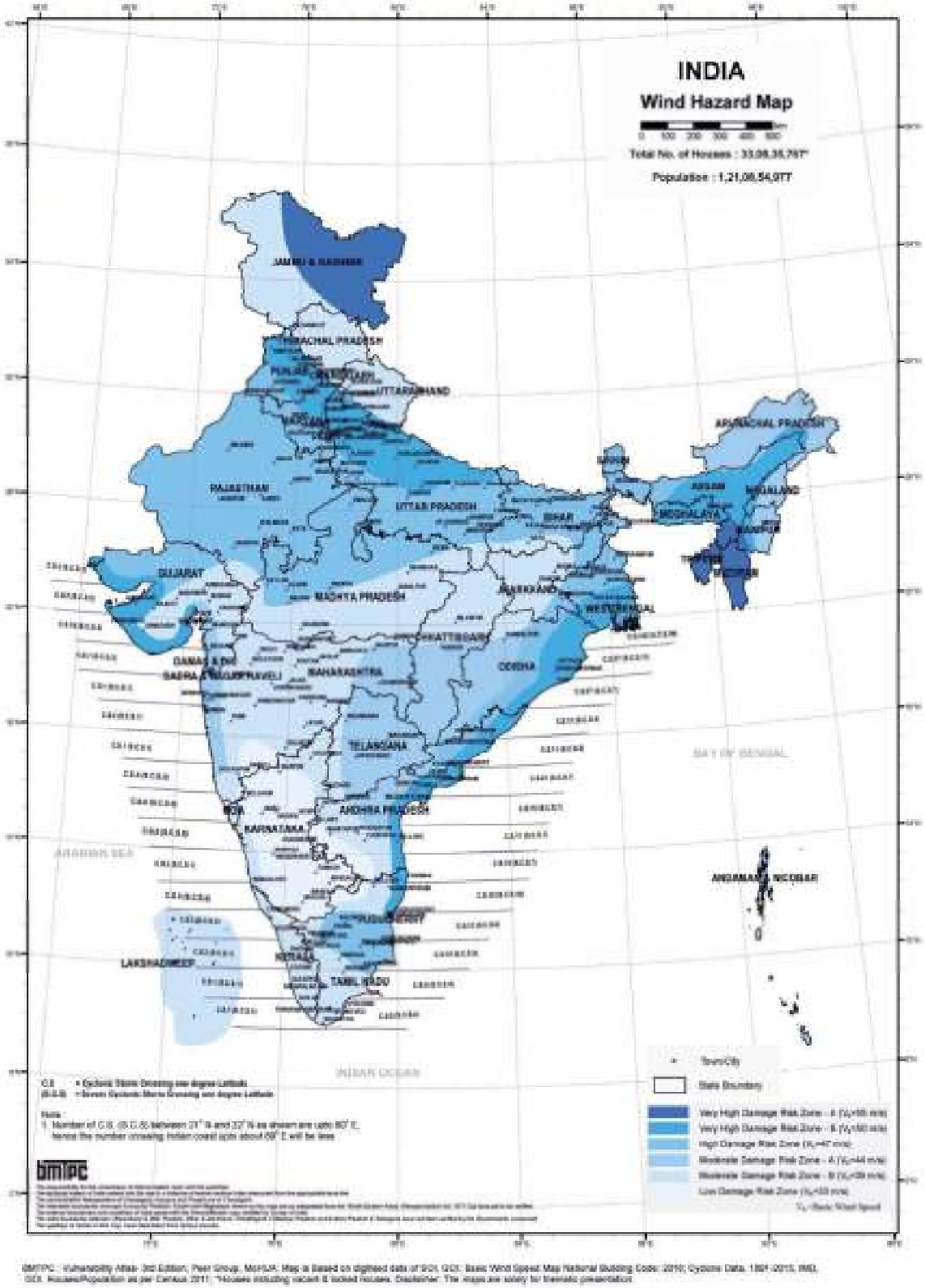
ANDHRA PRADESH STATE DISASTER RESPONSE FORCE (APSDRF)

Name of the Officer	Designation	Phone	Email ID
Sri. K. Kanna Babu, I.A.S	Special Commissioner (Disaster Management) & Ex-Officio Additional Secretary to Government, Revenue (DM) Department, Managing Director (FAC), APSDMA	0863-2377099	commr_relief_rev@ap.gov.in
Sri. Dr. C. Nagaraju	Executive Director	+91-9676957788, 0863-2377105	ed-apsdma@ap.gov.in
Smt. P. Seshasri	Administrative Officer	+91-8333905039	seshasrip-plg@ap.gov.in
Sri. Ch. Santhi Swarup	SEOC Incharge	+91-8333905033	seoc-apsdma@ap.gov.in

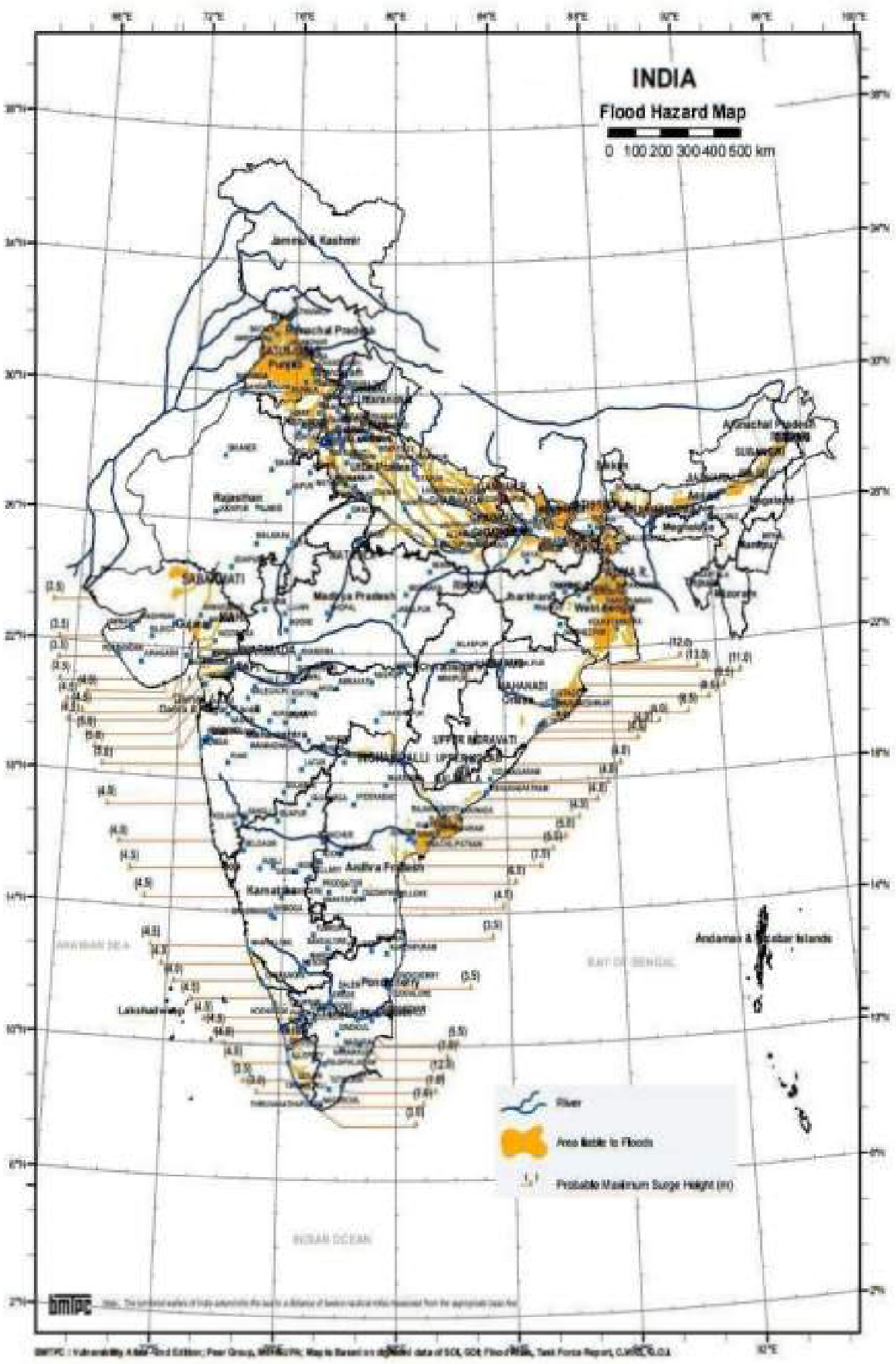
APPENDIX C
IMPORTANT MAPS



EARTHQUAKE HAZARD MAP



WIND HAZARD MAP



FLOOD HAZARD MAP

2.3 Oil/ Chemical Spill

The Port has unique safety and environmental protection problems and the need for a well-integrated emergency plan for oil/chemical spill is absolutely essential. A number of accidents have occurred world over due to accidental discharge/leakage of Cargo. List of major oil spill in recent years world over is listed in **Table 2.18**. In India Arabian Sea at Mumbai it occurred twice in 2010 and 2011. The possible accidental leak/release scenarios of oil/chemical spill occurs due to collision, grounding, barging/ banking during handling of petroleum products, loading & discharge of liquid cargo, incorrect sequence of operations and during commencement/completion of cargo operations. If cargo tanks are ruptured during collision followed by heavy spark, causes fire due to ignition of oil. On the basis of hazard study, the following scenarios are considered for oil/chemical spill in Inner and at Outer harbour.

2.3.1 Scenario Development

The following scenario's which are possible due to failure while loading/discharge of the petroleum products that may result in leak/release at the OSTT, LPG Jetty, Oil Wharf, FB and at Northern arm (EQ6, EQ7,WQ1 & WQ1RE, WQ5). The cause of common failure is due to incorrect line up of ship/shore valves, Host failure, Gasket failure, Piping failure, over pressure in the line, damage to the hose by parting of mooring and striking of the tanker by passing vessel.

On the basis of hazard study, the following events are considered for consequence analysis of oil/chemical spill.

- Leak/release of crude at OSTT from vessel or transfer pipe line
- Leak/release of High Speed diesel at LPG jetty
- Leak/release of flammable liquids (IB & IC) and combustible liquids at OR1, OR2 from vessel/transfer pipeline
- Leak release of Bio diesel at OIL Wharf and Northern arm berths from vessel & pipeline
- Leak/release of styrene monomer at OR1 &OR 2 from vessel/transfer pipeline
- Leak of sulphuric acid at WQ1 & WQ1RE and phosphoric acid at EQ6/EQ7 of northern arm from vessel/ transfer pipeline
- Leak of caustic lye at EQ6/EQ7, WQ5 from vessel/transfer pipeline

- Spill over of Ammonia Nitrate at Northern arm berths (EQ & WQ) during handling
- Leak/release of molten Sulphur from vessel/transfer pipeline at FB
- Leakage of Alumina from vessel/transfer pipeline at WQ5 berth

The estimated quantity of hazard material release and spill over area in water and on land is reported in **Table 2.19**. However, the spread over area depends on absorbing and non-absorbing surface and its type and wind speed. Emergency management for Tier -1 level is considered as onsite crisis, whereas Tier-2 /Tier-3 level are considered as offsite crisis. Various response organizations for oil/chemical spill are involved as in case of fire-explosion. Depending on the level of responsibility, different groups will function for taking necessary action. Emergency (control) measures which are delineated for each hazard cargo as in **Table 2.19**.

The objective oil/chemical spill contingency plan:

- To develop appropriate and effective systems for the detection and reporting of oil spill.
- To ensure that appropriate response techniques are employed to prevent, control and combat pollution and dispose off recovered material in an environmentally acceptable manner.
- To ensure adequate protection to public health, welfare and the marine environment.
- To ensure that complete and accurate records are maintained for all expenditure to facilitate cost recovery

2.3.2 Response Plans

Chairman of VPT is the chief emergency controller in onsite/offsite emergency situations and Deputy Conservator of the Port will be emergency coordinating officer. A guideline or response plan is delineated as shown in **Table 2.20**. To combat oil/chemical pollution responsibility of organization has to be identified as in line with Fire-explosion, to deal with following components.

- Organisational structure of Emergency
- Port risk evaluation
- Area risk evaluation
- Notification and communication

- Emergency equipment & facilities

2.3.3 Action Plan

On the basis of direct information through incident controller, immediate response is to implement action plan to take preventive measures for spill on land as well as on water. In case of oil spill accidents within Port limits, the Master as representative of the owner of the vessel and the cargo owner will take immediate action to inform the Port authorities and also to alert the concerned oil company representative onboard ship and immediately inform the oil terminal manager of the concerned oil company. The responsibility of the Port/ user Agency / industry is to protect the Harbour water, fisheries and maintenance of the ecology of the Port area. Hence full cooperation between all the parties concerned is required expeditiously and that as far as possible division of responsibility is to be delineated in principle, and accepted by all the parties.

Communication system within Port organization for emergency coordination linkages is given in **Annexure XII**, which is needed for onsite crisis management. The communication linkages with State & Central Government in the case of major crisis will be the same as in the case of Fire-explosion.

2.3.3.1 Preventive Measures

Preventive measures are aimed at reducing the chance of error as far as possible and to ensure that only best materials are used and maintained. The entire accident prevention is constantly concerned with the elimination of mistakes, and although complete success is probably an unattainable target, the use of a check-list system goes a long way to minimize errors, and is particularly valuable when two different parties, the shore and ship personnel, are required to work together. Approved safety checklist as contained in the International Safety Guide for Oil Tankers and Terminals may be used (As per IMDG guide lines).

Prompt action in the event of accidental spillage is essential and it is advised strongly that throughout the period of loading and discharging, the following steps are to be followed:

- A responsible ship's officer should be on watch on board and an adequate crew should remain on board to deal with emergencies.

- A responsible member of the ship's crew should be stationed near the ships main oil cargo control valves.
- Responsible member of the shore personnel should stand by the shore control valves at the shore end of the flexible hoses.
- The telephonic or other recognised communication systems between berth and pump house(s) or other point should be in working condition.
- At the commencement of operations and at each change of watch or shift, the responsible ship's officer and the responsible member of the shore personnel should confirm with each other that the “stand by", start loading", "stop loading", "slow down", "start discharging", "stop discharging" and any other necessary signals are properly understood and agreed.

At each jetty there should be an arrangement for stopping the flow of oil immediately in the event of failure of a manifold or hose on the ship or jetty. If the loading pumps are located away from the jetty (say more than 90m (295ft) away) remote-control arrangements at the loading berth and at another location, at a safe distance from the berth should be provided to stop the pumps immediately. In recent years, considerable progress has been made towards handling jetty equipment, and in standardizing tanker manifold design to take full advantage of the improvement in hose-handling techniques and of the installation of all oil booms. These arrangements have many variations to suit local needs. But in brief, the joining of a ship's manifold flanges and the jetty pipeline can be achieved by the following basic methods.

- Flexible hoses, the handling of which may be assisted by simple derricks/cranes.
- Booms terminating in flexible hoses.
- All metal swivel-jointed loading arms.

Flexible hoses are made of reinforced oil-resisting rubber to the specification of BS 1435: 1975 [3] and as recommended by the Oil Companies International Marine Forum “Buoy mooring forum standard".

However, a boat has been hired for keeping channel water in the Port clean, which works under the direction of Deputy Conservator. Chief Officer (pollution) takes necessary action to ensure that the Port waters are to be kept clean and initiates action to spray chemical for oil dispersion. Oil booms are also being placed around tankers.

2.3.3.2 Containment Measures

The containment measures must be capable of capturing oil that may discharge from a primary storage system (i.e., tank or pipe) such that the oil will not escape to the environment before cleanup occurs. Compliance requires the use of dikes, berms, retaining walls, curbing, spill diversion or retention ponds, absorbent materials or other equivalent measures. Under different sections of the rule, a quick drainage system is required for tank car or tank truck loading/unloading racks and secondary containment is required for all bulk storage containers.

Bulk storage containers must be constructed with a secondary means of containment for the entire capacity of the largest single container and sufficient freeboard to contain precipitation. Secondary containment of bulk storage containers is typically accomplished by concrete or steel dikes, earth berms, double-wall tanks or remote impoundments. Examples of common appropriate containment measures for operational equipment include the following methods:

1. Absorbent material

In the case of indoor hydraulic reservoirs (e.g., elevators, vehicle hoists, dock levelers, machinery etc.) appropriate containment may be achieved by placing absorbent materials around equipment to prevent spilled oil from reaching a floor drain or other drainage inlet. Absorbent materials are readily available in a variety of shapes and sizes.

2. Concrete curbing

In the case of out door electrical equipment, appropriate containment may be achieved by constructing concrete curbing around the equipment to prevent the lateral migration of oil from reaching a drainage inlet before cleanup occurs. Curbing needs to be constructed around common outdoor pad.

3. Drainage inlet cover

These are placed over drainage inlet structures to prevent spilled oil from entering the drainage system and discharging into the environment. This option requires keeping the drainage inlet covered for all the time. The drainage inlet operations should be properly supervised and inspected in consistent with the rules. Drainage inlet covers are most effective when the surrounding surface is conducive to a tight seal and the area is free of debris (e.g. grit, snow, ice, sand, etc.)

Loading / Unloading Rack containment

According to loading/ unloading rack containment procedures "where loading / unloading area drainage does not flow into a catchment's basin or treatment facility designed to handle discharges, use a quick drainage system for tank car or truck loading and unloading areas. It is necessary to design any containment system to hold at least the maximum capacity of any single compartment of a tank car or truck loaded or unloaded at the facility". The requirement for loading/ unloading rack containment applies to all bulk storage facilities, whether they are above ground or completely underground containers. This requirement does not apply to operational equipment.

2.3.3.3 Combat Pollution – Equipment

Equipment needed to combat oil pollution are booms, skimmers, transfer pumps, vacuum trucks, absorbents and dispersants. Apart from fire fighting and protective equipments boats, small crafts are also needed along with supportive equipment. Available resources to combat oil spill with VPT and pollution control equipment along with equipment to be procured is listed in **Tables 2.21 & 2.22**.

2.3.4. Chemical Spill (contingency plan)

In VPT, apart from petroleum products, hazardous chemicals are also handled in Inner Harbour at FB and in Northern arm at EQ6, EQ7, and WQ1, WQ1RE & WQ5 berths by CIL, IMC, NALCO and EIPL. The identified hazardous substances are Ammonia, molten sulphur, caustic lye, alumina, Ammonium nitrate, phosphoric acid and sulphuric acid including styrene monomer. The spill over area along with response measures are delineated and reported in **Table 2.19**. Ammonia leak/release is considered as toxic gas dispersion whereas styrene monomer is toxic as well as flammable liquid. Fertilizer grade Ammonium nitrate (more than 0.2% of combustible material) is possibly explodable in certain conditions. In recent times, accident occurred due to explosion are reported of Ammonium nitrate (fertilizer grade) (**Annexure XIII**). Responsibility of first response team with coordinating action team, preventive methods (spill disposal methods) on the basis of its reactivity and its combustibility with other chemicals have to be considered, which are reported in **Table 2.23**.

2.3.4.1 Response Plan

First Responder Operations level

First responders at the operations level are individuals who respond to releases or potential releases of hazardous substances as part of the initial response at the site for the purpose of protecting nearby persons, property, or the environment from the effects of the release. The first responder should know how to select and use proper personal protective equipment provided to the first responder at operational level, perform basic control, containment and/or confinement operations within the capabilities of the resources and personal protective equipment available with their unit and implement basic decontamination procedures.

The following absorbents can be used successfully to control chemical spill.

- Universal spill absorbent-1:1:1 mixture of Flor-Dri (or unscented kitty litter), sodium bicarbonate, and sand. This all-purpose absorbent is good for most chemical spills including solvents, acids (not good for hydrofluoric acid), and bases.
- Acid spill neutralizer-Sodium bicarbonate, Sodium carbonate or calcium carbonate.
- Alkali (base) Neutralizer-sodium bisulfate.
- Alkali Metals-Dry sand or a Class “D” Fire Extinguisher.
- Solvents/organic liquid absorbent - Inert absorbents such as vermiculite, clay, sand, Flor-Dri, and Oil-Dri.
- Ammonium Nitrate – Early stages of fire use flooding amount of water.
- Alumina – Moisten first to prevent dusting and wash away with plenty of water.

Action Plan

Action plan involves preventive measures and use of personnel protective equipment

2.3.4.2 Personnel Protective Equipment (PPE)

The purpose of personnel protective clothing and equipment (PPE) is to shield or isolate individuals from the chemical, physical, and biological hazards that may be encountered. Careful selection and use of adequate PPE is necessary to protect the respiratory system, skin, eyes, face, hands, feet, head, body, and hearing. No single combination of protective equipment and clothing is capable of protecting against all hazards. Thus PPE should be used in conjunction with other protective methods. The use of PPE can itself create significant worker mobility, and communication. For any

given situation, equipment and clothing should be selected so it provides an adequate level of protection. Over protection as well as under-protection can be hazardous and should be avoided. Few common PPE are:

- Goggles and Face Shield.
- Heavy Neoprene Gloves.
- Disposable Lab Coat and Corrosive Apron.
- Plastic Vinyl Booties.
- Dust Mask/Respirator.

2.3.4.3 Chemical Protective Clothing

Chemical Protective Clothing (CPC) is available in a variety of materials that offer a range of protection against different chemicals. The most appropriate clothing material will depend on the chemicals present and the task to be accomplished. Ideally, the chosen material resists permeation, degradation, and penetration. Permeation is the process by which a chemical dissolves in and/or moves through a protective clothing material on a molecular level. Degradation is the loss or change in the fabric's chemical resistance or physical properties due to exposure to chemicals or ambient conditions (e.g., sunlight). Penetration is the movement of chemicals through zippers, stitched seams or imperfections (e.g., pinholes) in a protective clothing material.

Selection of chemical-protective clothing is a complex task and should be performed by personnel with training and experience. Under all conditions, clothing is selected by evaluating the performance characteristics of the clothing against the requirements and limitations of the site and task specific conditions. If possible, representative garments should be inspected before purchase and their use and performance discussed with someone who has experience with the clothing under consideration. In all cases, the employer is responsible for ensuring that the personal protective clothing (and all PPE) necessary to protect employees from injury or illness that may result from exposure to hazards at the work site is adequate and are of safe design and fabrication for the work to be performed.

2.3.4.4 Chemical Spill Response Procedures

In the event of chemical spill, response teams depend on risks involving the release of a type or quantity of a chemical, i.e., immediate risk to health and involve chemical contamination to the body:

- Notify the personnel in the neighbouring accident area.
- Alert people in immediate area of the spill.
- Determine the chemical nature of the spill and check the Met sheet.
- Isolate the area, and evacuate the people immediately(if necessary depends on risk)
- Keep away ignition sources and disconnect power.
- Use a fire extinguisher to extinguish any flames if applicable.
- Choose appropriate personal protective equipment (goggles, face shield, impervious gloves, lab coat, apron, etc.)
- Confine and contain spill. Cover with appropriate absorbent material. If the absorbent material is acid or base it should be neutralized prior to cleanup.

If you are asked to evacuate

- Do so immediately
- Stay tuned to a radio or television for information on evacuation, temporary shelters and procedures.
- Follow the routes recommended by the authorities shorten & safe
- If you have time minimize the contamination in the house by closing windows and all vents and turning of all fans
- Take core pre assembled disaster supplies supplier.

Table 2.18: List of Oil Spills

S.No.	Spill / Vessel	Location	Dates	Min Tonnes	Max Tonnes
1.	Erika	France, Bay of Biscay	12 December 1999	15,000	25,000
2.	2001 Shell Ogbodo oil spill	Nigeria	25 June 2001	9,500	Unknown
3.	Limburg (bombing)	Yemen, Gulf of Aden	6 October 2002	12,200	12,200
4.	Prestige oil spill	Spain, Galicia	13 November 2002	63,000	63,000
5.	Tasman Spirit	Pakistan, Karachi	28 July 2003	28,000	30,000
6.	Bass Enterprises (Hurricane Katrina)	United States, Cox Bay, Louisiana	30 August 2005	12,000	12,000
7.	Jiyeh power station oil spill	Lebanon	14 July 2006 – 15 July 2006	20,000	30,000
8.	2007 Korea oil spill	South Korea, Yellow Sea	7 December 2007	10,800	10,800
9.	Deepwater Horizon	United States, Gulf of Mexico	20 April 2010 – 15 July 2010	492,000	627,000
10.	Xingang Port oil spill	China, Yellow Sea	16 July 2010 – 21 July 2010	1,500	90,000

Table 2.19: Emergecy Response Measures for Oil Spills/Chemical Spills

S. No	Cargo	Max. Parcel size	Estimated Quantity of Spill (T)		Estimated area of Spill (Maximum) (ha)		Spill Control measures (On-land)	Spill Control measures (On-water)	Remarks
			Min.	Max.	On-land	On-water			
1	Ammonia	10,000	59	163	1.26	–	Gas detection for NH_3 --Leak detection --Leak sealing plug rugs / leak seal --Use of surfactant foams for suppression of vapors --Mechanical covers (PP or HDPE) --Flooding with water and neutralize with dilute HCL --Collection by drain or dykes into storage drums or tanks --Recovery / treatment of collected material --Final cleaning by water	Gas detection for NH_3 --Leak detection --Leak sealing plug rugs / leak seal --Use of surfactant foams for suppression of vapors --Isopropyl alcohol spray to prevent vapours --Mixing/ agitation of water media for further dilution	Ensure the clean up below 300 ppm level --Use water and neutralize with HCL --Induced air movement to dilute the vapours --Prevent people entry --Enforce respirators --Monitor by gas sensors --Prevent people and exposures

S. No	Cargo	Max. Parcel size	Estimated Quantity of Spill (T)		Estimated area of Spill (Maximum) (ha)		Spill Control measures (On-land)	Spill Control measures (On-water)	Remarks
			Min.	Max.	On-land	On-water			
2	Crude	1,40,372	738	2218	6.9	12.3	Control of ignition sources –Temporary plugging or patching –Stop oil collection by drains / dykes / pipeline and storage in drums / under ground tanks	Use of floating or mobile skimmers --Water jet application to divert the slick towards skimmer/dykes --Application of sorbents such as alkali saw dust / treated cellulose --Use of biodegradable bacteria / consortium	Incase of fire use CO_2 blanketing Use of clean up kits on land –Use of floating or mobile skimmers on water
3	Naptha	31476 6462	178 37	536 110	0.67	1.23	Use of vapor suppression foams Fluoro protein and surfactant –Floor clean up by adsorbents and incineration of wastes	Collection by mechanical booms or skimming / vacuum application Diversion of slick by water jets --Application of sorbents and skimmers	Prevent fires and control ignition sources –Control of oxidizing substances such as HNO_3 and perchlorates to prevent reactivity
4	MS ATF	30,724 30,094	275 269	823 807	0.43 ha	0.81 ha	Induced air movement by mechanical means to maintain vapors below LFL	Use of vapor supression foams Flouro protein and surfactant	Prevent fires and control ignition sources
5	Kerosene	30,000	226	682	0.82 ha	1.5 ha	Floor clean up by adsorbents and incineration of wastes	Diversion of slick by water jets	Use of floating or mobile or vacuum skimmers on water
6	Diesel	21,169	85	254	1.13	2.05	Stop oil collection by drains / dykes / pipeline and storage in drums / under ground tanks	Water jet application to move the slick towards skimmers / dykes	Foam blanketing for vapors

S. No	Cargo	Max. Parcel size	Estimated Quantity of Spill (T)		Estimated area of Spill (Maximum) (ha)		Spill Control measures (On-land)	Spill Control measures (On-water)	Remarks
			Min.	Max.	On-land	On-water			
7	Fuel oil	34,604	42	125	0.08	0.15 ha	Leak sealing –Flooding with water	Use adsorbents and nutrients (biological) enrichment	Incase of fire use CO_2 blanketing
8	Ethyl alcohol / Ethyl hexanol / N - Butanol	4,000	110	330	0.4	—	Containment by dykes and berms –Collection by drains and drums – Recovery by distillation / destruction of wastes by incineration	Use of vapor suppression foams such as alcohol resistant, Fluoro proteins and surfactant foams	Prevent strong oxidizers –Enforce personnel protection –Cordon off the clean up area
9	Styrene Monomer	8,446	125	376	1.5	2.77	Use of sand bags, inflatable berms for containment –Collection by drums and tankers and recovery by distillation	Use of proprietary foaming agent and mechanical covers --Use of mechanical booms, rubber blades, mobile / floating / vacuum skimmers	Control of all forms of heat sources for preventing polymerization –Use of redox emulsion polymerization procedure for clean up
10	Causic Lye	16,289	435	1303	1.5 ha	—	Dykes for containment –High dilution and neutralize with HCL –Collecton through drains and special pumps into rubber lined tanks or PVC drums –Prevent people and reaction with halides and metals –Flooding with cold water and collect the material for recovery	Use of barriers with selective membrane coating / coffer dams --Nutralize with HCL --Remove the contaminated water to PVC drums or rubber lined tankers --Low pressure cold water flooding	Control of reactions with halides and metals –Enforce personnel protective clothing –Physical barriers for the clean up necessary
11	Mono ethylene glycol	2,000 T	67	200	0.24 ha	0.45 ha	Use of mechanical covers –Control of ignition sources	Use of mechanical /sorbent booms, high pressure barriers	Use mobile / floating booms –Prevent strong oxidizers

S. No	Cargo	Max. Parcel size	Estimated Quantity of Spill (T)		Estimated area of Spill (Maximum) (ha)		Spill Control measures (On-land)	Spill Control measures (On-water)	Remarks
			Min.	Max.	On-land	On-water			
12	Alumina powder	36,600	384	1150	local	local	Dust control systems –Collection by suction and removel –Avoid use of water	Prevent dust falling on water --Enforce respirator use by personnel	In contact with water procedures H_2 gas and in turn cause fire
13	Methanol	9,072	303	907	0.4 ha	—	Containment by dykes and berms –Collection by drains and drums –Recovery by distillation / destruction of wastes by incineration	Use of vapor suppression foams such as alcohol resistant, Fluoro proteins and surfactant foams	Prevent strong oxidizers –Enforce personnel protection –Cordon off the clean up area
14	Sulpher (Molten)	10,000	83	250	local	local	Prevent people –Enforce respirator use by personnel and personnel protection clothing and gloves	Prevent spills on water --Control ignition sources and fires	Enforce personnel protection and respirators
15	Sulphuric acid	18,844	31	94	0.08	–	Dykes for contaminant, high dilution and neutralise with alkalies.And Dispose of netralised liquids down the drain. Keep unnecessary people away, isolate hazard area, self contained breathing apparatus and protective clothes for	Use of selective membrane coating/ copper dams. Neutralise with alkalis and remove contaminated water to PVC Drums.	Incompatible with alkali (Strong caustic) and metals. Viloent reaction with sodium tetra hydrochloride. For severe inhalation use proper respiratory protection and evacuate effected people.
16	phosphoric acid	10,000	17	50	0.1	–	-do-	-do-	-do-

Table 2.20: Oil Spill Response Plan

Plan Guidelines:

1. Introduction: I. Authorities & responsibilities Committee 2. Statutory requirement, relevant agreements. 3. Dimensions of plans 4 .Interfaces with other plans	6. Communication & Control I. Incident control room & facilities 2. Field communications and equipment 3. Reports, manuals, maps, charts and incident logs
2. Oil Spill Risks I. Identification of activities and risks 2. Types of oil likely to be spilled 3. Probable fate of spilled oil 4. Development of oil spill scenarios 5. Shoreline resources protection priorities 6. Shoreline sensitivity mapping 7. Special local considerations	7. Actions & operations - Initial procedure: I. Reporting incident preliminary estimate of emergency 2. Notifying key team members/authorities 3. Establishing and staffing control room 4. Collecting information - oil type, sea/wind forecasts, aerial. surveillance, beach report 5. Estimating fate of slice 24h-48h-72h 6. Identifying resources at risk inform parties immediately. . 7. Deciding whether to escalate response
3.Spill Response Strategies I. Philosophy and objectives 2. Limiting and adverse conditions 3. Strategy for sea zones 4. Strategy for coastal zones 5. Strategy for shoreline zones 6. Strategy for oil waste storage & disposal	8. Operations Planning & Mobilization I. Assembling full response team 2. Identifying immediate response priorities 3. Mobilising immediate response 4. Preparing initial press statement 5. Planning medium term operations-24h-28h-72h 6. Mobilising/ placing on standby resources 7.Establishing field command post and communications.
4. Equipment. Supplies & Service I. Primary oil spill equipment 2. Inspection maintenance arid testing 3. Auxiliary equipment, supplies and services. 4. Support equipment, supplies and service	9. Control Operations: 1. Establishing a managerial team with experts 2. Updating weather information as in 7.4 3. Reviewing and planning operations 4. Obtaining additional equipment, supplies and manpower 5. Preparing daily incident log & management report 6. Preparing operations accounts and financing reports 7. Preparing releases for public & press conferences 8. Brief local and Govt. officials
5.Manaeement-manpower &training I. Crisis manager & financial authorities 2. Incident organization chart 3. Manpower availability-on site/ on call 4. Availability of additional labour. 5. Advisors and consultants 6.Training,safety schedules and emergency exercises	10. Termination of operations 1. Deciding final and optimal levels of beach clean-up 2. Standing down equipment, cleaning, maintenance and replacement 3. Preparing formal detailed report 4 .Reviewing plans and procedures

Table 2.21: Available Resources for Combating Oil Spills

Organization	Equipment Type	Size	Location	Supply Delay	Cost	Contact Tel/Mob
Port Trust	Rigid Boom w/crew	450m	Oil wharf Marine com.	--	--	--
	Inflatable type					
Coast Guard	Boom	200m	Vizag	1 hr.		568875/79
Coast Guard	Skimmer					
Port Trust	Dispersant	1000 L	MF			
Coast Guard	Dispersant	800 L	Vizag	1 hr.		
Port Trust	Spray units					
Coast Guard	Spray units		Vizag			
Port Trust	Absorbent pads					
Coast Guard	Absorbent		Vizag			
Port Trust	Plastic bags					
Port Trust	Disposal truck	1x10t	FS			
Port Trust	VHF-Radio	2 units	FS			
Coast Guard	VHF-Radio	2 units	Vizag			
Port Trust	Tugs	1 No.	MF			
Port Trust	Launch/workboat	1	MF			
Port Trust	Protective clothing		FS			
Coast Guard	Survl aircraft	Donier	Chennai	2/3 hrs.		
	Aircraft fuel					
	Portable	1	Vizag	1 hr.		
	Floodlights					

Table 2.22: Pollution Control Equipment with VPT - Oil Pollution

S. No	Equipment	Quantity
1	Oil Recovery and Pollution Control Vessel	300m Pl boom
2	Dispersant chemicals	1000 Ltr
3	Rigid Type Oil Booms	500 m
4	Masonry Tank to store the oily water(cap 100 m^3)	1 No
5	Hired Launch for collecting Floating debris & Oil slicks	1 No
6	Absorbent Materials(waste Cotton Rags)	12 Bags
7	Buckets Non-sparking(15 ltrs capacity)	4 Nos
8	Scoops	8 Nos
9	Portable Sprayers	4 Nos
10	Moping/Oil absorb pads	48 Nos
11	Protective Clothing(Body Glove System/Rubberized Hand)	4 Sets
12	Saw Dust	6 Bags

Pollution Control Equipment under process of procurement

I. Port Proposes to procure additional equipment for Tier I spill as per MOU with Oil companies

Table 2.23: Chemical spill

Description	Sulphuric acid	Phosphoric acid	Caustic soda	Alumina	Ammonia	Ammonium Nitrate	Styrene monomer
Storage	Separated from combustible and reducing substances, strong oxidants, strong bases, food and feedstuffs incompatible materials. Store in stainless steel containers. Store in an area having corrosion resistant concrete floor	Separated from food and feedstuffs Dry. Well closed.	Separated from strong acids, metals food and feedstuffs Dry. Well closed. Store in an area having corrosion resistant concrete floor.	Separated from Class 5.1 : acids, alkalis, iron oxides. Keep as dry as reasonably possible from liquid halogenated hydrocarbons.	Fire proof. Separated from oxidants, acids, halogens. Cool. Keep in a well-ventilated room.	Provision to contain effluent from fire extinguishing. Separated from combustible and reducing substances.	Fireproof. Separated from incompatible materials. Cool. Keep in the dark. Store only if stabilized.
Spillage disposal	Consult an expert and evacuate danger area. Do not absorb in saw-dust or other combustible absorbents. Complete protective clothing including self-contained breathing apparatus. Do not let this chemical enter the environment.	Sweep spilled substance into covered containers. Carefully collect remainder, then remove to safe place. Chemical protection suit including self-contained breathing apparatus.	Sweep spilled substance into suitable containers. Wash away remainder with plenty of water. Complete protective clothing including self-contained breathing apparatus	Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Wash away remainder with plenty of water. P1 filter respirator for inert particles.	Evacuate danger area and consult an expert. Ventilation. Never direct water jet on liquid. Remove gas with fine water spray. Gas-tight chemical protection suit including self-contained breathing apparatus.	Evacuate danger area and consult an expert. Sweep spilled substance into non-combustible containers. Wash away remainder with plenty of water.	Ventilation. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do not wash away into sewer. Do not let this chemical enter the environment. Self-contained breathing apparatus.
Chemical Dangers	Strong oxidant and reacts violently with combustible and reducing materials. Strong acid, it reacts violently with bases and is	Violently polymerizes under the influence of azo compounds and epoxides. On combustion, forms toxic fumes phosphorous oxides. Decomposes on contact with alcohols,	Strong base, it reacts violently with acid and is corrosive in moist air to metals like zinc, aluminum, tin and lead forming a combustible/explosi ve gas (hydrogen).	It posses the property of evolving hydrogen gas when it contacting with sea water and reacts readily with acids and	Shock-sensitive compounds are formed with mercury, silver and gold oxides. The substance is a strong base, it reacts violently with acid and is	Heating may cause violent combustion or explosion. The substance decomposes on heating or producing toxic fumes nitrogen	The substance can form explosive peroxides. The substance may polymerize due to warming, under the influence of light and on contact with many compounds

Contd…

Description	Sulphuric acid	Phosphoric acid	Caustic soda	Alumina	Ammonia	Ammonium Nitrate	Styrene monomer
	corrosive to most common metals forming a flammable/explosive gas (hydrogen). Reacts violently with water and organic materials with evolution of heat. Upon heating, irritating or toxic fumes or gases (sulfur oxides) are formed.	aldehydes, cyanides, ketones, phenols, esters, sulfides, halogenated organics producing toxic fumes Attacks many metals forming flammable/explosive gas (hydrogen). Medium strong acid. Reacts violently with bases	Reacts with to produce ammonia causing fire hazard. Attacks some forms of plastics, rubber or coatings. Rapidly absorbs carbon dioxide and water from air. Contact with moisture or water may generate heat	caustic alkalies.	corrosive. Reacts violently with strong oxidants and halogens. Attacks copper, aluminum, zinc and their alloys. Dissolves in water evolving heat.	oxides The substance is a strong oxidant and reacts with combustible and reducing materials.	such as oxygen, oxidizing agents, peroxides and strong acids with fire or explosion hazard. The substance decomposes on burning producing toxic fumes, styrene oxide. Attacks copper and copper alloys.
Incompatibili-ties and reactivities	Organic materials, chlorates, carbides, fulminates, water, powdered metals [Note: Reacts violently with water with evolution of heat. Corrosive to metals.]	Strong caustics, most metals [Note: Readily reacts with metals to form flammable hydrogen gas. Do not mix with solutions containing bleach or ammonia.]	Water; acids; flammable liquids; organic halogens; metals such as aluminum, tin & zinc; nitromethane [Note: Corrosive to metals.]	Chlorine trifluoride, hot chlorinated rubber, acids, oxidizers [Note: Hydrogen gas may be formed when finely divided iron contacts moisture during crushing & milling]	Strong oxidizers, acids, halogens, salts of silver & zinc [Note: Corrosive to copper & galvanized surfaces.]	Incompatible with Class 4.1: Chlorides, bromides, fluorides, hypo chlorates, nitrites, perchlorates, permanganates and powdered metals	Oxidizers, catalysts for vinyl polymers, peroxides, strong acids, aluminum chloride [Note: May polymerize if contaminated or subjected to heat. Usually contains an inhibitor such as tert-butyl alcohol.
Personal protection & sanitation	Skin - Prevent skin contact; Eyes - Prevent eye contact; Wash skin - When contaminated; Remove - When wet or contaminated; Provide - Eyewash (>1%), Quick drench (>1%)	Skin - Prevent skin contact; Eyes - Prevent eye contact; Wash skin - When contaminated; Remove: When wet or contaminated; Change – Daily; Provide - Eyewash (>1.6%), Quick drench (>1.6%)	Skin - Prevent skin contact; Eyes - Prevent eye contact; Wash skin - When contaminated; Remove - When wet or contaminated; Change – Daily; Provide - Eyewash, Quick drench	Skin - Prevent skin contact; Eyes - Prevent eye contact; Wash skin - When contaminated; Remove - When wet or contaminated; Change – Daily; Provide - Eyewash, Quick drench	Skin - Prevent skin contact; Eyes - Prevent eye contact; Wash skin - When contaminated (solution); Remove - When wet or contaminated (solution); Provide - Eyewash (>10%), Quick drench (>10%)	Skin - Prevent skin contact; Eyes - Prevent eye contact; Wash skin - When contaminated; Remove - When wet or contaminated; Change – Daily; Provide - Eyewash, Quick drench	Skin - Prevent skin contact; Eyes - Prevent eye contact; Wash skin - When contaminated; Remove - When wet (flammable)

Contd…

ANNEXURE – 6

ANNEXURE-A

Environment Impacts matrix sheet for Modernization and Expansion projects of VPT

	Environment components					Action plan
Phase	**Air**	**Noise**	**Water**	**Land**	**Socio Economic Environment**	
Construction						
Impacts due to quarrying operation	-ve	-ve		-ve	+ve, temporary	Construction material shall be obtained only from Approved mines.
Impacts due to effluents from labour camps			-ve	-ve	+ve, temporary	The sewage generated from construction sites and labor camps shall be disposed into inland drainage system.
Impacts due to Dredging	-ve	-ve	-ve		+ve, temporary	The increase in turbidity levels of marine water at the project site due to sediments is a temporary, as there are no sensitive species located in the site there are no significant impacts.
Impacts due to operation of construction equipment	-ve	-ve	-ve		+ve, temporary	The mufflers shall be used and modifications in the engines as per requirement shall be carried out for minimizing the noise levels.
Impacts due to transportation of construction materials	-ve	-ve			+ve, temporary	Vehicles having RTA pollution levels testing certificate only shall be deployed for material movement.
Operation						
Cargo handling operations	-ve	-ve	-ve		+ve	A standard and well structured EMS is in place for combating environment pollution effectively.
Solid waste	-ve	-ve	-ve	-ve		
Environmental impact of ship traffic	-ve	-ve	-ve	-ve		

ANNEXURE – 7

Sub: STATEMENT SHOWING THE DETAILS OF CER (CORPORATE ENVIRONMENT RESPONSIBILITY) IN VPA FOR YEAR OF 2024 - 2025

Sl.No.	Description of work	Expenditure incurred (Rs. in Crores)	Remarks
1.	**2.**	**3.**	**4.**
1.	Operation and Maintenance of Continuous Online Ambient Air quality monitoring Stations (CAAQMS) at 3 identified areas of VPA	0.3092	Work is in Progress.
2.	Sampling and analysis of Marine Sediments at Visakhapatnam Port	0.0138	Work is in Progress.
3.	Harbour water quality monitoring at high and low tides.	0.1170	Work is in Progress.
4.	Sampling, Analysis & Testing of raw sewage treated water of 10 MLD STP of VPA	0.0782	Work is in Progress.
5.	Operation and Maintenance Sewage Treatment Plant to handle total hospital sewage of 25 KLD at Golden Jubilee Hospital, Vishakhapatnam Port Trust for a period of 5 years.	0.0338	Operation and Maintenance is in Progress.
6.	Operation and Maintenance Sewage Treatment Plant Sullage at AOB 20 KLD for a period of 18 months.	0.3673	Treatment of Sullage water from canteen.
7.	Monitoring of Ground water samples to assess the contamination due to run off and water stagnation in cargo stacking Yards in Port area.	0.0220	Monitoring of Ground / Leachate Water is in Progress
8.	Engagement of Environment Cell Chief Manager, Manager and 3no.s of Supervisors on contract basis for Environment Cell of VPA.	0.3120	Engaged for Environmental Cell Works
9.	Marine Ecology Study	0.0412	Work in progress
10.	Providing PLC based MDSS at different areas in port area.	4.0000	Work Completed. PLC Based MDSS work is completed
11.	Construction of 4 covered storage sheds at various locations in Port area.	116.0400	3 Covered Sheds Construction work is completed. Another Shed work is in Progress.
12.	Mechanical sweeping on Port roads	1.9000	3no.s of Mechanical Sweeping Machine is deployed
13.	Three Truck Mounted and 7 Trolley Mounted Fog Canons	3.0000	Controlling of dust at operational area.
14.	Providing plantation of 10,000 Nos Avenue & Fruit Bearing plants**.**	0.0900	Work is in progress.
15.	Removal of Floating material from Drains	0.6600	Work is in progress.
16.	Green Belt Development (Maintenance)	5.0000	Work is in progress.
17.	Water Sprinkling on roads by Water Tankers	1.9200	Work is in progress.
18.	Internal roads and drains cleaning by Manpower	0.761	Work is in progress.
19	Environmental Audit and Development of Action plan for effective monitoring of Environmental Performance Indicators baseline study by NPC	0.2360	Report submitted.
20	AAQ Monitoring by Gravimetric method through M/s. MSV Analytical Laboratory	0.1275	Work in Progress.
	Total	**135.029**	

ANNEXURE – 8

ISO 9001, ISO 14001
ISO 45001
ISPS COMPLIANCE PORT

SAGARMALA
PORT LED PROSPERITY

विशाखपट्टणम पोर्ट प्राधिकरण
(पत्तन, पोत परिवहन एवं जलमार्ग मंत्रालय)
VISAKHAPATNAM PORT AUTHORITY
(Ministry of Ports, Shipping & Waterways, Govt. of India)
విశాఖపట్నం పోర్ట్ అథారిటీ

No. IENG/ Env.Cell/ MoEF /EC/Pt.I
Date: 15.07.2024.

To
The Member Secretary,
Ministry of Environment, Forests and Climate Change,
Integrated Regional Office, Green House,
Gopalareddy Road,
Vijayawada,
Andhra Pradesh - 520010

Sir,

Sub: Environment Clearance for various projects of Visakhapatnam Port Authority, Visakhapatnam -Submission of the Half-yearly Compliance reports - Reg.

Ref: 1. VPA -EC &CRZ clearances obtained from MOEF&CC for various projects.
2. This Office Previous Lr. No. IENG/Env.Cell/MoEF/EC/Pt.I dated 29.12.2023

***

Please find herewith the attachment of half yearly compliance report on EC's obtained by the VPA for kind perusal and information please.

Encl: As above.

DESPATCHED 17/7/24 4.30pm

Yours faithfully,

15/7/24
CHIEF ENGINEER (I/c)
मुख्य अभियंता
CHIEF ENGINEER
विशाखपट्टणम पोर्ट ट्रस्ट
Visakhapatnam Port Trust

Visakhapatnam Port Authority, Visakhapatnam - 530 035, Phone : (91) + 891-2562758, Fax : (91) + 891-2565023
विशाखपट्टणम पोर्ट प्राधिकरण, विशाखपट्टणम - 530 035, फोन : (91) + 891-2562758 फैक्स : (91) + 891-2565023
E-mail : chairman.vpt@gov.in

ANNEXURE – 9

Website : http://peso.gov.in
Email : explosives@explosives.gov.in
दूरभाष / Telephone : 0712-2510248
फैक्स / FAX : 0712-2510577
[illegible]

All communications intended for this Office should be addressed to the Chief Controller of Explosives and NOT to him by name.

भारत सरकार
GOVERNMENT OF INDIA
वाणिज्य और उद्योग मंत्रालय
Ministry of Commerce & Industry
पेट्रोलियम तथा विस्फोटक सुरक्षा संगठन
Petroleum and Explosives Safety Organisation
(पूर्व नाम – विस्फोटक विभाग)
(Formerly- Department of Explosives)
"ए" ब्लाक, पांचवा तल, केन्द्रीय कार्यालय परिसर,
"A" Block, 5th Floor, CGO Complex
सेमिनरी हिल्स, नागपुर – 440 006 (महा)
Seminary Hills, Nagpur- 440006

क्रमांक / No. G-22(47)118/VII

दिनांक / Dated 09/03/2022

To,

The Chief Engineer,
Engineering Department,
M/s. Visakhapatnam Port Trust,
Visakhapatnam – 530 035.

Sub: **Approval for Rehabilitation of Breasting and Mooring Dolphin at OSTT Jetty, Visakhapatnam Port Trust under Petroleum Rules, 2002 - Regarding**

Dear Sirs,

Please refer to your letter No. IM&UE/MOF/MII-8585 dated 17/02/2022 & inspection of the subject facilities by officer of O/o Dy. Chief Controller of Explosives, Visakhapatnam on 29/01/2021. Subsequently, M/s. Visakhapatnam Port Trust has submitted compliance report dated 15/02/2022 to the O/o Dy. Chief Controller of Explosives, Visakhapatnam. The inspection report along with recommendations of Dy. Chief Controller of Explosives, Visakhapatnam dated 17/02/2021 on the subject matter.

O/o Dy. Chief Controller of Explosives, Visakhapatnam has reported that M/s. Visakhapatnam Port Trust has conformed the avability of 2 Nos. of Class – III fire floats and 3 Nos.of tug boats as a Portable arrangement made for firefighting as per OISD 156, and recommended for handling the ships at the subject jetty restricted upto 1,00,000 DWT only.

In view of above the approval is accorded for the handling of vessels upto 1,00,000 DWT with following conditions :

1) A detailed clause wise compliance to OISD 156 shall be ensured.
2) SOP shall be strictly followed and regular safety audit to be carried out.
3) All activities shall be supervised by your technical competent persons.
4) Flame proof equipments with CCE approval details shall be maintained.
5) Details of hoses/unloading arms shall be regularly tested
6) HC/Fire detectors at strategic locations to be maintained
7) Automatic shutdown initiation due to HC/Fire detection to be incorporated suitably
8) No other activities to be carried out within 100 Mtrs. Radius from the unloading Arm/manifold.
9) All due safety precautions shall be taken to prevent accidents

This is issues with the concurrence of the Chief Controller of Explosives.

Yours faithfully,

[S.D. Mishra]
Controller of Explosives
for Chief Controller of Explosives

P.T.O.

Copy to :-

1) The Dy. Chief Controller of Explosives, Visakhapatnam with reference to his memo No. G-22147(1)/ 88/Part dated 17/02/2021.
2) M/s. HPCL Refinery, Visakha Vijayawada Secunderabad Pipeline, VR-ATP Area, Naval Base Post, Visakhapatnam – 530 044.

for Chief Controller of Explosives

भारत सरकार
Government of India
वाणिज्य और उद्योग मंत्रालय
Ministry of Commerce & Industry
पेट्रोलियम तथा विस्फोटक सुरक्षा संगठन (पेसो)
Petroleum & Explosives Safety Organisation (PESO)

E-mail : dyccevizag@explosives.gov.in
Phone/Fax No : 0891-2722257

29 NOV 2019

02 DEC 2019
1015413

संख्या /No : P/SC/AP/14/1437 (P34431)

दिनांक /Dated : 21/11/2019

27 NOV 2019

सेवा में /To,

visakhapatnam port trust,
VISAKHAPATNAM,
NIL,
VISAKHAPATNAM,
District: VISAKHAPATNAM,
State: Andhra Pradesh
PIN: 530035

विषय /Sub : Plot No, NIL, VISAKHAPATNAM PORT TRUST, VISAKHAPATNAM District: VISAKHAPATNAM, State: Andhra Pradesh, PIN. 999999 में स्थित विद्यमान पेट्रोलियम वर्ग A,B Retail Outlet की अनुज्ञप्ति संख्या P/SC/AP/14/1437 (P34431) - नवीकरण के संदर्भ में ।
Existing Petroleum Class A,B Retail Outlet at Plot No, NIL, VISAKHAPATNAM PORT TRUST, VISAKHAPATNAM, District: VISAKHAPATNAM, State: Andhra Pradesh, PIN: 999999 - Licence No. P/SC/AP/14/1437 (P34431) - Reg Renewal of Licence.

महोदय /Sir (s),

कृपया आपके उपर्युक्त विषय से संबंधित पत्र संख्या X दिनांक 19/09/2019 का संदर्भ ग्रहण करें ।

Please refer to your letter No. X dated 19/09/2019 on the subject.

अनुज्ञप्ति सं P/SC/AP/14/1437 (P34431) दिनांक 04/01/2002 दिनांक 31/12/2022 तक नवीकृत कर लौटाई जा रही है ।

Licence No. P/SC/AP/14/1437 (P34431) dated 04/01/2002 is returned herewith duly renewed upto 31/12/2022.

कृपया पेट्रोलियम नियम,2002 के अधीन बनाए गए नियम 148 में दी गई प्रक्रिया का कड़ाई से पालन करें । अनुज्ञप्ति के नवीकरण हेतु समस्त दस्तावेजों को दिनांक 31/12/2022 या उससे पहले इस कार्यालय में प्रस्तुत करें ।

Please follow the procedure strictly as laid down in rule 148 of the Petroleum Rules, 2002 and submit complete documents for the Renewal of the licence so as to reach this office on or before 31/12/2022

कृपया पावती दें । Please acknowledge the receipt

भवदीय /Yours faithfully,

(()
(B. Ravi Kumar))

Dy. Controller of Explosives
कृते उप मुख्य विस्फोटक नियंत्रक
For Dy. Chief Controller of Explosives
Visakhapatnam

(अधिक जानकारी जैसे आवेदन की स्थिति शुल्क तथा अन्य विवरण के लिए हमारी वेबसाइट http://peso.gov.in देखें)
(For more information regarding status,fees and other details please visit our website http://peso.gov.in)

फार्म XIV
(प्रथम अनुसूची का अनुच्छेद 5 देखिए)
FORM XIV
[see Article 5 of the First Schedule]

मोटर वाहनों में ईंधन भरने के लिए पम्प आउटफिट के साथ या टैंकों से पेट्रोलियम अंडारकरण के लिए अनुज्ञप्ति
LICENCE TO STORE PETROLEUM IN TANK/S IN CONNECTION WITH PUMP OUTFIT FOR FUELING MOTOR CONVEYANCES

अनुज्ञप्ति सं. (Licence No.) : P/SC/AP/14/1437(P34431)

फीस रुपए (Fee Rs.) 5000/- per year

पेट्रोलियम अधिनियम, 1934 और उसके अधीन बनाए गए नियमों तथा इस अनुज्ञप्ति की अनुसूची में दी गई शर्तों के अधीन रहते हुए 22.00 KL of Petroleum class B की टैंकों में भण्डारकरण मात्र के लिए visakhapatnam portt rust, VISAKHAPATNAM, NIL, VISAKHAPATNAM, District: VISAKHAPATNAM, State: Andhra Pradesh, PIN: 530035 का नीचे वर्णित अनुज्ञप्त परिसरों में जो कि इसमें उपाबद्ध नक्शे संख्या P/SC/AP/14/1437(P34431) दिनांक 21/11/2019 में दिखाया गया है, के लिए निम्नलिखित अनुज्ञप्ति अनुदत्त की जाती है।

Licence is hereby granted to visakhapatnam port rust, VISAKHAPATNAM, NIL, VISAKHAPATNAM, District: VISAKHAPATNAM, State: Andhra Pradesh, PIN: 530035 vaid only for the storage of 22.00 KL of Petroleum class B in tank/s in the licensed premises described below and shown on the plan no P/SC/AP/14/1437(P34431) dated 21/11/2019 attached hereto subject to the provisions of the Petroleum Act 1934 and the rule made thereunder and to the further conditions of this Licence

यह अनुज्ञप्ति 31st day of December 2022 तक विधिमान्य रहेगी ।
The Licence shall remain in force till the 31st day of December 2022

June 1 1988

Sd/-
For Jt. Chief Controller of Explosives
SC Chennai

1) Amendment dated - 04/01/2002

अनुज्ञप्त परिसरों का विवरण और अवस्थान
DESCRIPTION AND LOCATION OF THE LICENSED PREMISES

अनुज्ञप्त परिसर जिसकी सीमाएं संलग्न नक्शे में दिखाई गई हैं Plot No- NIL, VISAKHAPATNAM PORT TRUST, VISAKHAPATNAM, District: VISAKHAPATNAM, State Andhra Pradesh, PIN: 999999 में स्थित है और उसमें निम्नलिखित सम्मिलित हैं:

The licensed premises, the boundaries of which are shown in the attached plan, are situated at Plot No. NIL, VISAKHAPATNAM PORT TRUST, VISAKHAPATNAM, District: VISAKHAPATNAM, State: Andhra Pradesh, PIN: 999999 and consist of:

क पेट्रोलियम वर्ग क के परिसर के लिए NIL भूमिगत गैस रोधक टैंक, जो विद्युतचालित/हस्तचालित NIL डिस्पेन्सिंग पम्पों से जुड़े हुए हैं

a 1 number(s) underground gas tight tanks of capacity NIL kilolitres respectively of petroleum Class A connected with NIL number(s) electrically/manually operated dispensing pump(s)

ख पेट्रोलियम वर्ग ख के लिए परिसर के लिए 22.00 किलोलिटर क्षमता के क्रमशः 1 क्षमता के भूमिगत गैस रोधक टैंक, जो विद्युतचालित/हस्तचालित 1 डिस्पेंसिंग पम्पों से जुड़े हुए हैं ।

b 1 number(s) underground gas tight tanks of capacity 22.00 kilolitres respectively of petroleum Class B connected with 1 number(s) electrically/manually operated dispensing pump(s)

ग एक विक्रय कक्ष/किओस्क

c A sales room/kiosk

घ सहित सम्बन्धी सुविधाएं जिनमें as per approved plan सम्मिलित हैं ।

d Servicing facilities consisting of as per approved plan As per attached plan

अनुज्ञप्ति संख्या-[Licence No.] P/SC/AP/14/3437 (P344311)

नवीनीकरण के पृष्ठांकन के लिए स्थान
SPACE FOR ENDORSEMENT OF RENEWALS

पेट्रोलियम अधिनियम, 1934 के उपबन्धों या उनके अधीन बनाए गए नियमों या इस अनुज्ञप्ति की शर्तों का उल्लंघन न होने की दशा में यह अनुज्ञप्ति फिस में बिना किसी छूट के दस वर्ष तक नवीकृत की जा सकेगी। This licence shall be renewable without any concession in fee for ten years in the absence of contravention of any provisions of the Petroleum Act, 1934 or of the rules framed thereunder or of any of the conditions of this licence	नवीकरण की तारीख Date of Renewal	समाप्ति की तारीख Date of Expiry of license	अनुज्ञापन प्राधिकारी के हस्ताक्षर और दफ्तर का ठप्पा Signature and office stamp of the licensing authority.
1)	14/11/2005	31/12/2007	Sd/-
2)	26/05/2008	31/12/2009	Sd/- Dr. S K Dutt
3)	24/04/2014	31/12/2015	Sd/- K Srinivasa Rao Controller of Explosives For Dy. Chief Controller of Explosives Secunderabad
4)	30/11/2016	31/12/2019	Sd/- Amol Jaiwantrao Sonbarse Dy. Controller of Explosives For Dy. Chief Controller of Explosives Visakhapatanam
5)	21/11/2019	31/12/2022	B. Ravi Kumar Dy. Controller of Explosives For Dy. Chief Controller of Explosives Visakhapatanam उप मुख्य विस्फोटक नियंत्रक, विशाखपट्टणम Dy. Chief Controller of Explosives, Visakhapatnam

यदि अनुज्ञप्ति धारित परिसर इसमें उपाबद्ध विवरण और रेखांकन के अनुरूप नहीं पाए जाते हैं और जिन नियमों और शर्तों के अधीन यह अनुज्ञप्ति मंजूर की गई है उनमें से किसी का उल्लंघन होने की दशा में यह अनुज्ञप्ति रद्द की जा सकती है और अनुज्ञप्तिधारी प्रथम अपराध के लिए साधारण कारावास से जो एक मास तक हो सकता है, या जुर्माने से, जो एक हजार रुपये तक हो सकता है या दोनों से और प्रत्येक पश्चात्वर्ती अपराध के लिए साधारण कारावास से जो तीन मास तक हो सकता है, या जुर्माने से, जो पांच हजार रुपये तक हो सकता है, या दोनों से, दण्डनीय होगा।

This licence is liable to be cancelled if the licensed premises are not found conforming to the description given on the approved plan attached hereto and contravention of any of the rules and conditions under which this licence is granted and the holder of this licence is also punishable for the first offence with simple imprisonment which may be extend to one month or with fine which may extend to one thousand rupees or with both and for every subsequent offence with simple imprisonment which may extend to three months, or with fine which may extend to five thousand rupees or with both

Phones- 0891- 2722251 EPBX
- 2722258 Direct
- 2722259 FAX

All communications intended for this office should be addressed to the "Dy. Chief Controller of Explosives" NOT by officer's name

GOVERNMENT OF INDIA
PETROLEUM AND EXPLOSIVES SAFETY ORGANISATION (PESO)
Ministry of Commerce & Industry
O/o Dy. CHIEF CONTROLLER OF EXPLOSIVES
डोर न. 7-20-13, किरलमपुडी लेआउट, विसाखापट्टनम-530 017 (आंध्र प्रदेश)
Door No.7-20-13, Kirlampudy Layout, Visakhapatnam-530 017 (A.P.)

No. G – 22(47)118/Part
Dated: 19.11.19

21 NOV 2019

To
The Chief Engineer,
Engineering Department,
M/s Visakhapatnam Port Trust,
Visakhapatnam – 530 035.

Sub: Approval for Rehabilitation of Breasting and Mooring Dolphin at OSTT Jetty, Visakhapatnam Port Trust under Petroleum Rules, 2002 – Compliance to reminder letter dated 11.05.19 – observations regarding.

Dear Sir,

Please refer to your letter No. IENG/SE-IV/OSTT-PESO/446 dated 15.11.19 and inspection by this office dated 30.10.2019, the following comments are offered:

1. You have submitted a report "Stability calculation for rehabilitation of breasting and mooring dolphin at OSTT Jetty" and a self certified close out report. But not "Project Report" by the IIT Chennai with QRA included in it. Hence, your compliance could not be scrutinized. Please submit the required duly signed by the IIT Chennai (Consultant) and competent authority of VPT.
2. Please submit revised certificate IC/15-16/OEC/VPT/RSUN/OSTT/Ltr. No. 1273 dated 15.10.2019 with attestation of Professor R. Sundaravadivelu, IIT Chennai with his designation stamp pertaining to this study as explained to you.
3. You are advised to submit compliance report to the third party pre-commissioning audit duly verified by the auditing agency, ie. M/s IR Class Systems and Solutions and competent authority of VPT, in the comparison format as explained to you.
4. You are advised to submit completion (of works complying the CCE, Nagpur's approval) certificate.

Upon scrutiny of clause wise compliance to OISD 156, the following comments are offered:

5. Compliance report may please be signed by the competent authority of VPT and other stake holders of the premises.
6. The compliance report submitted has not mentioned requirement as prescribed in OISD STD 156 for several clauses, for comparison of existing facility/your compliance. Please mention each requirement and your compliance against the same supporting with relevant authenticated documents for each clause, as proof of compliance.
7. Please provide minimum four DCP fire extinguishers of 10 kg each and minimum two 75 kg DCP wheeled fire extinguishers instead of single 250 kg DCP fire extinguisher as prescribed in OISD 156.
8. Please submit fire float(s) details with IMO identification and duly endorsed by the competent authority of VPT.
9. Please submit detailed organization chart pertaining to the location and responsibility matrix of all stake holders related, including pipeline licence holders & users and SS Jetty, and corresponding communication copy informing all concerned about their roles and responsibilities as per the chart.

10. Please declare overall responsible officer (designation) in the Port Terminal pertaining safety along with fire officer. Please refer Clause 6 of OISD 156 in this regard.
11. Please furnish the details of trainings given to all stake holders including pipeline licence holders & users of this premises emphasizing on safety in marine operations handling hydrocarbons, duly signed by the VPT and stake holders.
12. Please submit the mechanism you are following for "Work Permit System" for works in the premises of Port complying OISD –STD 105, emphasizing on OSTT Jetty-Pipelines-SS Jetty.
13. Please submit record of fire & safety drills conducted for last 3 months.
14. Please submit Hazardous Area Classification drawing duly signed by the VPT & other stake holders and comply standards IS5571, IS5572 (Part – I) and OISD STD 113 and in line with rules 102-115 of Petroleum Rules, 2002. Please ensure the compliance accordingly.
15. Please submit Fire Emergency Manual duly signed by competent authority of VPT.
16. Please furnish comparative statement of existing facilities to "Typical Fire Protection Facilities at Port Terminal" in the format ANNEXURE II of OISD STD 156 including Notes, duly signed by competent authority of VPT.
17. Please furnish comparative statement of existing facilities (Class III fire scenario as claimed by VPT) to "Broad specification for Fire Floats" in the format given in ANNEXURE III of OISD STD 156.
18. Please furnish the documents regarding ROW permission and markers with TLPs were provided for the on shore pipeline connected to the OSTT Jetty. Please ensure this office regarding the compliance of your letter No. Estate/HPCL/LPG Jetty – OSTT/498 DATED 19.04.2018 by M/s HPCL.
19. Please submit to this office if night (sun set to sun rise) operations are being carried out on OSTT Jetty, SS Jetty & SPM facility and relevant permissions you obtained.
20. Please submit a third party electrical audit report and compliance to the identified violations as required under rule 114 of Petroleum Rules, 2002.
21. Please ensure this office colour coding identification of different pipelines installed on OSTT Jetty and markings related to.
22. Please ensure that the SOP (s) has been displayed at strategic locations useful for safe operations.
23. Please submit environment clearance certificate for this project.
24. Please submit authenticated copy of the list of available Oil Spill Management facilities, with specifications in a tabular form duly signed by competent authority of VPT.
25. Please ensure this office that Emergency Response and Disaster Management Plant for OSTT –SS Jetty area.
26. Please submit clear layout of CUP of OSTT Jetty segment, SS Jetty segment and Pipelines segment separately for identifying the structure and pipelines layout duly signed by the competent authority of VPT and other stake holders.
27. Please ensure this office that 3rd party audit of Pipelines installed on Jetty, subsea and on SS Jetty area was conducted by the stake holders and the findings were complied.

Further necessary action shall be initiated on receipt of the above.

Yours faithfully,

S SARKAR
For Dy. Chief Controller of Explosives
Visakhapatnam

GOVERNMENT OF INDIA
PETROLEUM AND EXPLOSIVES SAFETY ORGANISATION (PESO)
(Formerly Department of Explosives)
O/o Dy. CHIEF CONTROLLER OF EXPLOSIVES
डोर न. 7-20-13, किरलमपुडी लेआउट, विसाखापट्टनम -530 017 (आंध्र प्रदेश)
Door No.7-20-13, Kirlampudy Layout, Visakhapatnam-530 017 (A.P.)

संख्या (No.): **G – 22(47)118/Part**

तारीख (Date): 02nd March, 2020

- 3 MAR 2020

To
The Chief Engineer,
Engineering Department,
M/s Visakhapatnam Port Trust,
Visakhapatnam – 530 035.

Sub: Approval for Rehabilitation of Breasting and Mooring Dolphin at OSTT Jetty, Visakhapatnam Port Trust under Petroleum Rules, 2002 – regarding.

Please refer to this office's inspection dated 30.10.2019 and subsequent discrepancy letters from this office. You are once again requested to rectify all the discrepancies cited in earlier communications. The following is to reiterate the same.

1. Please submit compliance to each point in the Pre-commissioning Safety Audit by the third party agency (M/s IRClass Systems & Solutions), duly endorsed by the same agency.

2. Please submit Close out report with respect to QRA and recommendation made in Project report of IIT Chennai

3. Please submit original certificate No IC/15-16/OEC/VPT/RSUN/OSTT/Ltr. No. 1273 dated 15.10.2019 duly signed by the Professor Sundaravadivelu.

4. Please submit a proper formatted "Clause wise Compliance Report to OISD 156" with proofs. Please avoid self declarations as proof of compliance.

5. During inspection it is observed that

   a. Two Diesel driven 540 m^3/h. Fire water pumps (520 HP, 1989 commissioned) are available in the premises out of which one is not working. So effective FWS pumping capacity is 540 m^3/h only.
   b. One electrical driven Jockey pump of 10 m^3/h and 70 HP rating is available. But electricity is not available from land and it depends on one 200 kVA DG set only.
   c. During trial run of Fire Water Monitors, they could not throw water more than 30-40 m against required 100m. The length of berth from the middle of CUP to MD-1 is 210

meters and total length of Jetty is approximately 400 m and Fire Water System piping is of 24" size and 320 m length. So capacity of Fire Water Pumps is insufficient to meet the requirement.

d. There are no flow measuring devices in lines.
e. During FWS and monitors testing, it is observed that the pressure at farthest point is 5-6 kg/cm^2 only against the required 7 kg/cm^2.
f. Only 7 Fire Hydrant points are provided against minimum 20 required to handle 4 MLA s and 200 m berth.
g. Barge Berth needs total water pumping requirement of 371.04 m^3/h. One monitor and four Hydrants are required. But none of these facilities is available on Barge Berth.
h. There are four MAYURA type water curtains provided. During trial run, none of them formed continuous MAYURA curtain, nor the height of flow is above 5 meters and can not cover a ship of above 20000 DWT.
i. Performance of Fire Water pumps seem does not meet the clause 4.3.5 of OISD 156. The pump could not develop required head even when only two monitors are in operation and rest all FWS points closed. Also there is no standby pump at all. If one of the two available pumps is considered as stand by, the total pumping capacity on Jetty is only 540 m^3/h (rated capacity).
j. International Shore Fire Connection (IFSC) is not available for this Jetty, deviating from clause 4.3.6 (vii) of OISD 156.
k. Fire Hydrants for every 15 m shall be provided as per 4.3.7 (ii) & (iii) conforming IS 3844 as there are different buildings are available on the Jetty. Only 07 hydrant points are available as mentioned earlier.
l. The existing FWS is more than 30 years old. So, the material of construction of Pipes, isolation valves, Hydrants, Monitors, Hoses, Foam piping etc with respect to the clause 4.3.9 could not be established.
m. Colour coding for Hydrant stand posts, hose boxes, required MLAs are not followed as observed during and subsequent visits.
n. Foam tank capacity is 15000 liters and pump capacity is 600 lpm. So the foam availability is 25 min against minimum required 30 min to provide primary protection to cope up with fire (clause 4.4.7).
o. The Visakha Port Trust has SPM facility, OSTT Jetty for Crude oil and HSD (Total 5 Marine Loading Arms) and LPG Jetty (SS Jetty). So, the foam storage shall not be less than the requirement for the largest jetty and common storage terminal foam requirement is not meeting the minimum 65 minutes basis (clause 4.4.7).
p. No records are maintained for periodical testing of quality, replacement of deteriorated quantity following OISD-GDN 115. Hence, the foam requirement and availability could not be assessed.
q. Clean Agents to protect control rooms is not provided (clause 4.5)
r. Fire protection at Port in comparison to Annexure II of OISD 156 was verified and found substandard. The available facilities are suitable to 20000 DWT vessels berthing and most of them are not in working condition.
s. Manual call points, automatic gas, smoke, heat detectors, release and inhibit switches for fire suppression clean agent conforming to the latest Indian, International standards,

electricity rules and statutory regulations are not provided. Only gas detector at ML.A 5 is provided (clauses 5.1 & 5.4).

t. No records of fire fighting training taken by all operators, officers and other employees of the VPT. Monthly fire drills are not conducted and records of such drills are not produced during inspection (clause 6.2).

u. Fire protection system(s), inspection and testing as required under clauses 8.0 to 8.8 is not conducted at all by the VPT. No such records were produced during inspection.

v. During inspection, the VPT produced only one fire float whereas there is a requirement of **Five** number of Class III fire floats are required as per Annexure III of OISD 156.

w. The night operations permission as required under rule 32 of Petroleum Rules, 2002 is not obtained by the Visakha Port Trust for any of the three Hydrocarbon Handling premises ie., OSTT Jetty (Crude oil & HSD from 1989), SPM facility (Crude Oil from 2001) and LPG Jetty/ SS Jetty (from its installation), but has been operating overnight (refer recent accident at SPM facility). The SS Jetty LPG premises seem has no permission from PESO for operations.

x. Periodic audits were not conducted by the VPT. No such records were produced during inspection.

y. There is no Coastal Regulation Zone Permission for the OSTT Jetty. The certificate submitted by the VPT is for the pipeline of HPCL but not for OSTT Jetty of the VPT. Also there are no markers for the pipeline segment with TLPs in required places as there is free access to LFP and pipeline.

z. The Organogram and responsibility matrix related to Hydrocarbon handling in VPT is not established properly either by the VPT or by the HPCL. The VPT is reporting that the responsibility of the premises is of M/s HPCL and the vice versa is claimed by the HPCL.

aa. Both HPCL and VPT were issued several discrepancy letters and in response, self declaration compliances were submitted. However, in subsequent visits to the said premises, it is understood that most of them are not as per your declarations.

bb. The oil spill management facilities seem insufficient as there are two hydrocarbon handling facilities within inner harbour and one at outer harbour (5 km away from shore).

You are advised to rectify above discrepancies along with that in prior issued discrepancy letters and submit to the Chief Controller of Explosives, Nagpur with a copy to this office.

(B. Ravi Kumar),
Dy. Controller of Explosives,
Visakhapatnam.

Copy to: Chief Controller of Explosives, Nagpur

(B. Ravi Kumar),
Dy. Controller of Explosives,
Visakhapatnam.

भारत सरकार
GOVERNMENT OF INDIA
वाणिज्य और उद्योग मंत्रालय
Ministry of Commerce & Industry
पेट्रोलियम तथा विस्फोटक सुरक्षा संगठन
Petroleum and Explosives Safety Organisation
(पूर्व नाम – विस्फोटक विभाग)
(Formerly- Department of Explosives)
'ए'-ब्लाक, पाँचवा तल, केन्द्रीय कार्यालय परिसर,
"A" Block, 5th Floor, CGO Complex,
सेमिनरी हिल्स, नागपुर - 440 006 (महा)
Seminary Hills, Nagpur- 440006

Website : http://peso.gov.in
Email: explosives@explosives.gov.in
दूरभाष/ Telephone : 0712-2510248
फैक्स/ FAX : 2510577
कार्यालयीन उद्देश्य के सभी पत्रादि "मुख्य विस्फोटक नियंत्रक" के पदनाम से भेजे जाए उनके व्यक्तिगत नाम से नहीं.
All communications intended for this Office should be addressed to the 'Chief Controller of Explosives' and NOT to him by name.

स्पीड पोस्ट

पत्रांक / No. G-22 (47)118

दिनांक / Dated : 10/08/2017

14 AUG 2017

To,

The Chief Engineer,
M/s. Visakhapatnam Port Trust,
Visakhapatnam-530 035.

Sub: Approval for augmentation of the capacity utilization of OR-I & OR-II berths at Visakhapatnam Port Trust - regarding.

Dear Sirs,

Please refer to your letter No. ENG/SE-IV/391 dated 27/07/2017 on the above subject and the presentation on the subject matter in this office on 09/08/2017.

Drawing No. VPT/25/2017 & VPT/26/2017 showing the above facility are returned herewith duly endorsed in token of approval for augmentation of the capacity utilization of OR-I & OR-II berths at Visakhapatnam Port Trust subject to following conditions –

1) No ink correction in final as built drawing/plan
2) Safe operation procedure shall be strictly complied with.
3) Copy of on-site emergency plan and Risk Analysis shall be furnished.
4) Necessary clearance/permission from Ministry of Environment & Forest and Ministry of Petroleum & Natural Gas and other statutory authorities shall be furnished.
5) Augmentation of both berths shall not be taken simultaneously and effective isolation shall be made for operation of the respective berth.
6) No maintenance/repairing activities shall be undertaken while carrying out loading/unloading operation of the vessel.
7) Clause wise compliance of OIS 156 shall be furnished while applying for commissioning permission.
8) All the electrical equipments proposed to be installed in Hazardous area of the Berth shall be of type approved by Chief Controller of Explosives. The exhaustive list of all such electrical equipment shall be prepared and furnished to this office.
9) To submit documentary evidence of OR-I & OR-II berths as per Rule 16(1) of Petroleum Rules, 2002.

PTO

Once the above facilities are fully completed/installed, you may approach Dy. Chief Controller of Explosives, Visakhapatnam for inspection of the subject facilities. Further necessary action towards commissioning permission will be considered after receipt of "As Built" drawings without any ink /hand correction or color coding along with compliance of the conditions stipulated above.

This approval/permission does not absolve you from obtaining necessary permission/clearances from other authorities or under other statutes as applicable.

Yours faithfully,

(K.S. Rao)
Controller of Explosives
for Chief Controller of Explosives

Copy forwarded to:

1) The Jt. Chief Controller of Explosives, South Circle, Chennai
2) The Dy. Chief Controller of Explosives, Visakhapatnam. He is advised to inspect the above said facility as when approached by the applicant and submit his detailed report for further necessary action.

for Chief Controller of Explosives

MINISTRY OF SHIPPING

(PORTS WING)

NOTIFICATION

New Delhi, the 13th August, 2018

S.O. 3970(E).—In exercise of the powers conferred under Rule 10(2) (b) of the Explosives Rules 2008, the Central Government, in consideration of the necessity to import/export IMO Class 1 explosives in public interest, hereby notifies Vishakha Containers Terminal Pvt. Ltd (VCTPL) at Visakhapatnam Port Trust for import/export of IMO Class 1 explosives (commercial) in/out of India by sea in accordance with the conditions prescribed by the Petroleum and Explosives Safety Organisation vide its letter No.G. 22(47)/Vizag Port(Expl) dated 12/07/2018.

[F. No. PD-19017/12/2017-PD-V]

RABINDRA AGARWAL, Jt. Secy.

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and Published by the Controller of Publications, Delhi-110054.

ANNEXURE – 10

...రాపోటీ!

* దూసుకుపోతున్న ప్రధాన పార్టీల అభ్యర్థులు
* సిట్టింగ్ ఎమ్మెల్యే పతివాడకే మరో ఛాన్స్ ఇచ్చిన టీడీపీ
* త్రిముఖ పోటీ అనివార్యమంటున్న విశ్లేషకులు

దానికి 20 రోజులు ముందుగానే ప్రచార పర్వాన్ని ప్రారంభించిన నాగ మాధవి టిక్కెట్ ఖరారైన తర్వాత మరింత వేగం పెంచి జనాల హృదయాల్లో గూడు కట్టుకోవాలని గట్టిగా ప్రయత్నం చేస్తున్నారు. జాతీయ పార్టీల విషయానికి వస్తే, బీజేపీ తరఫున పతివాడ రమణకు ఆ పార్టీ అధిష్ఠానం టిక్కెట్ ప్రకటించడంతో ఆయన కూడా పెద్ద ఎత్తున ప్రచారానికి శ్రీకారం చుట్టి ముందుకు సాగుతున్నారు. గతంలో పట్టభద్రుల ఎమ్మెల్సీగా కూడా పతివాడ రమణ ఎన్నికల బరిలో నిలిచిన నైజం ఉండడంతో మరో జాతీయ పార్టీ కాంగ్రెస్ విషయానికి వస్తే నరగని ... టిక్కెట్ కేటాయించింది. ఈయన కూడా ప్రచారానికి శ్రీకారం చుట్టారు.

జైల్లో ఉన్నాను!

* జగన్‌పై టీడీపీ ఎమ్మెల్సీ బాబు రాజేంద్రప్రసాద్ కామెంట్

అమరావతి, ఆంధ్రప్రభ: అవినీతికి బ్రాండ్ అంబాసిడర్ అయిన జగన్ నేను తిన్నాను...నేను ఉన్నాను... అని సైగలతో చెబుతున్నారని, దీనికి బదులు నేను తిన్నాను...నేను జైల్లో ఉన్నాను.. అంతే దాగుంటుందని టీడీపీ ఎమ్మెల్సీ బాబు రాజేంద్రప్రసాద్ వ్యాఖ్యానించారు. మంగళవారం ఉండవల్లి ప్రజావేదికలో మీడియాతో మాట్లాడుతూ ప్రతిపక్షనేత జగన్ బొత్తిగా బహిరంగ సభల్లో అన్నీ అసత్యాలు మాట్లాడరని, టీడీపీ నాయకులు, కార్యకర్తలు అందరూ ... చేసుకున్నారని జగన్ అనటం దివాళాకోరుతనానికి నిదర్శనమన్నారు. ... జగన్‌కే ఉన్నాయన్నారు. ... తెలంగాణ ... నేరుగా లబ్ధిదారులకు సంక్షేమ పథకాలు అందిస్తున్నామన్నారు. రాష్ట్రం పోలవరం పూర్తి చేస్తాను అని జగన్ చెబుతున్నారని, పోలవరాన్ని చంద్రబాబు చేపట్టి అప్పటికే ... శాతం పనులు పూర్తిచేశారని, త్వరలో పూర్తిచేయడానికి సిద్ధంగా ఉందని, ... ప్రతిపక్షనేతగా జగన్ ... కనిపించడం విస్మయపరుస్తున్నారు. ఇప్పటికైనా జగన్ వాస్తవాలు తెలుసుకుంటే మంచిదని హితవు పలికారు.

కోటి రూపాయల నగదు పట్టివేత

(... పట్నం), ప్రభ న్యూస్: విశాఖ జిల్లా నక్కపల్లి మండలంలో కారులో తరలిస్తున్న కోటి ... నగదు పట్టుకున్నారు. దీనికి సంబంధించిన వివరాలు ఇలా ఉన్నాయి. ఎన్నికల ... నేపథ్యంలో ... పోలీసులు చెక్ పోస్టు ఏర్పాటు చేసి వాహన తనిఖీలు నిర్వహిస్తుండగా ... రూపాయల నగదును గుర్తించారు. వాహనంలో ఉన్నవారిని ప్రశ్నించగా, తాము ... బ్యాంకుకు తరలిస్తున్నామని, నగదు విశాఖలోని సీతంపేట ఏపీజీవీబీ నుండి పాయకరావుపేట బ్యాంకుకు ... కారులో తరలిస్తున్నారు ... ఆ నగదుకు సంబంధించి సరైన ధృవపత్రాలు ... పాయకరావుపేట ట్రెజరీకి తరలించారు. ఎస్.ఎస్.టి. ... రావు, నక్కపల్లి సీఐ, ఎం. శ్రీనివాసరావు, ఎస్సై ... ఈ దాడిలో ... నగదును మండలం ... అప్పగించినట్లు తెలిపారు.

ఫిరాయింపులతో ఖూనీ!

* తెలంగాణ భూములు దోచిన జగన్‌కు కేసీఆర్ మద్దతు ఇస్తారా? : టీ టీడీపీ నేత రావుల

హైదరాబాద్, ఆంధ్రప్రభ: ముఖ్యమంత్రి చంద్రశేఖరరావు పార్టీ ఫిరాయింపులను ప్రోత్సహిస్తూ ప్రజాస్వామ్యాన్ని ఖూనీ చేస్తున్నారని తెలుగుదేశం పార్టీ పొలిట్‌బ్యూరో సభ్యుడు రావుల చంద్రశేఖర్‌రెడ్డి దుయ్యబట్టారు. ... ఫిరాయిస్తేనే నియోజకవర్గాల్లో అభివృద్ధి జరుగుతుందని ఎమ్మెల్యేలు చెప్పడం ప్రజలను మోసం చేయడమేనని మంగళవారం జరిగిన విలేకరుల సమావేశంలో ఆయన అన్నారు. తెలంగాణ భూములు కొల్లగొట్టి, ఆస్తులు దోపిడీ చేసి 16 నెలలు జైలులో కూర్చున్న వైకాపా అధ్యక్షుడు జగన్‌కు గెలవాలని కేసీఆర్, కేటీఆర్‌లు ఎలా ... కోరుకుంటారని ఆయన ప్రశ్నించారు. ఫెడరల్ ఫ్రంట్ ఏర్పాటుచేసి ప్రభంజనం సృష్టిస్తామని ప్రగల్భాలు పలికిన కేసీఆర్ ఇప్పుడు మాటమార్చి జాతీయ పార్టీ అంటూ కొత్త రాగం ఎత్తుకున్నారని రావుల ఎద్దేవా చేశారు.

"MoEF&CC", ఢిల్లీ వారు ... పర్యావరణ అనుమతి ... OR-I & OR-2 ... సంబంధించిన ఉత్తర్వు ... ప్రకారం F.No.10-62/2016-IA-III తేది.07.03.2019 EC&CRZ క్లియరెన్స్ లభించినది. సదరు పర్యావరణ క్లియరెన్స్ ఉత్తర్వు కాపీ MoEF&CC, GoI వారి అధికారిక వెబ్‌సైట్ at http://envfor.nic.in" నందు కలదు.

"MoEF&CC", ఢిల్లీ వారు ... పర్యావరణ అనుమతి ... EQ-2 నుండి EQ-5 ... సంబంధించిన ఉత్తర్వు ... ప్రకారం F.No.11-19/2015-IA-III తేది 07.03.2019 EC&CRZ క్లియరెన్స్ లభించినది. సదరు పర్యావరణ క్లియరెన్స్ ఉత్తర్వు కాపీ MoEF&CC, GoI వారి అధికారిక వెబ్‌సైట్ at http://envfor.nic.in" నందు కలదు.

NO R... HAS ...

...'garh

Scanned by CamScanner

TIMES

THE TIMES OF INDIA, VISA[...]

FINANCE MINISTER ARUN JAITLEY SLAMS OPPOSITION-RULED STATES FOR 'ROBBING FARMERS' OF PM-KISAN SCHEME BENEFI[...]

Pulwama attack: CRPF will not celebrate Holi

Gurgaon: The CRPF will not officially celebrate Holi this year as a mark of respect to its 40 jawans killed last month in a suicide attack in Jammu and Kashmir, where the force eliminated 210 terrorists in 2018, the force's chief said on Tuesday.

During an event to the mark 80th raising day of the force at its group centre here, CRPF Director General (DG) R R Bhatnagar also said the influence of left-wing extremists or Naxals has reduced by 40 per cent and only a few areas in the country are now affected. Paying tributes to the slain personnel, the DG said the force is creating a mobile app in order to provide help to the families of jawans killed in action. "There will be no official celebrations in the force during the Holi festival on March 21 as a mark of respect to the 40 troops killed in the suicide attack in Pulwama on February 14," the DG said. en

BJP-led govt faces fl[...] today, CM Sawant c[...]

'Will Deal With People Like Parrikar Did'

Pramod Sawant was sworn in as CM during the early hours of Tuesda[...]

Panaji: The new BJP-led government in Goa will face the floor test in the state Assembly on Wednesday to prove its majority just a day after Speaker Pramod Sawant was sworn in as chief minister with an unprecedented two deputies past midnight capping a frenetic day of political wrangling.

The government claims majority with the support of 21 MLAs —12 from the BJP, three each of allies Goa Forward Party (GFP) and Maharashtrawadi Gomantak Party (MGP) and three independents. The strength of the 40-member House has been reduced to 36 following the death of chief minister Manohar Parrikar and BJP MLA Francis D'Souza and resignations of two Congress MLAs Subhash Shirodkar and Dayanand Sopte.

The Congress, which is the single largest party with 14 MLAs, had also staked claim to form the government. There is also an NCP legislator in the House. Governor Mridula Sinha has convened a special session of the Assembly at 11.30 am Wednesday to enable the chief Minister to prove his majority in the House, an official said. After multiple postponements of the oath ceremony o[...] Monday, Sawant, a two-tim[...] MLA from Sankhalim i[...] North Goa, was sworn in a[...] the Raj Bhavan at 1.50 am. A[...] ayurveda practitioner, Sawant is also a dedicated RSS worker.

Reflecting a generational shift in the BJP, Sawant, 45, was administered the oath of office and secrecy along with 11 other ministers including those from the MGP and the GFP. He succeeded Parrikar, who died on Sunday after

Woman naxal killed in C[...]

Rajnandgaon: A woman Naxal, carrying a[...] gunned down on Tuesday in an encounter[...] garh's Rajnandgaon district, police said. Th[...] muna alias Sagun Bai, 46, was allegedly inv[...] minister in the erstwhile Madhya Pradesh [...] dent of Police Kamlochan Kashyap said.

Jamuna was working as a secretary of [...] s. The skirmish took plac[...] lice station area, when a[...] Chhattisgarh and Madhy[...] al operation along the int[...]

SPYWARE SCANDAL

Pegasus may be shut down or its creator NSO sold

Tory unrest against Boris grows with Covid curbs vote

Tornado toll rises to 88 in five US states

Kids get sucked into raging storm

- Trey and Meghan Rackley and their three daughters sought shelter in a windowless bathroom in their southwest Missouri home as storms raged across the middle of the US
- To prove they were in their "safe space" with the storm approaching Friday evening, the girls' mom texted her aunt Sandy a photo of the three in and next to the bathtub — all of them smiling, Annalyn holding her favorite doll (see photo above)
- Fifteen minutes later, Sandra Hooker said, a tornado splintered the home, carrying the family members dozens of yards through the air into a field where first responders found them in mud. Annalyn, a third-grader who loved swimming, dancing and cheerleading, died, one of dozens killed in five states
- The other family members were injured, but survived. Seven-year-old Avalinn told doctors she flew around "in the tornado," Hooker said

Afghans angry after US lets soldiers off the hook

ASIA MATTERS

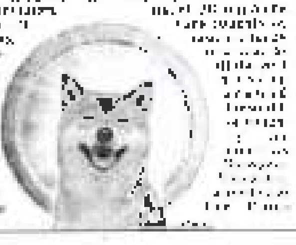
EXPRESS READS

At least 60 die after fuel gas tanker explodes in Haiti

Toyota boosts electric vehicle sales target

'Time running out on Iran Nuke deal'

Field day for Doge after Musk gives greenlight



సీమ, ఉత్తరాంధ్ర జిల్లాల కోసం

మూడు రాజధానులే ముద్దు

ఓటీఎస్‌తో సర్వ హక్కులు

మా బహిరంగ సభకు అనుమతివ్వండి

వేతనాలు... పెన్షన్లపై సీఎస్‌వి తప్పుడు లెక్కలు

ANDHRA PRABHA - DAILY

dt. 15.12.2021 (WEDNESDAY)

ఆర్డర్ నెం.ఎస్ఇఐఎఎ/ఎపి/విఎస్పి/ ఐఎన్‌డి/06/2019/1027167.74 & 164.65 - తేది: 26.10.2021 ప్రకారం విశాఖపట్నం పోర్ట్ ట్రస్ట్, విశాఖపట్నం వద్ద క్రూజ్-కం-కోస్టల్ కార్గో టెర్మినల్ యొక్క అభివృద్ధి ప్రాజెక్టు కొరకు ఇసి & సిఆర్‌జడ్ క్లియరెన్స్ "ఎంఓఇఎఫ్ & సిసి" కొత్త ఢిల్లీ వారిచే ఇవ్వబడినది. క్లియరెన్స్ లేఖల యొక్క ప్రతి ఎంఓఇఎఫ్ & సిసి యొక్క అధికారిక వెబ్‌సైట్ http://envfor.nic.in వద్ద అందుబాటులో కలదు.

ఆంధ్రప్రభ - దినపత్రిక B: 15.12.2021 (బుధవారము)

ANNEXURE – 11

Environment Management

Environment Management

The Port of Visakhapatnam, Environment Management wing is maintaining harmony between Port development and environmental protection.

Port of Visakhapatnam is accredited with ISO Certification (ISO 14001) by the Indian Register of Quality Systems for the Environmental Management System standards in all its activities including related support services.

An Environmental Monitoring Committee (EMC) is in place with members representing Citizen Welfare Associations, NGOs, Academic Institutions, Industries/Defense, Trade, Observers from APPCB, Government Organization's and Senior Officers of the Port. The Committee reviews the implementation of long term and short term directives issued by APPCB and also reviews the environmental activities to be implemented by the Port. The Committee also inspects various operational areas of the Port and advises improvements on the Enviro
out and gives suggestions for additional Environmental pollution mitiga
necessary based on the requirements from time to time.

Statutory Documents.

Environmental Clearance – EC Costal Regulation Zone - CRZ	Consent for Establishment - CFE	Consent for Operations – C
EC-1 Half Year Report-2023	CFE FOR OR1&2	CFO-Compliance Report Oct,2023
EC for VGCB	CFE FOR WQ7&8	CFO FOR Cruise cum Cargo Terminal
EC for WQ-6, WQ-8 and EQ-10	CFE FOR EQ-2 TO EQ-5	CFO FOR VGCB
EC for OR-I and OR-II	CFE FOR Cruise cum Cargo Terminal	CFO FOR VPA
EC for Multipurpose Berth		
EC for OHC, WQ-7 & WQ-8, Container Teminal-1		
EC for LPG Handling Jetty		
EC for Iron Ore Handling Faclity		
EC for EQ-2 to EQ- 5		
EC for EQ-1A & EQ-1		
EC for Cruise cum Cargo Terminal		
EC for 4 Multi Purpose Berths		

FOG CANNON

SWEEPING MACHINE

Hi I am Port Assistant

Environmental Form-V statement for FY 31-03-2023 **Environmental Clearance for various projects of VPA 2nd Half Year-2022**

Three Sub-Committees are constituted to review and monitor AAQ (Ambient Air Quality), Green Belt Development and Hazard Management. The EMC reviews the findings of the Sub-Committees and advises suitably on the environmental improvement measures.

Environmental cell has been established to monitor the environmental activities of the Port, duly appointing persons qualified in the field of Environment Management.

The measures taken by the Port to mitigate Environmental Pollution include:

- Monitoring of Ambient Air Quality at six locations in and around the Port area by Port and third parties like Andhra University Development Center and APPCB.
- Monitoring of harbour water quality at regular intervals through Andhra University Development Center.
- Monitoring of STP waters before and after treatment at regular intervals.
- Regular monitoring of pollution control measures in and around Port area and residential areas.
- Preparation of Environmental Management Action Plan and Comprehensi and land use plan for all occupied and unoccupied areas for the next MECON, Ranchi.
- Distribution of pamphlets and display of message boards on Environment Management.
- Development of Environmental Parks/ Nurseries and maintenance of Islands in and around Port areas.

- Continuous development of Green Belt in and around Port area.
- Mechanization of Cargo Handling Operations in phases.
- Monitoring effluent of Port based industries before discharging into Port Waters and ensuring that they posses consent of APPCB for their activities.

The Port is taking all possible measures to contain the pollution and the maintain the ambient air quality within permissible limits. In addition to the above measures, the Port is

- Modernizing the cargo handling facilities for coal, iron ore, fertilizers etc.,
- Re-organizing stack yards
- Insulating coal stack yards by providing high rise walls along with dust suppression system as long term measure to avoid dust pollution.
- Implemented MDSS (Mechanical Dust Suppression System) Automation in 04 pump houses and 100 sprinklers branches using PLC and SCADA.
- Developed a truck parking terminal to facilitate parking of 667 trucks and trailers to prevent traffic congestion on port roads.
- Deployed 02 nos of Mechanical road sweeping machine and 02 nos of dry fog machine to the various locations for mitigation of dust and air pollution.

Environmental Compliances:

- Filing of returns in the compliance (annual/half yearly) to the conditions put forth by MoEF& CC/APPCB/CPCB at the intervals specified in the consent order. Maintaining records in environmental cell and put up the same to EMC meetings/ HOD meetings.
- Maintenance of QMS, EMS & OHSAS records and files and putforth during internal or external auditing.
- Liasioning with the monitoring agencies engaged in Environment monitoring works.
- Submission of the required data for presenting at the time of attending the court trials. Filing of remarks and reasons with reference to court cases being filed against pollution caused as and when required.
- Collection and submission of information after proper scrutiny to the person who requests the information under RTI Act rule.
- Filling of online application with MoEF & CC for environmental clearanc expansion projects,

Environment Management System of VPA

Environment Management System at VPA
Environmental Form-V statement for FY 31-03-2022
Environmental Clearance for various projects of VPA 2nd Half Year-2022
EMS Sustainable development measures by VPA
Environment Management System of VPA

Visakhapatnam Port Authority, Port Area, Visakhapatnam-530035
e-reg.vpt@gov.in
+91 8912873677
FAX: +91- 891- 2565023
GST No. 37AAALV0035C1ZE
PAN: AAALV0035C

Important Links

Life certificate for Pensioner's of VPA
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VPA Online Payment
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Hi I am Port Assistant

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Gati Shakti

Vigilance Corner

Citizens / Employees Corner

Posts from @vptIndia **Follow**

Visakhapatnam @ · Apr 28

Visakhapatnam Port Authority Welcomes #TheWorld ! @shipmin_india

5 200

Website visitors

Hi I am Port Assistant

ANNEXURE – 12

विशाखपट्टणम पोर्ट प्राधिकरण
सिविल इंजीनियरिंग विभाग
प्रशासनिक भवन, पोर्ट क्षेत्र
विशाखपट्टणम – 530035 (आ.प्र.)

విశాఖపట్నం పోర్ట్ అథారిటీ
VISAKHAPATNAM PORT AUTHORITY
CIVIL ENGINEERING DEPARTMENT
Administrative Building, Port Area
Visakhapatnam – 530035 (A.P)

SAGARMALA
PORT-LED PROSPERITY

No.: IENG/Env.Cell/Form-V/2023
Date: 30.09.2023

To,
The Environmental Engineer,
Regional Office,
A.P. Pollution Control Board,
Beside RTA Office,
Madhavadhara VUDA Layout,
Visakhapatnam – 530018.

Sir,

Sub: Submission of Environmental Statement Form-V –Reg.
Ref: As per EC General Conditions.

Please find herewith the Environmental Statement in Form-V for the Financial Year ending 31.03.2023 as per Rule No.: 14 of E(P) Act, 1986.

Encl: As above

11/10/23 12.28 PM
DESPATCHED

Yours faithfully,

CHIEF ENGINEER
CHIEF ENGINEER
विशाखपट्टणम पोर्ट ट्रस्ट
Visakhapatnam Port Trust

Annexure - D

Environmental and CRZ Clearance

For

Modernization of existing facility and addition of **new facilities entailing capacity** at Visakhapatnam port vide letter dated **25.05.2016 bearing F.No:11-93/2012-IA III**.

Amendments

i. **Development of WQ-7 & WQ-8 berth in the Northern arm of Inner Harbour of Visakhapatnam Port Trust Revised scope of proposal for handling of multiple cargo through semi mechanized mode vide letter dated 21.11.2022 bearing F.No.:11-93/2012-IA.III**

ii. **Modernization of existing facilities and addition of New facilities entailing capacity at Visakhapatnam Port by M/s Visakhapatnam Port Trust - Amendment in Environmental and CRZ Clearance - Subsequent Amendments F.No.11-93/2012-IA.III vide letter dated 16th November, 2018**

iii. **Modernization of existing facilities and addition of New facilities entailing capacity at Visakhapatnam Port by M/s Visakhapatnam Port Trust - Amendment in Environmental and CRZ Clearance - Subsequent Amendments F.No.11-93/2012-IA.III vide letter dated 17th May, 2017**

Compliance on Conditions of Environmental Clearance for (OHC&WQ-1), (WQ-7&8), Container Terminal

ENVIRONMENT CLEARANCE CONDITIONS		
S. No.	**Specific Conditions**	**Compliance Status for the period of Apr'24 – Sep'24**
i	The environmental clearance is subject to obtaining prior clearance from Wildlife angle including clearance from the Standing Committee of the National Board for Wildlife as applicable.	**Complied.** VPA obtained NBWL Clearance. Copy is Enclosed as **Annexure - 1**
ii	Construction activity shall be carried out strictly according to the provisions of CRZ Notification, 2011. No construction work other than those permitted in Coastal Regulation Zone Notification shall be carried out in Coastal Regulation Zone area.	**Complied.** VPA Strictly followed CRZ Rules and Environmental Clearance Conditions.
iii	The Project proponent shall ensure that there shall be no damage to the existing mangroves patches near site and also ensure the free flow of water to avoid damage to the mangroves.	**Noted for Comply.** Existing Mangroves are far away from the port activities.
iv	The Project proponent shall ensure that no creeks or rivers are blocked due to any activities at the project site.	**Noted for Comply.** No blockages of any creeks or rivers will be ensured due to any of the VPA project activities.
v	Shoreline should not be disturbed due to dumping. Periodical study on shore line changes shall be conducted and mitigation carried out, if necessary. The details shall be submitted along with the six monthly monitoring report.	**Complied.** • Periodical study on shore line changes is ensured by VPA on regular basis as directed. • Details of Shoreline study by APSAC (Andhra Pradesh Space Application Centre) are enclosed as **Annexure - 2**.
vi	The commitments made during the Public Hearing and recorded in the Minutes shall be complied with letter and spirit. A hard copy of the action taken shall be submitted to the Ministry.	**Complied.** The detailed compliance status of commitments made by VPA during the Public Hearing was enclosed as **Annexure - 3**.
vii	All the conditions stipulated in the earlier Clearance including the recommendations of Environment Management Plan, Disaster management Plan shall be strictly complied with.	**Complied.** The detailed compliance status of Recommendations in Environment Management Plan and Disaster Management Plan is enclosed as **Annexure - 4**.
viii	Cargo shall be unloaded directly into hopper from the ship and transported to the stack yards through closed conveyor system only. Inbuilt dust suppression systems shall be provided at hoppers and all the transfer points / storage yards. Cargo shall not be unloaded directly onto the berth. Water meters shall be provided at different locations to record the consumption of water used for dust suppression and daily log shall be maintained.	**Complied.** VPA provided water meters at different locations for recording the consumption of water is used for dust suppression duly maintain the log book photographs are enclosed as **Annexure - 5**.
ix	Disposal sites for excavated material should be so designed that the revised land use after dumping and changes in the land use pattern do not interfere with the natural drainage.	**Complied.** Construction work is completed.
x	There shall be no ground water drawl in no development zone of CRZ area.	**Complied.** VPA not withdrawal of ground water in CRZ area.
xi	Necessary arrangements for the treatment of the effluents and solid wastes must be made and it must be ensured that	**Complied.** VPA is not having any processing

	they conform to the standards laid down by the competent authorities including the Central or State Pollution Control Board and under the Environment (Protection) Act, 1986.	facility in port area. The Generated solid waste being collected and disposed at Kapuluppada GVMC dumping yard. The Plastic Waste is collected from geddas and disposed to M/s. Jindal Visakhapatnam Urban Waste Management for power generation from solid waste.
xii	All the operational areas will be connected with the network of liquid waste collection corridor comprising of storm water, oily waste and sewage collection pipelines.	**Complied.** VPA developed good network connection for storm water drains. The city sewage water is treated in 10MLD STP and treated water being used for dust suppression in Port area.
xiii	Marine ecology shall be monitored regularly also in terms of sea weeds, sea grasses, mudflats, sand dunes, fisheries, echinoderms, shrimps, turtles, corals, coastal vegetation, mangroves and other marine biodiversity components as part of the management plan.	**Complied.** VPA carried out marine ecology study by Andhra University, the copy is enclosed as **Annexure - 6**.
xiv	The marine ecology management plan being drawn up with regards to the environmental impacts of natural disasters, oil spills and other wastes, dredging and dumping on marine ecology (all micro, macro and mega biotic components) shall be scrupulously implemented. It shall be ensured that the marine ecology in the area of influence is not adversely affected.	**Complied.** VPA having DMP, Oil Spill Contingency Plan, Emergency Preparedness Plan. VPA carried out marine ecology study by AUDC.
xv	Marine ecology shall be monitored regularly also in terms of all micro, macro and mega floral and faunal components of marine biodiversity	**Complied.** Same as Specific Condition no. xiii & xiv.
xvi	Measures should be taken to contain, control and recover the accidental spills of fuel and cargo handle.	**Complied.** VPA having Oil Spill Contingency Plan, Disaster Management Plan with well-equipped and trained personnel. Extracted pages of Oil Spill Contingency Plan are enclosed as **Annexure - 7**.
xvii	All the mitigation measures submitted in the EIA report shall be prepared in a matrix format and the compliance for each mitigation plan shall be submitted to the RO MoEF&CC along with half yearly compliance report.	**Complied.** The EIA matrix format is enclosed as **Annexure - 8**.
xviii	Ships/barges/vessels calling at the jetty shall not be allowed to release any oily bilge waste or ballast water/ dump wastes during the berthing period in the sea. Any effluents from the Jetty which have leachable characteristics shall be segregated and recycled/disposed as per SPCB guidelines.	**Complied.** VPA implemented MARPOL at port, as an ISO 14000:2015 complainant port, VPA provided reception facility for collection of Bilge / Ballast Water from ships and it is disposed by authorized agencies through APEMCL portal.
xix	Location of DG sets and other emission generating equipment shall be decided keeping in view the predominant wind direction so that emissions do not effect nearby residential areas. Installation and operation of DG sets shall comply with the guidelines of CPCB.	**Complied.** DG Sets are arranged at predominant wind direction.
xx	All the mechanized handling systems and other associated equipment such as hoppers, belt conveyors, stacker cum reclaimers shall have integrated dust suppression systems. Dust suppression systems shall be provided at all transfer	**Complied.** VPA implemented MDSS (Mechanical Dust Suppression System) at hoppers, at all transfer

	point.	points of belt conveyors, at stacker cum Reclaimers those are fully mechanized berths Photographs are enclosed at **Annexure - 9**.
xxi	No product other than permitted under the CRZ Notification, 2011 shall be stored in the CRZ area.	**Complied.** No other than permitted product is handled at VPA.
xxii	The quality of treated effluents, solid wastes, emissions and noise levels and the like, from the project area must conform to the standards laid down by the competent authorities including the Central or State Pollution Control Board and under the Environment (Protection) Act, 1986.	**Complied.** VPA monitored STP water, AAQ and Noise Levels in the site and confirmed with the CPCB Standards. All parameters are within the prescribed standards. Monitoring reports are enclosed as **Annexure - 10**.
xxiii	All the mitigation measures suggested in the EIA report and the marine environment study of CWPRS, Pune shall be implemented. The compliance for each of these measures shall be submitted to concerned SPCB and R.O. of this Ministry along with six monthly compliance reports.	**Complied.** VPA Strictly followed the CWPRS guidelines. The copy CWPRS recommendations are enclosed as **Annexure - 11**.
xxiv	Periodical study on shore line changes shall be conducted and mitigation carried out, if necessary. The details shall be submitted along with the six monthly monitoring report.	**Complied.** Details of Shoreline study by APSAC (Andhra Pradesh Space Application Centre) are enclosed as **Annexure - 2**.
xxv	It shall be ensured by the Project Proponent that the activities does not cause disturbance to the fishing activity, movements of fishing boats and destruction to mangroves during the construction and operation phase.	**Complied.** VPA established fishing harbour for fishermen and the port activities are not disturbing any existing mangroves.
xxvi	The Project Proponent shall take up and earmark adequate fund for socioeconomic development and welfare measures as proposed under the CSR Programme. This shall be taken up on priority.	**Complied.** The detailed report on item wise expenditure incurred for Socio Economic Development under CSR Programme for the year 2024-25 is enclosed at **Annexure-12**.
xxvii	The project proponent shall set up separate environmental management cell for effective implementation of the stipulated environmental safeguards under the supervision of a Senior Executive.	**Complied.** A separate environment cell is established with qualified personnel for implementation of stipulated measures on environmental safe guards under the supervision of Chief Engineer.
xxviii	The funds earmarked for environment management plan shall be included in the budget and this shall not be diverted for any other purposes.	**Complied.** The detailed report on item wise expenditure incurred for environment management plan for the year of 2024-25 is enclosed at **Annexure - 13**.
xxix	The proponent shall abide by all the commitments and recommendations made in the EIA / EMP report so also during their presentation to the EAC.	**Complied.** The details of EIA / EMP recommendations and VPA compliance status is enclosed as **Annexure - 4**.
xxx	10m thick greenbelt shall be developed on the periphery of the area proposed to be developed for WQ- North (WQ-7 & WQ-8) berth in the inner Harbour of Visakhapatnam Port.	**Complied.** VPA developing green belt 10 m. at berths (Photographs are enclosed at **Annexure - 14)**.

xxxi	Company shall have own Environment Management Cell having qualified persons with proper background.	**Complied.** A separate environment cell is established with qualified (Master's Degree in Environmental Sciences along experience in the same field) personnel for implementation of stipulated measures on environmental safe guards under the supervision of Chief Engineer.
xxxii	Company shall prepare operating manual in respect of all activities. It shall cover all safety & environment related issues and system. Measures to be taken for protection. One set of environmental manual shall be made available at the project site. Awareness shall be created at each level of the management. All the schedules and results of environmental monitoring shall be available at the project site office.	**Complied.** An operation manual with well-structured EMPs and SOPs prepared by ASCI, Hyderabad is available with port for entire port operations including existing and proposed projects.
xxxiii	Corporate Social Responsibility:	
	a. The Company shall have a well laid down Environment Policy approved by the Board of Directors.	**Complied.** VPA is ISO 9001:2015; ISO 14001:2015 and ISO 45001:2018 Complainant port. As per Harit Sagar Green Port Guidelines the Visakhapatnam Port Authority Policy was updated.
	b. The Environment Policy shall prescribe for standard operating process / procedures to bring into focus any infringements / deviation / violation of the environmental or forest norms/ conditions.	**Complied.** VPA is ISO 9001:2015; ISO 14001:2015 and ISO 45001:2018 Complainant port. VPA conducting internal and external audits.
	c. The hierarchical system or Administrative Order of the company to deal with environmental issues and for ensuring compliance with the environmental clearance conditions shall be furnished.	**Complied.** The Environmental Organisation chart is enclosed as **Annexure-15.**
	d. To have proper checks and balances, the company shall have a well laid down system of reporting of non-compliance/violations of environmental norms to the Board of Directors of the company and/or shareholders or stakeholders at large.	**Complied.** VPA Regularly Monitor the PPP/ BOTs including VPA activities and ensuring the environmental pollution control measures by separate wing of Environmental Task Force Team.
	General Conditions	**Compliance Status for the period of Apr'24 – Sep'24**
i	'Consent for Establish' shall be obtained from State Pollution Control Board under the Air (Prevention and Control of Pollution) Act, 1981 and the Water (Prevention and Control of Pollution) Act, 1974.	**Complied.** CFO Order No. APPCB/VSP/ VSP/45/CFO/HO/1933 dated 13.04.2024
ii	Appropriate measures must be taken while undertaking digging activities to avoid any likely degradation of water quality.	**Complied.** VPA carried out at regular intervals marine sediment analysis by M/s. S.V. Enviro Labs & Consultancy Services

iii	Full support shall be extended to the officers of this Ministry/ Regional Office at Bangalore by the project proponent during inspection of the project for monitoring purposes by furnishing full details and action plan including action taken reports in respect of mitigation measures and other environmental protection activities.	**Noted and Complied.**
iv	A six-Monthly monitoring report shall need to be submitted by the project proponents to the Regional Office of this Ministry at Bangalore regarding the implementation of the stipulated conditions.	**Complied.** VPA Carried out Environmental Monitoring and the Reports are enclosed as **Annexure - 10**.
v	Ministry of Environment, Forest and Climate Change or any other competent authority may stipulate any additional conditions or modify the existing ones, if necessary in the interest of environment and the same shall be complied with.	**Noted for Comply.**
vi	The Ministry reserves the right to revoke this clearance if any of the conditions stipulated are not complied with the satisfaction of the Ministry.	**Noted.**
vii	In the event of a change in project profile or change in the implementation agency, a fresh reference shall be made to the Ministry of Environment, Forest and Climate Change.	**Noted and Complied.**
viii	The project proponents shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of start of land development work.	**Complied.**
ix	A copy of the clearance letter shall be marked to concerned Panchayat/local NGO, if any, from whom any suggestion representation has been made received while processing the proposal.	**Complied.**
x	A copy of the environmental clearance letter shall also be displayed on the website of the concerned State Pollution Control Board. The EC letter shall also be displayed at the Regional Office, District Industries centre and Collector's *Officel* Tehsildar's office for 30 days.	**Complied.**
11.	These stipulations would be enforced among others under the provisions of Water (Prevention and Control of Pollution) Act 1974, the Air (Prevention and Control of Pollution) Act 1981, the Environment (Protection) Act, 1986, the Public Liability (Insurance) Act, 1991 and EIA Notification 1994, including the amendments and rules made thereafter.	**Noted for Comply.**
12.	All other statutory clearances such as the approvals for storage of diesel from Chief Controller of Explosives, Fire Department, Civil Aviation Department, Forest Conservation Act, 1980 and Wildlife (Protection) Act, 1972 etc. shall be obtained, as applicable by project proponents from the respective competent authorities.	**Complied.** The NOC photo copies are enclosed as **Annexure - 16**.
13.	The project proponent shall advertise in at least two local Newspapers widely circulated in the region, one of which shall be in the vernacular language informing that the project has been accorded Environmental and CRZ Clearance and copies of clearance letters are available with the State Pollution Control Board and may also be seen on the website of the Ministry of Environment, Forest and Climate Change at http://www.envfor.nic.in. The advertisement should be made within Seven days from the date of receipt of the Clearance letter and a copy of the same should be forwarded to the ~ Regional office of this Ministry at Bangalore	**Complied.** Photo copies of advertisement published by VPA in newspaper are enclosed at **Annexure - 17**.

14.	This Clearance is subject to final order of the Hon'ble Supreme Court of India in the matter of Goa Foundation Vs Union of India in Writ Petition (Civil) No.460 of 2004 as may be applicable to this project.	**Noted.**
15.	Status of compliance to the various stipulated environmental conditions and environmental safeguards will be uploaded by the project proponent in its website.	**Complied.** VPA ensures for uploading of EC compliance report in the VPA website. Screen shot is attached at **Annexure - 18**.
16.	Any appeal against this Clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.	**Noted.**
17.	A copy of the clearance letter shall be sent by the proponent to concerned Panchayat, Zilla Parisad / Municipal Corporation, Urban Local Body and the Local NGO, if any, from whom suggestions/representations, if any, were received while processing the proposal. The clearance letter shall also be put on the website of the company by the proponent.	**Complied.** In VPA website the Environmental Clearances for various projects of Visakhapatnam Port Authority is available.
18.	The proponent shall upload the status of compliance of the stipulated EC conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of MoEF&CC, the respective Zonal Office of CPCB and the SPCB	**Complied.** The Status of Environmental Clearance Compliance report with Environmental Monitoring data was uploaded in Visakhapatnam Port Trust website. The same copy was send to I.R.O., MoEF&CC, Vijayawada.
19.	The environmental statement for each financial year ending 31st March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of EC conditions and shall also be sent to the respective Regional Offices of MoEF&CC by e-mail.	**Complied.** Form-V is submitted to Environment Engineer, R.O., APPCB, Visakhapatnam on 30.09.2024. Photo copy is enclosed as **Annexure - 19**.

Compliance on Conditions of Environmental Clearance of Amendment vide letter dated 21.11.2022 for Development of WQ7 & WQ8 berth in the Northern arm of Inner Harbour at Visakhapatnam Port.

	ENVIRONMENT CLEARANCE AMENDMENT ADDITONAL GENERAL CONDITIONS	
Sl.No	**Conditions**	**Compliance Status for the period of Apr'24–Sep'24**
i.	All the conditions in the Environmental and CRZ Clearance letter F. No.11-93/2012-IA-III dated 25.05.2016 and subsequent amendments vide letter even no. dated 17.05.2017 and 16th November, 2018 shall remain unchanged.	**Noted and Complied.**
ii.	Risk assessment for spill scenarios and Disaster Management Plan as prepared shall be in place in the environment Management cell of VPT will all SOP's for various scenarios.	**Noted and Complied.** VPA conducted Risk Assessment Study by National Productivity Council, New Delhi. The extracted pages are enclosed as **Annexure–21.**
iii.	Continuous Ambient Air quality monitoring stations shall be installed, covering all the berths for assessment of regular pollution level on landward side.	**Complied.** As per PCB directions 3 continuous Ambient Air Quality Monitoring Stations are arranged at different locations in port area. Geographical map is enclosed as **Annexure-22.**
iv.	Dust suppression shall be regularly carried out with water sprinkling and other measures.	**Complied.** • VPA taken necessary actions on Dust Suppression Measures in Port area by Arrangement of MDSS (Mechanical Dust Suppression System) for all cargo handling areas and stocking areas. • In addition to this VPA proposed 4 no.s of Covered Storage Sheds, in that 3 no.s of covered sheds are constructed and occupied in port area. Another one is to be completed in the month of Dec, 2024. • VPA deployed Water Tankers for wetting of roads and stock yards to suppress the dust emissions. • Mechanical Road Sweeping Machine are deployed. • Manual Sweepers are arranged for cleaning of spillage on internal roads and drains. • 9no.s of Fog Canons machines are arranged at Cargo Loading and Unloading areas.
v.	Records of regular dredging shall be maintained with periodic survey data.	**Complied.** Dredging details are enclosed as **Annexure-23**.
vi.	Sediment analysis of harbor at identified locations shall be analyzed and records for past and present period shall be maintained.	**Complied.** VPA carried out Sediment Analysis by Accredited Laboratory of M/s. S.V. Enviro Labs.

Modernization of existing facilities and addition of New facilities entailing capacity at Visakhapatnam Port by M/s Visakhapatnam Port Trust - **Amendment** in Environmental and CRZ Clearance - **F.No.11-93/2012-IA.III vide letter dated 16th November, 2018**

Point no. 4: All other conditions in the Environmental and CRZ Clearance letter F.No. 11-93/2012-IA-III dated 25.05.2016 and subsequent amendment vide letter dated 17.05.2017, shall remain **unchanged**.

Modernization of existing facilities and addition of New facilities entailing capacity at Visakhapatnam Port by M/s Visakhapatnam Port Trust - **Amendment** in Environmental and CRZ Clearance - Subsequent Amendments **F.No.11-93/2012-IA.III vide letter dated 17th May, 2017**

Point no. 6: All other conditions stipulated in the Environmental and CRZ Clearance letter No. 11-93/2012-IA-III dated 25.05.2016 shall remain **unchanged**.

ANNEXURE – 1

GOVERNMENT OF ANDHRA PRADESH
FOREST DEPARTMENT

From:
Sri K.S.Reddy, I.F.S.,
Prl.Chief Conservator of Forests (WL) &
Chief Wildlife Warden,
Aranya Bhavan,
Agathavarappadu,
Guntur.

To:
The Deputy Chairman,
Visakhapatnam Port Trust,
Administrative Building,
Visakhapatnam-530035.

Rc.No. 9781/2016/WL-I,Dt: 24.11.2016

Sir,

Sub: FD - WL - Modernization of Existing facility and additional new facilities entailing capacity at Visakhapatnam port - Environmental clearance (EC) - Wildlife Clearance / Forest Clearance - Requested - Reg.

Ref: Minutes of the 39th Standing Committee of National Board for Wildlife held on 23-08-2016.

***

This is to inform that the Standing Committee of National Board for Wildlife in its 39th meeting (copy enclosed) held on 23-08-2016 has agreed to recommend the above subject proposal along with the conditions prescribed by the State Chief Wildlife warden and the State Board for Wildlife.

The conditions prescribed by the Chief Wildlife Warden and State Board of Wildlife are as follows;

1. The User Agency has proposed development of Green Belt with an outlay of 7.2 Million as per the EIA report table 12-1.
2. The User Agency should plant broad leaved native species in place of eucalyptus and Casuarina.
3. The User Agency should have a plan for continuity of Green Belt development in and around Port Area.

Hence, the user Agency is requested to give an undertaking stating the they will comply the conditions prescribed by the Chief Wildlife Warden and State Board of Wildlife.

Encl: As above

Yours faithfully,

Sd/- K.S.Reddy
Prl. Chief Conservator of Forests (WL) &
Chief Wildlife Warden

// True Copy //

for Prl. Chief Conservator of Forests (WL) &
Chief Wildlife Warden

Copy to AE(EC) for info

ANNEXURE – 2

APSAC ANDHRA PRADESH SPACE APPLICATIONS CENTRE (APSAC)
ISO 9001:2015 ITE & C Department, Government of Andhra Pradesh

Dr. B.Sundar, IFS
Vice Chairman

Lr. no. SAC-12022/63/2022-DMSCS-APSAC – 1830 Dt. .10.2024

OFFICE OF THE CHAIRPERSON
25 NOV 2024
VISAKHAPATNAM PORT AUTHORITY

To
The District Collector,
Visakhapatnam - 530002

Dy Chairman
CE

Sub: Gride wise Shoreline Changes maps -Detailed shoreline hotspot report - Detailed maps- Visakhapatnam District – Reg.

***

EE(EC) 4/9/12

Dear Sir/Madam,

1. The Andhra Pradesh Space Applications Center (APSAC) is carrying out Shoreline Changes mapping for the Andhra Pradesh coast. Shoreline geometry remains one of the key parameters in the detection of coastal erosion and deposition. Remote Sensing and Geographical Information Systems (GIS) are important tools for quantifying shoreline change on a temporal scale. The satellite images from 28th November 1990 and 6th March 2021 are the oldest and newest data sets used for the assessment of the coastal dynamics of the Visakhapatnam district.
2. The Digital Shoreline Analysis System (DSAS), a software application that works within the Environmental Systems Research Institute (ESRI)'s ArcGIS software, is employed in this study.
3. In the present study, the shoreline change rates are classified into seven classes based on the magnitude of changes. The erosion and accretion status during 1990-2021 for the Visakhapatnam district (**64.97 km**) with the lengths (km) is computed.
4. The analysis and shoreline change map are enclosed. In summary, the shoreline analysis indicates that 19.12 km (**29.43%**) of the Visakhapatnam coast is eroding, 24.42 km (**37.59%**) is under accretion, and 21.43 km (**32.98%**) is in a stable state. These lengths exclude the rocky coast, sea wall, and breakwaters. The eroding areas and areas under accretion require

CE

Address: # 40-17-3/1, M.G.Road, Labbipet, Vijayawada - 520 010
Phone: 0866-2973510, e-mail: apsac.itec@gmail.com, website:http://apsac.ap.gov.in

interventions, as both geological phenomena can affect microclimate and biogeochemical cycles.

5. Regional and detailed grid wise maps of the Visakhapatnam district are shared for carrying out ground truth verification by the field Engineers and technical officers associated with the protection of coastal resources. We request their feedback on the GIS analysis presented by APSAC for further processing.

Yours faithfully,

Vice Chairman

Encl: Shoreline Changes Map, Gridewise detailed map, Brief Description, Merits and Demerits of Accretion

Copy to

1. The Member Secretary, AP Coastal Zone Management Authority, Paryavaran Bhavan, Gurunanak Colony, Vijayawada- 520 007
2. The Commissioner, Greater Visakhapatnam Municipal Corporation (GVMC), Visakhapatnam
3. The Chairperson, Visakhapatnam Port Trust, Visakhapatnam

MONITORING AND SHORELINE CHANGE ANALYSIS STATUS REPORT FOR VISAKHAPATNAM DISTRICT USING REMOTESENSING AND GIS

Coastal shorelines or land-sea interfaces change in response to natural or anthropogenic interference. Natural factors may be morphological, climatological, or geological. Shoreline geometry remains one of the key parameters in detecting coastal erosion and deposition. Coastal features interact with waves, tides, rivers, storms, tectonic, and physical processes. Erosion (landward retreat) and deposition (advance and growth through accretion) can both present challenges to coastal communities and infrastructure. The vulnerability of coastal areas increases due to erosion, which can threaten human activities along the coasts. Changes (whether short-term or long-term) in the position and geometry of shorelines are crucial in understanding coastal dynamism and managing coastal areas. Remote sensing and GIS are considered important tools for quantifying shoreline change on a temporal scale.

The Digital Shoreline Analysis System (DSAS) is a software application that works within the Environmental Systems Research Institute (ESRI) Geographic Information System (ArcGIS) software. The US Geological Survey developed DSAS. The prime activity in the shoreline analysis workflow is the extraction of shoreline positions through digitization. DSAS computes rate-of-change statistics for a time series of shoreline vector data. A baseline is constructed to serve as the starting point for all transects cast by the DSAS application. DSAS generates transects perpendicular to the baseline at a user-specified spacing (100 m) alongshore. The transect shoreline intersections along this baseline are then used to calculate the rate-of-change statistics. The reported rates are expressed as meters of change along transects per year. The results obtained from the analysis of shoreline changes are in the form of numbers, i.e., ±m/yr, where + indicates accretion and - indicates erosion.

The satellite images from 28th November 1990 (LANDSAT - Thematic Mapper) and 6th March 2021 (LANDSAT 8 Operational Land Imager) are the oldest and newest datasets used. Other datasets include the Indian Remote Sensing Satellite (IRS) P3 Linear Imaging and Self Scanning (LISS) Sensor-III from 29th January 1999; IRS P6 LISS III from 14th February 2005 and 19th January 2010; and LANDSAT8–Operational Land Imager (OLI) from 22nd March 2015. The quantitative results are plotted in a GIS environment showing the magnitude of changes. The classification of shoreline changes is a subjective aspect. In this study, shoreline change rates are classified into seven classes. Considering the magnitude of changes, each of the erosion and accretion categories is divided into three sub-classes. A marginal change of ±0.5m/yr is considered as no change or stable coast.

The shoreline along the Visakhapatnam coast was analyzed for the period 1990-2021 to estimate shoreline changes (erosion, accretion, and stable areas). The shoreline length used in the analysis is the shore face length (excluding the interior parts of rivers/creeks) obtained from LANDSAT–Thematic Mapper and LANDSAT 8 - OLI satellite data. The erosion/accretion status during 1990-2021 for the Visakhapatnam district (64.97 km) with the lengths (km) is given in tabular form. Only four categories of shoreline are present in the district. A significant extent of the shoreline falls under the category of Stable Coast. The shoreline analysis indicates that about 29% of the coast is eroding, 38% is accreting, and 33% is in a stable state. These lengths exclude rocky coasts, sea walls, and breakwaters.

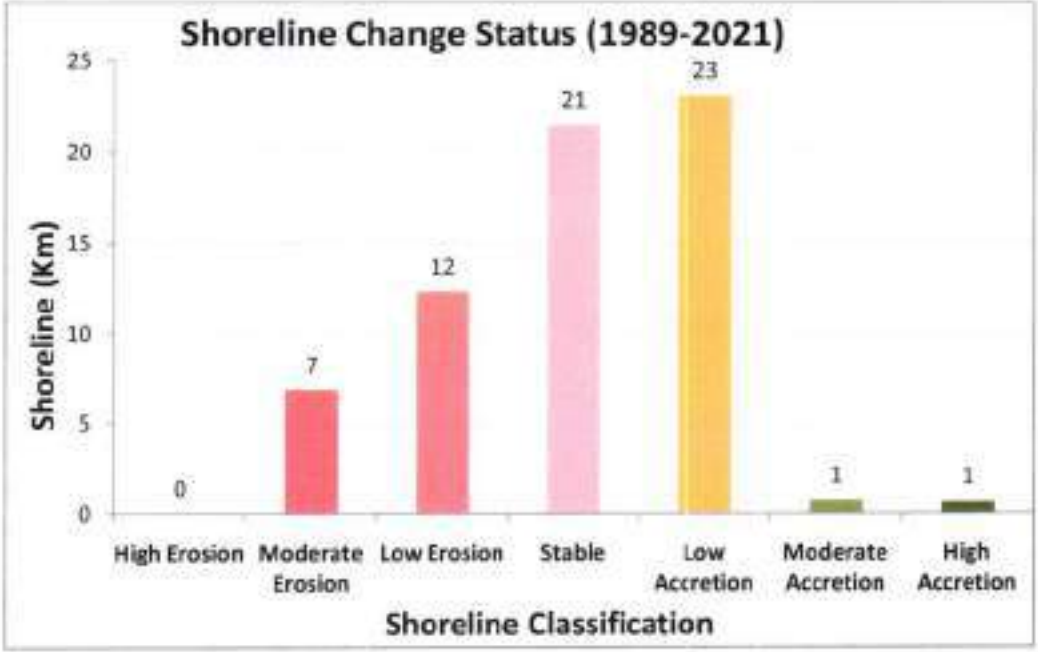
Table-1 Shoreline change Classification and Location Status.

Sl. No	Shoreline Classification (m/year)	Class length (Km)	Location (Nearest village/river/ creek)
1	High Erosion (> -5)	0.00	
2	Moderate Erosion (-5 to -2)	6.83	Beemunipatnam Northside area,Chepalupada area, North side Gostani river place.
3	Low Erosion (-2 to -0.5)	12.29	Annavaram places, Northside Gostani river area, Southside Beemunipatnam, Rushikonda area,
4	Stable Coast (-0.5 to +0.5)	21.43	Southside of Gostani River, Rushikonda area, Enadada, north and south side of port area,
5	Low Accretion (+0.5 to +2)	23.06	Appikonda area, Southside of Gangavaram port area, Southside of Visakhapatnam port places, near Rushikonda Place
6	Moderate Accretion (+2 to +5)	0.72	Near Gostani River mouth area, Southside of Visakhapatnam post area, Appikonda place,
7	High Accretion (>+5)	0.64	Near appikonda seawall area, Southside port places,
	Total	**64.97**	

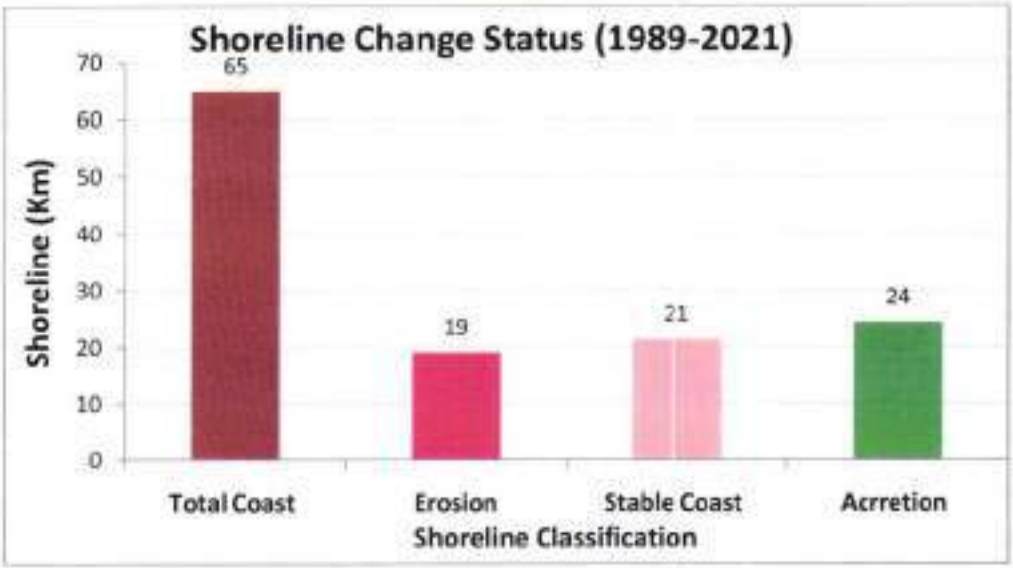
Table- 2 Classification of Shoreline Change in Visakhapatnam District

Classification of Coast	Length of the Coast (km)	Cumulative Length (km)	Percentage of Coast (%)	Cumulative (%)
Length of coastline	64.97			
High Erosion	0.00		0	
Moderate Erosion	6.83		10.51	
Low Erosion	12.29	19.12	18.92	29.43

Stable	21.43	21.43	32.98	32.98
Low Accretion	23.06		35.49	
Moderate Accretion	0.72		1.11	
High Accretion	0.64	24.42	0.99	37.59



Graph-1 Shoreline chage classification Status for Visakhapatnam district



Graph-2 Shoreline chage overall Status for Visakhapatnam district

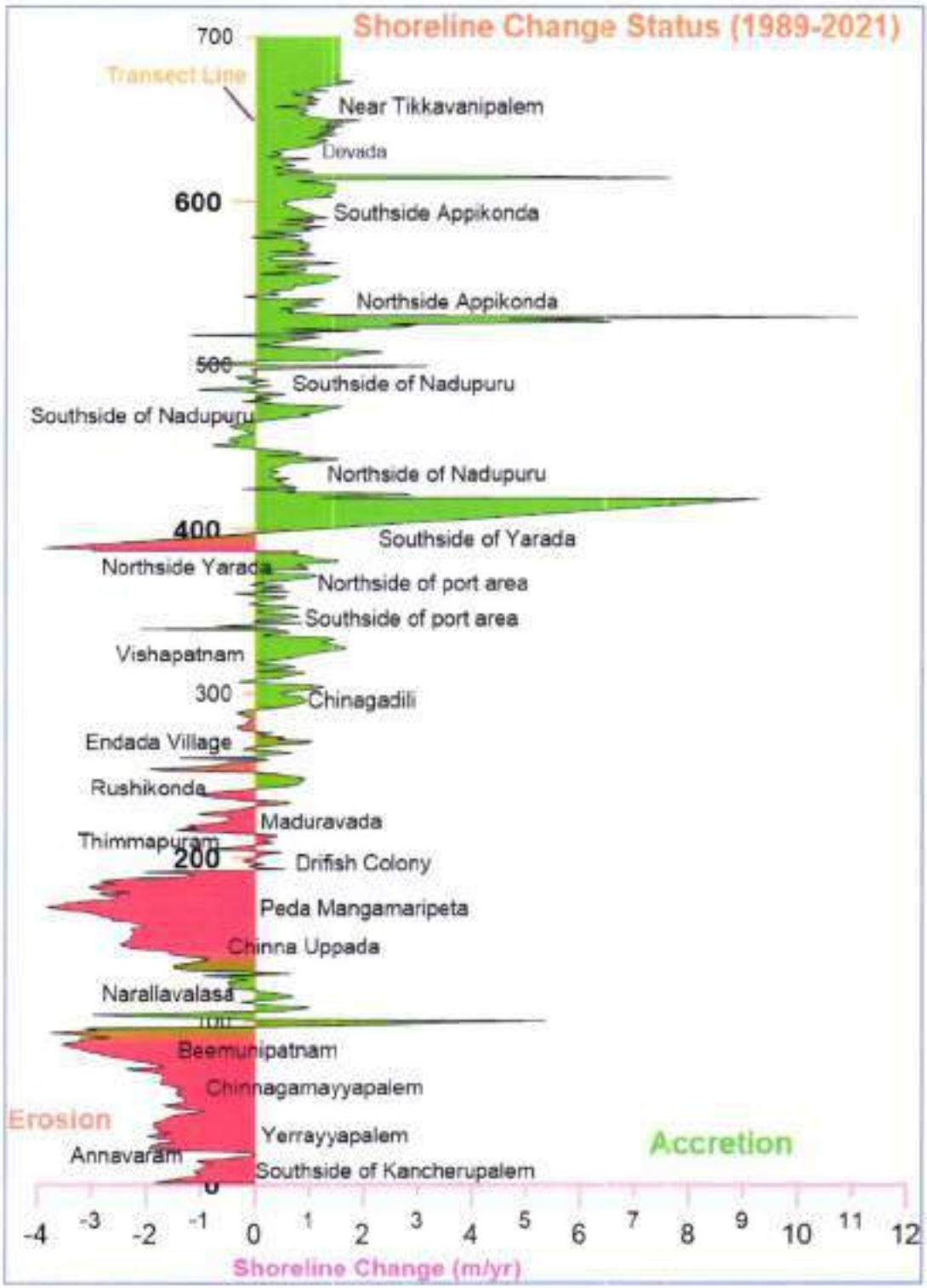
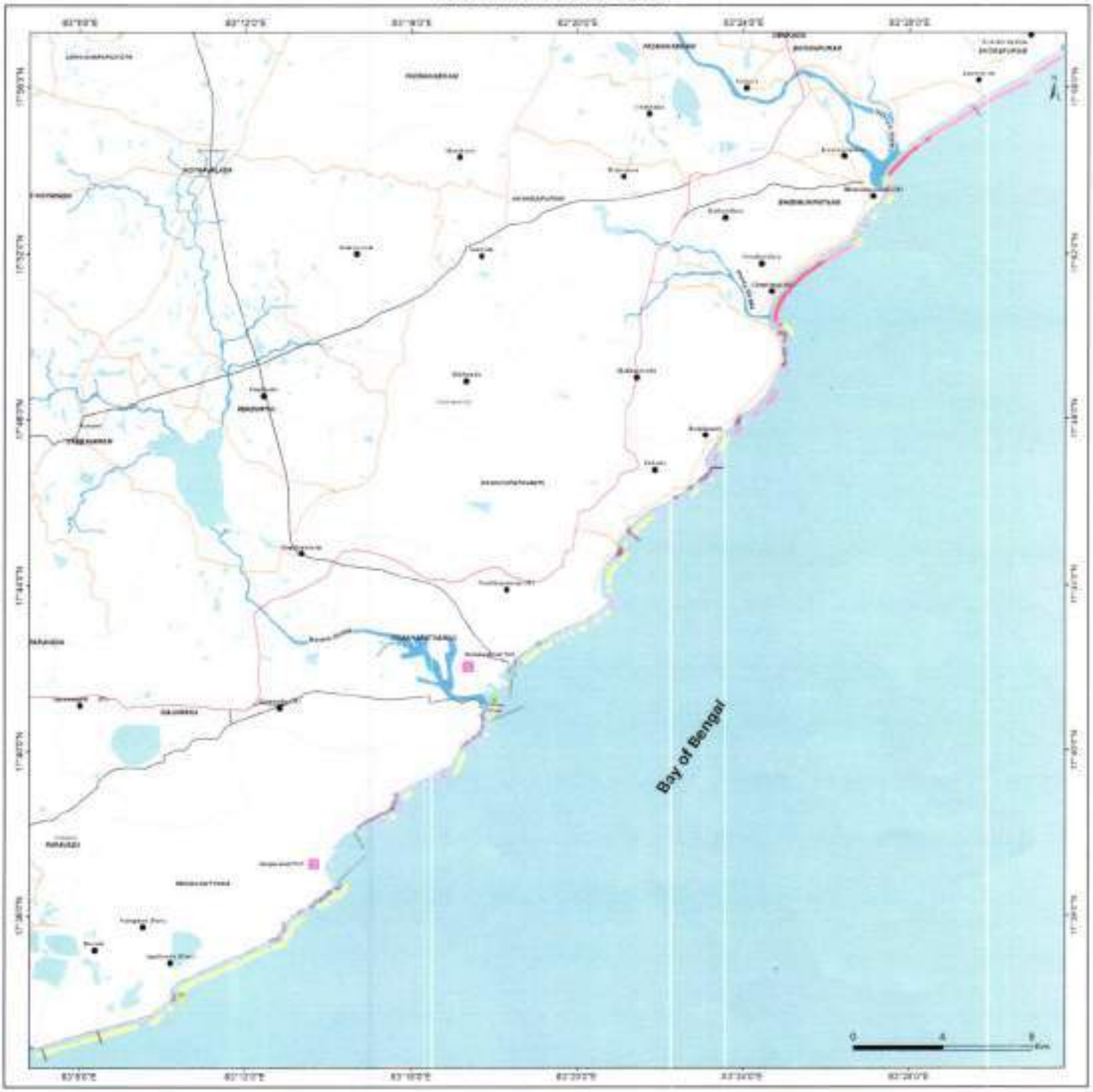


Figure- 1 Shoreline Change status along Visakhapatnam Coast

VISAKHAPATNAM

SHORELINE CHANGE MAP
ANDHRA PRADESH



Shoreline change Trend for Period 1988 - 2021

- High Erosion
- Moderate Erosion
- Low Erosion
- Stable
- Low Accretion
- Moderate Accretion
- High Accretion

Shoreline Date

- 12/10/1988
- 21/03/2021

Data Sources - Satellite Data	
Sensors	Date of acquisition
Landsat5-TM	12/10/1988
IRS P3 -LISS- III	10/03/1999
IRS P6 -LISS- III	09/02/2005
IRS P6 -LISS- III	03/03/2010
Landsat8-OLI	13/03/2015
Landsat8-OLI	21/03/2021

- National Highway
- State Highway
- District Road

- Habitation
- Port
- Groyne
- Breakwater
- Rock
- Seawall
- Mandal Boundary
- Tank/Pond/Lake
- River/Creek

S.No	Shoreline Classification (m/year)	length in Km
1	High Erosion (< -5)	0.00
2	Moderate Erosion (-5 to -2)	6.83
3	Low Erosion (-2 to -0.5)	12.29
4	Stable Coast (-0.5 to +0.5)	21.43
5	Low Accretion (+0.5 to +2)	23.06
6	Moderate Accretion (+2 to +5)	0.72
7	High Accretion (> +5)	0.64
	Total	64.97

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Vijayawada - 520010

1988 - 2021

SHORELINE CHANGE MAP
ANDHRA PRADESH

Official Use

Visakhapatnam | **65O5NE**

Shoreline change Trend for Period 1988 - 2021

- High Erosion
- Moderate Erosion
- Low Erosion
- Stable
- Low Accretion
- Moderate Accretion
- High Accretion

Shoreline Date

- 12/10/1988
- 21/03/2021

Data Sources: Satellite Data

Sensors	Date of acquisition
Landsat5-TM	12/10/1988
IRS P3-LISS- III	10/03/1999
IRS P6-LISS- III	09/02/2005
IRS P6-LISS- III	03/03/2010
Landsat8-OLI	13/03/2015
Landsat8-OLI	21/03/2021

Administrative Boundaries

- District Boundary
- Mandal Boundary
- Village Boundary
- National Highway
- State Highway
- District Road

Km
0 2.25 4.5

- Habitation
- Port
- Groyne
- Breakwater
- Rock
- Seawall
- Tank/Pond/Lake
- River/Creek

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1988 - 2021

SHORELINE CHANGE MAP
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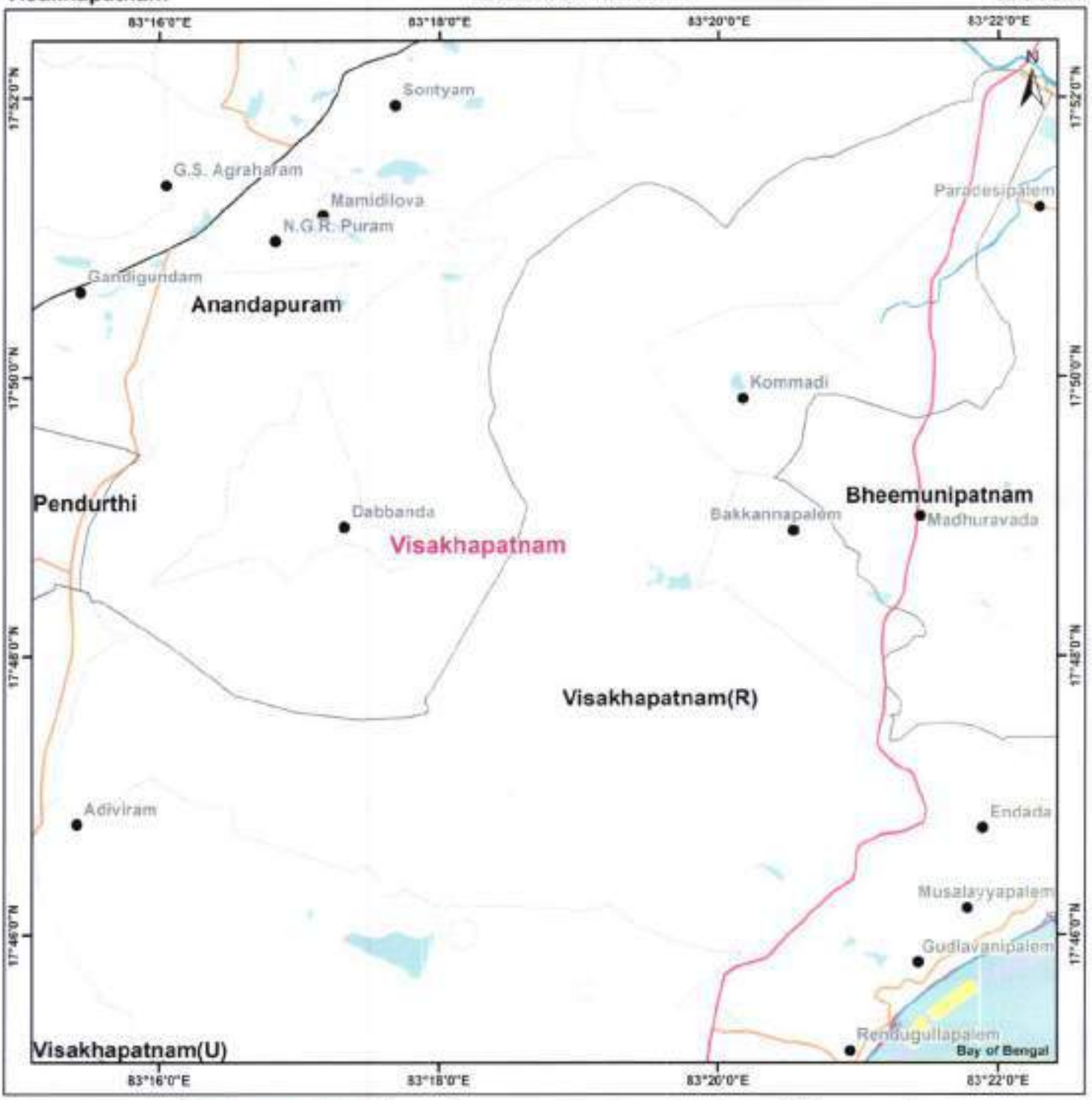
Visakhapatnam **65O5SW**



Shoreline change Trend for Period 1988 - 2021

- High Erosion
- Moderate Erosion
- Low Erosion
- Stable
- Low Accretion
- Moderate Accretion
- High Accretion

Shoreline Date

- 12/10/1988
- 21/03/2021

Data Sources: Satellite Data

Sensors	Date of acquisition
Landsat5-TM	12/10/1988
IRS P3-LISS- III	10/03/1999
IRS P6-LISS- III	09/02/2005
IRS P6-LISS- III	03/03/2010
Landsat8-OLI	13/03/2015
Landsat8-OLI	21/03/2021

Administrative Boundaries

- District Boundary
- Mandal Boundary
- Village Boundary
- National Highway
- State Highway
- District Road

Km
0 2.25 4.5

- Habitation
- Port
- Groyne
- Breakwater
- Rock
- Seawall
- Tank/Pond/Lake
- River/Creek

A.P. SPACE APPLICATIONS CENTRE
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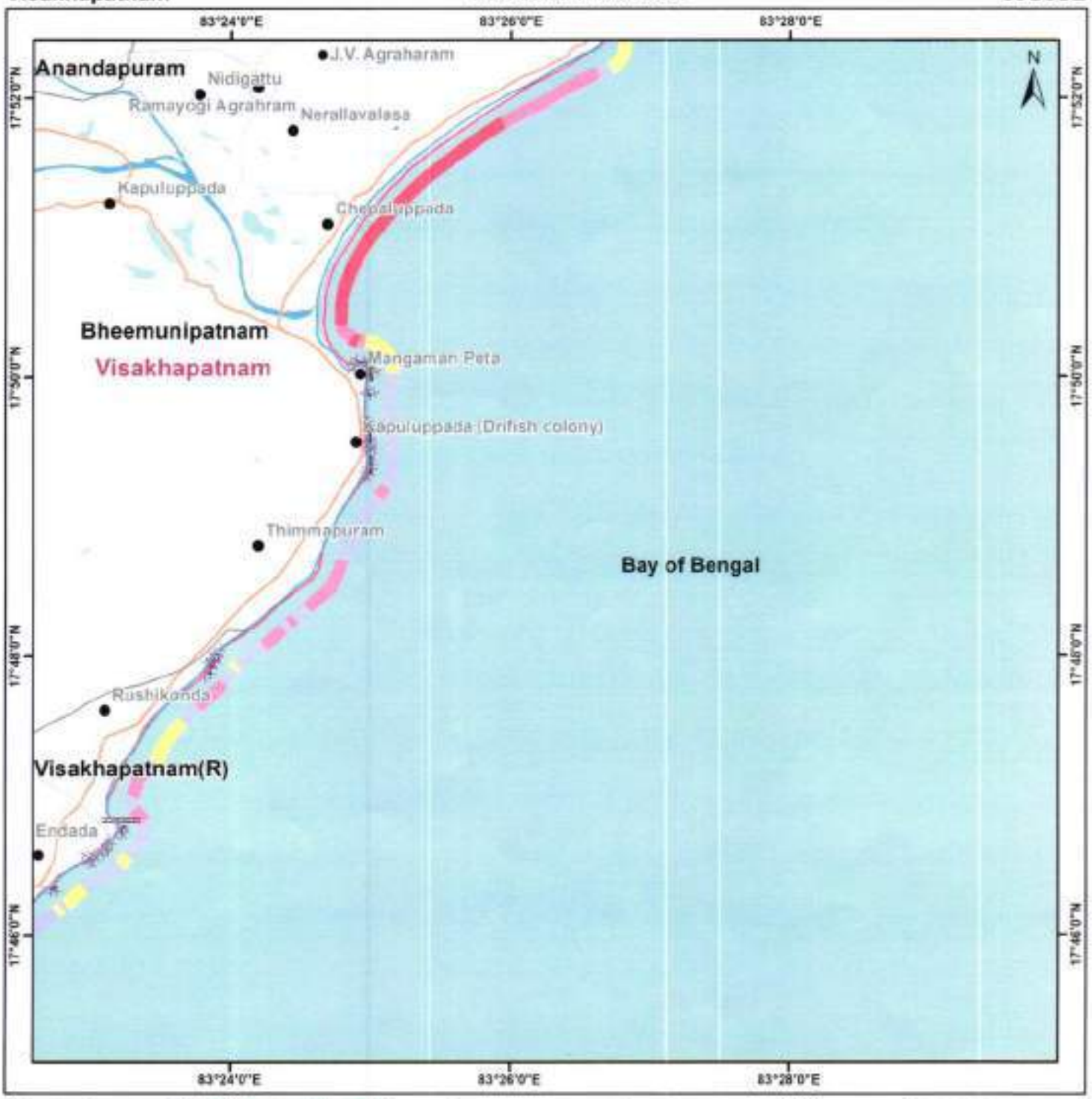
Vijayawada - 520010

1988 - 2021

SHORELINE CHANGE MAP
ANDHRA PRADESH

Official Use

Visakhapatnam **65O5SE**



Shoreline change Trend for Period 1988 - 2021

- High Erosion
- Moderate Erosion
- Low Erosion
- Stable
- Low Accretion
- Moderate Accretion
- High Accretion

Shoreline Date

- 12/10/1988
- 21/03/2021

Data Sources: Satellite Data

Sensors	Date of acquisition
Landsat5-TM	12/10/1988
IRS P3-LISS- III	10/03/1999
IRS P6-LISS- III	09/02/2005
IRS P6-LISS- III	03/03/2010
Landsat8-OLI	13/03/2015
Landsat8-OLI	21/03/2021

Administrative Boundaries

- District Boundary
- Mandal Boundary
- Village Boundary
- National Highway
- State Highway
- District Road

Km
0 2.25 4.5

- Habitation
- Port
- Groyne
- Breakwater
- Rock
- Seawall
- Tank/Pond/Lake
- River/Creek

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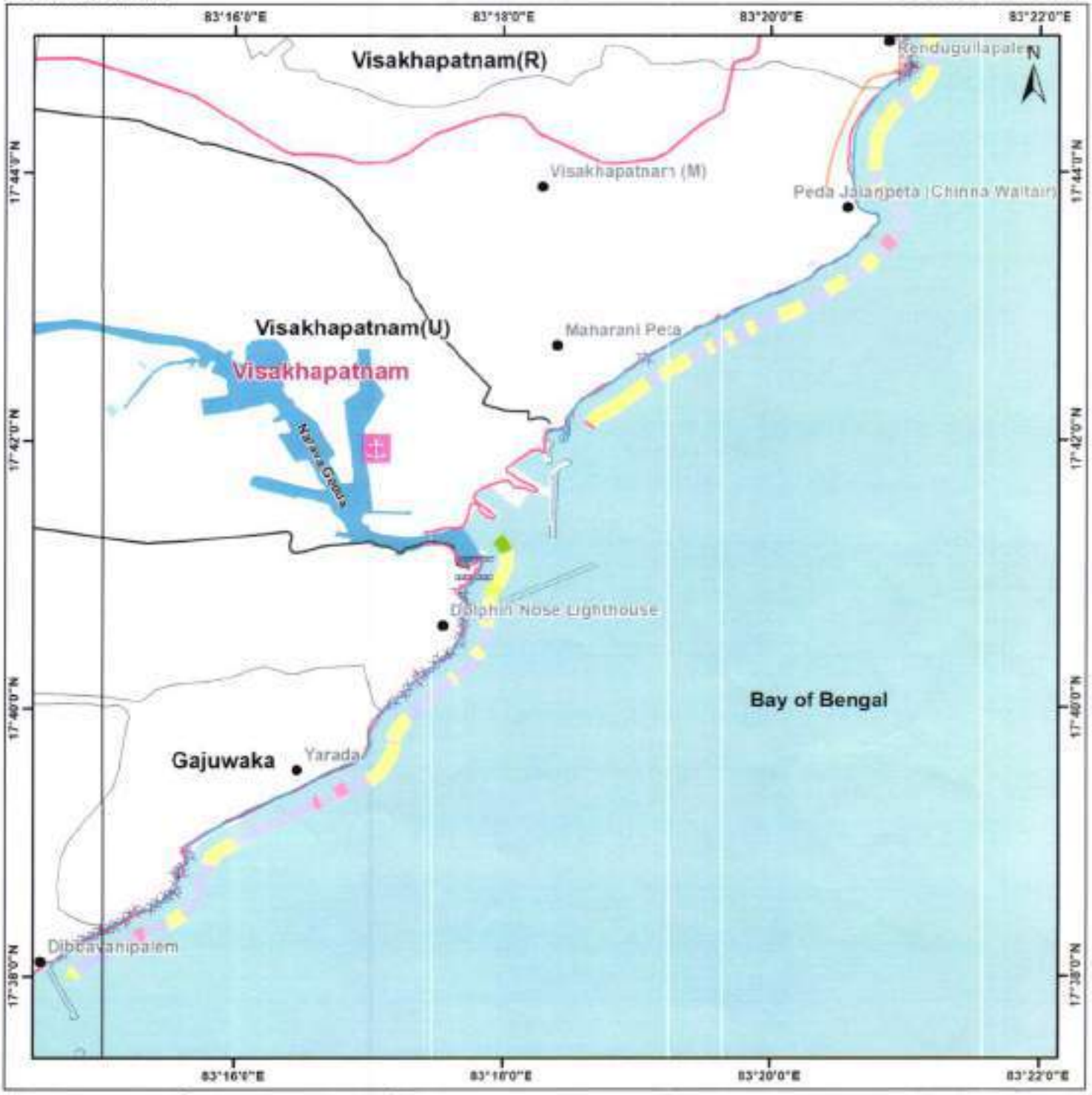
1988 - 2021

SHORELINE CHANGE MAP
ANDHRA PRADESH

Official Use

Visakhapatnam

65O6NW/ 65O2NE



Shoreline change Trend for Period 1988 - 2021

- High Erosion
- Moderate Erosion
- Low Erosion
- Stable
- Low Accretion
- Moderate Accretion
- High Accretion

Shoreline Date

- 12/10/1988
- 21/03/2021

Data Sources: Satellite Data

Sensors	Date of acquisition
Landsat5-TM	12/10/1988
IRS P3-LISS- III	10/03/1999
IRS P6-LISS- III	09/02/2005
IRS P6-LISS- III	03/03/2010
Landsat8-OLI	13/03/2015
Landsat8-OLI	21/03/2021

Administrative Boundaries

- District Boundary
- Mandal Boundary
- Village Boundary
- National Highway
- State Highway
- District Road

0 2.5 5 Km

- Habitation
- Port
- Groyne
- Breakwater
- Rock
- Seawall
- Tank/Pond/Lake
- River/Creek

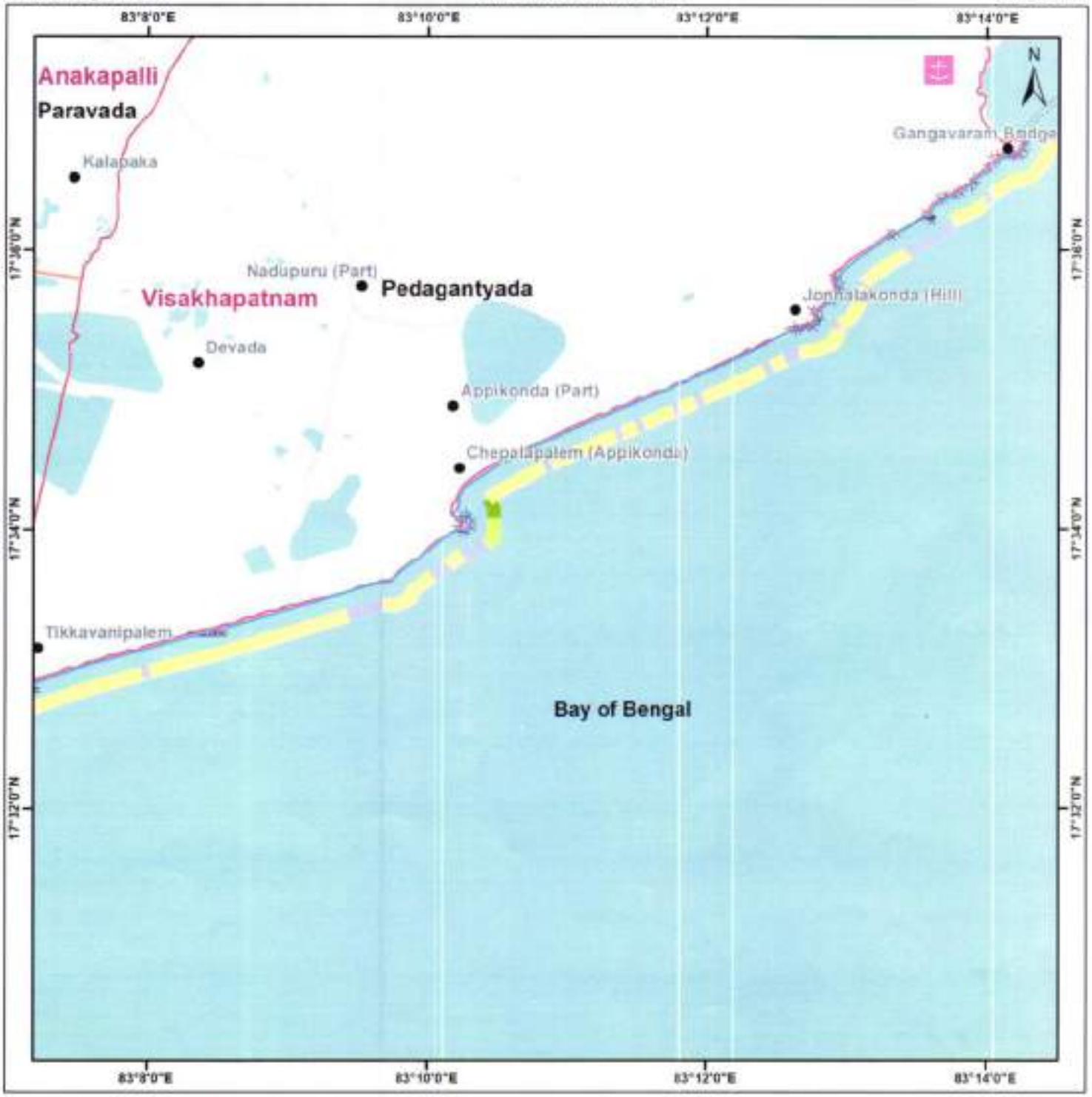
A.P. SPACE APPLICATIONS CENTRE
(T&IC Department, Govt. of A.P.
Vijayawada - 520010)

1988 - 2021

SHORELINE CHANGE MAP
ANDHRA PRADESH

Official Use

Visakhapatnam — **65O2SE**



Shoreline change Trend for Period 1988 - 2021

- High Erosion
- Moderate Erosion
- Low Erosion
- Stable
- Low Accretion
- Moderate Accretion
- High Accretion

Shoreline Date

- 12/10/1988
- 21/03/2021

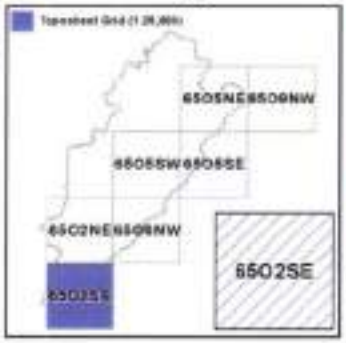
Data Sources: Satellite Data

Sensors	Date of acquisition
Landsat5-TM	12/10/1988
IRS P3-LISS- III	10/03/1999
IRS P6-LISS- III	09/02/2005
IRS P6-LISS- III	03/03/2010
Landsat8-OLI	13/03/2015
Landsat8-OLI	21/03/2021

Administrative Boundaries

- District Boundary
- Mandal Boundary
- Village Boundary
- National Highway
- State Highway
- District Road

Km
0 — 2.25 — 4.5



- Habitation
- Port
- Groyne
- Breakwater
- Rock
- Seawall
- Tank/Pond/Lake
- River/Creek

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ANNEXURE – 3

VISAKHAPATNAM PORT AUTHORITY

Sub: Statement showing the Issues raised during public hearing and response/Action taken by VPA:

S.No	Petitioner	Comments	Response/Action taken by VPA
1.	**Sri J.T.Rama Rao,** Uttharandhra Ikya Vedika	Expressed that he is not against the modernization and expansion of the Port but questioned the implementation of the dust pollution control measures so far. He also raised concern about dust pollution problems faced by the residents of Kotaveedhi and Granapuram areas. He informed that R K Beach is regularly getting eroded due to port dredging activities.	VPT is conducting health monitoring regularly in coordination with Indian Red Cross, health camps for the residents of the 1 Town Area as a part of CSR activities 'and also regular health check-ups of all the VPT employees who are working in the field are being conducted. There is no evidence/correlation of any illness caused due to dust pollution amongst employees. The proposed expansion project of VPT is not in any way related to the R.K.Beach erosion. VPA ensuring dust pollution control measures in all aspects including observation of CSR activities in the surrounding areas of Kotaveedhi and Gnanapuram (Photographs are enclosed at Annexure).
2.	**Sri Paka SatyaNarayana,** Backward Rights society.	Raised his concern regarding the drainage system and health related issues of the people residing in the surroundings of the Port.	VPT is taking utmost care regarding the health of the local population and regularly conducting the health check-ups in coordination with Indian Red Cross. Health camps for the residents of the Town Area as a part of CSR activities and regular health check ups are being conducted of all the VPT employees who are working in the field are being conducted. No evidence/correlation of any illness caused due to dust pollution to the employees has been observed. VPA ensuring dust pollution control measures in all aspects including drainage facilities and observation of CSR activities in the surrounding areas of Kotaveedhi and Gnanapuram (Photographs are enclosed at Annexure).
4.	**Sri Alikhan,** One-Town Area	Raised his concern about the pollution problems and indicated that the Health of the people residing in and around port is adversely affected and suffered with respiratory diseases. The Port should take up dust pollution control measures on war- footing basis.	VPT would invest Rs.200for Improving the environment in and around port area. Following measures are proposed for control of Air pollution: • Decrease in vehicular traffic in the Port area due to mechanisation. • Shifting of coal stack yard by providing proper environmental safeguards viz.
5.	**Sri AJ Stalin,** City secretary, CPI (M)	Complained about dust pollution due to open storing and stacking of coal.	
6.	**Sri Abdul Gaphar,** Kotaveedhi	Informed that the people residing in and around port are adversely affected and suffering with	

S.No	Petitioner	Comments	Response/Action taken by VPA
		respiratory diseases. He opined that the Port can take up the expansion project after addressing the pollution problems on top priority.	construction of high rise walls, drainage system, MDSS and Plantation which is targeted to be completed by end of year 2015
7.	**Sri V.Bosanna, Sampradaya Matsakarula society**	Raised his concern regarding the air pollution problems due to coal handling and storage.	VPT has also taken the following measures: • Mechanical dust suppression system has been provided at coal stack yards at GCB, WOB, North, South of S4 Conveyor covering an area of 4,75,000 m^2 commissioned in the year 2002,at a cost of RS.8.00 Crores, and the same is effective and water sprinkling is done continucusly round the clock. • Recently the MOSS was also developed in East Yard, S-6 Area and West of ESSAR covering an area of 3,58,116 sq.m. • Wetting of cargo stacks and roads by sprinkling of water with water tankers where mechanised. Water Sprinkling System was not installed. • Dedicated storage tanks, separate pumps and pipelines are provided for each filling station to ensure continuous water supply for carrying out round the clock water sprinkling through MOSS and tankers. • Manual sweeping of roads All cargo stacks are covered with tarpaulins and a separate task force is appointed directly reporting to Chairman to go around all the Port operational areas daily for monitoring the implementation of pollution control measures and for identification of the shortfalls if any. Basing on the task force reports necessary action is being initiated at the respective ends dully addressing the prevailing pollution problems. VPA ensuring dust pollution control measures in all aspects
8.	**Sri L.F.Raghuram,** Visakhapatnam	Informed that the Port authorities invited the people for participating in environmental public hearing by Dandora (Tom - Tom arrangement) and the present chairman- VPT, earlier was worked as Joint Collector, Visakhapatnam knows all the circumstances in the area. He also opined that VPT has become coal cargo hub, if seen through aerial view and the people would have feel that they have landed in the coal mining area. He expressed that handling of huge quantity of coal cargo leading to dust problems in the city and informed the Government officials not to permit any coal based industries in Visakhapatnam area. Finally he opined that they want development but not at the cost of life of the people.	

S.No	Petitioner	Comments	Response/Action taken by VPA
			including observation of CSR activities in the surrounding areas of Kotaveedhi and Gnanapuram (Photographs are enclosed at Annexure).
9.	**Sri Abdul Anif,** TDP Minority Cell President	He opined that the Port should not take up the project at the cost of risk to the life of the people residing in and around port due to aggravation of the pollution problems. He expressed that if the Govt. officials residing in their area, then they would know about the pollution problems facing due to port activity.	VPT has taken various measures for control of dust emissions in port area by mechanization and installed MDSS at all the stocking areas. Regarding health issues the port is conducting health check-ups regularly in coordination with Indian Red Cross, health camps for the residents of the 1 Town Area VPA ensuring dust pollution control measures in all aspects including observation of CSR activities in the surrounding areas of VPA (Photographs are enclosed at Annexure).
10.	**Sri M.A.Rasool,** Kotaveedhi	Raised his voice against proposed land acquisition for the Port in kotavedhi village.	There are no plans at VPT to acquire lands in Kotaveedhi village
11.	**Smt.A.Vimala,** Andhra Pradesh Mahila Samakhya Visakha City Secretary	Expressed her concern about the health issues related to women in the port area and reported that women are facing abortion due to pollution. She finally opined that port should not take up modernization and expansion project unless taking the concrete and permanent pollution control measures.	The port is conducting regular health checkups in coordination with Indian Red Cross. Regular health checkups of all the VPT employees who are working in the field are being conducted. There is no evidence/correlation of any illness caused due to pollution to the employees and there are no evidences of abortions due to pollution. VPA ensuring dust pollution control measures in all aspects including observation of CSR activities in the surrounding areas of Kotaveedhi and Gnanapuram (Photographs are enclosed at Annexure).
12.	**Sri J.D.Naidu, Visakha**Fishing HarbourMatsakarula Society Secretary	Informed and mentioned the problems in fish drying due to port pollution and also raised health issues. He opined that the historical churches, Masque, temples constructed by British people are losing their heritage due to port pollution. He expressed that the people are declared suffering with respiratory diseases when they consulted doctors.	VPT has no immediate plans to shift Fishing harbour. Regarding health issues VPT is regularly conducting health checkups in coordination with Indian Red Cross as a part of CSR activities. Regular health checkups are being conducted of all the VPT employees who are working in the field. There is no evidence/correlation of any illness caused due to pollution to the employees, those who are exposed directly in the port activities.

S.No	Petitioner	Comments	Response/Action taken by VPA
13.	**Sri T.Sankar,** Peda Jalaripeta, Matsakarula Society Secretary	He raised his concerns that fish catch is depleting due to construction of jetties by usage of explosives in the beneath of the sea and finally he opined that the port should address pollution problems first and then start the expansion project.	The fish catch is not related to any construction of jetties and VPT has taken various measures for control of dust emissions in port area by mechanization and installed MDSS at all the stacking areas. VPA ensuring dust pollution control measures in all aspects to avoid pollution problems (Photographs are enclosed at Annexure).
14.	**Sri P.Venkata Rao,** Ex-Corporator	He said that the historical churches, Masque, temples constructed by British people are losing their heritage due to port pollution. He expressed people are declared suffering with respiratory diseases when they consulted doctors. Hence, port should not take up modernization and expansion project unless taking the concrete and permanent pollution control measures	As a part of CSR activities VPT is regularly conducting health camps in coordination with Indian Red Cross for the residents of the 1 Town Area and as a part of CSR activities. Regular health check-ups are being conducted for all the VPT employees who are working in the field and there is no evidence/correlation of any illness caused due to pollution to the employees (Photographs are enclosed at Annexure).
15.	**Dr. Sharin Rahman,** ChaitanyaSravanthi Organization	Informed that the EIA report prepared by WAPCOS is in-correct and baseless. She opined that as per WAPCOS report; there is no pollution due to port activity, whereas APPCB reports are showing there is pollution due to port activities. She opined that WAPCOS is misleading the public and given favorable report to VPT and also mentioned that there are no Historical monuments and habitat places in the Port area which is not really true. She informed that there are historical churches, Masques; temples constructed by British people are existing in that area. She expressed that there is vast difference between the EIA report submitted by the Andhra University in the year 1997 and the present report submitted by the WAPCOS. She also opined that there is no similarity between the report submitted by VPT to the Parliamentary standing committee and the present EIA report for expansion project. She informed that they already filed an appeal in National Green Tribunal, Chennai against the port and people would fight against port if expansion is not done in proper way.	M/s. WAPCOS Ltd has prepared the EIA report as per required standards after proper scientific analysis of Environmental data. WAPCOS Ltd is NABET Accredited agency for conducting the EIA studies in Ports and harbour sector
16.	**Sri ChowdhariApparao**	Appealed the gathering not to obstruct the development. He also appealed the Port Authorities to address the pollution issues in amicable way	VPA ensuring dust pollution control measures in all aspects to avoid pollution problems (Photographs are enclosed at Annexure).

S.No	Petitioner	Comments	Response/Action taken by VPA
17.	**Shri RajsekharVarma** of Lok Satta party	Informed that there would be employment where there is development, but it is not fair in development without considering the environment. The report of WAPCOS & A.P. Pollution Control Board is the quite contrary. He opined that if the capacity of the Port increases then pollution levels would also be increased proportionately.	VPT has entrusted the work to EIA accredited agency, M/s.WAPCOS and prepared the EIA report as per required standards after proper scientific analysis of Environmental Management data. Suitable Environmental Plan has been suggested as a part of the EIA study to minimize the adverse impacts including air pollution. VPA ensuring dust pollution control measures in all aspects to avoid pollution problems (Photographs are enclosed at Annexure).
19	**Prof. S. Ramakrishna Rao,** GITAM University	Informed that the Chairman of Visakhapatnam Port trust has started initiation for control of pollution immediately after taking charge as Chairman. He opined that, pollution levels would be reduced to greater extent due to introduction of Container cargo operations and other mechanized initiatives by December 2017.	VPA ensuring dust pollution control measures in all aspects to avoid pollution problems (Photographs are enclosed at Annexure).
20	**Residents of Kota street**	Opined that the Port shall adopt the systems those are being implemented in developed countries and there is no development without industrial growth. He requested the public not to oppose the port modernization and expansion activities.	---
21.	**Sri Vasupalli Ganesh Kumar,** Hon'ble M.L.A for Visakhapatnam (South)	Concern regarding Environmental issues.	The present proposal of VPT is to seek Environmental clearance in respect of the following three projects only viz. a) **Extension of existing Container Terminal in the Outer Harbour' of VPT on DBFOT basis (Rs.633.11 Crores).** b) ***Development of West Quay North (WQ-7&WQ-8) berth with mechanized handling facilities for handling dry bulk/break bulk cargo on DOFOT basis in Inner Harbour of VPT*** **(Rs.376Crores)** c) **Up-gradation of existing facility and creating of New facility at VPT for Iron Ore handling on DBFOT basis(OHC&WQ-1) (Rs.845.41 Crores)** The expansion and modernization involving three projects have been taken up with an intention of controlling and minimizing the pollution in VPT. Proposed up gradation and mechanization including enhancing containerization operations will improve environment and reduce pollution VPA ensuring dust pollution control measures in all aspects to avoid pollution problems (Photographs are enclosed at Annexure).

ANNEXURE – 4

VISAKHAPATNAM PORT AUTHORITY

Sub: Compliance on Conditions & Recommendations made in EMP/DMP:

S. No.	Recommendation	VPA Compliance
1	The proposed project would require significant amount of construction material. During construction phase, runoff from these sites would increase soil erosion from such sites. If such sites are left untreated after excavation of construction material, then rainwater is likely to get stored in these sites, which are then likely to serve as breeding habitats for mosquitoes.	**Complied.** Construction Work is Completed.
2	During construction phase, labour would migrate in the project area. Adequate arrangements for potable water supply, sewage treatment and disposal, solid waste management have been suggested as a part of the study to mitigate pollution due to labour camps.	
3	Sewage from the labour camps shall be conveyed to the existing STP. There is sufficient unutilized capacity in the sewage treatment plant. The total handling capacity of the STP is 10 mld. At present 6-7 mld of sewage is treated in the sewage treatment plant.	
4	A total quantity of dredged material likely to be generated in the proposed project has been estimated as 8,66,249 m^3 of which 1,84,000 m_3 will be generated due to up gradation of existing facility and creation of new facilities. The dredged material would be disposed at designated site.	
5	Major sources of noise during construction phase are due to operation of various construction equipment. Modeling studies were conducted to assess the increase in noise level due to operation of various construction equipments, and no increase in noise levels were anticipated as a result of various activities, during the project construction phase.	
6	Vehicular movement for the transportation of construction material and operation of construction equipment in the area is likely to increase temporarily during the construction period. However, the vehicular pollution is not expected to lead to any major impacts on ambient air quality could be one of the possible sources of incremental air pollution during the construction phase.	
7	Appropriate measures to control air pollution have been recommended as a part of Environmental Management Plan.	
8	Proposed project is likely to have adverse impacts of marine ecology and benthic flora fauna. The project area has moderate productivity. Area to be dredged recolonizes in short duration, after the cessation of dredging activities. This means that though the dredged stretches are likely to get recolonized, the ecology is not expected to develop up to the pre-project levels.	**Complied.** Construction Work is Completed.
9	There are no sites of ecological significance in and around the project area. Likewise, no spawning ground was observed.	

10	High turbidity due to heavy suspended solid load during dredging or disposal of dredged materials results in clogging of gills of fishes thereby causing asphyxiation. But since fishes are free swimming they very well avoid such areas and move to safer areas. Once the turbidity is over due to currents, they come back to the area.	
11	Economic benefits of a port are manifold and significant positive impacts are expected during construction phase of the proposed project, as it will lead to mushrooming of allied business activities, which provide an impetus to overall development of the area.	
12	Some of the locals will get direct employment in project construction activities or indirect employment due to mushrooming of allied business activities.	
Impacts during Operation Phase and their Mitigation:		
1	Vehicular movement for the transportation of cargo is likely to increase during the operation phase. The entire operation would be handled in dry state is closed conveyor system. Thus, no major impact on air pollution is envisaged.	• VPA ensures regular cleaning of roads with Mechanical Sweeping Machines and through manually. • VPA ensures water sprinkling on Port roads through water tankers to avoid dust emission (180trips/ day). • VPA ensures coverage of tarpaulin over dust cargo stacks.
2	Solid waste in the proposed project could be generated mainly from three sources viz. institutional/ office waste, domestic waste and waste from cargo handling etc. This could comprise floating materials, packaging, polythene or plastic materials. It is proposed to be routinely collected and is disposed at a designated solid waste disposal site.	VPA complying the recommendations in EIA duly ensuring the removal of floating material and safe disposal of the same to GVMC dumping area at Kaapuluppada, VSP.
3	The present system of iron ore handling through semi mechanized process has the capacity to handle less than 12000 Tonnes of iron ore. A receiving conveyor system with a rated capacity of 3000 TPH compatible with the wagon unloading from tippler house to the stockyard is proposed as a part of the project. The proposed system will reduce fugitive emissions. Hence, the proposed expansion and modernization is not expected to cause any significant adverse impacts and will be beneficial for the environment.	--
4	Impact of accidental release of solid cargo, particularly during rough weather, can take place. It would have limited impact on the environment. However, the port operations may be hampered if the ship is damaged or the cargo goes overboard that could risk navigation.	Noted for compliance.
5	Escapement of bulks such as iron ore, bulk cargo and container cargo during unloading is not expected to cause any serious impact, as they are non-toxic.	--
6	Recommendations of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 (MARPOL 73/78), shall be implemented to prohibit all ships from discharging wastes at sea. MARPOL 73/78 requires that ships retain all the wastes on board until reaching port.	Being complied.
7	Vessels shall be equipped with dedicated holding tanks for sewage and oily wastes and have the capacity to compact and store garbage.	VPA ensure to comply the recommendation in EMP through marine department of VPA.

8	Effluent from workshops, oil storage, etc. will contain oil and grease particles which shall be treated in an oil skimmer and suitably disposed after treatment. The collected oily matter is stored in cans, etc. and disposed at landfill sites designated by the district administration.	VPA ensure to comply the recommendation in EMP through marine department of VPA.
GREENBELT DEVELOPMENT		
	Greenbelt was developed around the stack yards. Plantation programme is being pursued by VPT on a Continuous basis for the last 2 decades for continual improvement and addition of Green Belt in and around Port area. So, far 4,30,000 sampling has been planted over an area of 630 acres at different areas including port operational areas, residential and city areas. Similarly, greenbelt will be developed as a part of development of the proposed berths.	Complied.
PORT AREA EMERGENCY RESPONSE PLAN		
	A detailed plan for oil and chemical spill is being implemented at Vishakhapatnam Port. Likewise, a Disaster Management Plan for implementation in the event of various natural and manmade hazards too has been formulated and is under implementation. The same shall be implemented for the proposed projects as well.	Being complied.

Summary of Environmental Monitoring Programme for implementation during project construction phase					
S.No.	**Aspects**	**Parameters to be monitored**	**Frequency of monitoring**	**Location**	**Compliance Status**
1	**Marine Water**				
a	Physical-Chemical Parameters	pH, Salinity, EC, TDS, Turbidity, Phosphates, Nitrates, Sulphates, Chlorides	Once in three months	9 sites	Construction Work Completed.
b	Biological Parameters	Light penetration, Chlorophyl, Primary Productivity Phytoplanktons Zooplanktons	Once in three months	9 locations	Construction Work Completed.
2	**Sediments**				
a	Physical-Chemical Parameters	Texture, pH, Sodium, Potassium, Phosphate, Chlorides, Sulphates	Once in three months	9 sites	Construction Work Completed.
b	Biological Parameters	Benthic Meio-fauna, benthic Macro-fauna	Once in three months	9 sites	Construction Work Completed.
3	Ambient Air Quality	SPM, RPM, SO2 and NOx	Summer, Post-monsoon and Winter seasons Twice a week for four consecutive weeks per season.	6 sites close to construction site(s)	Construction Work Completed.
4	Noise	Equivalent Noise Level	During peak construction activities	Construction Site(s)	Construction Work Completed.
Summary of Environmental Monitoring Programme for implementation during project operation phase					
S.No.	**Aspects**	**Parameters to be monitored**	**Frequency of monitoring**	**Location**	**Compliance Status**
1	**Marine Water**				
a	Physical-Chemical Parameters	pH, Salinity, EC, TDS, Turbidity, Phosphates, Nitrates, Sulphates, Chlorides	Once in three months	9 sites	Being complied.

b	Biological Parameters	Light penetration, Chlorophyl, Primary Productivity Phytoplanktons Zooplanktons	Once in three months	9 locations	Being complied.
2	**Sediments**				
a	Physical-Chemical Parameters	Texture, pH, Sodium, Potassium, Phosphate, Chlorides, Sulphates	Once in three months	9 sites	Being complied.
b	Biological Parameters	Benthic Meio-fauna, benthic Macro-fauna	Once in three months	9 sites	Being complied.
3	Ambient Air Quality	SPM, RPM, SO2 and NOx	Summer, Post-monsoon and Winter seasons Twice a week for four consecutive weeks per season.	6 sites close to construction site(s)	Being complied.
4	Noise	Equivalent Noise Level	During peak construction activities	Construction Site(s)	Being complied.
5	Greenbelt Development	Rate of survival and growth of various species	Once per month	Various plantation sites	Being complied.

INTEGRATED ENVIRONMENTAL MONITORING PROGRAMME

S.No.	Name of Work	Description of work/sampling areas	Parameters	Compliance Status
1	Continuous online Ambient Air quality monitoring (CAAQM)	Monitoring of ambient air quality in Residential and Port operational areas is being carried out by GITAM University as a pilot study • St. Aloysius School • R&D Yard • CISF tower near S6 Conveyor	$PM_{2.5}$, PM_{10}, SO_2 and NOx	Being complied. VPA installed 3 CAAQM stations at R&D Yard, GVMC stadium and GCB area and monitoring is done through AUDC
2	Monitoring of ambient air quality	Monitoring of ambient air quality in Industrial & Residential areas is being carried out by AUDC/AU weekly twice at following three locations in three shifts: • ONGC Building • R&D Yard, • DLB Canteen	$PM_{2.5}$, PM_{10}, SO_2 and NOx	Being complied. VPA installed 3 CAAQM stations at R&D Yard, GVMC stadium and GCB area and monitoring is done through Andhra University, VSP

		2 locations near 3 project sites being developed as a part of the present proposal.		
3	Monitoring of Harbour water quality	Analysis of water samples collected during low tide and high tide for assessing the Harbour water quality by AUDC/AU quarterly at: • 9 locations (Inner & Outer Harbour) • 2 locations near 3 project sites being developed as a part of the present proposal	PH, Color, Odor, TSS, DO, BOD, Oil& Grease, Sulphide, Ammonical Nitrogen, Free Ammonical Nitrogen, Total Kjeldahl Nitrogen, Cyanide, Fluoride, heavy metals and faecal Coliform	Being complied. VPA complying the recommendation in EIA for monitoring of harbour water quality through Andhra University, Visakhapatnam.
4	Monitoring of harbour water quality for the assessment of dredging impact	Bed samples and water samples are being collected during dredging and analyzed by GITAM University, parameters concerned are physico-chemical parameters Sampling points: • Northern Arm • Western Arm • Outer harbor 2 locations near 3 project sites being developed as a part of the present proposal	DO, Turbidity, Phosphate, Sulphate, Ammonia, and heavy metals.	Being complied. VPA complying the recommendation in EIA for monitoring of harbour water quality through Andhra University, Visakhapatnam.
5	Noise	Equivalent Noise Level near 2 locations near each of the 3 Project sites	Once per month	Being complied.
6	Greenbelt Development	Rate of survival and growth of various species	Once per month	Being complied.

VISAKHAPATNAM PORT TRUST

MARINE DEPARTMENT
VISAKHAPATNAM – 530035
ANDHRA PRADESH

COMPREHENSIVE DISASTER MANAGEMENT PLAN

JANUARY -2021

ENVIRONMENTAL TECHNICAL SERVICES PVT. LTD.
MOBILE NO. 0-9873552267, 0-9810830190
EMAIL – SS@ETSINFRA.COM, JPSHRI@GMAIL.COM

FOREWORD

This study has been carried out by M/s Environmental Technical Services Private Limited, New Delhi, Work Order No. IMAR/MSS (tenders)/2020/15/, Dated 05/05/2020 based on inputs received form Visakhapatnam Port Trust, Visakhapatnam. M/s Environmental Technical Services Private Limited, would like to take this opportunity to extend their thanks to the Visakhapatnam Port Trust, Visakhapatnam, management and officers who co-operated in supplying the data and information required, thus maximizing the effectiveness of the study. The study identified the hazards and analysed the consequences of potential accident scenarios. The above study results, conclusions and recommendations were based on the information made available to ETS Private Limited at the time of study. ETS Private Limited exercised all reasonable skill, care and diligence in carrying out the study. However, this report should not be deemed as any undertaking, warranty or certificate and cannot be challenged in any court of law of the country.

Environmental Technical Services Pvt. Ltd. New Delhi

Place : New Delhi
Date : 11.01.2021

Dr J. P. Shrivastava
Managing Director

VISAKHAPATNAM PORT TRUST

PART I

DISASTER MANAGEMENT PLAN

CONTENTS- PART I

The Visakhapatnam Port Trust in recognition of the importance of safety and security of port area as first priority set up a core group committee for preparation of Disaster plan as per the recommendation of the National Disaster Management Plan. Our scope of plan covers the area of port and all the emergencies as per the act.

1.4 VISION

To maintain Visakhapatnam Port safer and disaster resilient by a holistic, pro-active, technology driven approach that involves all stakeholders and port users so that a culture of prevention, preparedness and mitigation is imbibed.

Further, to assist local, state and national authorities, so that Visakhapatnam Port's response complements that of authorities in providing assistance to affected populations during natural disasters.

1.5 TIME FRAMES

EVENT SCENARIOS

Probability: Low-once in 10-50yrs; Moderate=once in 2-10yrs; High=once annually
Impact/Preparedness/Risk Threat: 0=Very Low / 1=Low / 2= Moderate / 3 = High

Event/Scenario Spectrum	**Early warning**	**Probability of occurrence**	**Duration Impact**	**Impact on property**	**Impact on People**	**Time to Restore Facilities**	**Risk Threat Probability**
Cyclone	96-12 Hrs.	Very Low	0	0	0	12- 24 hrs.	Moderate
Floods	4-2 hrs.	Very Low	1	1	2	12-36 hrs.	Very Low
Earthquake	nil	Very Low	1	1	2	12-36 hrs.	Very Low
Tsunami	6-1 h	Very Low	1	1	2	12-24 hrs.	Very Low
Marine Accident							
Collision	< 1min	Low	<1hr	2	0	4 h	Moderate
Grounding	<1 min	Low	1-48h	2	0	1-48 hrs.	Moderate
Fire/Explosion	< 1min	Low	0.5-12 h	2	1	1-96 hrs.	Moderate

Event/Scenario Spectrum	Early warning	Probability of occurrence	Duration Impact	Impact on property	Impact on People	Time to Restore Facilities	Risk Threat Probability
Oil Pollution	<5 mins	Low	1-72 h	1	1	1-30 d	Moderate
Transport Accident							
Road	< 1min	Low	< 5 min	0.1	0.1	< 2 h	Moderate
Rail	< 1min	Low	< 5 min	0.05	0.1	1-48 h	Low
Function Failure							
Elec sub station	< 1min	Mod	24 h	0	0	12-48 h	Low
Pipelines failure	< 1min	Mod	1-24 h	0	0	12-48 h	Low
Fire station failure	< 1min	Mod	1-24 h	0	0	12-48 h	Low
Water system	< 1min	Mod	1-24 h	0	0	12-48 h	Low
Communications	< 1min	Mod	1-24 h	0	0	12-48 h	Low
Medical facilities	< 1min	Mod	1-24 h	0	0	12-48 h	Low
Human related							
Labour Action/ Strike	24 h	Mod	< 24 h	0	0	12-48 h	Low
Civil disturbance	< 12 h	Mod	< 24 h	0	0	12-48 h	Low
Terrorism & War							
State of War	< 48 h	Low	1- 10 d	2	2	12-96 h	Mod
Bomb Threat	< 1 h	Mod	1-3 d	2	3	12-96 h	High
Hostage Threat	< 1 h	Mod	1 – 3 d	1	3	12-48 h	High
Terrorist attack	Nil	Mod	1- 3 d	1	3	> 48 h	High

2. HAZARD, RISK, VULNERABILITY & CAPACITY ANALYSIS

2.1 DISASTER RISKS, VULNERABILITIES AND CHALLENGES.

VISAKHAPATNAM PORT – AREA VULNERABILITY & THREAT MATRIX

X = Slightly Vulnerable, XX = Moderately Vulnerable, XXX = Highly Vulnerable

Threats	**Vessel Accidents Collision Grounding**	**Fire Explosion on board vessel/ashore**	**Fire & Explosion Manifold Pipeline, Tank farm**	**Oil & Chemical Pollution**	**Personnel injury: Accident Rail, Road, On board ship**
Respondent Agencies	D.C. Visakhapatnam Port Trust DG Shipping Min. of Shipping	Visakhapatnam Port Trust Fire Service Visakhapatnam Fire Brigade Mutual Aid Response Group Police, Min. of Shipping	Visakhapatnam Port Trust Fire Service Oil Companies Visakhapatnam Fire Brigade Mutual Aid Response Group Police Min. of Shipping	Visakhapatnam Port Trust (CFO) Control Room Oil Companies Coast Guard, Visakhapatnam Corporation Distt. Collector Min. of Shipping	C.M.O, Visakhapatnam Port Trust Police
Vulnerable Areas					
Vessel Movement	----	------	-----	------	-------
Channel	xxx	xx	----	xxx	x
At Berth	x	xx	xx	xxx	xx

Threats	Vessel Accidents Collision Grounding	Fire Explosion on board vessel/ashore	Fire & Explosion Manifold Pipeline, Tank farm	Oil & Chemical Pollution	Personnel injury: Accident Rail, Road, On board ship
Storage-	----	----	----	----	----
Transfer					
Oil Transfer	---	xx	xx	xx	x
Cargo Transfer	----	----	----	----	----
Trucks, Trains	----	---	----	x	xx
Crane- Shore/Ship	----	xx	----	x	xx
Services	----	----	---	---	----
Access Gates	----	x	x	x	x
Emergency Generators	----	x	---	---	x
Electric Substations	----	x	---	---	x
Train siding Locos, Wagons,	---	----	---	---	xx
Fire station	----	----	---	----	----
Port tugs, crafts,	x	x	---	x	x
Administration Building & Parking	---	---	---	---	---
Customs Area	---	----	---	---	x
Port Employees' Quarters	----	x	----	---	---

Threats	Terrorism Bomb, War, Arson	Technical Failures Power, Transport Communication Infrastructure	Occupational Accidents Strikes	Cyclone Floods	Tsunami Earth Quake
Respondent agencies	Visakhapatnam Port Trust CISF, Police, Coast Guard, Navy, Control Room Min. of Shipping	Visakhapatnam Port Trust	Visakhapatnam Port Trust, CISF Police, Min. of Shipping	Visakhapatnam Port Trust, Dist. Collector, Control Room, Min. of Shipping	Visakhapatnam Port Trust, Distt Collector, Control Room Min. of Shipping
Vulnerable Areas					
Vessel Movement					
Channel	xxx	--	--	xx	x
At Berth	xx	x	x	xx	x
Storage- Transfer					
Oil Transfer	xxx	x	x	xx	--
Cargo Transfer					
Trucks, Trains	xxx	x	xx	xx	--
Crane- Shore/Ship	x	x	xx	xx	--
Services					
Access Gates	xxx	xxx	xx	xx	--
Emergency Generators	xx	x	--	x	--
Electric Substations	xx	x	--	xx	--
Train siding Locos, Wagons,	x	x	x	x	--
Fire station	--	x	--	x	--
Port tugs, crafts,	x	x	x	xx	--

Threats	Terrorism Bomb, War, Arson	Technical Failures Power, Transport Communication Infrastructure	Occupational Accidents Strikes	Cyclone Floods	Tsunami Earth Quake
Administration Building & Parking	x	x	--	x	--
Customs Area & Weigh Bridge	--	x	--	x	--
Port Employees' Quarters	x	x	--	x	--

VISAKHAPATNAM PORT TRUST

PART II

EMERGENCY CONTINGENCY PLAN

CONTENTS- PART II

CENTRAL DISASTER MANAGEMENT GROUP- BASIC FUNCTIONS

Team Leader : Chairman / Dy Chairman
Members: Dy Chairman , Secretary, FA & CAO, Chief Engineer, CME , Traffic Manager, Materials Manager, Chief Medical Officer, Commandant-CISF, Commandant – Coast Guard.
Basic Functions
1-Monitor and analyze reports from the On Site Action team and identify the area/population at risk
2-Activate the Response Plan and arrange the Alert siren.
3-Support the Action Group with materials, equipment, information and human resources
4- Implement changes in the current mode of action if deemed necessary
5-Adjust the Disaster classification of the incident and actuate the Central Control Room
6- Coordinate with external organizations, State Govt. as deemed necessary
7- Make the necessary arrangements and funds for evacuation, transportation, food & supplies
8-Make media statements and reports to MOS.

ON SITE ACTION GROUP - BASIC RESPONSIBILITIES

Team Leader:- Harbour Master / Senior Pilot
Members:-Control room-Sr. pilot, Chief Fire Officer, Dy Comdt. CISF , Exec. Engineer (Electrical) Addl. TM, Dy Chief Med. Officer.
Basic Functions
1- Assess & classify Incident:-nature-location- severity-casualties-resource requirement – time to control
2- Activate elements of the disaster management plan, arrange alert signal in liaison with DC
3-Conduct search, rescue and evacuation operations. Provide medical Aid
4- Manage incident operations and terminate plan, Arrange for re-Entry and restoration

EMERGENCY CLASSIFICATION

Level 1. It is an Incident within the port and is of a minor nature with a low level of personnel injury, interruption to work, damage level and loss of capability. It can be handled by the Port Trust Staff involving Marine and other depts. The Emergency Management group leader is the Dept Head. E.g. Building/Shed Fire, Elec Supply disruption, labour accident, vessel accidents

Level 2;- It is an Incident within the port area and is of a limited and moderate level of personnel injury, possible death(s),interruption of work, damage to port ..Besides Port resources, outside assistance may be required. The Disaster Management group leader is the Chairman, VPT.

E.g. Gas Leaks, Chemical/Oil Spills, Terminal Fires/ Explosions

Level 3:- It is a disaster of a severe and critical nature and could have a high level of personnel injury (and deaths), interruption to work, damage to port and loss of capability. It affects the port and possibly adjacent areas. Besides Port resources, assistance from outside agencies is required. If incident affects VPT, group leader is chairman, VPT and if it affects outside PPT , then information will be given to District Collector depending on the intensity.

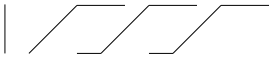
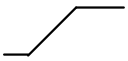
E.g. Gas Leaks, Chemical/Oil Spills, Fires/ Explosions & Cyclones

INCIDENT/REQUIREMENT SCENARIOS	LEVEL I – ACTION BY	LEVEL II & III –ACTION BY
Vessel–Grounding-Shifting-Evacuation	HM	HM + Salvage efforts + Navy + Coast Guard
Casualties	CMO	Port + District + State
Fire & Explosion on Vessel or Terminal	CFO	CFO + District (Fire wing) + CDMG
Fire & Explosion at Shed	CFO , TM	CFO + District (Fire wing) + CDMG
Oil or Chemical Spill	CFO	CFO +Central disaster Magmt. Group+ outside agencies
Toxic Gas Leakage	CFO	Central disaster Magmt. Group +District/ state assistance + outside agencies
Cyclone, tsunami, flood etc	Dy. Conservator	National disaster Management group + CDMG + District + state
Electric Supply breakdown	SE (Elect.)	CDMG + District + State

CENTRAL DISASTER MANAGEMENT GROUP - RESPONSIBILITIES

Position	Port Position	Alternative
Chief Emergency Controller	**Chairman**	**Dy. Chairman**
Monitors Disaster Management action Plan and a state of emergency preparedness is maintained at all times. Authorizes release of required funds. Leads Central Disaster Management group to direct operations from the emergency control center.		
For industrial disasters, confirms level of crisis, monitors the shutting down, evacuation and other operations as necessary. Directs activation of the Central Control room at emergency level 2 and 3		
Activates the off-site emergency plan if the disaster is spreading to/from outside Port boundary in liaison with Dy chairman, DC,TM and CFO		
Approves information to the media		
Liaises with the Secretary, Jt. Secy (Ports) of the MOS (Ministry of shipping)		
Confirms the termination of the emergency.		
Leads the Central Disaster Management Group, monitors the early restoration of facilities and port activities,		
Provides timely required status reports to the Secretary MOS		

Disaster Warning Alarm and Evacuation Signals

TSUNAMI - TYPE-HIGH PITCHED CONTINIOUS WAILING SIREN 5 Sec.  1 Sec.
FIRE /EXPLOSION/BOMB TYPE-LONG SIREN FOLLOWED BY SHORT SIREN 10 Sec. 3 Sec.
GENERAL EVACUATION ALARM FOR TOXIC/RADIATION LEAKAGES / NATURAL CALAMITIES TYPE-HIGH PITCHED RINGING ALARM AT SHORT INTERVALS 
C- ALL CLEAR SIGNAL TYPE:-LONG CONTINIOUS SIREN FOR 90 SECONDS 

Competent Agencies

List of agencies competent for issuing warning or alert is given below:

Competent agencies for issuing warnings

Disaster	**Agencies**
Earthquakes	IMD, MERI,BARC
Floods	Meteorology Department, Irrigation Department, Central Water Commission
Cyclones	Meteorology Department, Irrigation Department, IMD, INCOIS
Tsunami and Storm Surge	INCOIS
Epidemics	Public Health Department
Road Accidents	Police
Industrial and Chemical accidents	Industry, Police, MARG, DISH, BARC,AERB
Fires	Fire Brigade, Police

5.1 PORT RISK HAZARDOUS PRODUCTS STORAGE FACILITIES

COMPANY	LOCATION	NO OF TANKS	CAPACITY	PRODUCTS HANDLED
BPCL-VISAKHA	VIZAG	15	79,441 KL	ETHANOL, FO, LDO, HSD, BIO-DIESEL, MS
IOCL	VIZAG	28	1,40,797 KL	HFHSD, HSD, MS, LDO, LVFO, NFO-380, BFO-180, BFO-380, ATF, ETHANOL, JP-5, BIO-DIESEL
HPCL	STORAGE CAPACITIES	33	1,78,054.5 KL	HSD, NAPHTHA, MS, SKO, SOFT, ATF, ETHANOL, MTO, DIESEL, BIODIESEL, SLOP
CIL	VIZAG	3	27,500 KL	MOLTEN SULPHUR, SULPHURIC ACID, PHOSPHORIC ACID
IMC		1	10,000 KL	SULPHURIC ACID
IMC LIMITED	VISAKHAPATNAM	6	12,555.084 KL	S/ACID
HPCL	VISAKH	12	96,381 KL	HSD, HFHSD, CLO, LDO, LSHS, FO180, VLSFO, SLOP TANK, BITUMEN-VG40, BITUMEN-VG30, BITUMEN-VG10, JBO, LUBE OIL
HPCL REFINERY	ATF AREA	33	12,78,099.7 KL	CRUDE, NAPHTHA, E III MS, E IV MS, DRY SLOP, WET SLOP, E IV HSD, SKO, ATF
HPCL REFINERY	REFINERY AREA	77	8.88,870.6 KL	CRUDE, NAPHTHA, ISOMERATE, MS, HWO, DRY. SLOP, WET SLOP, MTO, HSD, LS HFHSD, LDO, JBO, CUTTER, FO, LSHS, IFO, BITUMEN, VGO, HSSR
NALCO		1	GROSS 7368M^3 NET 6896M^3	CAUSTIC SODA

5.2 VISAKHAPATNAM PORT TRUST – AREA VULNERABILITY & THREAT MATRIX

X=slightly vulnerable: xx=moderately vulnerable: xxx=highly vulnerable

Threats Vulnerable Areas	Vessel Accidents Collision Grounding Fire Explosion	Land Transport Personnel; Accident Rail Road	Fire & Explosion Manifold Pipeline	Toxic Gas Leakage Pipeline Manifold	Pollution Oil Chemical	Terrorism Bomb War Arson Cyber	Technical Failures Power, Transport Communication Infrastructure	Occupational Accidents Strikes	Cyclone - Floods	Tsunami Earth Quake
Vessel Movement										
Approach Channel	xx				x	x	x	x		X
Coal Berths	x	x	x	x	x	x	x	x	x	x
Oil Tanker Berth	x	x	xx	x	x	x	x	x	x	x
LNG Berth	x	x	xxx	xx	x	xx	x	x	x	x
Fertilizer Berth	x	x	x	x	x	x	x	x	x	x
Boat Train Pier	x	x	x		x	x	x	x	x	x
Gen Cargo Berths	x	x	x		x	x	x	x	x	x
Cargo Transfer										
Oil pipe lines			xx		xx	xx	xx	x	x	x
Ammonia/ph.acid			xx	xx	xx	xx	xx	x	x	x
pipeline										
Trucks/Mobile eqmt			x		x	x	x	x	x	x
Train tracks-Roads						x			x	x
Cranes & Ship Loaders						x	x	x	x	x
Bulk cargo conveyor system						x	x	x	x	x

Threats Vulnerable Areas	Vessel Accidents Collision Grounding Fire Explosion	Land Transport Personnel; Accident Rail Road	Fire & Explosion Manifold Pipeline	Toxic Gas Leakage Pipeline Manifold	Pollution Oil Chemical	Terrorism Bomb War Arson Cyber	Technical Failures Power, Transport Communication Infrastructure	Occupational Accidents Strikes	Cyclone - Floods	Tsunami Earth Quake
SERVICES	------	----	------	-----	------	------	------	------	-----	----
Control gates			x			xx		x	x	x
Emergency Generators			x			x	x	x	x	x
Electric Substations			x			x	x	x	x	x
Train siding Locos, Wagons,			x			x	x	x	x	x
Signal station-electronic means commn			x			x	x	x	x	x
Fire station 1 & 2			x			x	x	x	x	x
Port tugs, crafts, dredger	x	x	x		x	x	x	x	x	x
ADMINISTRATION	------	----	------	-----	------	------	------	------	-----	----
Administration Building & Parking			x	x		x	x	x	x	x
Customs Area & Weigh Bridge			x	x		x	x	x	x	x
Port officers & CISF Quarters			x	x		x			x	x

EVENT SCENARIOS -VISAKHAPATNAM PORT TRUST

Probability-Low-once every 10-50yrs:: moderate=once every 2-10yrs; High=once annually
Impact/Preparedness/Risk Threat 0=Very Low 1=Low 2=moderate 3=High

EVENT/ SCENARIO SPECTRUM	Early warning	Probability of Occurrence	Duration Impact	Impact on property	Impact on people	Time to Restore Facilities	RISK THREAT
Cyclone	96h-12h	Low	N/A	1	**1**	N/A	Moderate
Floods	96h-12h	Low	N/A	**1**	**1**	N/A	Low
Earthquake/Tsunami	5-8h	**low**	**N/A**	**1**	**1**	N/A	Low
V/L Accident							
Collision	< 1min	Low	<1hr	0	0	4 h	Low
Grounding	< 1min	Low	2-4hr	0	0	4 h	Low
Fire/Explosion	< 1min	Low	0.5-12h	1-2	1-2	12-96h	Moderate
Transport Accident							
Rail	< 1min	Mod	< 1min	0	1	6-48h	Low
Road Accident	< 1min	Mod	< 1min	0	1	<1h	Low
Pollution-							
Gas Release-Ammonia	< 1min	Low	1-24h	0.1	2	2-30d	Low
Phos /sulph acid spill	< 1min	Low	1-12h	0.1	1	2-4d	Low
Oil Spill	< 30min	Low	1-12h	1	1	1-2d	Low
Fire-Admin Building	< 10min	Low	1-72 h	1	1	12-96h	Low
Parking/Gates	< 1min	Low	1-12h	0	1	12-96h	Low
Function Failure							
Elec sub station	< 1min	Low	1-24h	0	0	12-48h	Low
Emergency Generator	< 1min	Low	1-24h	0	0	12-48h	Low
Pipelines failure	< 1min	Low	1-24h	0	0	12-48h	Low
Evacuation routes	< 1min	Low	1-24h	0	0.2	12-48h	Low
Fire Alarm failure	< 1min	Low	1-24h	0	0	12-48h	Low
Fire station failure	< 1h	Low	1-24h	0	0	12-48h	Low
Water system	< 1h	Low	1-24h	0	0	12-48h	Low

List of Local Industries – Phone Numbers

S. No.	Name	Office Phone
1	M/s. Hindustan Shipyard Limited	0891- 2577437
2	M/s. Hindustan Petroleum Corp. Ltd.	0891- 2895000/2895100
3	M/s. Coromandel Fertilizers Ltd.	0891- 2578400
4	Visakhapatnam Steel Plant	0891- 2518431
5	M/s. BHPV Limited	0891- 2517381
6	M/s. NALCO	0891- 2561432/35
7	M/s. East India Petroleum Ltd.	0891- 2578168
8	M/s. Andhra Petro Chemicals Ltd.	0891- 2578342
9	M/s. R.C.L.	0891- 2740500
10	M/s B.P.C.L.	0891- 2577528
11	M/s. I.O.C. Ltd.	0891- 2578300/302
12	M/s. I.M.C. Ltd.	0891- 2751250/2755612
13	M/s. ESSAR Steel Ltd.	0891- 2876300/2523213
14	M/s. Visakha Container Terminal Ltd.	0891- 2502164/40
15	M/s. SAIL	0891- 2704074/2563611
16	M/s. ONGC	0891- 2567833
17	M/s. NTPC	089247274
18	M/s. NMDC	0891- 25623943/262945
19	M/s. SALPG	0891- 2748928/29

CONTACT DETAILS OF NDRF OFFICERS

Force Head Quarters

Name	Designation	Address	Telephone No.	Fax No.	E-Mail
Shri S N Pradhan (IPS)	Director General	Directorate General, NDRF, 6th Floor, NDCC-II Building, Jai Singh Road, New Delhi - 110001	011-23438020, 011-23438119	011-23438091	dg.ndrf@nic.in
Shri Amrendra Kumar Sengar (IPS)	Inspector General	-- Do --	011-23438021	011-23438091	ig.ndrf@nic.in
Ms Nishtha Upadhyay	Financial Advisor	-- Do --	011-24368148	011-23438091	--
Mr. Mohsen Shahedi	Deputy Inspector General (Proc/Prov)	-- Do --	011-23438022	011-23438091	digprov-ndrf@nic.in
Shri Manoj Kumar Yadav	Deputy Inspector General (Trg/Pro /Academy/NCDC/East & North East Sector)	--Do--	011-23438140	011-23438091	dig.es.ndrf@nic.in
Shri Randeep Kumar Rana	Deputy Inspector General (Estt/ Ops / North-West Sector)	--Do--	011-23438023	011-23438091	dig.ns.ndrf@nic.in
Shri K K Singh	Deputy Inspector General (Adm/Works/South Sector)	-- Do --	011-23438185	011-23438091	dig.ss.ndrf@nic.in
Shri V V N Prasanna Kumar	Commandant (PROC/PROV/NDRR)	-- Do --	011-23438183	011-23438091	--
Dr. Amit Murari	CMO (SG)	-- Do --	011-23438091	011-23438091	cmo-ndrf@gov.in
Shri Muneesh Kumar	Second-in-Command (Works & Proc)	--Do--	--	011-23438091	--

Shri Daulat Ram Chaudhary	Second-in-Command (ADM)	--Do--	--	011-23438091	hq.ndrf@nic.in
Shri Pranshu Srivastava	Deputy Commandant (Trg)	--Do--	011-23438138	011-23438091	hq.ndrf@nic.in
Shri Rakesh Ranjan	Deputy Commandant (OPS)	--Do--	011-23438024	011-23438091	hq.ndrf@nic.in
Shri Surendar Kumar	Deputy Commandant (Engineer)	--Do--	--	011-23438091	--
Shri Krishan Kumar	AC (IT/COMN/PRO)	--Do--	011-23438024	011-23438091	krishan.0405@gov.in
Shri Bhawani Singh	AC(ADM & SO to DG)	--Do--	011-23438118	011-23438091	dc.adm.ndrf@nic.in
Shri S Raghavindra	AC/MIN	--Do--	011-23438091	011-23438091	hq.ndrf@nic.in
Control Room	--	--Do--	011-23438091, 011-23438136	011-23438091	hq.ndrf@nic.in

NDRF
Units

Name	Designation	Address	Telephone No.	Fax No.	Mobile No.	Unit Control Room No.	E-Mail
Sh. R S Gill	Officiating Commandant	1st BN NDRF, Patgaon PO - Azara,Distt. Kamrup Metro, Guwahati-781017	0361-2840027	0361-2849080	--	0361-2840284 09401048790 09435117246	assam01-ndrf[at]nic[dot]in
Sh. Nishit Upadhyay	Commandant	2nd BN NDRF, Near RRI Camp. Haringhata, Mohanpur, Nadia, (West Bengal) Pin - 741246	033-25875032	033-25875032	-	033-25875032 09474061104 09474116775	wb02-ndrf[at]nic[dot]in
Sh. Jacob Kispotta	Commandant	3rd BN NDRF, PO-Mundali, Cuttack - Odisha Pin - 754013	0671-2879710	0671-2879711	--	0671-2879711 09437581614	ori03-ndrf[at]nic[dot]in
Ms. Rekha Nambiyar	Commandant	4th Bn NDRF, PO - Suraksha Campus , Arrakonam , Distt. Vellore Tamilnadu-631152	04177-246269	04177-246594	--	04177-246594 09442140269	tn04-ndrf[at]nic[dot]in
Sh. Anupam Srivastava	Commandant	5th Bn NDRF, Sudumbare Taluka, Distt - Maval Pune (Maharashtra) Pin - 412109	02114-247010	02114-247008	--	02114-247000 09422315628	mah05-ndrf[at]nic[dot]in
Sh. A. K. Tiwari	Commandant	6th Bn NDRF, Jarod Camp,Teh-Wagodia, Vadodara, Pin - 391510	02668-274470	02668-274245	--	02668-274245 09723632166	guj06-ndrf[at]nic[dot]in
Sh. Ravi Kumar Pandita	Commandant	7th Bn NDRF, Bibiwala Road, Bhatinda (Punjab) Pin 151001	0164-2246193	0164 - 2246570	--	0164-2246193 0164-2246570	pun07-ndrf[at]nic[dot]in

Sh. P.K.Srivastava	Commandant	8th Bn NDRF, Kamla Nehru Nagar, Ghaziabad (UP) Pin - 201002	0120-2766013	0120 - 27666012	--	0120-2766618 09412221035	up08-ndrf[at]nic[dot]in
Sh. Vijay Sinha	Commandant	9th Bn NDRF, Bihata Patna, Bihar Pin - 801103	06115-253942	06115-253939	--	06115-253939 08544415050 09525752125	patna-ndrf[at]nic[dot]in
Mr. Zahid Khan	Commandant	10th Bn NDRF, ANU Campus, Nagarjuna Nagar, Guntur (AP) Pin - 522510	0863-2293178	0863-2293050	--	0863-2293050 08333068559	ap10-ndrf[at]nic[dot]in
Sh. A.K.Singh	Commandant	11 th Bn NDRF, Sanskritik Sankul, Maqbool Alam Road, Varanasi, UP - 221002	0542-2501201	0542 - 2501101	--	0542-2501101 08004931410	up-11ndrf[at]gov[dot]in
Sh. Rajesh Thakur	Commandant	12 th Bn NDRF, Itanagar, Arunachal Pardesh791112	0360-2277109	0360-2277106	--	0360-2277104 09485235464	bn12[dot]ndrf[at]gov[dot]in

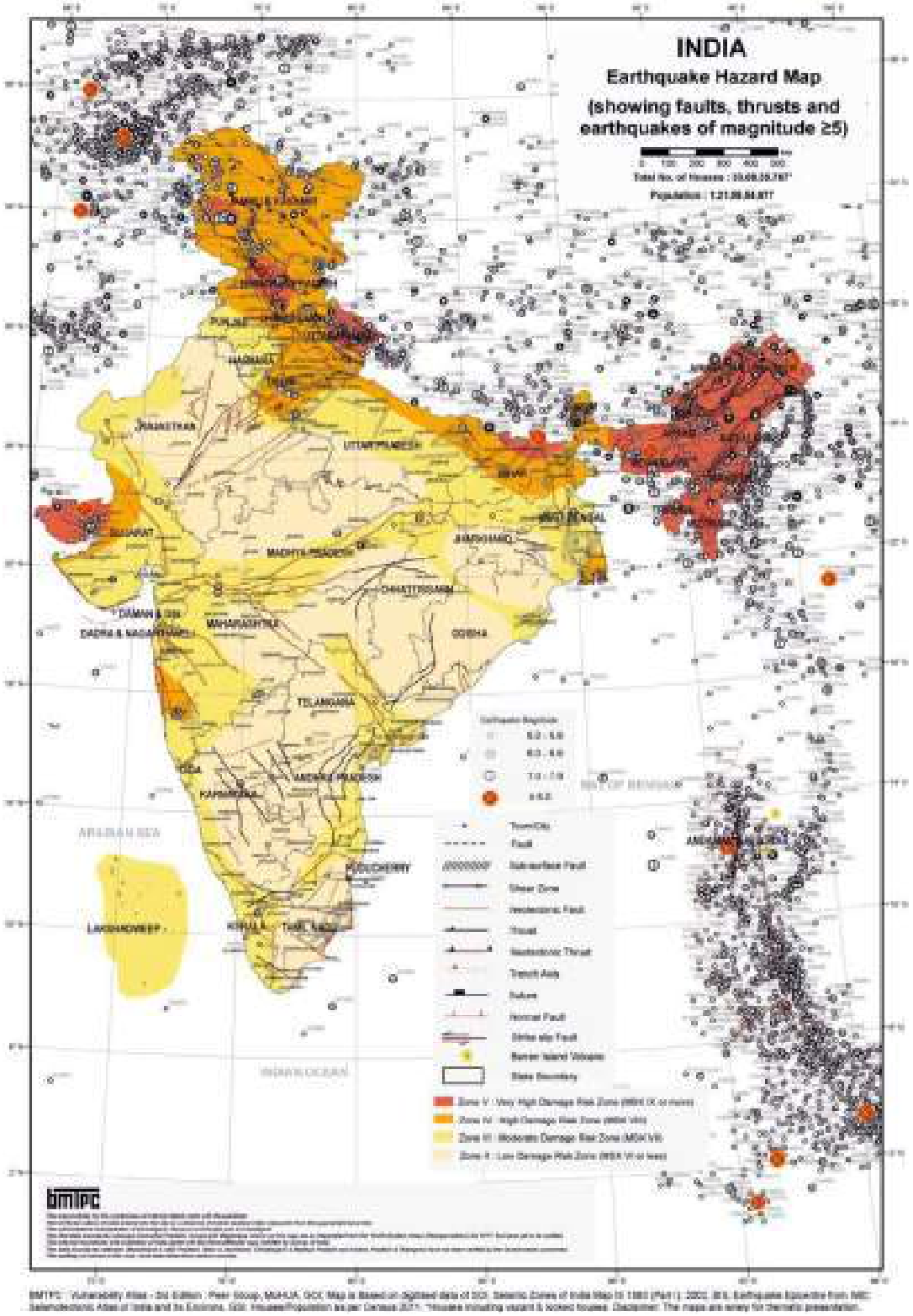
NDRF
RRCs

Name of RRC	Landline Number	Mobile Number
NDRF RRC, Port Blair, Andaman	03192289174	09442112269
NDRF RRC, Adayar, Chennai	04424420269	09442112269
NDRF RRC, Vizag Steel Plant, Vishakhapatnam, Andhra Pradesh	--	08333068565 08333068560
NDRF RRC, Fire Station Mahadevapura, Bengluru, Karnatka	--	09482978719 09482978715
NDRF RRC, Shaikpet Sport Complex, Hyderabad, Telangana	04023565666	08333068536 08333068547

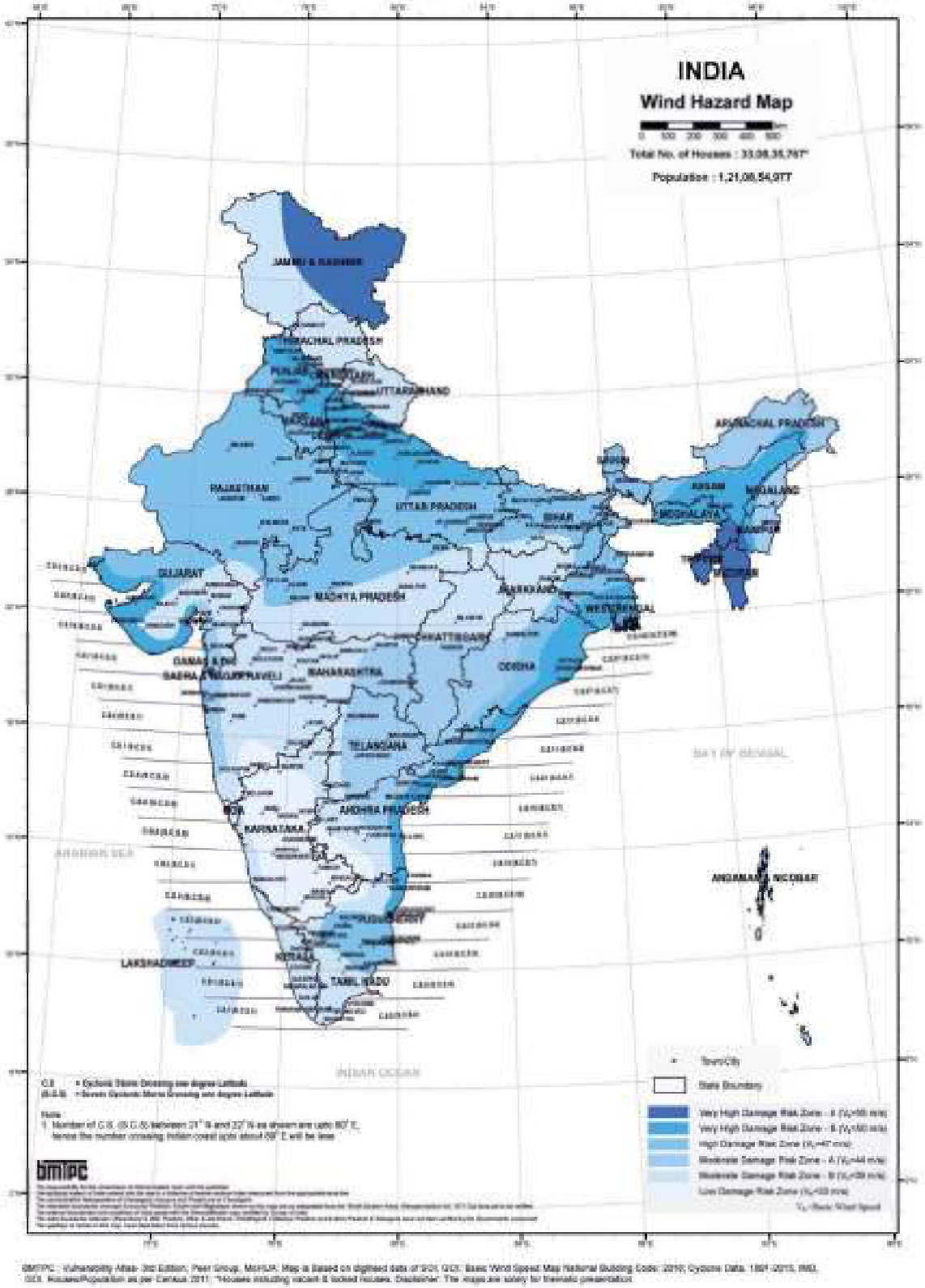
ANDHRA PRADESH STATE DISASTER RESPONSE FORCE (APSDRF)

Name of the Officer	Designation	Phone	Email ID
Sri. K. Kanna Babu, I.A.S	Special Commissioner (Disaster Management) & Ex-Officio Additional Secretary to Government, Revenue (DM) Department, Managing Director (FAC), APSDMA	0863-2377099	commr_relief_rev@ap.gov.in
Sri. Dr. C. Nagaraju	Executive Director	+91-9676957788, 0863-2377105	ed-apsdma@ap.gov.in
Smt. P. Seshasri	Administrative Officer	+91-8333905039	seshasrip-plg@ap.gov.in
Sri. Ch. Santhi Swarup	SEOC Incharge	+91-8333905033	seoc-apsdma@ap.gov.in

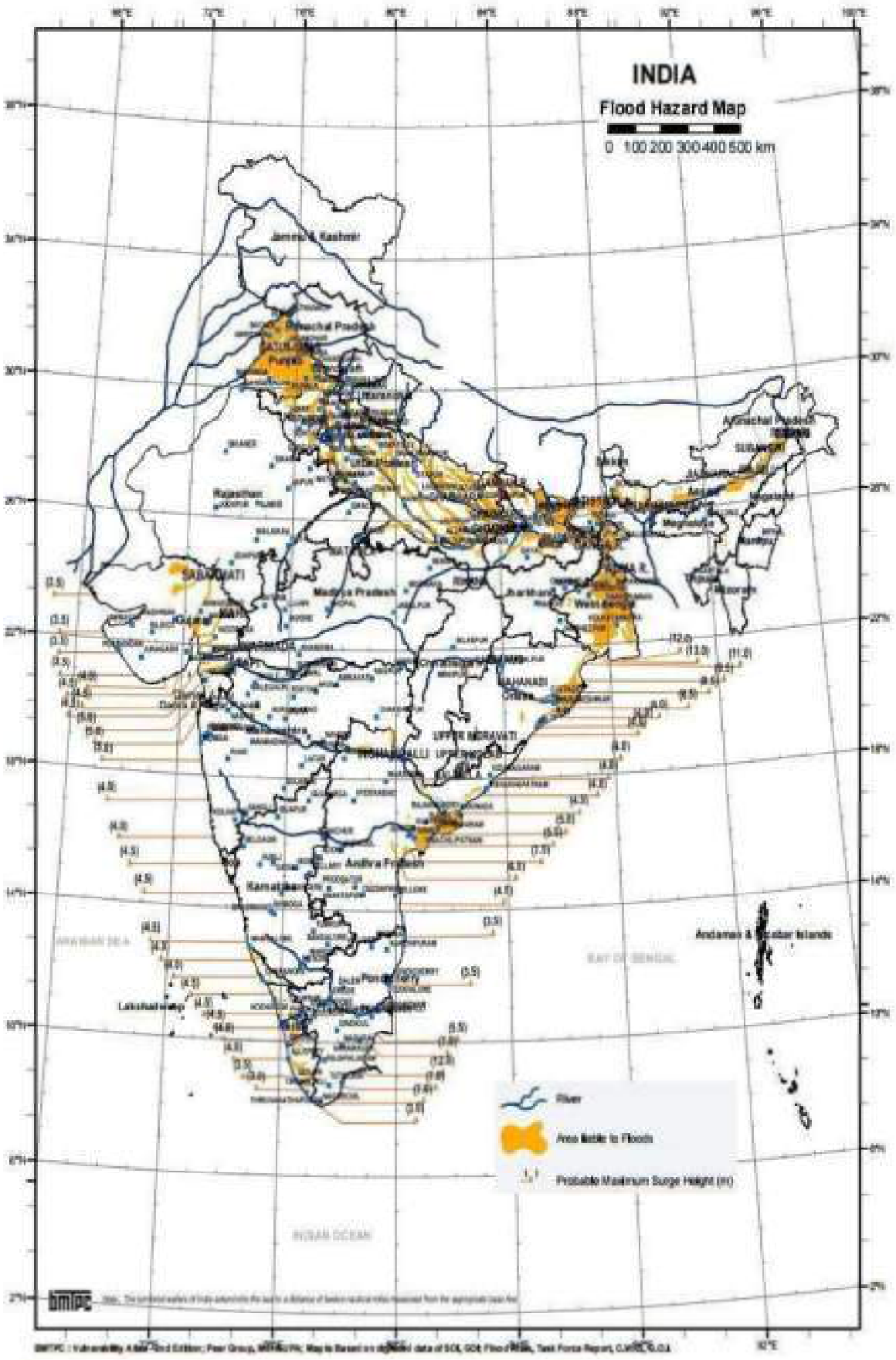
APPENDIX C
IMPORTANT MAPS



EARTHQUAKE HAZARD MAP



WIND HAZARD MAP



FLOOD HAZARD MAP

ANNEXURE – 5

SR READING
2024
SEPTEMBER

NO	DATE	starting	closing	TOTEL UNITS	REMARKS
1	01/09/24	7554	7554	NILL	SUNDAY
2	02/09/24	7554	7554	Nil	
3	03/09/24	7554	7554	Nil	
4	04/09/24	7554	7558	-4-	
5	05/09/24	7558	7567	-9-	
6	06/09/24	7567	7569	-2-	
7	07/09/24	7569	7569	-NIL-	
8	08/09/24	7569	7569	-NIL-	SUNDAY
9	09/09/24	7569	7571	-2-	
10	10/09/24	7571	7576	-5-	
11	11/09/24	7576	7580	-4-	
12	12/09/24	7580	7586	-6-	
13	13/09/24	7586	7592	-6-	
14	14/09/24	7592	7592	-0-	
15	15/09/24	7592	7592	NIL	SUNDAY
16	16/09/24	7592	7592	NIL	
17	17/09/24	7592	7594	-02-	
18	18/09/24	7594	7602	-08-	
19	19/09/24	7602	7605	-03-	
20	20/09/24	7605	7612	-07-	
21	21/09/24	7612	7619	-07-	
22	22/09/24	7619	7619	NILL	SUNDAY
23	23/09/24	7619	7623	-4-	
24	24/09/24	7623	7634	-11-	
25	25/09/24	7634	7634	-NIL-	
26	26/09/24	1634	7634	-NIL-	
27	27/09/24	7634	7634	NIL	
28	28/09/24	7634	7634	NIL	
29	29/09/24	7634	7634	NIL	SUNDAY
30	30/09/24	7634	7641	-7-	
31	~~31/09/24~~				

ANNEXURE – 6

1st half- yearly 2024 report

Marine Ecological Sensitivity assessment studies for preparing Biodiversity Monitoring and management plan in Visakhapatnam Port

Submitted to

Department of Civil Engineering
Visakhapatnam Port Authority
Visakhapatnam

Submitted
by

Department of Environmental Sciences
Andhra University
Visakhapatnam

1st half- yearly, 2024 report on

MARINE ECOLOGICAL SENSITIVITY ASSESSMENT STUDIES FOR PREPARING BIODIVERSITY MONITORING AND MANAGEMENT PLAN IN VISAKHAPATNAM PORT

Submitted to

DEPARTMENT Of CIVIL ENGINEERING

VISAKHAPATNAM PORT AUTHORITY

VISAKHAPATNAM

Submitted by

PROF. T. BYRAGI REDDY

DEPARTMENT OF ENVIRONMENTAL SCIENCES

ANDHRA UNIVERSITY

VISAKHAPATNAM - 530 003

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Background of the study:

Coastal marine ecosystems provide a variety of ecosystem services for humans; however, these systems are susceptible to both terrestrial and marine factors because they are situated in the coastal ecotone (Ray and Hayden, 1992; Reizopoulou et al., 2014). Consequently, coastal marine ecosystems are very sensitive to environmental change and human activities (Halpern et al., 2004; Hoegh-Guldberg and Bruno, 2010; Perry et al., 2010). Marine ecosystem services are declining due to various problems, including marine pollution, eutrophication, habitat loss, and the degradation of biodiversity (Solan, 2004; Worm et al., 2006; Deegan et al., 2012; Johnston et al., 2015, Hewitt et al., 2016; Le Moal et al., 2019). However, ocean uses are still often located in sensitive biological and ecological areas without much consideration of their impact (Douvere and Ehler, 2009; Hu et al., 2019).

Life on earth is supported by the surrounding ecological conditions and the natural resources. Continents and oceans are the two major divisions comprising of all the ecosystems. The ocean serves as a source of food, energy, and minerals. About 75 % of the earth' surface is covered with oceanic waters which have a rich wealth of marine life. If we say that land is dominated by plant biomass, then we also have to accept that animal biomass dominates the oceanic waters.

Seas and oceans constitute the marine ecosystems. When compared to

land based terrestrial ecosystems, the marine ecosystems have certain unique features. They are:

1. The oceanic environment is very wide covering 75% of the earth's surface
2. The oceanic systems are very deep in which life extends to all depths
3. Sea is continuous
4. The water is in continuous movement both in vertical and horizontal dimensions
5. The water is salty with an average salt content of 35 g/litre
6. The concentration of dissolved nutrients is low. Ecology deals with organisms, populations, communities, ecosystems and the biosphere.

Marine ecology deals with the study of the environment and life in marine waters. It involves the study of a) Marine organisms and their habitat (physical support, light and transparency, nutrients, temperature, salinity and osmotic processes, gases, hydrostatic pressure, viscosity, circulation of water) b) Divisions of Marine environment (open sea-pelagic environment, epipelagic environment, mesopelagic zone, bathypelagic zone, abyssopelagic zone, and sea bottom- benthic environment) c) Distribution of marine life (planktons-floaters, Phytoplanktons, Zooplanktons, The nektons and the benthos).

Life on earth originated from oceanic waters. Creatures living on land need to deal with gravity, dehydration, great temperature variations, and

many other factors which are normally not encountered in oceans. But the marine organisms are affected by the factors like

A. Depth of oceanic water

B. Change in salinity

C. Change in temperature

D. Change in turbidity

E. And other environmental factors.

Marine Ecology involves the understanding of all these aspects.

A. Depth Zones in Oceans:

The continental margin forms the part of the sea bed that borders all the land frontiers. It consists of three zones as Continental shelf, continental slope and Deep Ocean basins. The continental shelf extends from the coast to a depth of 130 m. The width averages to about 75 kilometers. This shelf zone collects much of the sediments(deposits of sand and mud) that are carried by the rivers from land. The continental slope begins at the outer edge of the shelf. The slope is much steeper than the shelf and plunges to great depths of 3.6 kilometers. The width ranges from 20 to 100 kilometers. Submarine canyons extend into these slopes. The canyon heads may form some deep-sea fans and levees. The area between continental slope and deep ocean floor is known as continental rise. The deep ocean basin is called as the abyssal plain. Abyssal hills, gyots, sea mounts and deep-sea trenches are the physiographic features of the basin.

The deep ocean basins consist of deep-sea peaks, valleys, and plains which lie beyond the continental margin in the ocean basin. The mid-ocean ridges are the unique features of the ocean basins. Deep valleys also cut across the ridges in many places. Frequent volcanic activity is also expected in some valleys. The two chief sources of deep-sea sediment are the land itself and marine life. Marine life sediment consists mainly of tiny shells and the remains of dead organisms of the plankton. When such matter makes up a large part of sediment, they are called as oozes.

B. Salinity

Sea water contains much mineral salts to the extent of increasing its density. The oceans and seas put together contain about 5 x 10 16 tons of salts. One cubic foot of average sea water contains 2.2 pounds of salt. Salinity is generally reported in terms of ppt or parts per thousand (abbreviated o/oo), the number of pounds of salt per 1,000 pounds of water. It is affected by precipitation, evaporation and movement of water masses. It also varies from the surface zone to the deep ocean waters. Based on this factor, animals living in marine waters are classified into a) Stenohaline animals - restricted life with salinity b) Euryhaline animals – life that can be found at all levels of salinity. The marine communities are adapted to live in high saline waters. The osmotic properties of seawater are another problem of marine animals.

C. Temperature:

The Temperature fluctuation is minimum in oceanic waters. Arctic waters are colder. Tropical waters are warmer. The variation is seasonal and diurnal. Ocean animals show a varied response to the temperatures. There are two kinds of animals.

Stenothermal animals – the ones which live within 20°C 2. Eurythermal animals – the animals which can withstand the wide range of temperature variations. The cold-water forms also show an increase their in sizes. The surface temperature of the oceanic waters vary from about -2 °C near the North and South poles to about 30 °C near the equator. In the Polar Regions, the surface sea water freezes. The western tropical Pacific has the warmest surface water. Ocean currents affect the surface temperature.

D. Light and Photic Zones:

Light is very essential for the marine life. For photosynthesis, heating, radiations and vision are related to this factor. It determines the plant and animal life and depends on the angle of incidence. Perpendicular rays go deeper into the oceans.

E. Ocean Water Pressure

The difference in pressure (pgh) comes due to the thickness of water column(h), density of water (p) and the acceleration due to gravity (g). This has a great influence over the life and deposition, and solubility of $CaCO_3$ mechanisms. There are two classes: 1. Eurybathic -Animals live with great

vertical range (Eg. Natica) 2. Stenobathic -narrow range (Eg. Turris). Other factors: The other abiotic factors which have much impact on marine ecosystems are tides, currents and waves.

F. Marine Life

Marine life ranges in size from microscopic one-celled organisms to the blue whale, which may measure up to 30 meters long. Ocean plants and plantlike organisms use sunlight and the minerals in the water to grow. Sea animals eat these organisms and one another. Based on the variations in physical condition and the presence of certain specific kinds of animals and plants, the Marine environment is broadly classified into a) pelagic zone - open sea -entire sea water above ocean floor - encompasses a neritic zone and an oceanic zone. b) Benthic zone - ocean (bottom)- encompasses the littoral and deep-sea zones. All ocean life can be divided into three groups. These groups are: (1) the plankton, (2) the nekton, and (3) the benthos.

Description of Marine Ecology: The area of the port is located in a fjord estuary and the surrounding areas also could be crucial for the thriving of marine ecosystems directly and indirectly. Zooplankton is algal forms and juveniles of many shrimps, crabs and fishes and indicates the productivity and abundance in the area. Many important marine ecosystems such as intertidal ecosystems, estuaries, shallow water areas etc are present in the study site.

Scope of Work:

The assess the existing status of marine ecology in and around the project site and to prepare a suitable bio diversity monitoring and management plan for Visakhapatnam Port, the following attributes were studied by using the appropriate methods of marine/coastal sampling as per standard guidelines and understand the intertidal area through sample collection and analysis were carried out by Department of Environmental Sciences, Centre for Industrial and Scientific Consultancy (CISC), Andhra University, Visakhapatnam. Water analysis done to understand the pollution and effects in the area.

Primary Productivity

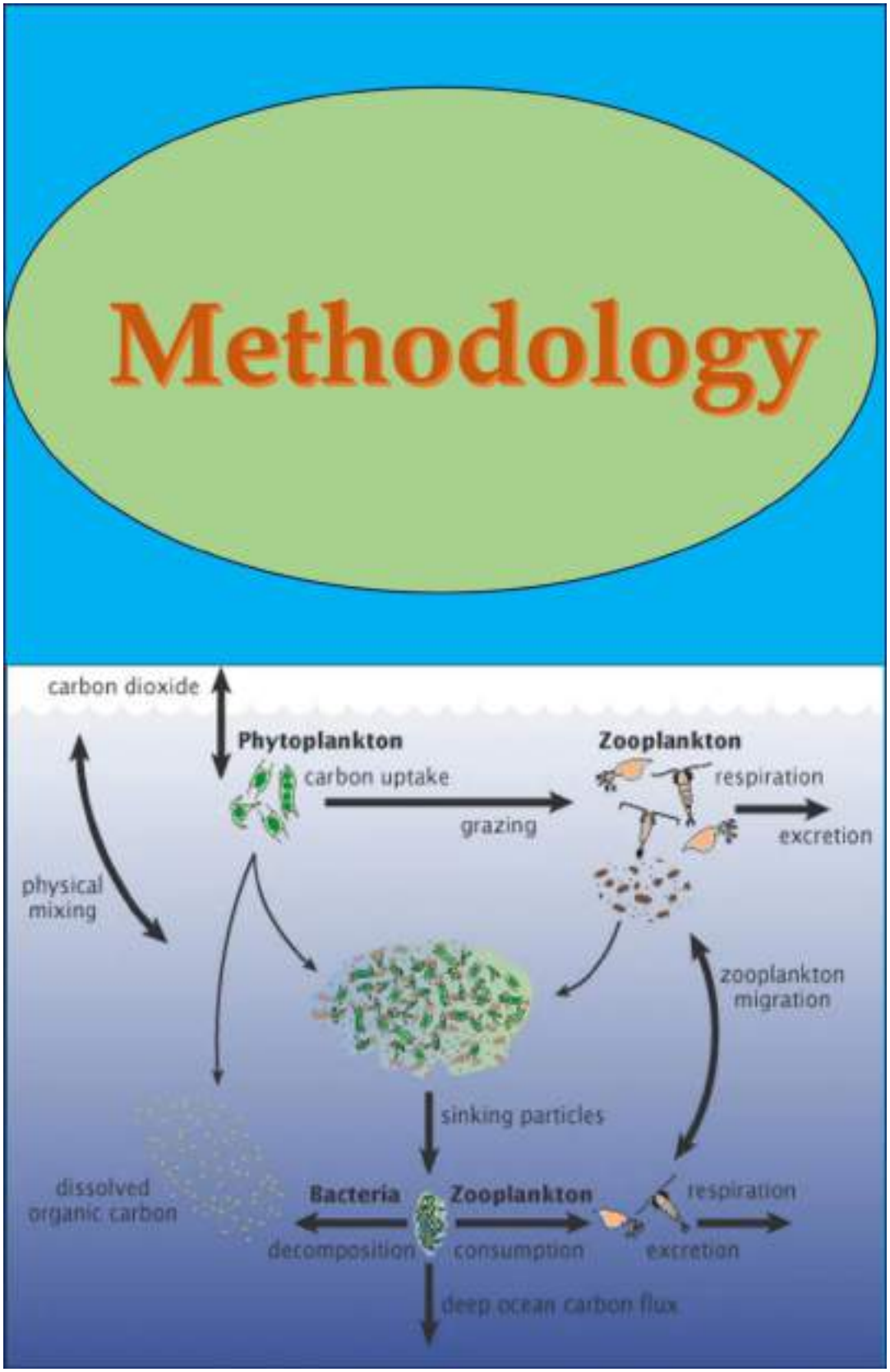
Phytoplankton

Zooplankton, Benthic fauna

Nekton, Beach ecology (Intertidal survey & costal survey)

Bio-accumulation of heavy metals

The project report was prepared and submitted for the Visakhapatnam Port Authority (VPA) for its project activities Viz, Strengthening, Deepening and Modification by the Department of Environmental Sciences, Centre for Industrial and Scientific Consultancy (CISC), Andhra University, Visakhapatnam.


Methodology
carbon dioxide
Phytoplankton
carbon uptake
grazing
Zooplankton
respiration
excretion
physical mixing
zooplankton migration
sinking particles
dissolved organic carbon
Bacteria
Zooplankton
respiration
decomposition
consumption
excretion
deep ocean carbon flux

Methodology

Centre for industrial and Scientific consultancy (CISC), Andhra University, Department of Environmental Sciences to undertaken a Marine Ecological Sensitivity Assessment study in and around for the harbour of Visakhapatnam Port Authority (Lat. 17041'40" N and Long. 83016'52" E) and coastal waters (~35m) as a part of their commitment to harbour expansion needs in that area. Taking into account the available expertise and the Department's acquaintance with Marine Biological Investigations of Visakhapatnam coastal waters, it was agreed that the study be held as per request from Department of Environmental Sciences, Andhra University. The scope of the Investigation related to monitoring physico-chemical variables and marine biology at 7 pre-determined locations (4 in the main Harbour; 1 Fishing harbour and 2 Sea) representing conditions in the inner harbour (stations 1-4), fishing harbour (st.5) and two locations (sts. 6 & 7) in the open sea as reference points being away from the Harbour (Fig.1).

It was also agreed that water quality and sediment characteristics be studied (as one time observation). For evaluation of water quality, the proposed variables included sea temperature, pH, dissolved oxygen, salinity, turbidity (in place of suspended particulate matter), nitrogen as ammonia, nitrite and nitrate, reactive silicate and phosphate. In addition, total nitrogen and phosphorus were also proposed to differentiate between inorganic and organic fractions. Sediment parameters consisted of organic carbon and its texture.

Marine Biological investigations included taxonomic enumeration (including species diversity) and quantification of phytoplankton, zooplankton and benthos at the above 7 locations. It was decided to lay emphasis on seabed life (macrobenthos) since they are the most vulnerable to any environmental disturbance. It was also proposed to estimate phytoplankton chlorophyll at all locations and primary productivity limited to two/three sites in the harbour and close to the coast. Experimental trawling was also proposed (~35m) to find out the fishery component of this area.

Study Area:

Visakhapatnam port is located in the ford estuary of the Meghadri River and is one of the significant ports of Andhra Pradesh. The location of the port is very ideal in the sense that it affords protection from cyclones which strike the east coast regularly, by a high promontory into the sea, known as Dolphin's Nose Hill which is to the north of the entrance channel. The low tidal range of a maximum of 1.82 meters is also advantageous for the location of the port.

Till the end of the 19th century, major commercial activity in Visakhapatnam was centred on the deep-water port with ships anchored off the sheltered coast. Post world war-I, the Bengal-Nagpur Railways constructed the Inner Harbor and the actual development of Visakhapatnam took place during 1927-33 that resulted in Vizag gaining importance as a hub of maritime/industrial activity.

The estuarine area serves as both a commercial and defence area and is very important for the development of the state and defence. Out of 13 major ports Visakhapatnam Port is one among situated on East coast of India. The first South East Asian port which got ISO certifications for Quality (ISO, 9001), Environment (ISO, 14001) and Safety (OHSAS, 18001). The Port is existing from 1933 till date taking an amazing role in building the nation duly serving industrial, commercial and Agricultural Sectors.

One more multi commodity berth EQ.4 was added to it in 1955. To meet the requirement of Oil Companies facilitating the discharge of crude and petroleum products two berths OR.1 & OR.2 were developed in the year 1957. Subsequently 4 more berths were added in the Inner Harbor between years 1965 to 1968. During the year 1976 Outer Harbor has been developed. The outer harbor is having Ore Berth (OB-I & OB-II), General cargo berth (GCB), LPG berth, OSTT, Container terminal and dredger berth.

The Visakhapatnam port is presently handling coal at west quay of Inner harbour. However, due to depth constraints in the inner harbour the larger size vessels of coal are lightened/handled at outer harbour due to availability of deeper dredge depths in the outer harbour.

The coal at GCB is unloaded from the ships on the wharf using floating cranes and the unloaded cargo is loaded in to the trucks using loaders and stacked in the back up area of the berth and at East Yard until it is lifted to the concerned parties. Handling of COAL at GCB by conventional method and

transportation through trucks from the berth to the stack yard are observed to be the main sources of Air pollution. Therefore, to minimize the dust, coal handling is totally mechanized and is being operated by Vedanta on PPP (Public –Private Partnership) mode.

Iron ore is handled at ore berth in outer harbour. The ore received from wagons is unloaded at ore handling plant and stacked. The handling of ore is done through fully mechanized facility. The conveyor passing through city and having interface was covered. However small quantity of iron ore fines is handled at west quay of inner harbour.

Fertilizer is handled at east quay of inner harbour, which is away from the city. The Visakhapatnam port trust in the earlier years of inception used to handle very less cargo and habitations were very much scattered with less population. Subsequently, due to the establishment of major industries in Visakhapatnam and its surroundings public habitation around Port increased abnormally while the port activities had increased steadily over a period of time.

The Port of Visakhapatnam, right from its inception, handles maximum cargo compared to other major ports for the past 7 years and thus is classified as a premier Port of India has been handling dry bulk cargo and the share of dusty cargo is about 50% of the total cargo. More or less the same level is being maintained for the past two decades. Handling of dusty cargo is neither unique to port of Visakhapatnam nor to other Indian seaports. It is a global practice

that has existed for over few decades. Sea Ports that act as gate ways to sea borne domestic and international trade are required to handle variety of cargoes required by the industries and Port of Visakhapatnam handling large volumes of coal, iron ore, fertilizer is no exception. With volumes of cargo going up the dust levels have also increased correspondingly and VPA is making all efforts to mitigate the same by taking certain environment protection measures such as dust suppression systems by water sprinkling.

Therefore, VPT committed to convert the present semi mechanized system into a fully mechanized system within built dust suppression system to minimize the emission of dust into the surrounding environment as it was found out through a scientific study carried out by an independent agency that the factors influencing the generation of dust pollution are mainly due to non-mechanized method of handling of dry bulk cargo such as coal, iron ore, fertilizer etc contributing for dust emissions during loading/unloading and transportation through trucks. Hence, loading and unloading of domestic, agricultural and commercial goods may cause ecological and water quality degradation of surrounding area of marine water. The following report encompasses the biodiversity and water quality parameters of the area to assess how the environment is at the time of the data collection.

Sampling Locations earmarked on Map

The proposed project site is located on the shore of Bay of Bengal,

Visakhapatnam, Andhra Pradesh. The project location image captured from Google earth of the Visakhapatnam Port Authority is shown inFigure 1.

Table. 1: The Sub-tidal (offshore) locations with co-ordinates.

S. No.	Sampling Locations	Longitude Latitude
1	Inner Harbour between East Quay& West Quay	17^0 42′ 03.2″ N 83^0 16' 54.5" E
2	Turning Circle, Inner Harbour	17^0 41' 34.4" N $83^0$16' 52.3" E
3	Turning Circle, Outer Harbour	17^0 41'10.6" N $83^0$18' 10.3" E
4	—0.3km Off Ramakrishna Beach (North of Port)	17^0 42' 53.9" N $83^0$19' 52.7" E
5	—3.0 km off Ramakrishna Beach (North of Port)	17°42' 08. 6" N 83°20' 14.4" E
6	—0.3 km Off Yarada Beach (South of Port)	17°39' 33.4" N 83°17' 02.9" E
7	—3.0 km Off Yarada Beach (South of Port)	17°38' 50.6' N 83^0 I4 44.1"E

Table 2: Beach Ecology Transect locations with co-ordinates

Transect no.	Location		Longitude Latitude
i	R.K. Beach (Near Submarine Museum) I		N17°43.048' E83°19.822'
ii	Yerada Beach		N17°39.078' E83°15.812'
Coastal Survey			
A	Start	5-6 km southwest of the port	N 17'38'57.67" E 83°15'38.44"
	End		N 17°39'15,37" E 83°16'6.84"
B	Start	5-6 km northeast of the port	N 17°43'7.76" E 83°20'2.75"
	End		N 17°42'5331" E 83°19'31.94"

Fig. 1: The Google image depicting the present study area

Fig. 2: The Google image showing the sampling locations of the present study

Date of sampling: June, 15th to 30th 2024

Method of sampling:

Phytoplankton and zooplankton sampling:

Plankton nets of mesh sizes 100µm and 25 µm are used for sampling of zooplankton and phytoplankton respectively. The nets are suspended horizontally to a vessel to collect the sample. The speed of the vessel and the diameter of the net opening are taken into consideration to know how much water is filtered for the sampling of the given number of plankton. 3 iterations are taken in each field site to have a mean value of the samples.

Phytoplankton:

Samples were collected from the surface water by using Towing a plankton net (mouth diameter 0.35mm) made of bolting silk (30 mesh size 48µm) for half an hour. These samples were preserved in 5% neutralized formalin and used for quantitative analysis in the method of Sukhanovo (1978). Numerical plankton analysis was carried out using Utermohl's invented plankton microscope.

Identified by using Hustedt (1930-1966), Venkararaman (1939), Cupp (1943), Subramanian (1946), Prescott (1954), Desikachary (1959 & 1987), Hendey (1964), Steidinger and Williams (1970), Taylor (1976) and Anandet al (1986).

Chlorophyll-a:

Samples filtered through Whatman GF/C filter papers and Chlorophyll was extracted into 90% acetone. The resulting-colored acetone was measured in Spectrophotometer at deferent wavelengths and the same acetone extracts were acidified and measured for the phaeo-pigments as per APHA manual (1989).

Zooplankton:

Samples were collected from the surface water by horizontal towing of plankton net with mouth diameter of 0.35m made of bolting silk (70 mesh size 200µm) for half an hour. After collection, the samples were preserved in 5% neutralized formalin and used for quantitative analysis.

Identified by Dakin and Colefax (1940), Davis (1955), Kasthurirangan (1963), Wickstead (1965) Damodara Naidu (1981). For quantitative analysis of Zooplankton, known quantity of water (100 ltr) was filtered through a bag net (0.33 mm mesh size) and filtrate was made upto 1 ltr in a wide mouthed bottle and then enumerated using Utermohl's invented plankton microscope. The density is expressed as number of organisms/m^3.

Fig. 3: sampling Collection of sediment and Zooplankton

Benthic sampling:

A benthic grab is used to collect sediment of the ocean floor and associated organisms at all the given sites. 3 iterations are used in

each site to collect both macro and micro-benthos of the area.

Samples were collected using a Van veen grab which covered an area of 0.1m^2. The wet sediment was sieved with varying mesh sizes for segregating the organisms. The organisms retained in the sieved were fixed in 5-7% formalin and stained further with Rose Bengal solution for easy spotting at the time of sorting. After a day or two, the organisms were sorted into various groups. The number of organisms in each grab sample was expressed as number per meter square. According to size, benthic animals are divided into three groups.

(i) Macrobenthos, (ii) Meiobenthos , (iii) Microbenthos (Mare, 1942)

Identified by: Fauvel (1953), Day (1967) referred for Polychaetes, Branes (1980), Lyla et al., (1999) for Crustaceans, Subba Rao et.al (1991), Ramakrishna (2003) for Molluscs.

Fig. 4: Phytoplankton and Benthos Sampling

Nekton sampling: Nektonic organisms' data is collected through catch data from the nearest landing center.

Beach ecology: A team has gone into intertidal areas of the given areas during low tide and did a species identification and count in 20*20 quadrants in both sandy and rocky intertidal areas. Photos are taken of the organisms for identification.

Methodology for Preservation:

- The plankton are preserved in 20 per cent ethyl alcohol and saltwater.
- The other organisms are photographed immediately and notpreserved
- Methodology for Sampling and Analysis:

Methodology of Analysis:

Zooplankton and Phytoplankton Analysis:

1. **Microscopic examination**: Place the prepared slide under a compound microscope and examine it at low magnification (e.g.,10x or 20x) to locate and identify zooplankton organisms. Use identification keys or taxonomic guides specific to the region andtarget organisms to assist with identification.
2. **Counting and quantification**: Randomly select several fields of

view and switch to a higher magnification (e.g., 40x or 100x) for accurate counting and quantification. Count the number of individuals of each identified species within the chosen fields of view. If necessary, repeat the process for multiple subsamples toobtain statistically significant results.

3. **Data analysis**: Calculate the abundance and diversity indices based on the counted individuals. Common metrics include total abundance, species richness, Shannon-Weaver diversity index, and evenness. Use appropriate statistical methods to analyze and interpret the data.
4. **Data recording:** Record all relevant data, including sampling location, date, sampling depth, preservative used, and identification information for each zooplankton species. Maintain a standardized data sheet or database to ensure consistency and facilitate future comparisons or analyses.

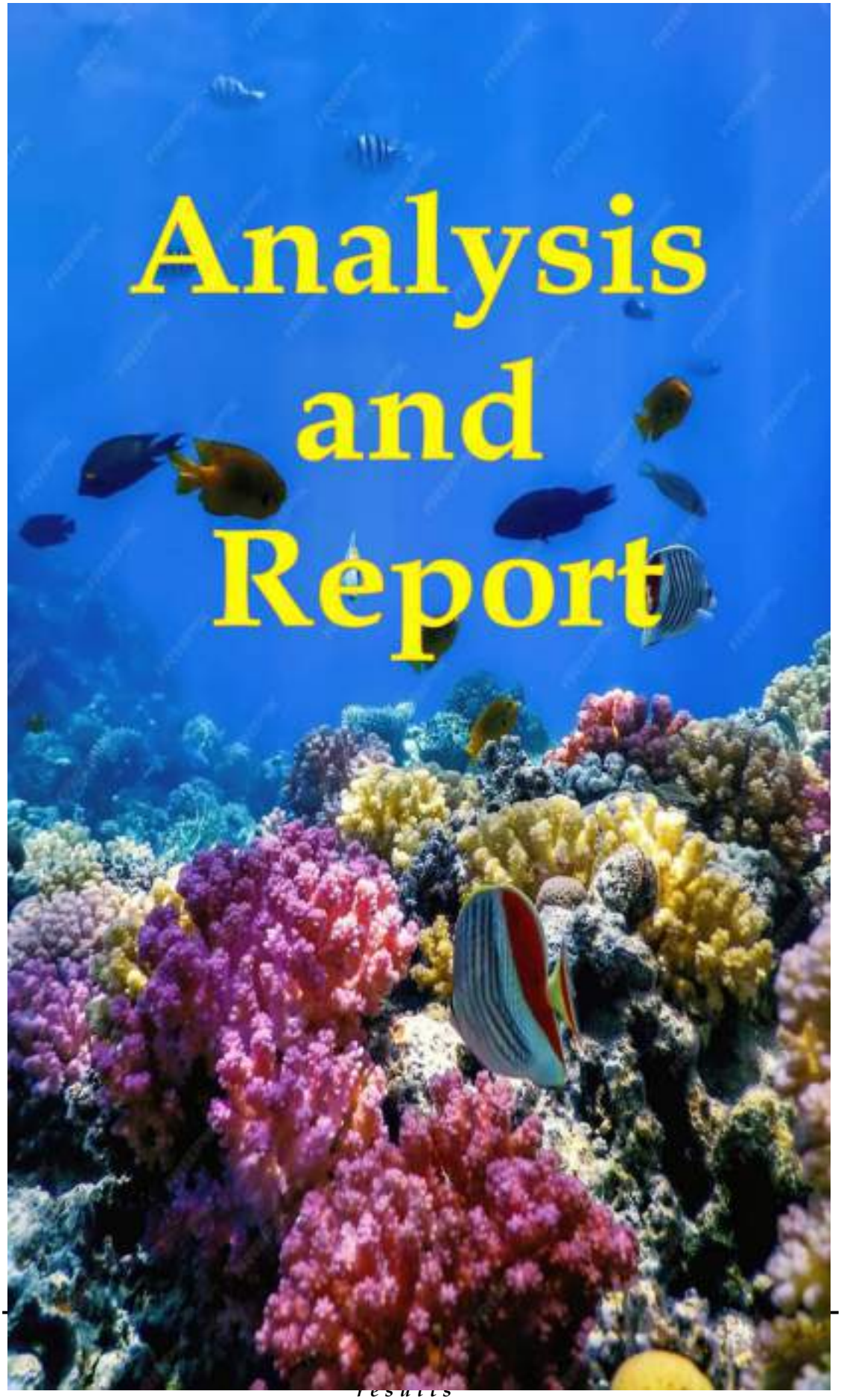
b. Benthic sampling analysis: Benthos are sieved and the organisms areidentified.

c. Nekton analysis: The samples are photographed and identified. The species and abundance count are taken into consideration.

Table. 3: Marine Ecological Studies of Visakhapatnam Port and its sampling methods & analysis of marine ecological sensitive studies

Parameter	Method	Instrument	Reference
Depth (m)	-	Sonar	-
S. D. Transp (m)	-	Secchi-disc	-
Sea Water Temp. (^{0}C)	Temp. Probe	Quanta Hydro Lab with appropriate sensors	-
Turbidity (NTU)	Turbidity Meter	Quanta Hydro Lab with appropriate sensors	-
Salinity (PSU)	Argentometric Method (Precipitation titration with $AgNO_3$)	Quanta Hydro Lab with appropriate sensors + Analytical estimation	Std. method for examination of water and waste water APHA 1989 – 17th Edition – 4500-CI-B, Page 4-68
pH	Electrometric	Quanta Hydro Lab with appropriate sensors	-
DO (mg/L^{-1})	Winklers (Titration with Hypo)	Quanta Hydro Lab with appropriate sensors	APHA 1989 – 17th Edition – 4500-CI-B, 4-152
Ammonia (N) (µmol.L^{-1})	Spectrophotometer	BRIAC-UV Spectrophotometer	Grasshoff et.al, 1999
NO_2 – N (µmol.L^{-1})	Spectrophotometer (Azo-dye formation)	BRIAC-UV Spectrophotometer	Grasshoff et.al, 1999
NO_3– N (µmol.L^{-1})	Spectrophotometer (UV method)	BRIAC-UV Spectrophotometer	Grasshoff et.al, 1999
Phosphates-P (µmol.L^{-1})	Spectrophotometer (UV method)	BRIAC-UV Spectrophotometer	Grasshoff et.al, 1999
Silicate (µmol.L^{-1})	Spectrophotometer (UV method)	BRIAC-UV Spectrophotometer	Grasshoff et.al, 1999
Total Nitrogen (µmol.L^{-1})	Spectrophotometer (UV method)	BRIAC-UV Spectrophotometer	Grasshoff et.al, 1999
T. Phosphorous (µmol.L^{-1})	Spectrophotometer (UV method)	BRIAC-UV Spectrophotometer	Grasshoff et.al, 1999
Primary Productivity (MgC/m^3/hr)	Dark and light bottle	Estimating DO	Gaarder, T and Gran, H.H. (1927) Subba Rao, D.V. (2002)
Sediment Grain Size	Wet Sieving and pipette analysis	Gravimetric and particle size analysis	Krumbein W.C. and Pettijohn F.J. (1938)

Sand (%) Silt (%) Clay (%)		through conventional sieving	and Holme NA, Mclntyre AD (Eds. 1984)
Sediment Organic Matter (%)	Wet Oxidation	Initial digestion using a strong Oxidant followed by Fe Titration.	Walkley Black, later as modified Gaudette et.al.1974
Phytoplankton (nos. ml^{-1})	As numbers per ml using sedgwick counting chamber	Initial sedimentation of 1l volume of sample with Lugol's Iodine	UNESCO 1978
Zooplankton (no.s m^{-3})	Bongo net (twin sampler) Hydrobios Counting cell for enumeration	Digital flow meter used for volume of water filtered Stereozoom microscope for counting	UNESCO 1968, ICES 2000
Macrobenthos (no.s $haul^{-1}$)	Dredge and Grab Sampling	Initial sieving through 0.5mm mesh size, counter under magnification	Analysis according to Holme and Mclntyre (1984) Eleftheriou & Mclntyre 2005


Analysis
and
Report

ANALYSIS AND REPORT:

Hydrological Conditions:

Primary Productivity:

Most marine primary production is generated by a diverse collection of marine microorganisms called algae and cyanobacteria. Together these form the principal primary producers at the base of the ocean food chain and produce half of the world's oxygen. In the present work, marine water samples were from 7 different locations and transferred to 300ml Dissolved Oxygen (DO) bottles (one light and one dark bottle). The experiment was performed using dark and light bottle method. One bottle was fixed with Winkler reagent for initial oxygen. The other light bottle and dark bottle were kept in a bucket containing same water sample for 24 hours.

After 24 hours, both samples were fixed with Winkler A and B and the DO were analyzed. The increase in dissolved oxygen of water as a result of photosynthesis was measured in light bottle; simultaneously decrease in oxygen of dark bottle was measured to estimate the respiration in the same sample.

Water quality:

Water quality characteristics consisted of conventional variables (namely Depth, Secchi disc, Water Temperature, Conductivity, Turbidity, Total Suspended Matter, pH, Salinity, Dissolved Oxygen, Dissolved Oxygen

Saturation, Nitrite, Nitrate, Ammonia, Dissolved Inorganic Nitrogen, Phosphate, Silicate, Total Nitrogen, Total Phosphorous, Dissolved Organic Nitrogen, Dissolved Organic Phosphate) intended for Environment Impact Assessment. Both surface and bottom samples were collected in two phases during June 2024 for the above physicochemical characteristics. Altogether Seven GPS prefixed sampling locations were visited for monitoring the study area (Fig.3). The following tabulation shows minimum, maximum and, mean values and (SE±) in respect of overall water quality off Visakhapatnam Port and two locations in the open sea. Table. 2 shows water quality data at the selected locations.

Table. 4: Water quality characteristics at the selected location of Visakhapatnam Port, June 2024.

S. No.	Sample -1	Sample - 2	Sample - 3	Sample - 4	Sample - 5	Sample - 6	Sample - 7
Temp	33	33	33	31	29	31	29
Depth	12.7	20.2	16.7	25.2	4.9	33.6	40.3
Secchi Disc (m)	1.4	1.7	1.2	2.2	0.5	3.1	2.6
Conductivity (ms.cm-1)	53.7	54.9	54.7	57.3	55.9	56.2	56.6
Turbidity (NTU)	9.4	9.9	10.7	5.5	6.6	3.3	5.8
TSM	74	97	89	80	28	17	24
pH	8.14	7.63	7.96	8.19	8.36	8.36	8.37
NO_2	7.3	7.5	3.5	1.4	3.1	0.5	0.0

NO_3	13.4	9.7	11.4	8.1	10.3	2.5	5.8
NH_3	20.6	21.4	20.5	6.9	13.1	3.9	3.6
DIN	39.7	37.4	34.1	15.5	25.4	6.6	8.8
PO4	13.8	17.0	24.0	8.4	2.6	0.1	0.4
SiO4	166.9	170.2	177.4	80.6	39.1	29.8	90.2
DO	6.64	4.93	4.29	4.71	1.93	5.36	5.36
Salinity	33.89	34.70	34.57	36.45	35.77	35.77	35.91
TN	173.8	210.5	325.9	78.7	127.5	57.0	46.4
TP	13.9	17.1	24.6	8.7	2.8	0.2	0.4
DON	134.1	173.2	291.8	63.2	102.1	50.3	37.6
DOP	1.20	1.42	2.46	0.88	0.24	0.10	0.38

(**Note:** All parameter values expressed in mg/l except pH, depth, secchi-disc, temperature, conductivity and turbidity.)

In the present study, depth ranged from 4.9m to 40.3m and secchi-disc transparency 0.5m to 3.1m. Average seawater temperature was high (~29.5 0C) which reflects hot weather conditions. Salinity was high (35.91); dissolved oxygen was ranges from 1.93 to 6.64 mg/l, however very low DO levels (1.93mg/l) were observed sampling location - 5 in the surface waters which may be due to polluted conditions found in the inner harbour. Turbidity ranged from 3.3 NTU to 10.7 NTU; pH alkaline (≤8), TSM loads high (97mg/l), high total nitrogen (325.9mg/l), high phosphate (24.6mg/l), silicate (177.4mg/l), which together indicated impacting conditions from industrial wastage and domestic sewage.

Sediment Characteristics

In marine benthic ecology, sediment grain size or granulometry is considered an important variable that determines the composition and

characterization of benthos. The nature of biological community living in sediment is always related to sediment type (Gray, 1974). Sediment type could be defined in a number of different ways, one of which is the sediment particle size distribution. In marine benthic monitoring studies, biological communities are routinely compared to sediment particle size distribution.

Gray (1974) reported that diversity within shelf habitats is lowest in mud, higher in sand and highest in mixed mud and sands-sediment with a median particle diameter of about 200 µm. Any correlation between the benthic organisms and sediment nature (texture, structure and organic content) should therefore be taken as the key to benthic ecology. The nature of sediment is determined by the complex interaction of a large number of factors such as the source and supply of sedimentary material, its transportation, deposition and post-depositional changes, if any, of mainly biogenic origin (e.g. bio-deposition and bio-turbation) etc. In conjunction with more extensive benthic surveys, sufficient information can be derived from a measurement of the combined sand, silt and clay levels as well organic content of the sediment.

During the present study, detailed analysis of sand, silt, clay and organic carbon was carried out for 6 locations as per the requirement (st.M4 could not be sampled for technical reasons). Table 4 contains data on the sediment texture and %organic content in respect of these locations. The following tabulation shows summarized information (range, mean and SE) on sediment nature and organic content.

Table. 5: Summary of Sediment nature and characteristics

S. No.	Characteristics	Min	Max	Mean	SE
1	Silt (%)	25.21	86.21	57.36	10.18
2	Sand (%)	13.65	74.64	42.47	10.18
3	Clay (%)	0.10	0.33	0.16	0.03
4	Sediment organic carbon (%)	1.01	9.72	5.21	1.47

From the data presented above, organic carbon is high (mean 5.21%). Sand ranged from 13.65% (st. M3) to 74.64% (st. M6), Silt ranged from 25.21% (st. M6) to 86.21% (st. M3) and average clay was very low (mean 0.16 %). In sts. M3 and M5 very high organic carbon content was observed and also mud (Silt + Clay) is highest at the same locations. It is generally established that soft sediments contain more organic carbon than those with coarse particles. The predominant reason for the relatively high mud levels could be related to submarine drilling activity during the last few years at station M3 and fishing harbour effect at station M5.

Heavy metals:

In the present study, the gastropod sample was collected for Heavy metals analysis. The shows that the presence of heavy metal concentration is below detectable level and copper and other metals are absent in observed gastropod sample.

ZOOPLANKTON

Zooplankton numerical abundance (Ind./10m3), and diversity at the harbor and sea locations off Visakhapatnam was studied according to standard procedures before the onset of active monsoon. Altogether seven zooplankton samples were collected representing the seven stations. As mentioned before, the sampling locations and reference sites were selected in such a manner they adequately represented the ecological conditions in and around the Visakhapatnam harbour.

Zooplankton were identified to the group level since they were poorly poor represented inside the harbour. As a matter of fact, there were hardly any active zooplankton at the stations examined inside the harbour evidently due to poor seawater quality. The forms were identified with the help of a binocular stereomicroscope following standard taxonomic references (e.g., Nishida, 1985, ICES identification leaflets for plankton, 1939-2001; Kasturirangan, 1963 and Newell and Newell, 1977). All abundance data were converted to density (ind./10m3) using the volume of water filtered by the net.

Zooplankton count and species in the area:

Zooplankton was collected during pre-monsoon area and showed biomass between 38 and 43 ml/100 m3 in the study areas. The Total population per each sample ranged from 288912 to 392047. The biomass and population have been observed to be minimal in the inner harbour and highest in the Outer

harbour area. Copepods and Decapods are dominant in RK Beach and Yarada areas. While in average, Tintinnids, Copepods and decapods are Dominant groups in all areas. The dominant groups in Inner Harbour are bivalves.

Table. 6: Numerical abundance of zooplankton (ind./10m3).

Taxa	Sampling Locations							Total	%
	1	2	3	4	5	6	7		
Copepod	373	84	169	89	2757	13989	1894	19355	87.9
Bivalve Veliger	8	314	0	46	317	51	209	945	4.3
Mysis sp.	0	0	0	0	17	0	61	78	0.4
Cyclopoida	20	15	2	8	12	0	8	65	0.3
Lucifer sp.	0	5	0	0	31	27	218	281	1.3
Spirotricha	0	5	8	0	10	12	4	39	0.2
Saggita sp.	0	0	6	0	31	810	12	859	3.9
Protozoea	0	0	0	0	31	0	12	43	0.2
Zoea	0	0	0	0	17	0	21	38	0.2
Gastropod Veliger	0	0	0	0	0	15	12	27	0.1
Polychaete larva	0	0	0	0	0	15	40	55	0.2
Cladocera sp.	0	0	0	0	0	0	21	21	0.1
Megalopa	0	0	0	0	0	0	12	12	0.1
Nauplius	0	0	0	0	0	0	61	61	0.3
Amphipod	0	5	0	0	0	0	31	36	0.2
Foraminifera	2	0	4	6	1	11	10	34	0.2
Fish eggs	0	0	68	0	0	0	0	68	0.3
Others	0	0	0	0	4	0	10	14	0.1
	403	428	257	149	3228	14930	2636	22031	100.0

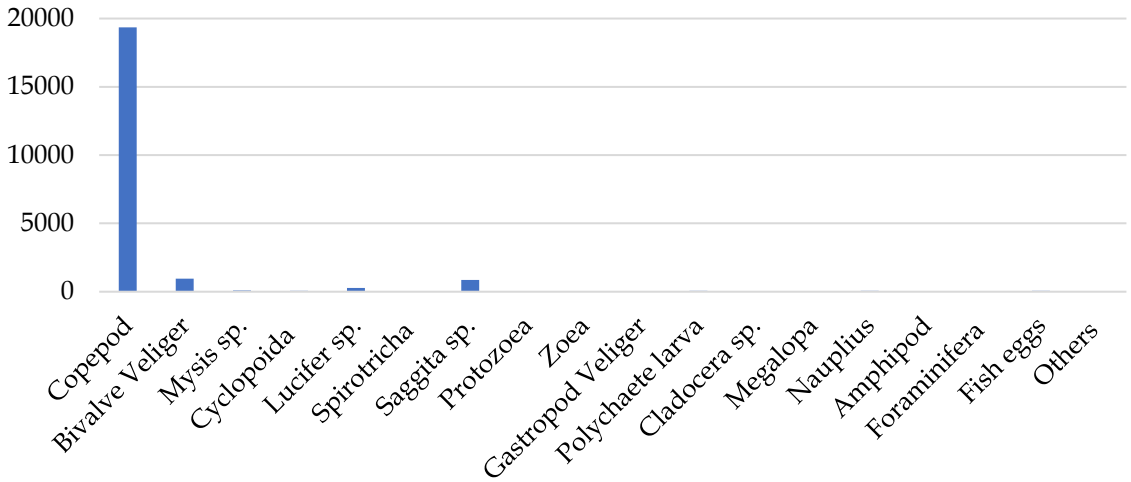


Fig. 5: Numerical Abundance of Zooplankton

Composition

During this study, copepods constituted the bulk (87.9%) of the population followed by the arrow work *Sagitta* (3.9%), larval forms (4.5%) and contribution by other groups (7.6%) (F). Table 8 shows numerical abundance of zooplankton at the selected stations. Based on the data, it is found that the order of maximum abundance of zooplankton relates to copepods (max 13969 ind./10m3) at st.6 in the open sea.

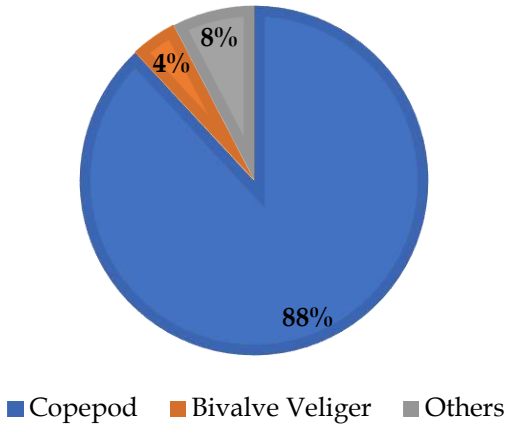


Fig. 6: Composition of Zooplankton

Minimum numbers (84-89 ind./10m3) within the polluted habitat in the harbour. Among the larval plankton, bivalve veligers outnumbered all others. It is noteworthy that there were most abundant (314 ind./10m3) at st.2 located in the north channel affected by sewage pollution.

Phytoplankton:

In the present study carried out during pre-monsoon and the observations on phytoplankton consisted of species composition and their numerical abundance at 7 selected locations. Surface samples consisted of net hauls (30µm mesh size) towed alongside boat (2-3knots) for about 5-10 minutes. All net hauls were fixed in buffered 5% formaldehyde and stored until analysis in the Laboratory. For taxonomic identification, a research microscope (Leica, DMLS) with x400 was utilized. All taxonomic identifications were carried out according to Subrahmanyam (1946), Santhanam et al. (1987) and Tomas (1997).

Phytoplankton biomass was observed between 60 and 80 ml/100 m3 in the study areas. The Total population per sample ranged from 10220983 to 15905782. The biomass and population have been observed to be minimal in the RK beach offshore area and highest in the Outer harbour area. The dominant groups, in general, are *T. pseudonana*, *Skeletonema, Thalassiosera, Asterionellopsis, Rgizocelenia and Asteromphalus* genii.

Table. 7: Numerical abundance of Phytoplankton (ind./10m3).

Name of the Species	Sampling locations							Total	%
	1	2	3	4	5	6	7		
T. pseudonana	356	152	165	0	0	0	0	673	24.9
Skeletonema costatum	13	20	10	36	347	30	10	466	17.2
T. coromandeliana	0	0	0	50	267	13	0	330	12.2
Protoperidinium granii	0	205	23	7	43	0	0	278	10.3
Thalassiosira subtilis	10	66	46	27	112	0	0	261	9.6
P. seriata	0	13	10	17	13	17	20	90	3.3
R. stolterfothii	0	0	3	7	40	13	10	73	2.7
Chaetoceros lorenzianus	0	0	0	10	7	13	20	50	1.8
Rhizosolenia setigera	3	7	7	0	10	13	7	47	1.7

Nitzschia sp.	0	7	0	13	26	0	0	46	1.7
Chaetoceros sp.	7	3	7	7	7	3	7	41	1.5
Navicula sp.	10	0	13	0	0	10	0	33	1.2
L.minimus	0	0	0	7	30	0	0	37	1.4
Nitzschia longissima	0	3	7	0	20	0	0	30	1.1
R. robusta	0	13	0	3	10	0	0	26	1.0
Gloeocapsa sp.	23	0	0	0	0	0	0	23	0.9
Monas socialis	13	0	10	0	0	0	0	23	0.9
Diplopsalis sp.	0	0	0	0	20	0	0	20	0.7
Oscillatoria princeps	3	7	10	0	0	0	0	20	0.7
Bacteriastrum hyalinum	0	0	0	0	0	10	7	17	0.6
R.styliformis	0	0	0	7	3	0	0	10	0.4
Lauderia annulata	0	0	10	0	0	0	0	10	0.4
Cylindrotheca closterium	0	0	0	0	10	0	0	10	0.4
P. angulatum	0	0	0	0	3	7	0	10	0.4
Cymbella sp.	10	0	0	0	0	0	0	10	0.4
Microcystis pulverea	10	0	0	0	0	0	0	10	0.4
Trichodesmium sp.	0	0	0	0	0	3	7	10	0.4
Hemiaulus sinensis	0	0	0	0	0	0	7	7	0.3
O.limosa	0	0	0	0	0	7	0	7	0.3
Melosira sp.	7	0	0	0	0	0	0	7	0.3
Amphiprora alata	3	3	0	0	0	0	0	6	0.2
O. sinensis	3	3	0	0	0	0	0	6	0.2
Cosmarium sp.	3	0	3	0	0	0	0	6	0.2
C. jonesianus	0	0	0	0	3	0	0	3	0.1
Lithodesmium undulatum	0	0	0	0	0	0	3	3	0.1
Eucampia cornuata	0	0	0	0	0	3	0	3	0.1
Thalassiothrix frauenfeldii	0	0	0	0	3	0	0	3	0.1
Total	**474**	**502**	**324**	**191**	**974**	**142**	**98**	**2705**	100.0

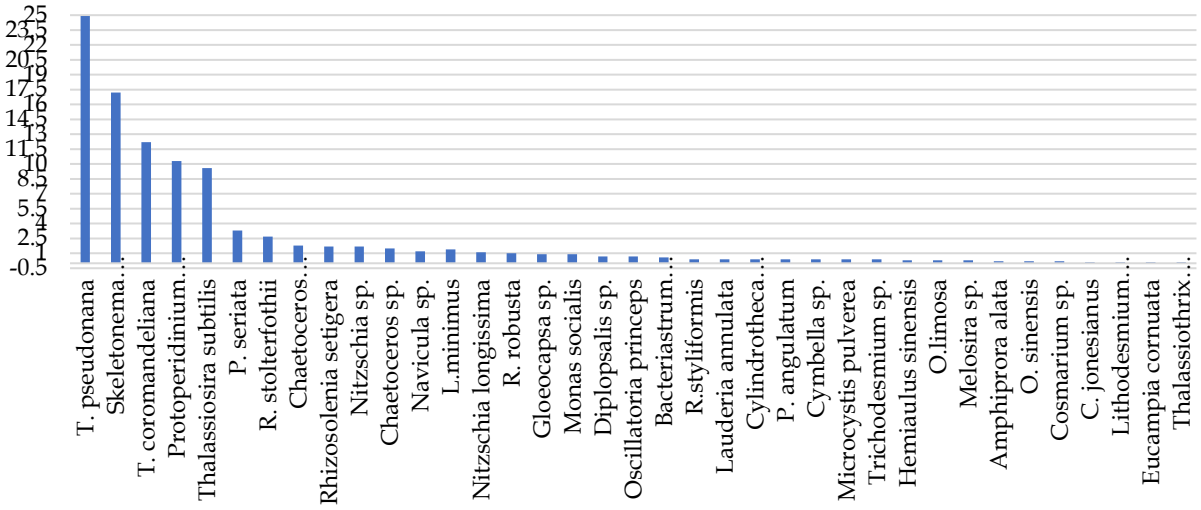
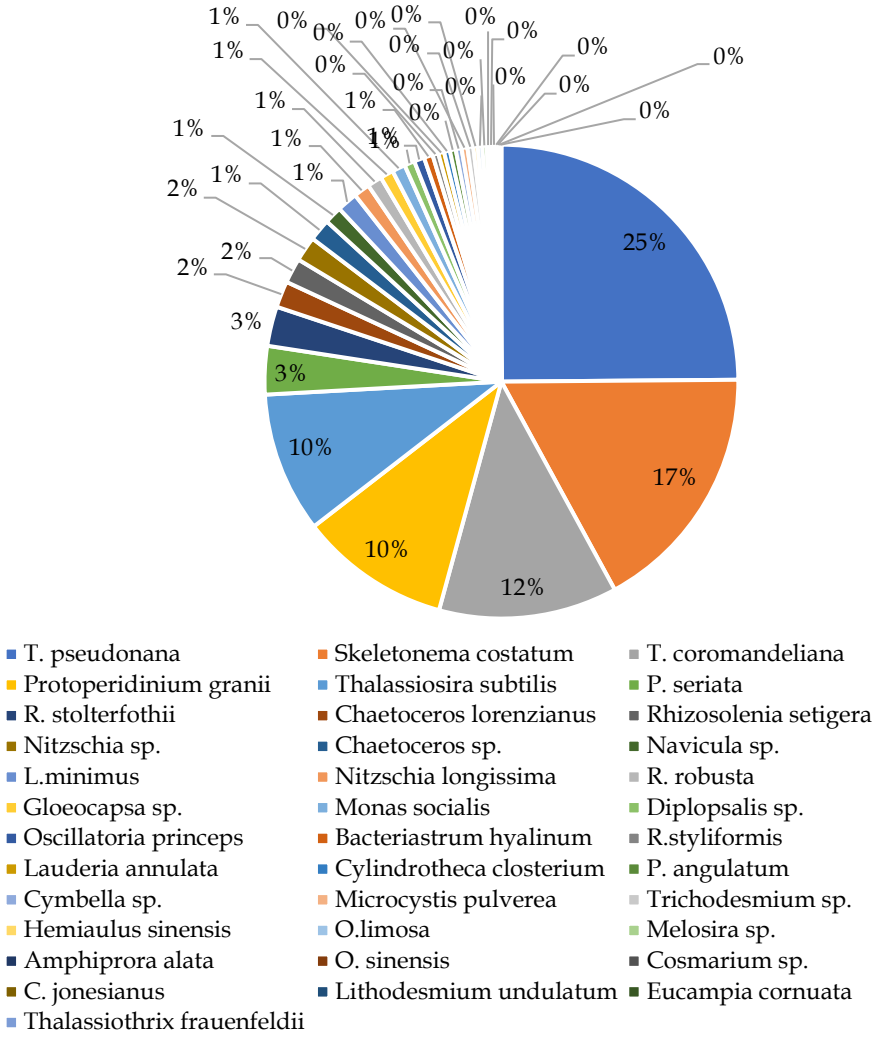


Fig. 7: Numerical Abundance of Phytoplankton

Fig. 8: Composition of phytoplankton



Select Species of Phytoplankton (Diatoms)

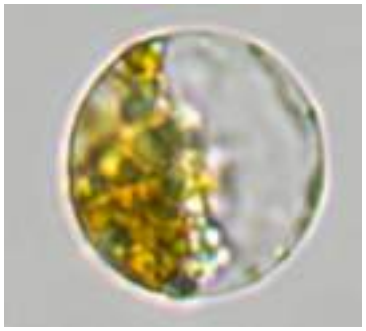


Fig. 9: *T. pseudonana*

Fig. 10: Skeletonema costatum

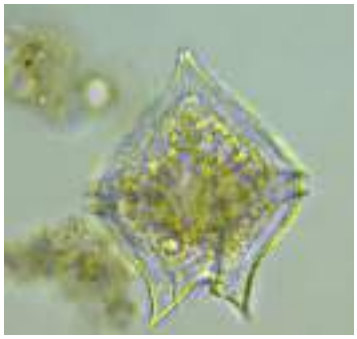


Fig.11: Protoperidinium granii

Fig. 12: Thalassiosira subtilis

Fig. 13: Chaetoceros lorenzianus

Fig. 14: Rhizosolenia setigera

Fig. 15: *Navicula* sp.

Fig. 16: *Gloeocapsa* sp.

Fig.17: Diplopsalis sp.

Fig. 18: *Oscillatoria princeps*

Fig. 19: Bacteriastrum hyalinum

Fig. 20: *Lauderia annulata*

Fig. 21: Cylindrotheca closterium

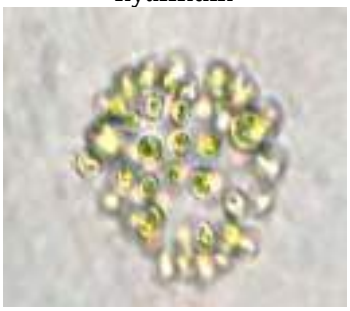


Fig. 22: Microcystis pulverea

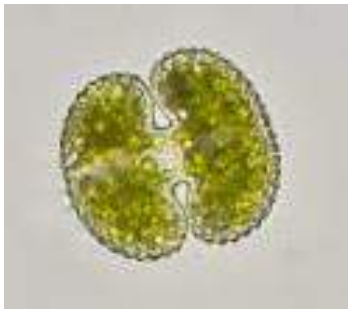


Fig. 23: Cosmarium sp.

Benthic sampling:

Collected Benthic samples showed varied dominant groups between Inner Harbour area and other areas. The Species count in general varied from 4 to 17. The Dominant groups in general are Tanaids, Neptys, Amphipods, and Cossurids.

Table. 8: List of species and dominant groups in the present study

Location	Number	Species count	Dominant groups
Outer harbour	1,245	17	Tanaids, Amphipods, Nephtys dibranchis Cossurids
Inner harbour	688	12	Cirratulus, Nephtys, Cossurids, Tanids
Between East quay and West quay	86	4	Cirratulus, Nephtys Cossurids, Tanids
RK beach - offshore	200	5	Tanaids, Amphipods, Nephtys dibranchis Cossurids
RK beach nearshore	345	10	Tanaids, Amphipods, Nephtys dibranchis Cossurids
Yarada offshore	260	7	Tanaids, Amphipods, Nephtys dibranchis Cossurids
Yarada nearshore	445	9	Tanaids, Amphipods, Nephtys dibranchis Cossurids

Nekton sampling:

The Nekton samples are from local catch and also from research trawl nets. The most common species seen are jellyfish, Sargent fishes, gobies, mullets and fewer numbers of elasmobranchs are also seen.

Table. 9: Species count and dominant groups in the study

Location	Number per hawl	Species count	Dominant groups
Outer harbour	180	4	Nemepteridae, Abudefduf, Mugilidae
Inner harbour	80	4	Mugilidae, Abudefduf, Gobidae Scyphozoa
Between East quay and West quay	76	3	Gobidae Scyphozoa Mugilidae
RK beach offshore	348	17	Rastrelliger kanagurta, Nemepteridae, Scyphozoa
RK beach nearshore	345	22	Abudefduf sp, Nemepteridae, Scyphozoa
Yarada offshore	420	23	Scyphozoa, Rastrelliger kanagurta, Nemepteridae,
Yarada nearshore	322	16	Rastrelliger kanagurta, Nemepteridae, Scyphozoa

Heavy metals:

In the present study, the gastropod sample was collected for Heavy metals analysis. The shows that the presence of heavy metal concentration is below detectable level and copper and other metals are absent in observed gastropod sample.

Beach Ecology:

Intertidal Biodiversity survey:

Intertidal Biodiversity survey was conducted in Yarada and RK Beach sandy shores and rocky shores. The following are the results of the same. The areas showed the abundance of diversity in both sandy and rocky shores.

Flora;

In flora, 4 trees, 2 shrubs, 10 herbs and 1 alga were observed during the study. Out of the 17 species observed, family Arecaceae was the most dominant family. *1pomeabiloba, Spinifex littoreus and Boerhavia diffusa* are the only three species of flora found in Transect B. *Ulvalactuca* was the only algal species which was found during the complete study. It was found only on a patch of rock present on the transect B. A mangrove patch present near the port was surveyed. It showed presence of three species viz. *Avecinia officinalis, Acanthus ilicifolius and Sessuvium portulachstrum.* The species richness of flora was more in Transect A. The distribution pattern of coastal flora shows *pomeabiloba* as the most frequent, dominant and abundant plant species present in the study area followed *by Spinifex littoreus.*

Table. 10: The list of flora observed during the present study

S. No.	Botanical Name	Habit	Family
1	*Acanthus ilicifolius*	Herb	Acanthaceae
2	*Avecinia officinalis*	Shrub	Acanthaceae
3	*Boerhavia diffusa*	Herb	Nyctaginaceae
4	*Borassus flabellifer*	Tree	Arecaceae
5	*Cocos nucifera*	Tree	Arecaceae
6	*Cyperus sp*	Herb	Cyperaceae
7	*Fimbristylis sp*	Herb	Cyperaceae
8	*Indigofera sp*	Herb	Fabaceae
9	*Ipomoea biloba*	Shrub	Convolvulaceae
10	*Launaeas armentosa*	Herb	Asteraceae
11	*Opuntiasp*	Herb	Cactaceae
12	*Phoenix sylvestris*	Tree	Arecaceae
13	*Prosopis juliflora*	Tree	Fabaceae
14	*Sessuvium portulachstrum*	Herb	Aizoaceae
15	*Spinifex littoreus*	Herb	Poaceae
16	*Typha angustata*	Herb	Typhaceae
17	*Ulvalactuca*	Algae	Ulvaceae

Fig. 24: *Cocos nucifera*

Fig. 25: *Sesuvium portulacastrum*

Fig. 26*: Borassus flabellifer*

Fig. 27: *Scaevola taccada*

Fauna:

The Transect A was more diverse area found during the study period. In fauna, 13 molluscs, 3 crustaceans, 2 butterflies and 3 bird species were observed during the study. Class Bivalvia of Mollusca was dominant. Species like *Papia textile and Sunetta effosa* were the species which were most common in the present study area.

The birds sighted during the study were also the most commonly sighted ones and are least concern according to IUCN. The birds sighted during the study were also the most commonly sighted ones and are least concern according to IUCN. In crab species, Fiddler crabs and Mottled Sally Lightfoot were the crabs which were seen only in transect A. The species richness of fauna is more on Transect A. No butterfly species was seen during the survey on transect B. Considering the distribution pattern of the fauna, molluscs were the most frequently, densely and abundantly distributed group followed by crustaceans, birds and butterflies

Figure. 11: list of Fauna observed at transect area during the study period

Location	Number (per square meter)	Species count in Average	Dominant groups
RK Beach shore	245	34	Caulerpaceae, Echinometridae, Ulvaceae, Gobidae Blennidae Portunidae Menippidae Astroidea
Yarada shore	320	42	Astroidea Emerita Ocepoda Ulvaceae Caulerpaceae

The different types of fauna were observed during the survey. The list of molluscs observed is given below in Table. 12.

Table. 12: List of Molluscs

S. No.	Scientific Name	Class	Family
1	*Anadara gubernaculum*	Bivalvia	Arcidae
2	*Babylonia spirata*	Gastropoda	Babyloniidae
3	*Olivafaba*	Gastropoda	Olividae
4	*Paphia textile*	Bivalvia	Veneridae
5	*Sunnetaeffosa*	Bivalvia	Veneridae
6	*Neritaoryzarum*	Gastropoda	Neritidae
7	*Mesocibotabistrigata*	Bivalvia	Arcidae
8	*Carditacalyculata*	Bivalvia	Carditidae
9	*Donaxscortum*	Bivalvia	Donacidae
10	*Sepia aculeate*	Cephalopoda	Sepiidae

11	*Gastranapolygona*	Bivalvia	Tellinidae
12	*Meritrixmeritrix*	Bivalvia	Veneridae
13	*Placuna placenta*	Bivalvia	Placunidae

During the present survey, the Arthropoda (Crustaceans and Insects (Butterfly)) observed during the survey are given below in the Table. 13.

Table. 13: List of Arthropoda- (Crustaceans and insects)

Arthropoda- Crustaceans			
S. No.	**Common Name**	**Scientific Name**	**Family**
1	Fiddler crab	*Uca spp.*	Ocypodidae
2	Mottled Sally Lightfoot	*Grapsus grapsus*	Grapsidae
3	Ghost Crab	*Ocypode spp.*	Ocypodidae
Arthropoda - Insecta (Butterflies)			
1	Common Lime Butterfly	*Papiliode moleus*	Papilionidae
2	Common Bottle blue	*Graphium sarpedon*	Papilionidae

Some of the Species observed during the present study:

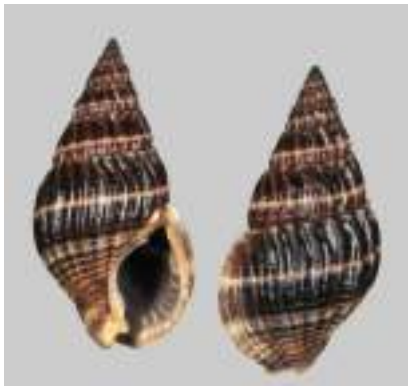


Fig. 28: *Nassarius olivaceus*

Fig. 29: *Ptychobela nodulosa*

Fig. 30: *Nassarius foveolatus*

Fig. 31: *Sphenopus arenaceus*

Fig. 32: Leucosia anatum

Fig. 33: Charybdis affinis

Fig. 34: *Charybdis* sp.

Fig. 35: Myra fugax

Fig. 36: Bursa rana

Fig. 37: *Papiliode moleus*

Fig. 38: *Graphium sarpedon*

The list of birds observed during the survey is given below in Table. 14.

Table. 14: List of Birds

S. No.	Common Name	Scientific Name	Family
1	Black Kite	*Milvus migrans*	Accipitridae
2	Common myna	*Acridother estristis*	Sturnidae
3	House crow	*Corvus splendens*	Corvidae

Fig. 39: ***Milvus migrans***

Fig. 40: ***Corvus splendens***

Fig. 41: ***Acridotheres Tristis***

The overall coastal diversity of flora and fauna is fair and any development activity inside the port premises would not have much effect on the coastal diversity.

Fisheries

Visakhapatnam is one of the important fish landing Centre's of Andhra Pradesh. Secondary fish data was procured from State Fishery Department, Fishery Survey of India & Department of Animal Husbandry Dairying & Fisheries. For supporting above data, local fish market and landing Centre data were studied.

The fish production data for the period 2016-17 to 2019-20 for nine major coastal States of India was procured from secondary source i.e., Department of Animal Husbandry Dairying & Fisheries. As per data, Andhra Pradesh has the highest fish production in India.

Visakhapatnam coastal marine fish and shrimp production data was procured from State Fishery Department. According to last five-year available data (Table. 15), there was a continuous increase in the production of marine fish and shrimp. As per data analysis, Indian Mackerel *(Rastrelliger kanagurta) and* Tuna (Tunnies) are the most dominant fishes at Visakhapatnam coast. Subsequently, very less quantity Bombay duck *(Harpodan nehereus)* and Hilsa (*Tenualosa ilisha*) catch was observed.

Table. 15: State wise maximum contribution to production of fish in India (In Lakh Tons)

Coastal States of India	2015-16	2016-17	2017-18	2018-19	2019-20
Andhra Pradesh	23.52	27.66	56.11	39.91	41.74
Goa	1.12	1.18	1.24	1.2	1.05
Gujarat	8.09	8.16	9.54	8.41	8.59
Karnataka	5.81	5.58	7.46	5.88	6.32
Kerala	7.28	5.92	7.81	8.01	6.8
Madhya Pradesh	1.15	1.39	2.82	1.73	2
Maharashtra	5.8	6.63	7.94	5.68	5.61

Odisha	5.22	6.08	11.42	7.59	8.18
Tamil Nadu	7.1	6.69	8.54	6.9	7.57
West Bengal	16.71	17.02	32.59	17.82	17.82
Puducherry	0.54	0.5	0.57	0.47	0.51
India	107.62	114.31	203.79	135.73	141.64

Table. 16: Total annual catch of marine fish & shrimp during 2011 to 2015 – Visakhapatnam.

SN	Name of the fishes	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015
1	Shark	607	460.225	342.316	119.2	80.84
2	Skates	114	253	207.323	196.872	120.21
3	Rays	545	256.442	218.68	141.653	132.74
4	Oil Sardine	1008	3491	3484	3854	5290.82
5	Other Sardine	741	1344	1870	2248	2540
6	Hilsa Shad	19	34	184	99	102
7	Other Shads	437	303	498.8	312	350
8	Thrisocies	439	587	429	1139	1241
9	Anchovies	2289	2216	3159	4663	4521
10	Other Clupeids	516	876	1174	2988	3100
12	Chriocentrus	495	520	397	290	320
13	Polynemids	839	1149	777	339	410
14	Chorinemus	367	562	441	257	260
15	Trichuridae	2004	1637	3644	7830	6845
16	Carangids	3545	4241.41	1897	2964	2857
17	Indian mackeral	7873	11669.38	15774	14090	12345
18	Other mackerals	2502	5036.82	3462	4057	5621
19	S.commerson	1599	914	592	503	680
20	S.guttatus	749	676	439	311.8	350
21	S.Ieneoitus	408	419	141	117	120
22	Tunnies	6496	6142.251	4090.865	10037.638	10998.54
23	Mugil	951	497	148	83.72	110.24
24	Eels	700	214.626	194.985	123.986	154.21
25	Cat fish	692	547	659	481	598
26	Threadfin breams	638	934	1447	838	911
27	Pigface breams	416	435	332	293	302

28	Other perches	1151	1156	1294	1605	1826
29	Scianids	562	362	153	320	540.14
30	Leoignathus	742	491	2329	1147	1325.54
31	Black Pomfrets	985	409	3618.364	1921.76	1628.55
32	Silver Pomfrets	729	524.516	285.31	363.207	251.47
33	Sole (flat fish)	662	219	303	358	421
34	P.monodon	1148	497.93	453.674	612.776	750.36
35	P.indicus	967	677.904	538.616	419.564	520.41
36	Meta peneaus	3707	1817.85	1125.315	4230.376	4829.23
37	Non peneaid	1037	4188.081	7214.14	6120.457	5650.25
38	Mannecrustaceans	3341	1266.13	2299	2231.427	2310.84
39	Other crustaceans	14	34	49	56	46
40	Lobsters	410	220.748	17.911	5.056	11.95
41	Molluscans	471	380	41.81	96.4	100.82
42	Squids & cuttlefish	2468	688.07	2019.569	931.603	805.75
43	Mischallaneous	12202	16983.231	13496.576	11110.9	15986.19
	Total	**67712**	**75358.614**	**81241.254**	**89906.395**	**97365.1**

Visakhapatnam is well known as a hub of fishing activity. During fish market survey at Visakhapatnam fishing harbour a variety of fish were observed include yellow fin tuna, Prawns, Mackerel, King fish, Sardine, Ribbon fish, Sole fish, etc. As per local fishermen the Yellowfin tuna *(Thunnus albacares)* are the dominant species, it contributing 20% -30% to the total catch of the region.

Figure.42: The local, wholesale and fish market at Visakhapatnam Fishing Harbour

During local fish market survey some varieties of dry fishes are observed. The local women are engaged fulltime in procuring, drying, packing and marketing of dried fish at Visakhapatnam, these activities provide employment and economic security to local fisherman. Small shrimp such as acetes, ribbonfish, serfish, mackerel, sardines, flatfishes, and sciaenids are mainly used in the dried form.

Marine Turtle

In recent years, Visakhapatnam has become an increasingly popular destination for tourists. The degradation of the aquatic and coastal environments is mostly caused by infrastructural expansion, tourism, and increased pollution. Because of this, sea turtles find it challenging to nest here, and as a result, this beach is rarely used as a nesting site.

Reasons for the Loss of Nesting Beaches: water pollution, beach erosion, sea level rise, uncontrolled coastal development and other human activities. Uncontrolled fishing during nesting seasons, Non-use of turtle excluder device, increased marine traffic, offshore developmental activity, Threats from domestic dogs, wild boars & human being, Incidental catch in mechanized fisheries were treat to nesting for turtles.

Activities Supporting Conservation: Create a thorough action plan for the conservation of sea turtles in cooperation with all law enforcement agencies, businesses, and local communities. prohibiting the release of heavy metals, pesticides, heavy oils, heavy waters, and other toxic effluents into or close to beaches where turtles breed. prohibiting the throwing of waste into the water or on the beach, such as fishing nets, plastic bags, and other items that could kill sea turtles accidentally. coordinated beach and near-shore waterway cleanups by the local fisheries and forest departments and other government organizations. It is important to start this before sea turtles breed and to promote awareness about marine turtles.

CONCLUSION

The features of the water quality showed that the harbor waters are heavily contaminated due to the current circumstances (poor tidal exchange). The harbor waters have become extremely eutrophic, or nutrient built-up, due to the excessive enrichment of inorganic nitrogen and phosphorus caused by waste additives and ineffective mixing. This has resulted in the extinction of sensitive species and the proliferation of pollution-tolerant taxa like *Skeletonema costatum*, which is known to inhabit polluted marine water bodies frequently with exclusive dominance as in the present case.

When compared to similar aquatic bodies, zooplankton also showed a low diversity of life. Macrobenthos's life is completely destroyed. Nowhere in the harbor's bottom sediments was there any macroscopic life. The large concentrations of organic materials and sulfur-tainted hydrogen emissions attest to this. In fact, no life was found in the sediments even in 2008, when this laboratory conducted a similar investigation on the quality of harbor water and marine biodiversity. The conditions seem to have gotten worse over the years following, primarily due to an increase in the amount of waste being discharged into the harbor and an ineffective mixing system.

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ANNEXURE – 7

VISAKHAPATNAM PORT TRUST

MARINE DEPARTMENT
VISAKHAPATNAM – 530035
ANDHRA PRADESH

COMPREHENSIVE DISASTER MANAGEMENT PLAN

JANUARY -2021

ENVIRONMENTAL TECHNICAL SERVICES PVT. LTD.
MOBILE NO. 0-9873552267, 0-9810830190
EMAIL – SS@ETSINFRA.COM, JPSHRI@GMAIL.COM

FOREWORD

This study has been carried out by M/s Environmental Technical Services Private Limited, New Delhi, Work Order No. IMAR/MSS (tenders)/2020/15/, Dated 05/05/2020 based on inputs received form Visakhapatnam Port Trust, Visakhapatnam. M/s Environmental Technical Services Private Limited, would like to take this opportunity to extend their thanks to the Visakhapatnam Port Trust, Visakhapatnam, management and officers who co-operated in supplying the data and information required, thus maximizing the effectiveness of the study. The study identified the hazards and analysed the consequences of potential accident scenarios. The above study results, conclusions and recommendations were based on the information made available to ETS Private Limited at the time of study. ETS Private Limited exercised all reasonable skill, care and diligence in carrying out the study. However, this report should not be deemed as any undertaking, warranty or certificate and cannot be challenged in any court of law of the country.

Environmental Technical Services Pvt. Ltd. New Delhi

Place : New Delhi
Date : 11.01.2021

Dr J. P. Shrivastava
Managing Director

VISAKHAPATNAM PORT TRUST

PART I

DISASTER MANAGEMENT PLAN

CONTENTS- PART I

The Visakhapatnam Port Trust in recognition of the importance of safety and security of port area as first priority set up a core group committee for preparation of Disaster plan as per the recommendation of the National Disaster Management Plan. Our scope of plan covers the area of port and all the emergencies as per the act.

1.4 VISION

To maintain Visakhapatnam Port safer and disaster resilient by a holistic, pro-active, technology driven approach that involves all stakeholders and port users so that a culture of prevention, preparedness and mitigation is imbibed.

Further, to assist local, state and national authorities, so that Visakhapatnam Port's response complements that of authorities in providing assistance to affected populations during natural disasters.

1.5 TIME FRAMES

EVENT SCENARIOS

Probability: Low-once in 10-50yrs; Moderate=once in 2-10yrs; High=once annually
Impact/Preparedness/Risk Threat: 0=Very Low / 1=Low / 2= Moderate / 3 = High

Event/Scenario Spectrum	**Early warning**	**Probability of occurrence**	**Duration Impact**	**Impact on property**	**Impact on People**	**Time to Restore Facilities**	**Risk Threat Probability**
Cyclone	96-12 Hrs.	Very Low	0	0	0	12- 24 hrs.	Moderate
Floods	4-2 hrs.	Very Low	1	1	2	12-36 hrs.	Very Low
Earthquake	nil	Very Low	1	1	2	12-36 hrs.	Very Low
Tsunami	6-1 h	Very Low	1	1	2	12-24 hrs.	Very Low
Marine Accident							
Collision	< 1min	Low	<1hr	2	0	4 h	Moderate
Grounding	<1 min	Low	1-48h	2	0	1-48 hrs.	Moderate
Fire/Explosion	< 1min	Low	0.5-12 h	2	1	1-96 hrs.	Moderate

Event/Scenario Spectrum	Early warning	Probability of occurrence	Duration Impact	Impact on property	Impact on People	Time to Restore Facilities	Risk Threat Probability
Oil Pollution	<5 mins	Low	1-72 h	1	1	1-30 d	Moderate
Transport Accident							
Road	< 1min	Low	< 5 min	0.1	0.1	< 2 h	Moderate
Rail	< 1min	Low	< 5 min	0.05	0.1	1-48 h	Low
Function Failure							
Elec sub station	< 1min	Mod	24 h	0	0	12-48 h	Low
Pipelines failure	< 1min	Mod	1-24 h	0	0	12-48 h	Low
Fire station failure	< 1min	Mod	1-24 h	0	0	12-48 h	Low
Water system	< 1min	Mod	1-24 h	0	0	12-48 h	Low
Communications	< 1min	Mod	1-24 h	0	0	12-48 h	Low
Medical facilities	< 1min	Mod	1-24 h	0	0	12-48 h	Low
Human related							
Labour Action/ Strike	24 h	Mod	< 24 h	0	0	12-48 h	Low
Civil disturbance	< 12 h	Mod	< 24 h	0	0	12-48 h	Low
Terrorism & War							
State of War	< 48 h	Low	1- 10 d	2	2	12-96 h	Mod
Bomb Threat	< 1 h	Mod	1-3 d	2	3	12-96 h	High
Hostage Threat	< 1 h	Mod	1 – 3 d	1	3	12-48 h	High
Terrorist attack	Nil	Mod	1- 3 d	1	3	> 48 h	High

2. HAZARD, RISK, VULNERABILITY & CAPACITY ANALYSIS

2.1 DISASTER RISKS, VULNERABILITIES AND CHALLENGES.

VISAKHAPATNAM PORT – AREA VULNERABILITY & THREAT MATRIX

X = Slightly Vulnerable, XX = Moderately Vulnerable, XXX = Highly Vulnerable

Threats	**Vessel Accidents Collision Grounding**	**Fire Explosion on board vessel/ashore**	**Fire & Explosion Manifold Pipeline, Tank farm**	**Oil & Chemical Pollution**	**Personnel injury: Accident Rail, Road, On board ship**
Respondent Agencies	D.C. Visakhapatnam Port Trust DG Shipping Min. of Shipping	Visakhapatnam Port Trust Fire Service Visakhapatnam Fire Brigade Mutual Aid Response Group Police, Min. of Shipping	Visakhapatnam Port Trust Fire Service Oil Companies Visakhapatnam Fire Brigade Mutual Aid Response Group Police Min. of Shipping	Visakhapatnam Port Trust (CFO) Control Room Oil Companies Coast Guard, Visakhapatnam Corporation Distt. Collector Min. of Shipping	C.M.O, Visakhapatnam Port Trust Police
Vulnerable Areas					
Vessel Movement	----	------	-----	------	-------
Channel	xxx	xx	----	xxx	x
At Berth	x	xx	xx	xxx	xx

Threats	Vessel Accidents Collision Grounding	Fire Explosion on board vessel/ashore	Fire & Explosion Manifold Pipeline, Tank farm	Oil & Chemical Pollution	Personnel injury: Accident Rail, Road, On board ship
Storage-	----	----	----	----	----
Transfer					
Oil Transfer	---	xx	xx	xx	x
Cargo Transfer	----	----	----	----	----
Trucks, Trains	----	---	----	x	xx
Crane- Shore/Ship	----	xx	----	x	xx
Services	----	----	---	---	----
Access Gates	----	x	x	x	x
Emergency Generators	----	x	---	---	x
Electric Substations	----	x	---	---	x
Train siding Locos, Wagons,	---	----	---	---	xx
Fire station	----	----	---	----	----
Port tugs, crafts,	x	x	---	x	x
Administration Building & Parking	---	---	---	---	---
Customs Area	---	----	---	---	x
Port Employees' Quarters	----	x	----	---	---

Threats	Terrorism Bomb, War, Arson	Technical Failures Power, Transport Communication Infrastructure	Occupational Accidents Strikes	Cyclone Floods	Tsunami Earth Quake
Respondent agencies	Visakhapatnam Port Trust CISF, Police, Coast Guard, Navy, Control Room Min. of Shipping	Visakhapatnam Port Trust	Visakhapatnam Port Trust, CISF Police, Min. of Shipping	Visakhapatnam Port Trust, Dist. Collector, Control Room, Min. of Shipping	Visakhapatnam Port Trust, Distt Collector, Control Room Min. of Shipping
Vulnerable Areas					
Vessel Movement					
Channel	xxx	--	--	xx	x
At Berth	xx	x	x	xx	x
Storage- Transfer					
Oil Transfer	xxx	x	x	xx	--
Cargo Transfer					
Trucks, Trains	xxx	x	xx	xx	--
Crane- Shore/Ship	x	x	xx	xx	--
Services					
Access Gates	xxx	xxx	xx	xx	--
Emergency Generators	xx	x	--	x	--
Electric Substations	xx	x	--	xx	--
Train siding Locos, Wagons,	x	x	x	x	--
Fire station	--	x	--	x	--
Port tugs, crafts,	x	x	x	xx	--

Threats	Terrorism Bomb, War, Arson	Technical Failures Power, Transport Communication Infrastructure	Occupational Accidents Strikes	Cyclone Floods	Tsunami Earth Quake
Administration Building & Parking	x	x	--	x	--
Customs Area & Weigh Bridge	--	x	--	x	--
Port Employees' Quarters	x	x	--	x	--

VISAKHAPATNAM PORT TRUST

PART II

EMERGENCY CONTINGENCY PLAN

CONTENTS- PART II

CENTRAL DISASTER MANAGEMENT GROUP- BASIC FUNCTIONS

Team Leader : Chairman / Dy Chairman
Members: Dy Chairman , Secretary, FA & CAO, Chief Engineer, CME , Traffic Manager, Materials Manager, Chief Medical Officer, Commandant-CISF, Commandant – Coast Guard.
Basic Functions
1-Monitor and analyze reports from the On Site Action team and identify the area/population at risk
2-Activate the Response Plan and arrange the Alert siren.
3-Support the Action Group with materials, equipment, information and human resources
4- Implement changes in the current mode of action if deemed necessary
5-Adjust the Disaster classification of the incident and actuate the Central Control Room
6- Coordinate with external organizations, State Govt. as deemed necessary
7- Make the necessary arrangements and funds for evacuation, transportation, food & supplies
8-Make media statements and reports to MOS.

ON SITE ACTION GROUP - BASIC RESPONSIBILITIES

Team Leader:- Harbour Master / Senior Pilot
Members:-Control room-Sr. pilot, Chief Fire Officer, Dy Comdt. CISF , Exec. Engineer (Electrical) Addl. TM, Dy Chief Med. Officer.
Basic Functions
1- Assess & classify Incident:-nature-location- severity-casualties-resource requirement – time to control
2- Activate elements of the disaster management plan, arrange alert signal in liaison with DC
3-Conduct search, rescue and evacuation operations. Provide medical Aid
4- Manage incident operations and terminate plan, Arrange for re-Entry and restoration

EMERGENCY CLASSIFICATION

Level 1. It is an Incident within the port and is of a minor nature with a low level of personnel injury, interruption to work, damage level and loss of capability. It can be handled by the Port Trust Staff involving Marine and other depts. The Emergency Management group leader is the Dept Head. E.g. Building/Shed Fire, Elec Supply disruption, labour accident, vessel accidents

Level 2;- It is an Incident within the port area and is of a limited and moderate level of personnel injury, possible death(s),interruption of work, damage to port ..Besides Port resources, outside assistance may be required. The Disaster Management group leader is the Chairman, VPT.

E.g. Gas Leaks, Chemical/Oil Spills, Terminal Fires/ Explosions

Level 3:- It is a disaster of a severe and critical nature and could have a high level of personnel injury (and deaths), interruption to work, damage to port and loss of capability. It affects the port and possibly adjacent areas. Besides Port resources, assistance from outside agencies is required. If incident affects VPT, group leader is chairman, VPT and if it affects outside PPT , then information will be given to District Collector depending on the intensity.

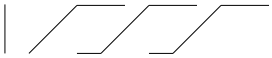
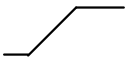
E.g. Gas Leaks, Chemical/Oil Spills, Fires/ Explosions & Cyclones

INCIDENT/REQUIREMENT SCENARIOS	LEVEL I – ACTION BY	LEVEL II & III –ACTION BY
Vessel–Grounding-Shifting-Evacuation	HM	HM + Salvage efforts + Navy + Coast Guard
Casualties	CMO	Port + District + State
Fire & Explosion on Vessel or Terminal	CFO	CFO + District (Fire wing) + CDMG
Fire & Explosion at Shed	CFO , TM	CFO + District (Fire wing) + CDMG
Oil or Chemical Spill	CFO	CFO +Central disaster Magmt. Group+ outside agencies
Toxic Gas Leakage	CFO	Central disaster Magmt. Group +District/ state assistance + outside agencies
Cyclone, tsunami, flood etc	Dy. Conservator	National disaster Management group + CDMG + District + state
Electric Supply breakdown	SE (Elect.)	CDMG + District + State

CENTRAL DISASTER MANAGEMENT GROUP - RESPONSIBILITIES

Position	Port Position	Alternative
Chief Emergency Controller	**Chairman**	**Dy. Chairman**
Monitors Disaster Management action Plan and a state of emergency preparedness is maintained at all times. Authorizes release of required funds. Leads Central Disaster Management group to direct operations from the emergency control center.		
For industrial disasters, confirms level of crisis, monitors the shutting down, evacuation and other operations as necessary. Directs activation of the Central Control room at emergency level 2 and 3		
Activates the off-site emergency plan if the disaster is spreading to/from outside Port boundary in liaison with Dy chairman, DC,TM and CFO		
Approves information to the media		
Liaises with the Secretary, Jt. Secy (Ports) of the MOS (Ministry of shipping)		
Confirms the termination of the emergency.		
Leads the Central Disaster Management Group, monitors the early restoration of facilities and port activities,		
Provides timely required status reports to the Secretary MOS		

Disaster Warning Alarm and Evacuation Signals

TSUNAMI - TYPE-HIGH PITCHED CONTINIOUS WAILING SIREN 5 Sec.  1 Sec.
FIRE /EXPLOSION/BOMB TYPE-LONG SIREN FOLLOWED BY SHORT SIREN 10 Sec. 3 Sec.
GENERAL EVACUATION ALARM FOR TOXIC/RADIATION LEAKAGES / NATURAL CALAMITIES TYPE-HIGH PITCHED RINGING ALARM AT SHORT INTERVALS 
C- ALL CLEAR SIGNAL TYPE:-LONG CONTINIOUS SIREN FOR 90 SECONDS 

Competent Agencies

List of agencies competent for issuing warning or alert is given below:

Competent agencies for issuing warnings

Disaster	**Agencies**
Earthquakes	IMD, MERI,BARC
Floods	Meteorology Department, Irrigation Department, Central Water Commission
Cyclones	Meteorology Department, Irrigation Department, IMD, INCOIS
Tsunami and Storm Surge	INCOIS
Epidemics	Public Health Department
Road Accidents	Police
Industrial and Chemical accidents	Industry, Police, MARG, DISH, BARC,AERB
Fires	Fire Brigade, Police

5.1 PORT RISK HAZARDOUS PRODUCTS STORAGE FACILITIES

COMPANY	LOCATION	NO OF TANKS	CAPACITY	PRODUCTS HANDLED
BPCL-VISAKHA	VIZAG	15	79,441 KL	ETHANOL, FO, LDO, HSD, BIO-DIESEL, MS
IOCL	VIZAG	28	1,40,797 KL	HFHSD, HSD, MS, LDO, LVFO, NFO-380, BFO-180, BFO-380, ATF, ETHANOL, JP-5, BIO-DIESEL
HPCL	STORAGE CAPACITIES	33	1,78,054.5 KL	HSD, NAPHTHA, MS, SKO, SOFT, ATF, ETHANOL, MTO, DIESEL, BIODIESEL, SLOP
CIL	VIZAG	3	27,500 KL	MOLTEN SULPHUR, SULPHURIC ACID, PHOSPHORIC ACID
IMC		1	10,000 KL	SULPHURIC ACID
IMC LIMITED	VISAKHAPATNAM	6	12,555.084 KL	S/ACID
HPCL	VISAKH	12	96,381 KL	HSD, HFHSD, CLO, LDO, LSHS, FO180, VLSFO, SLOP TANK, BITUMEN-VG40, BITUMEN-VG30, BITUMEN-VG10, JBO, LUBE OIL
HPCL REFINERY	ATF AREA	33	12,78,099.7 KL	CRUDE, NAPHTHA, E III MS, E IV MS, DRY SLOP, WET SLOP, E IV HSD, SKO, ATF
HPCL REFINERY	REFINERY AREA	77	8.88,870.6 KL	CRUDE, NAPHTHA, ISOMERATE, MS, HWO, DRY. SLOP, WET SLOP, MTO, HSD, LS HFHSD, LDO, JBO, CUTTER, FO, LSHS, IFO, BITUMEN, VGO, HSSR
NALCO		1	GROSS 7368M^3 NET 6896M^3	CAUSTIC SODA

5.2 VISAKHAPATNAM PORT TRUST – AREA VULNERABILITY & THREAT MATRIX

X=slightly vulnerable: xx=moderately vulnerable: xxx=highly vulnerable

Threats Vulnerable Areas	Vessel Accidents Collision Grounding Fire Explosion	Land Transport Personnel; Accident Rail Road	Fire & Explosion Manifold Pipeline	Toxic Gas Leakage Pipeline Manifold	Pollution Oil Chemical	Terrorism Bomb War Arson Cyber	Technical Failures Power, Transport Communication Infrastructure	Occupational Accidents Strikes	Cyclone - Floods	Tsunami Earth Quake
Vessel Movement										
Approach Channel	xx				x	x	x	x		X
Coal Berths	x	x	x	x	x	x	x	x	x	x
Oil Tanker Berth	x	x	xx	x	x	x	x	x	x	x
LNG Berth	x	x	xxx	xx	x	xx	x	x	x	x
Fertilizer Berth	x	x	x	x	x	x	x	x	x	x
Boat Train Pier	x	x	x		x	x	x	x	x	x
Gen Cargo Berths	x	x	x		x	x	x	x	x	x
Cargo Transfer										
Oil pipe lines			xx		xx	xx	xx	x	x	x
Ammonia/ph.acid			xx	xx	xx	xx	xx	x	x	x
pipeline										
Trucks/Mobile eqmt			x		x	x	x	x	x	x
Train tracks-Roads						x			x	x
Cranes & Ship Loaders						x	x	x	x	x
Bulk cargo conveyor system						x	x	x	x	x

Threats Vulnerable Areas	Vessel Accidents Collision Grounding Fire Explosion	Land Transport Personnel; Accident Rail Road	Fire & Explosion Manifold Pipeline	Toxic Gas Leakage Pipeline Manifold	Pollution Oil Chemical	Terrorism Bomb War Arson Cyber	Technical Failures Power, Transport Communication Infrastructure	Occupational Accidents Strikes	Cyclone - Floods	Tsunami Earth Quake
SERVICES	------	----	------	-----	------	------	------	------	-----	----
Control gates			x			xx		x	x	x
Emergency Generators			x			x	x	x	x	x
Electric Substations			x			x	x	x	x	x
Train siding Locos, Wagons,			x			x	x	x	x	x
Signal station-electronic means commn			x			x	x	x	x	x
Fire station 1 & 2			x			x	x	x	x	x
Port tugs, crafts, dredger	x	x	x		x	x	x	x	x	x
ADMINISTRATION	------	----	------	-----	------	------	------	------	-----	----
Administration Building & Parking			x	x		x	x	x	x	x
Customs Area & Weigh Bridge			x	x		x	x	x	x	x
Port officers & CISF Quarters			x	x		x			x	x

EVENT SCENARIOS -VISAKHAPATNAM PORT TRUST

Probability-Low-once every 10-50yrs:: moderate=once every 2-10yrs; High=once annually
Impact/Preparedness/Risk Threat 0=Very Low 1=Low 2=moderate 3=High

EVENT/ SCENARIO SPECTRUM	Early warning	Probability of Occurrence	Duration Impact	Impact on property	Impact on people	Time to Restore Facilities	RISK THREAT
Cyclone	96h-12h	Low	N/A	1	**1**	N/A	Moderate
Floods	96h-12h	Low	N/A	**1**	**1**	N/A	Low
Earthquake/Tsunami	5-8h	**low**	**N/A**	**1**	**1**	N/A	Low
V/L Accident							
Collision	< 1min	Low	<1hr	0	0	4 h	Low
Grounding	< 1min	Low	2-4hr	0	0	4 h	Low
Fire/Explosion	< 1min	Low	0.5-12h	1-2	1-2	12-96h	Moderate
Transport Accident							
Rail	< 1min	Mod	< 1min	0	1	6-48h	Low
Road Accident	< 1min	Mod	< 1min	0	1	<1h	Low
Pollution-							
Gas Release-Ammonia	< 1min	Low	1-24h	0.1	2	2-30d	Low
Phos /sulph acid spill	< 1min	Low	1-12h	0.1	1	2-4d	Low
Oil Spill	< 30min	Low	1-12h	1	1	1-2d	Low
Fire-Admin Building	< 10min	Low	1-72 h	1	1	12-96h	Low
Parking/Gates	< 1min	Low	1-12h	0	1	12-96h	Low
Function Failure							
Elec sub station	< 1min	Low	1-24h	0	0	12-48h	Low
Emergency Generator	< 1min	Low	1-24h	0	0	12-48h	Low
Pipelines failure	< 1min	Low	1-24h	0	0	12-48h	Low
Evacuation routes	< 1min	Low	1-24h	0	0.2	12-48h	Low
Fire Alarm failure	< 1min	Low	1-24h	0	0	12-48h	Low
Fire station failure	< 1h	Low	1-24h	0	0	12-48h	Low
Water system	< 1h	Low	1-24h	0	0	12-48h	Low

List of Local Industries – Phone Numbers

S. No.	Name	Office Phone
1	M/s. Hindustan Shipyard Limited	0891- 2577437
2	M/s. Hindustan Petroleum Corp. Ltd.	0891- 2895000/2895100
3	M/s. Coromandel Fertilizers Ltd.	0891- 2578400
4	Visakhapatnam Steel Plant	0891- 2518431
5	M/s. BHPV Limited	0891- 2517381
6	M/s. NALCO	0891- 2561432/35
7	M/s. East India Petroleum Ltd.	0891- 2578168
8	M/s. Andhra Petro Chemicals Ltd.	0891- 2578342
9	M/s. R.C.L.	0891- 2740500
10	M/s B.P.C.L.	0891- 2577528
11	M/s. I.O.C. Ltd.	0891- 2578300/302
12	M/s. I.M.C. Ltd.	0891- 2751250/2755612
13	M/s. ESSAR Steel Ltd.	0891- 2876300/2523213
14	M/s. Visakha Container Terminal Ltd.	0891- 2502164/40
15	M/s. SAIL	0891- 2704074/2563611
16	M/s. ONGC	0891- 2567833
17	M/s. NTPC	089247274
18	M/s. NMDC	0891- 25623943/262945
19	M/s. SALPG	0891- 2748928/29

CONTACT DETAILS OF NDRF OFFICERS

Force Head Quarters

Name	Designation	Address	Telephone No.	Fax No.	E-Mail
Shri S N Pradhan (IPS)	Director General	Directorate General, NDRF, 6th Floor, NDCC-II Building, Jai Singh Road, New Delhi - 110001	011-23438020, 011-23438119	011-23438091	dg.ndrf@nic.in
Shri Amrendra Kumar Sengar (IPS)	Inspector General	-- Do --	011-23438021	011-23438091	ig.ndrf@nic.in
Ms Nishtha Upadhyay	Financial Advisor	-- Do --	011-24368148	011-23438091	--
Mr. Mohsen Shahedi	Deputy Inspector General (Proc/Prov)	-- Do --	011-23438022	011-23438091	digprov-ndrf@nic.in
Shri Manoj Kumar Yadav	Deputy Inspector General (Trg/Pro /Academy/NCDC/East & North East Sector)	--Do--	011-23438140	011-23438091	dig.es.ndrf@nic.in
Shri Randeep Kumar Rana	Deputy Inspector General (Estt/ Ops / North-West Sector)	--Do--	011-23438023	011-23438091	dig.ns.ndrf@nic.in
Shri K K Singh	Deputy Inspector General (Adm/Works/South Sector)	-- Do --	011-23438185	011-23438091	dig.ss.ndrf@nic.in
Shri V V N Prasanna Kumar	Commandant (PROC/PROV/NDRR)	-- Do --	011-23438183	011-23438091	--
Dr. Amit Murari	CMO (SG)	-- Do --	011-23438091	011-23438091	cmo-ndrf@gov.in
Shri Muneesh Kumar	Second-in-Command (Works & Proc)	--Do--	--	011-23438091	--

Shri Daulat Ram Chaudhary	Second-in-Command (ADM)	--Do--	--	011-23438091	hq.ndrf@nic.in
Shri Pranshu Srivastava	Deputy Commandant (Trg)	--Do--	011-23438138	011-23438091	hq.ndrf@nic.in
Shri Rakesh Ranjan	Deputy Commandant (OPS)	--Do--	011-23438024	011-23438091	hq.ndrf@nic.in
Shri Surendar Kumar	Deputy Commandant (Engineer)	--Do--	--	011-23438091	--
Shri Krishan Kumar	AC (IT/COMN/PRO)	--Do--	011-23438024	011-23438091	krishan.0405@gov.in
Shri Bhawani Singh	AC(ADM & SO to DG)	--Do--	011-23438118	011-23438091	dc.adm.ndrf@nic.in
Shri S Raghavindra	AC/MIN	--Do--	011-23438091	011-23438091	hq.ndrf@nic.in
Control Room	--	--Do--	011-23438091, 011-23438136	011-23438091	hq.ndrf@nic.in

NDRF
Units

Name	Designation	Address	Telephone No.	Fax No.	Mobile No.	Unit Control Room No.	E-Mail
Sh. R S Gill	Officiating Commandant	1st BN NDRF, Patgaon PO - Azara,Distt. Kamrup Metro, Guwahati-781017	0361-2840027	0361-2849080	--	0361-2840284 09401048790 09435117246	assam01-ndrf[at]nic[dot]in
Sh. Nishit Upadhyay	Commandant	2nd BN NDRF, Near RRI Camp. Haringhata, Mohanpur, Nadia, (West Bengal) Pin - 741246	033-25875032	033-25875032	-	033-25875032 09474061104 09474116775	wb02-ndrf[at]nic[dot]in
Sh. Jacob Kispotta	Commandant	3rd BN NDRF, PO-Mundali, Cuttack - Odisha Pin - 754013	0671-2879710	0671-2879711	--	0671-2879711 09437581614	ori03-ndrf[at]nic[dot]in
Ms. Rekha Nambiyar	Commandant	4th Bn NDRF, PO - Suraksha Campus , Arrakonam , Distt. Vellore Tamilnadu-631152	04177-246269	04177-246594	--	04177-246594 09442140269	tn04-ndrf[at]nic[dot]in
Sh. Anupam Srivastava	Commandant	5th Bn NDRF, Sudumbare Taluka, Distt - Maval Pune (Maharashtra) Pin - 412109	02114-247010	02114-247008	--	02114-247000 09422315628	mah05-ndrf[at]nic[dot]in
Sh. A. K. Tiwari	Commandant	6th Bn NDRF, Jarod Camp,Teh-Wagodia, Vadodara, Pin - 391510	02668-274470	02668-274245	--	02668-274245 09723632166	guj06-ndrf[at]nic[dot]in
Sh. Ravi Kumar Pandita	Commandant	7th Bn NDRF, Bibiwala Road, Bhatinda (Punjab) Pin 151001	0164-2246193	0164 - 2246570	--	0164-2246193 0164-2246570	pun07-ndrf[at]nic[dot]in

Sh. P.K.Srivastava	Commandant	8th Bn NDRF, Kamla Nehru Nagar, Ghaziabad (UP) Pin - 201002	0120-2766013	0120 - 27666012	--	0120-2766618 09412221035	up08-ndrf[at]nic[dot]in
Sh. Vijay Sinha	Commandant	9th Bn NDRF, Bihata Patna, Bihar Pin - 801103	06115-253942	06115-253939	--	06115-253939 08544415050 09525752125	patna-ndrf[at]nic[dot]in
Mr. Zahid Khan	Commandant	10th Bn NDRF, ANU Campus, Nagarjuna Nagar, Guntur (AP) Pin - 522510	0863-2293178	0863-2293050	--	0863-2293050 08333068559	ap10-ndrf[at]nic[dot]in
Sh. A.K.Singh	Commandant	11 th Bn NDRF, Sanskritik Sankul, Maqbool Alam Road, Varanasi, UP - 221002	0542-2501201	0542 - 2501101	--	0542-2501101 08004931410	up-11ndrf[at]gov[dot]in
Sh. Rajesh Thakur	Commandant	12 th Bn NDRF, Itanagar, Arunachal Pardesh791112	0360-2277109	0360-2277106	--	0360-2277104 09485235464	bn12[dot]ndrf[at]gov[dot]in

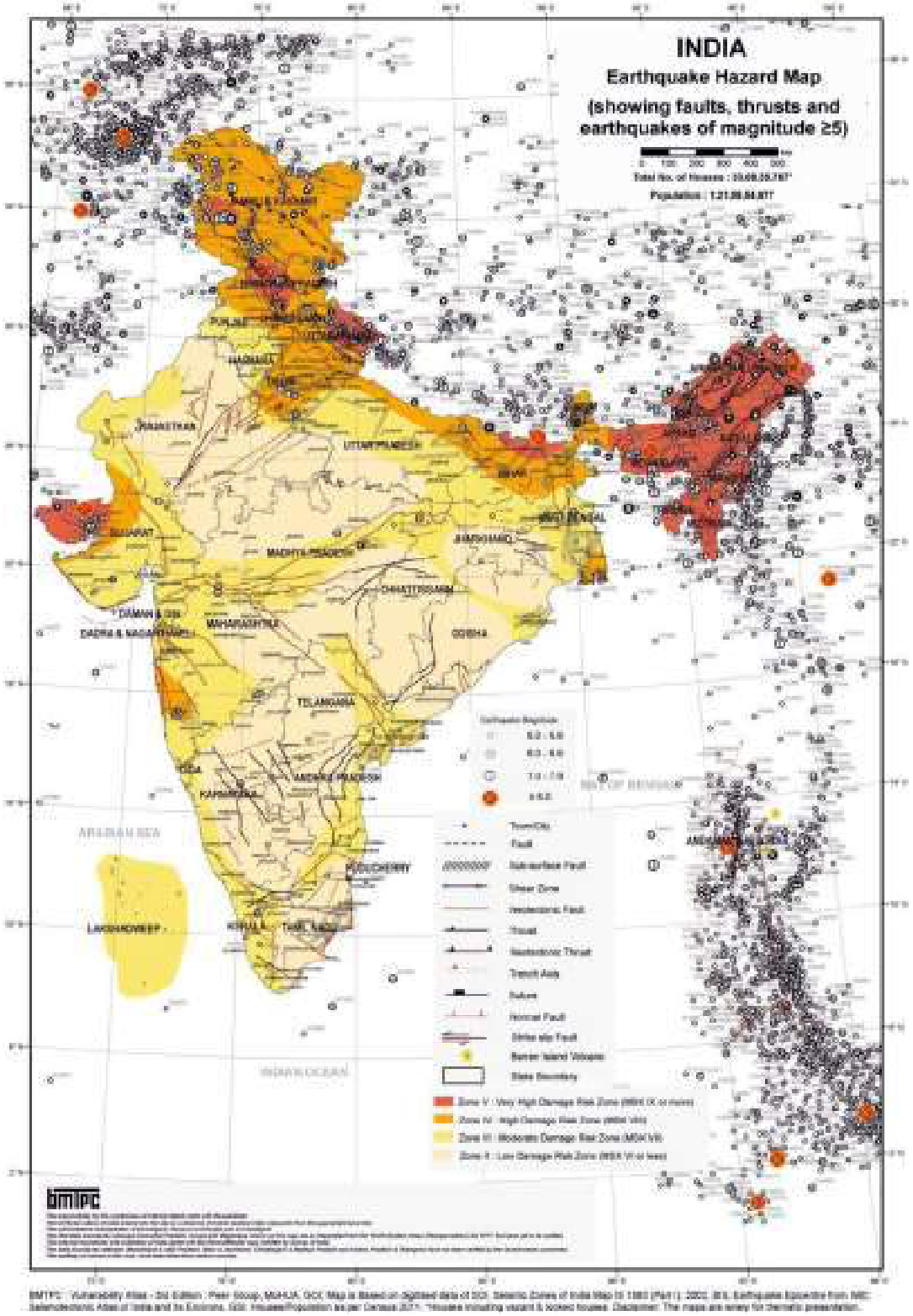
NDRF
RRCs

Name of RRC	Landline Number	Mobile Number
NDRF RRC, Port Blair, Andaman	03192289174	09442112269
NDRF RRC, Adayar, Chennai	04424420269	09442112269
NDRF RRC, Vizag Steel Plant, Vishakhapatnam, Andhra Pradesh	--	08333068565 08333068560
NDRF RRC, Fire Station Mahadevapura, Bengluru, Karnatka	--	09482978719 09482978715
NDRF RRC, Shaikpet Sport Complex, Hyderabad, Telangana	04023565666	08333068536 08333068547

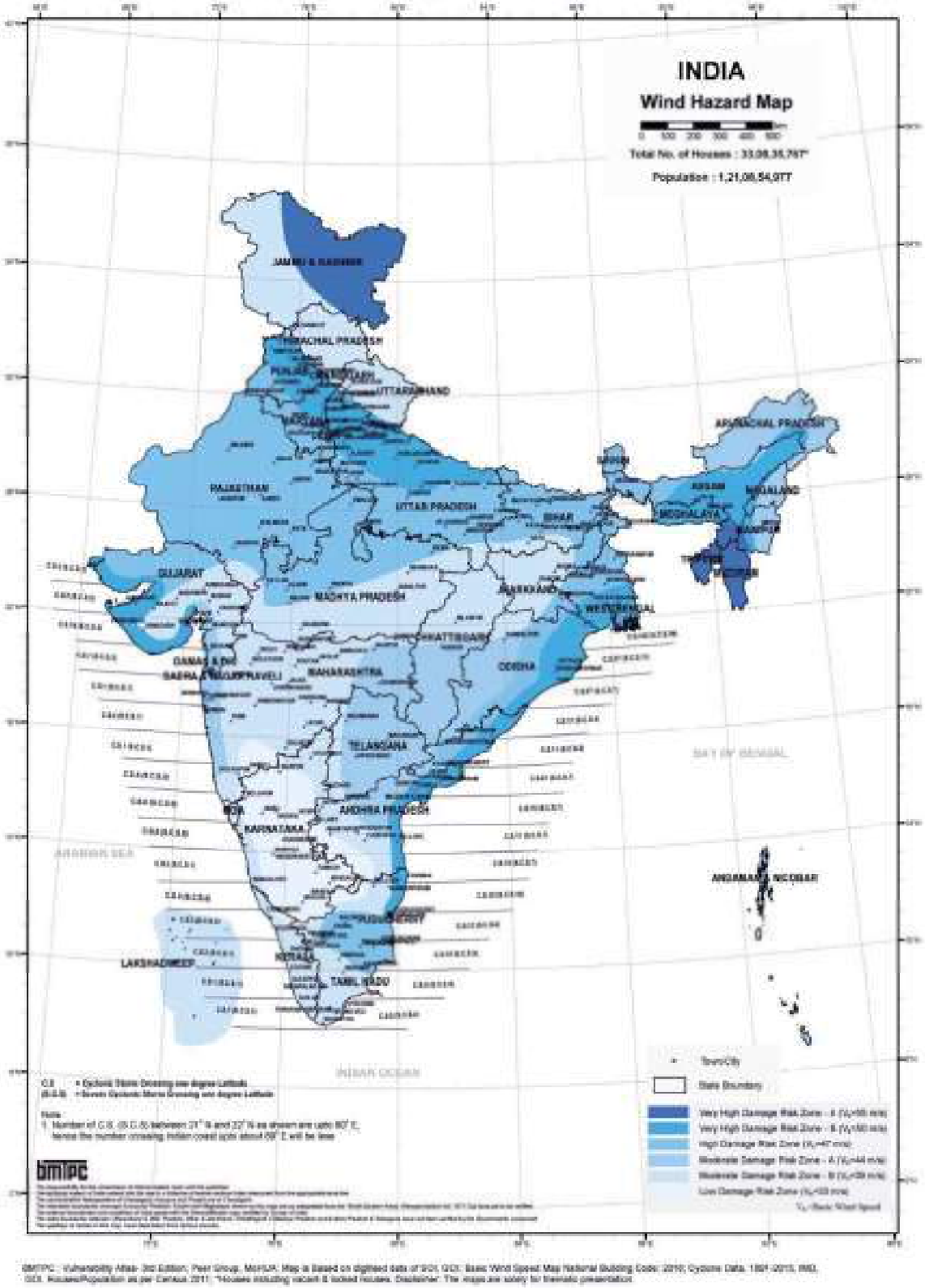
ANDHRA PRADESH STATE DISASTER RESPONSE FORCE (APSDRF)

Name of the Officer	Designation	Phone	Email ID
Sri. K. Kanna Babu, I.A.S	Special Commissioner (Disaster Management) & Ex-Officio Additional Secretary to Government, Revenue (DM) Department, Managing Director (FAC), APSDMA	0863-2377099	commr_relief_rev@ap.gov.in
Sri. Dr. C. Nagaraju	Executive Director	+91-9676957788, 0863-2377105	ed-apsdma@ap.gov.in
Smt. P. Seshasri	Administrative Officer	+91-8333905039	seshasrip-plg@ap.gov.in
Sri. Ch. Santhi Swarup	SEOC Incharge	+91-8333905033	seoc-apsdma@ap.gov.in

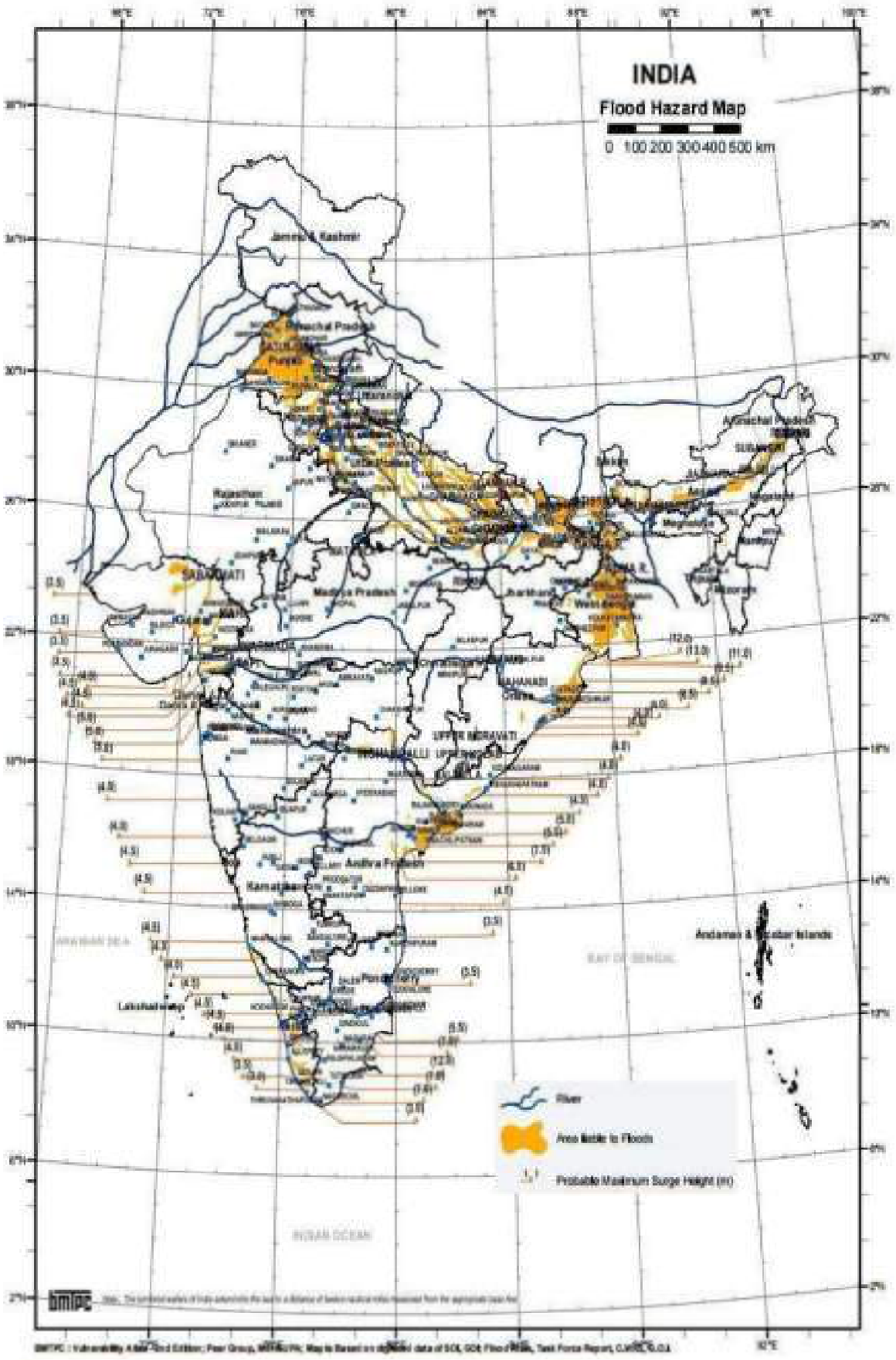
APPENDIX C
IMPORTANT MAPS



EARTHQUAKE HAZARD MAP



WIND HAZARD MAP



FLOOD HAZARD MAP

2.3 Oil/ Chemical Spill

The Port has unique safety and environmental protection problems and the need for a well-integrated emergency plan for oil/chemical spill is absolutely essential. A number of accidents have occurred world over due to accidental discharge/leakage of Cargo. List of major oil spill in recent years world over is listed in **Table 2.18**. In India Arabian Sea at Mumbai it occurred twice in 2010 and 2011. The possible accidental leak/release scenarios of oil/chemical spill occurs due to collision, grounding, barging/ banking during handling of petroleum products, loading & discharge of liquid cargo, incorrect sequence of operations and during commencement/completion of cargo operations. If cargo tanks are ruptured during collision followed by heavy spark, causes fire due to ignition of oil. On the basis of hazard study, the following scenarios are considered for oil/chemical spill in Inner and at Outer harbour.

2.3.1 Scenario Development

The following scenario's which are possible due to failure while loading/discharge of the petroleum products that may result in leak/release at the OSTT, LPG Jetty, Oil Wharf, FB and at Northern arm (EQ6, EQ7,WQ1 & WQ1RE, WQ5). The cause of common failure is due to incorrect line up of ship/shore valves, Host failure, Gasket failure, Piping failure, over pressure in the line, damage to the hose by parting of mooring and striking of the tanker by passing vessel.

On the basis of hazard study, the following events are considered for consequence analysis of oil/chemical spill.

- Leak/release of crude at OSTT from vessel or transfer pipe line
- Leak/release of High Speed diesel at LPG jetty
- Leak/release of flammable liquids (IB & IC) and combustible liquids at OR1, OR2 from vessel/transfer pipeline
- Leak release of Bio diesel at OIL Wharf and Northern arm berths from vessel & pipeline
- Leak/release of styrene monomer at OR1 &OR 2 from vessel/transfer pipeline
- Leak of sulphuric acid at WQ1 & WQ1RE and phosphoric acid at EQ6/EQ7 of northern arm from vessel/ transfer pipeline
- Leak of caustic lye at EQ6/EQ7, WQ5 from vessel/transfer pipeline

- Spill over of Ammonia Nitrate at Northern arm berths (EQ & WQ) during handling
- Leak/release of molten Sulphur from vessel/transfer pipeline at FB
- Leakage of Alumina from vessel/transfer pipeline at WQ5 berth

The estimated quantity of hazard material release and spill over area in water and on land is reported in **Table 2.19**. However, the spread over area depends on absorbing and non-absorbing surface and its type and wind speed. Emergency management for Tier -1 level is considered as onsite crisis, whereas Tier-2 /Tier-3 level are considered as offsite crisis. Various response organizations for oil/chemical spill are involved as in case of fire-explosion. Depending on the level of responsibility, different groups will function for taking necessary action. Emergency (control) measures which are delineated for each hazard cargo as in **Table 2.19**.

The objective oil/chemical spill contingency plan:

- To develop appropriate and effective systems for the detection and reporting of oil spill.
- To ensure that appropriate response techniques are employed to prevent, control and combat pollution and dispose off recovered material in an environmentally acceptable manner.
- To ensure adequate protection to public health, welfare and the marine environment.
- To ensure that complete and accurate records are maintained for all expenditure to facilitate cost recovery

2.3.2 Response Plans

Chairman of VPT is the chief emergency controller in onsite/offsite emergency situations and Deputy Conservator of the Port will be emergency coordinating officer. A guideline or response plan is delineated as shown in **Table 2.20**. To combat oil/chemical pollution responsibility of organization has to be identified as in line with Fire-explosion, to deal with following components.

- Organisational structure of Emergency
- Port risk evaluation
- Area risk evaluation
- Notification and communication

- Emergency equipment & facilities

2.3.3 Action Plan

On the basis of direct information through incident controller, immediate response is to implement action plan to take preventive measures for spill on land as well as on water. In case of oil spill accidents within Port limits, the Master as representative of the owner of the vessel and the cargo owner will take immediate action to inform the Port authorities and also to alert the concerned oil company representative onboard ship and immediately inform the oil terminal manager of the concerned oil company. The responsibility of the Port/ user Agency / industry is to protect the Harbour water, fisheries and maintenance of the ecology of the Port area. Hence full cooperation between all the parties concerned is required expeditiously and that as far as possible division of responsibility is to be delineated in principle, and accepted by all the parties.

Communication system within Port organization for emergency coordination linkages is given in **Annexure XII**, which is needed for onsite crisis management. The communication linkages with State & Central Government in the case of major crisis will be the same as in the case of Fire-explosion.

2.3.3.1 Preventive Measures

Preventive measures are aimed at reducing the chance of error as far as possible and to ensure that only best materials are used and maintained. The entire accident prevention is constantly concerned with the elimination of mistakes, and although complete success is probably an unattainable target, the use of a check-list system goes a long way to minimize errors, and is particularly valuable when two different parties, the shore and ship personnel, are required to work together. Approved safety checklist as contained in the International Safety Guide for Oil Tankers and Terminals may be used (As per IMDG guide lines).

Prompt action in the event of accidental spillage is essential and it is advised strongly that throughout the period of loading and discharging, the following steps are to be followed:

- A responsible ship's officer should be on watch on board and an adequate crew should remain on board to deal with emergencies.

- A responsible member of the ship's crew should be stationed near the ships main oil cargo control valves.
- Responsible member of the shore personnel should stand by the shore control valves at the shore end of the flexible hoses.
- The telephonic or other recognised communication systems between berth and pump house(s) or other point should be in working condition.
- At the commencement of operations and at each change of watch or shift, the responsible ship's officer and the responsible member of the shore personnel should confirm with each other that the “stand by", start loading", "stop loading", "slow down", "start discharging", "stop discharging" and any other necessary signals are properly understood and agreed.

At each jetty there should be an arrangement for stopping the flow of oil immediately in the event of failure of a manifold or hose on the ship or jetty. If the loading pumps are located away from the jetty (say more than 90m (295ft) away) remote-control arrangements at the loading berth and at another location, at a safe distance from the berth should be provided to stop the pumps immediately. In recent years, considerable progress has been made towards handling jetty equipment, and in standardizing tanker manifold design to take full advantage of the improvement in hose-handling techniques and of the installation of all oil booms. These arrangements have many variations to suit local needs. But in brief, the joining of a ship's manifold flanges and the jetty pipeline can be achieved by the following basic methods.

- Flexible hoses, the handling of which may be assisted by simple derricks/cranes.
- Booms terminating in flexible hoses.
- All metal swivel-jointed loading arms.

Flexible hoses are made of reinforced oil-resisting rubber to the specification of BS 1435: 1975 [3] and as recommended by the Oil Companies International Marine Forum “Buoy mooring forum standard".

However, a boat has been hired for keeping channel water in the Port clean, which works under the direction of Deputy Conservator. Chief Officer (pollution) takes necessary action to ensure that the Port waters are to be kept clean and initiates action to spray chemical for oil dispersion. Oil booms are also being placed around tankers.

2.3.3.2 Containment Measures

The containment measures must be capable of capturing oil that may discharge from a primary storage system (i.e., tank or pipe) such that the oil will not escape to the environment before cleanup occurs. Compliance requires the use of dikes, berms, retaining walls, curbing, spill diversion or retention ponds, absorbent materials or other equivalent measures. Under different sections of the rule, a quick drainage system is required for tank car or tank truck loading/unloading racks and secondary containment is required for all bulk storage containers.

Bulk storage containers must be constructed with a secondary means of containment for the entire capacity of the largest single container and sufficient freeboard to contain precipitation. Secondary containment of bulk storage containers is typically accomplished by concrete or steel dikes, earth berms, double-wall tanks or remote impoundments. Examples of common appropriate containment measures for operational equipment include the following methods:

1. Absorbent material

In the case of indoor hydraulic reservoirs (e.g., elevators, vehicle hoists, dock levelers, machinery etc.) appropriate containment may be achieved by placing absorbent materials around equipment to prevent spilled oil from reaching a floor drain or other drainage inlet. Absorbent materials are readily available in a variety of shapes and sizes.

2. Concrete curbing

In the case of out door electrical equipment, appropriate containment may be achieved by constructing concrete curbing around the equipment to prevent the lateral migration of oil from reaching a drainage inlet before cleanup occurs. Curbing needs to be constructed around common outdoor pad.

3. Drainage inlet cover

These are placed over drainage inlet structures to prevent spilled oil from entering the drainage system and discharging into the environment. This option requires keeping the drainage inlet covered for all the time. The drainage inlet operations should be properly supervised and inspected in consistent with the rules. Drainage inlet covers are most effective when the surrounding surface is conducive to a tight seal and the area is free of debris (e.g. grit, snow, ice, sand, etc.)

Loading / Unloading Rack containment

According to loading/ unloading rack containment procedures "where loading / unloading area drainage does not flow into a catchment's basin or treatment facility designed to handle discharges, use a quick drainage system for tank car or truck loading and unloading areas. It is necessary to design any containment system to hold at least the maximum capacity of any single compartment of a tank car or truck loaded or unloaded at the facility". The requirement for loading/ unloading rack containment applies to all bulk storage facilities, whether they are above ground or completely underground containers. This requirement does not apply to operational equipment.

2.3.3.3 Combat Pollution – Equipment

Equipment needed to combat oil pollution are booms, skimmers, transfer pumps, vacuum trucks, absorbents and dispersants. Apart from fire fighting and protective equipments boats, small crafts are also needed along with supportive equipment. Available resources to combat oil spill with VPT and pollution control equipment along with equipment to be procured is listed in **Tables 2.21 & 2.22**.

2.3.4. Chemical Spill (contingency plan)

In VPT, apart from petroleum products, hazardous chemicals are also handled in Inner Harbour at FB and in Northern arm at EQ6, EQ7, and WQ1, WQ1RE & WQ5 berths by CIL, IMC, NALCO and EIPL. The identified hazardous substances are Ammonia, molten sulphur, caustic lye, alumina, Ammonium nitrate, phosphoric acid and sulphuric acid including styrene monomer. The spill over area along with response measures are delineated and reported in **Table 2.19**. Ammonia leak/release is considered as toxic gas dispersion whereas styrene monomer is toxic as well as flammable liquid. Fertilizer grade Ammonium nitrate (more than 0.2% of combustible material) is possibly explodable in certain conditions. In recent times, accident occurred due to explosion are reported of Ammonium nitrate (fertilizer grade) (**Annexure XIII**). Responsibility of first response team with coordinating action team, preventive methods (spill disposal methods) on the basis of its reactivity and its combustibility with other chemicals have to be considered, which are reported in **Table 2.23**.

2.3.4.1 Response Plan

First Responder Operations level

First responders at the operations level are individuals who respond to releases or potential releases of hazardous substances as part of the initial response at the site for the purpose of protecting nearby persons, property, or the environment from the effects of the release. The first responder should know how to select and use proper personal protective equipment provided to the first responder at operational level, perform basic control, containment and/or confinement operations within the capabilities of the resources and personal protective equipment available with their unit and implement basic decontamination procedures.

The following absorbents can be used successfully to control chemical spill.

- Universal spill absorbent-1:1:1 mixture of Flor-Dri (or unscented kitty litter), sodium bicarbonate, and sand. This all-purpose absorbent is good for most chemical spills including solvents, acids (not good for hydrofluoric acid), and bases.
- Acid spill neutralizer-Sodium bicarbonate, Sodium carbonate or calcium carbonate.
- Alkali (base) Neutralizer-sodium bisulfate.
- Alkali Metals-Dry sand or a Class “D” Fire Extinguisher.
- Solvents/organic liquid absorbent - Inert absorbents such as vermiculite, clay, sand, Flor-Dri, and Oil-Dri.
- Ammonium Nitrate – Early stages of fire use flooding amount of water.
- Alumina – Moisten first to prevent dusting and wash away with plenty of water.

Action Plan

Action plan involves preventive measures and use of personnel protective equipment

2.3.4.2 Personnel Protective Equipment (PPE)

The purpose of personnel protective clothing and equipment (PPE) is to shield or isolate individuals from the chemical, physical, and biological hazards that may be encountered. Careful selection and use of adequate PPE is necessary to protect the respiratory system, skin, eyes, face, hands, feet, head, body, and hearing. No single combination of protective equipment and clothing is capable of protecting against all hazards. Thus PPE should be used in conjunction with other protective methods. The use of PPE can itself create significant worker mobility, and communication. For any

given situation, equipment and clothing should be selected so it provides an adequate level of protection. Over protection as well as under-protection can be hazardous and should be avoided. Few common PPE are:

- Goggles and Face Shield.
- Heavy Neoprene Gloves.
- Disposable Lab Coat and Corrosive Apron.
- Plastic Vinyl Booties.
- Dust Mask/Respirator.

2.3.4.3 Chemical Protective Clothing

Chemical Protective Clothing (CPC) is available in a variety of materials that offer a range of protection against different chemicals. The most appropriate clothing material will depend on the chemicals present and the task to be accomplished. Ideally, the chosen material resists permeation, degradation, and penetration. Permeation is the process by which a chemical dissolves in and/or moves through a protective clothing material on a molecular level. Degradation is the loss or change in the fabric's chemical resistance or physical properties due to exposure to chemicals or ambient conditions (e.g., sunlight). Penetration is the movement of chemicals through zippers, stitched seams or imperfections (e.g., pinholes) in a protective clothing material.

Selection of chemical-protective clothing is a complex task and should be performed by personnel with training and experience. Under all conditions, clothing is selected by evaluating the performance characteristics of the clothing against the requirements and limitations of the site and task specific conditions. If possible, representative garments should be inspected before purchase and their use and performance discussed with someone who has experience with the clothing under consideration. In all cases, the employer is responsible for ensuring that the personal protective clothing (and all PPE) necessary to protect employees from injury or illness that may result from exposure to hazards at the work site is adequate and are of safe design and fabrication for the work to be performed.

2.3.4.4 Chemical Spill Response Procedures

In the event of chemical spill, response teams depend on risks involving the release of a type or quantity of a chemical, i.e., immediate risk to health and involve chemical contamination to the body:

- Notify the personnel in the neighbouring accident area.
- Alert people in immediate area of the spill.
- Determine the chemical nature of the spill and check the Met sheet.
- Isolate the area, and evacuate the people immediately(if necessary depends on risk)
- Keep away ignition sources and disconnect power.
- Use a fire extinguisher to extinguish any flames if applicable.
- Choose appropriate personal protective equipment (goggles, face shield, impervious gloves, lab coat, apron, etc.)
- Confine and contain spill. Cover with appropriate absorbent material. If the absorbent material is acid or base it should be neutralized prior to cleanup.

If you are asked to evacuate

- Do so immediately
- Stay tuned to a radio or television for information on evacuation, temporary shelters and procedures.
- Follow the routes recommended by the authorities shorten & safe
- If you have time minimize the contamination in the house by closing windows and all vents and turning of all fans
- Take core pre assembled disaster supplies supplier.

Table 2.18: List of Oil Spills

S.No.	Spill / Vessel	Location	Dates	Min Tonnes	Max Tonnes
1.	Erika	France, Bay of Biscay	12 December 1999	15,000	25,000
2.	2001 Shell Ogbodo oil spill	Nigeria	25 June 2001	9,500	Unknown
3.	Limburg (bombing)	Yemen, Gulf of Aden	6 October 2002	12,200	12,200
4.	Prestige oil spill	Spain, Galicia	13 November 2002	63,000	63,000
5.	Tasman Spirit	Pakistan, Karachi	28 July 2003	28,000	30,000
6.	Bass Enterprises (Hurricane Katrina)	United States, Cox Bay, Louisiana	30 August 2005	12,000	12,000
7.	Jiyeh power station oil spill	Lebanon	14 July 2006 – 15 July 2006	20,000	30,000
8.	2007 Korea oil spill	South Korea, Yellow Sea	7 December 2007	10,800	10,800
9.	Deepwater Horizon	United States, Gulf of Mexico	20 April 2010 – 15 July 2010	492,000	627,000
10.	Xingang Port oil spill	China, Yellow Sea	16 July 2010 – 21 July 2010	1,500	90,000

Table 2.19: Emergecy Response Measures for Oil Spills/Chemical Spills

S. No	Cargo	Max. Parcel size	Estimated Quantity of Spill (T)		Estimated area of Spill (Maximum) (ha)		Spill Control measures (On-land)	Spill Control measures (On-water)	Remarks
			Min.	Max.	On-land	On-water			
1	Ammonia	10,000	59	163	1.26	–	Gas detection for NH_3 --Leak detection --Leak sealing plug rugs / leak seal --Use of surfactant foams for suppression of vapors --Mechanical covers (PP or HDPE) --Flooding with water and neutralize with dilute HCL --Collection by drain or dykes into storage drums or tanks --Recovery / treatment of collected material --Final cleaning by water	Gas detection for NH_3 --Leak detection --Leak sealing plug rugs / leak seal --Use of surfactant foams for suppression of vapors --Isopropyl alcohol spray to prevent vapours --Mixing/ agitation of water media for further dilution	Ensure the clean up below 300 ppm level --Use water and neutralize with HCL --Induced air movement to dilute the vapours --Prevent people entry --Enforce respirators --Monitor by gas sensors --Prevent people and exposures

S. No	Cargo	Max. Parcel size	Estimated Quantity of Spill (T)		Estimated area of Spill (Maximum) (ha)		Spill Control measures (On-land)	Spill Control measures (On-water)	Remarks
			Min.	Max.	On-land	On-water			
2	Crude	1,40,372	738	2218	6.9	12.3	Control of ignition sources –Temporary plugging or patching –Stop oil collection by drains / dykes / pipeline and storage in drums / under ground tanks	Use of floating or mobile skimmers --Water jet application to divert the slick towards skimmer/dykes --Application of sorbents such as alkali saw dust / treated cellulose --Use of biodegradable bacteria / consortium	Incase of fire use CO_2 blanketing Use of clean up kits on land –Use of floating or mobile skimmers on water
3	Naptha	31476 6462	178 37	536 110	0.67	1.23	Use of vapor suppression foams Fluoro protein and surfactant –Floor clean up by adsorbents and incineration of wastes	Collection by mechanical booms or skimming / vacuum application Diversion of slick by water jets --Application of sorbents and skimmers	Prevent fires and control ignition sources –Control of oxidizing substances such as HNO_3 and perchlorates to prevent reactivity
4	MS ATF	30,724 30,094	275 269	823 807	0.43 ha	0.81 ha	Induced air movement by mechanical means to maintain vapors below LFL	Use of vapor supression foams Flouro protein and surfactant	Prevent fires and control ignition sources
5	Kerosene	30,000	226	682	0.82 ha	1.5 ha	Floor clean up by adsorbents and incineration of wastes	Diversion of slick by water jets	Use of floating or mobile or vacuum skimmers on water
6	Diesel	21,169	85	254	1.13	2.05	Stop oil collection by drains / dykes / pipeline and storage in drums / under ground tanks	Water jet application to move the slick towards skimmers / dykes	Foam blanketing for vapors

S. No	Cargo	Max. Parcel size	Estimated Quantity of Spill (T)		Estimated area of Spill (Maximum) (ha)		Spill Control measures (On-land)	Spill Control measures (On-water)	Remarks
			Min.	Max.	On-land	On-water			
7	Fuel oil	34,604	42	125	0.08	0.15 ha	Leak sealing –Flooding with water	Use adsorbents and nutrients (biological) enrichment	Incase of fire use CO_2 blanketing
8	Ethyl alcohol / Ethyl hexanol / N - Butanol	4,000	110	330	0.4	—	Containment by dykes and berms –Collection by drains and drums – Recovery by distillation / destruction of wastes by incineration	Use of vapor suppression foams such as alcohol resistant, Fluoro proteins and surfactant foams	Prevent strong oxidizers –Enforce personnel protection –Cordon off the clean up area
9	Styrene Monomer	8,446	125	376	1.5	2.77	Use of sand bags, inflatable berms for containment –Collection by drums and tankers and recovery by distillation	Use of proprietary foaming agent and mechanical covers --Use of mechanical booms, rubber blades, mobile / floating / vacuum skimmers	Control of all forms of heat sources for preventing polymerization –Use of redox emulsion polymerization procedure for clean up
10	Causic Lye	16,289	435	1303	1.5 ha	—	Dykes for containment –High dilution and neutralize with HCL –Collecton through drains and special pumps into rubber lined tanks or PVC drums –Prevent people and reaction with halides and metals –Flooding with cold water and collect the material for recovery	Use of barriers with selective membrane coating / coffer dams --Nutralize with HCL --Remove the contaminated water to PVC drums or rubber lined tankers --Low pressure cold water flooding	Control of reactions with halides and metals –Enforce personnel protective clothing –Physical barriers for the clean up necessary
11	Mono ethylene glycol	2,000 T	67	200	0.24 ha	0.45 ha	Use of mechanical covers –Control of ignition sources	Use of mechanical /sorbent booms, high pressure barriers	Use mobile / floating booms –Prevent strong oxidizers

S. No	Cargo	Max. Parcel size	Estimated Quantity of Spill (T)		Estimated area of Spill (Maximum) (ha)		Spill Control measures (On-land)	Spill Control measures (On-water)	Remarks
			Min.	Max.	On-land	On-water			
12	Alumina powder	36,600	384	1150	local	local	Dust control systems –Collection by suction and removel –Avoid use of water	Prevent dust falling on water --Enforce respirator use by personnel	In contact with water procedures H_2 gas and in turn cause fire
13	Methanol	9,072	303	907	0.4 ha	—	Containment by dykes and berms –Collection by drains and drums –Recovery by distillation / destruction of wastes by incineration	Use of vapor suppression foams such as alcohol resistant, Fluoro proteins and surfactant foams	Prevent strong oxidizers –Enforce personnel protection –Cordon off the clean up area
14	Sulpher (Molten)	10,000	83	250	local	local	Prevent people –Enforce respirator use by personnel and personnel protection clothing and gloves	Prevent spills on water --Control ignition sources and fires	Enforce personnel protection and respirators
15	Sulphuric acid	18,844	31	94	0.08	–	Dykes for contaminant, high dilution and neutralise with alkalies.And Dispose of netralised liquids down the drain. Keep unnecessary people away, isolate hazard area, self contained breathing apparatus and protective clothes for	Use of selective membrane coating/ copper dams. Neutralise with alkalis and remove contaminated water to PVC Drums.	Incompatible with alkali (Strong caustic) and metals. Viloent reaction with sodium tetra hydrochloride. For severe inhalation use proper respiratory protection and evacuate effected people.
16	phosphoric acid	10,000	17	50	0.1	–	-do-	-do-	-do-

Table 2.20: Oil Spill Response Plan

Plan Guidelines:

1. Introduction: I. Authorities & responsibilities Committee 2. Statutory requirement, relevant agreements. 3. Dimensions of plans 4 .Interfaces with other plans	6. Communication & Control I. Incident control room & facilities 2. Field communications and equipment 3. Reports, manuals, maps, charts and incident logs
2. Oil Spill Risks I. Identification of activities and risks 2. Types of oil likely to be spilled 3. Probable fate of spilled oil 4. Development of oil spill scenarios 5. Shoreline resources protection priorities 6. Shoreline sensitivity mapping 7. Special local considerations	7. Actions & operations - Initial procedure: I. Reporting incident preliminary estimate of emergency 2. Notifying key team members/authorities 3. Establishing and staffing control room 4. Collecting information - oil type, sea/wind forecasts, aerial. surveillance, beach report 5. Estimating fate of slice 24h-48h-72h 6. Identifying resources at risk inform parties immediately. . 7. Deciding whether to escalate response
3.Spill Response Strategies I. Philosophy and objectives 2. Limiting and adverse conditions 3. Strategy for sea zones 4. Strategy for coastal zones 5. Strategy for shoreline zones 6. Strategy for oil waste storage & disposal	8. Operations Planning & Mobilization I. Assembling full response team 2. Identifying immediate response priorities 3. Mobilising immediate response 4. Preparing initial press statement 5. Planning medium term operations-24h-28h-72h 6. Mobilising/ placing on standby resources 7.Establishing field command post and communications.
4. Equipment. Supplies & Service I. Primary oil spill equipment 2. Inspection maintenance arid testing 3. Auxiliary equipment, supplies and services. 4. Support equipment, supplies and service	9. Control Operations: 1. Establishing a managerial team with experts 2. Updating weather information as in 7.4 3. Reviewing and planning operations 4. Obtaining additional equipment, supplies and manpower 5. Preparing daily incident log & management report 6. Preparing operations accounts and financing reports 7. Preparing releases for public & press conferences 8. Brief local and Govt. officials
5.Manaeement-manpower &training I. Crisis manager & financial authorities 2. Incident organization chart 3. Manpower availability-on site/ on call 4. Availability of additional labour. 5. Advisors and consultants 6.Training,safety schedules and emergency exercises	10. Termination of operations 1. Deciding final and optimal levels of beach clean-up 2. Standing down equipment, cleaning, maintenance and replacement 3. Preparing formal detailed report 4 .Reviewing plans and procedures

Table 2.21: Available Resources for Combating Oil Spills

Organization	Equipment Type	Size	Location	Supply Delay	Cost	Contact Tel/Mob
Port Trust	Rigid Boom w/crew	450m	Oil wharf Marine com.	--	--	--
	Inflatable type					
Coast Guard	Boom	200m	Vizag	1 hr.		568875/79
Coast Guard	Skimmer					
Port Trust	Dispersant	1000 L	MF			
Coast Guard	Dispersant	800 L	Vizag	1 hr.		
Port Trust	Spray units					
Coast Guard	Spray units		Vizag			
Port Trust	Absorbent pads					
Coast Guard	Absorbent		Vizag			
Port Trust	Plastic bags					
Port Trust	Disposal truck	1x10t	FS			
Port Trust	VHF-Radio	2 units	FS			
Coast Guard	VHF-Radio	2 units	Vizag			
Port Trust	Tugs	1 No.	MF			
Port Trust	Launch/workboat	1	MF			
Port Trust	Protective clothing		FS			
Coast Guard	Survl aircraft	Donier	Chennai	2/3 hrs.		
	Aircraft fuel					
	Portable	1	Vizag	1 hr.		
	Floodlights					

Table 2.22: Pollution Control Equipment with VPT - Oil Pollution

S. No	Equipment	Quantity
1	Oil Recovery and Pollution Control Vessel	300m Pl boom
2	Dispersant chemicals	1000 Ltr
3	Rigid Type Oil Booms	500 m
4	Masonry Tank to store the oily water(cap 100 m^3)	1 No
5	Hired Launch for collecting Floating debris & Oil slicks	1 No
6	Absorbent Materials(waste Cotton Rags)	12 Bags
7	Buckets Non-sparking(15 ltrs capacity)	4 Nos
8	Scoops	8 Nos
9	Portable Sprayers	4 Nos
10	Moping/Oil absorb pads	48 Nos
11	Protective Clothing(Body Glove System/Rubberized Hand)	4 Sets
12	Saw Dust	6 Bags

Pollution Control Equipment under process of procurement

I. Port Proposes to procure additional equipment for Tier I spill as per MOU with Oil companies

Table 2.23: Chemical spill

Description	Sulphuric acid	Phosphoric acid	Caustic soda	Alumina	Ammonia	Ammonium Nitrate	Styrene monomer
Storage	Separated from combustible and reducing substances, strong oxidants, strong bases, food and feedstuffs incompatible materials. Store in stainless steel containers. Store in an area having corrosion resistant concrete floor	Separated from food and feedstuffs Dry. Well closed.	Separated from strong acids, metals food and feedstuffs Dry. Well closed. Store in an area having corrosion resistant concrete floor.	Separated from Class 5.1 : acids, alkalis, iron oxides. Keep as dry as reasonably possible from liquid halogenated hydrocarbons.	Fire proof. Separated from oxidants, acids, halogens. Cool. Keep in a well-ventilated room.	Provision to contain effluent from fire extinguishing. Separated from combustible and reducing substances.	Fireproof. Separated from incompatible materials. Cool. Keep in the dark. Store only if stabilized.
Spillage disposal	Consult an expert and evacuate danger area. Do not absorb in saw-dust or other combustible absorbents. Complete protective clothing including self-contained breathing apparatus. Do not let this chemical enter the environment.	Sweep spilled substance into covered containers. Carefully collect remainder, then remove to safe place. Chemical protection suit including self-contained breathing apparatus.	Sweep spilled substance into suitable containers. Wash away remainder with plenty of water. Complete protective clothing including self-contained breathing apparatus	Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Wash away remainder with plenty of water. P1 filter respirator for inert particles.	Evacuate danger area and consult an expert. Ventilation. Never direct water jet on liquid. Remove gas with fine water spray. Gas-tight chemical protection suit including self-contained breathing apparatus.	Evacuate danger area and consult an expert. Sweep spilled substance into non-combustible containers. Wash away remainder with plenty of water.	Ventilation. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do not wash away into sewer. Do not let this chemical enter the environment. Self-contained breathing apparatus.
Chemical Dangers	Strong oxidant and reacts violently with combustible and reducing materials. Strong acid, it reacts violently with bases and is	Violently polymerizes under the influence of azo compounds and epoxides. On combustion, forms toxic fumes phosphorous oxides. Decomposes on contact with alcohols,	Strong base, it reacts violently with acid and is corrosive in moist air to metals like zinc, aluminum, tin and lead forming a combustible/explosi ve gas (hydrogen).	It posses the property of evolving hydrogen gas when it contacting with sea water and reacts readily with acids and	Shock-sensitive compounds are formed with mercury, silver and gold oxides. The substance is a strong base, it reacts violently with acid and is	Heating may cause violent combustion or explosion. The substance decomposes on heating or producing toxic fumes nitrogen	The substance can form explosive peroxides. The substance may polymerize due to warming, under the influence of light and on contact with many compounds

Contd…

Description	Sulphuric acid	Phosphoric acid	Caustic soda	Alumina	Ammonia	Ammonium Nitrate	Styrene monomer
	corrosive to most common metals forming a flammable/explosive gas (hydrogen). Reacts violently with water and organic materials with evolution of heat. Upon heating, irritating or toxic fumes or gases (sulfur oxides) are formed.	aldehydes, cyanides, ketones, phenols, esters, sulfides, halogenated organics producing toxic fumes Attacks many metals forming flammable/explosive gas (hydrogen). Medium strong acid. Reacts violently with bases	Reacts with to produce ammonia causing fire hazard. Attacks some forms of plastics, rubber or coatings. Rapidly absorbs carbon dioxide and water from air. Contact with moisture or water may generate heat	caustic alkalies.	corrosive. Reacts violently with strong oxidants and halogens. Attacks copper, aluminum, zinc and their alloys. Dissolves in water evolving heat.	oxides The substance is a strong oxidant and reacts with combustible and reducing materials.	such as oxygen, oxidizing agents, peroxides and strong acids with fire or explosion hazard. The substance decomposes on burning producing toxic fumes, styrene oxide. Attacks copper and copper alloys.
Incompatibili-ties and reactivities	Organic materials, chlorates, carbides, fulminates, water, powdered metals [Note: Reacts violently with water with evolution of heat. Corrosive to metals.]	Strong caustics, most metals [Note: Readily reacts with metals to form flammable hydrogen gas. Do not mix with solutions containing bleach or ammonia.]	Water; acids; flammable liquids; organic halogens; metals such as aluminum, tin & zinc; nitromethane [Note: Corrosive to metals.]	Chlorine trifluoride, hot chlorinated rubber, acids, oxidizers [Note: Hydrogen gas may be formed when finely divided iron contacts moisture during crushing & milling]	Strong oxidizers, acids, halogens, salts of silver & zinc [Note: Corrosive to copper & galvanized surfaces.]	Incompatible with Class 4.1: Chlorides, bromides, fluorides, hypo chlorates, nitrites, perchlorates, permanganates and powdered metals	Oxidizers, catalysts for vinyl polymers, peroxides, strong acids, aluminum chloride [Note: May polymerize if contaminated or subjected to heat. Usually contains an inhibitor such as tert-butyl alcohol.
Personal protection & sanitation	Skin - Prevent skin contact; Eyes - Prevent eye contact; Wash skin - When contaminated; Remove - When wet or contaminated; Provide - Eyewash (>1%), Quick drench (>1%)	Skin - Prevent skin contact; Eyes - Prevent eye contact; Wash skin - When contaminated; Remove: When wet or contaminated; Change – Daily; Provide - Eyewash (>1.6%), Quick drench (>1.6%)	Skin - Prevent skin contact; Eyes - Prevent eye contact; Wash skin - When contaminated; Remove - When wet or contaminated; Change – Daily; Provide - Eyewash, Quick drench	Skin - Prevent skin contact; Eyes - Prevent eye contact; Wash skin - When contaminated; Remove - When wet or contaminated; Change – Daily; Provide - Eyewash, Quick drench	Skin - Prevent skin contact; Eyes - Prevent eye contact; Wash skin - When contaminated (solution); Remove - When wet or contaminated (solution); Provide - Eyewash (>10%), Quick drench (>10%)	Skin - Prevent skin contact; Eyes - Prevent eye contact; Wash skin - When contaminated; Remove - When wet or contaminated; Change – Daily; Provide - Eyewash, Quick drench	Skin - Prevent skin contact; Eyes - Prevent eye contact; Wash skin - When contaminated; Remove - When wet (flammable)

Contd…

ANNEXURE – 8

ANNEXURE-A

Environment Impacts matrix sheet for Modernization and Expansion projects of VPT

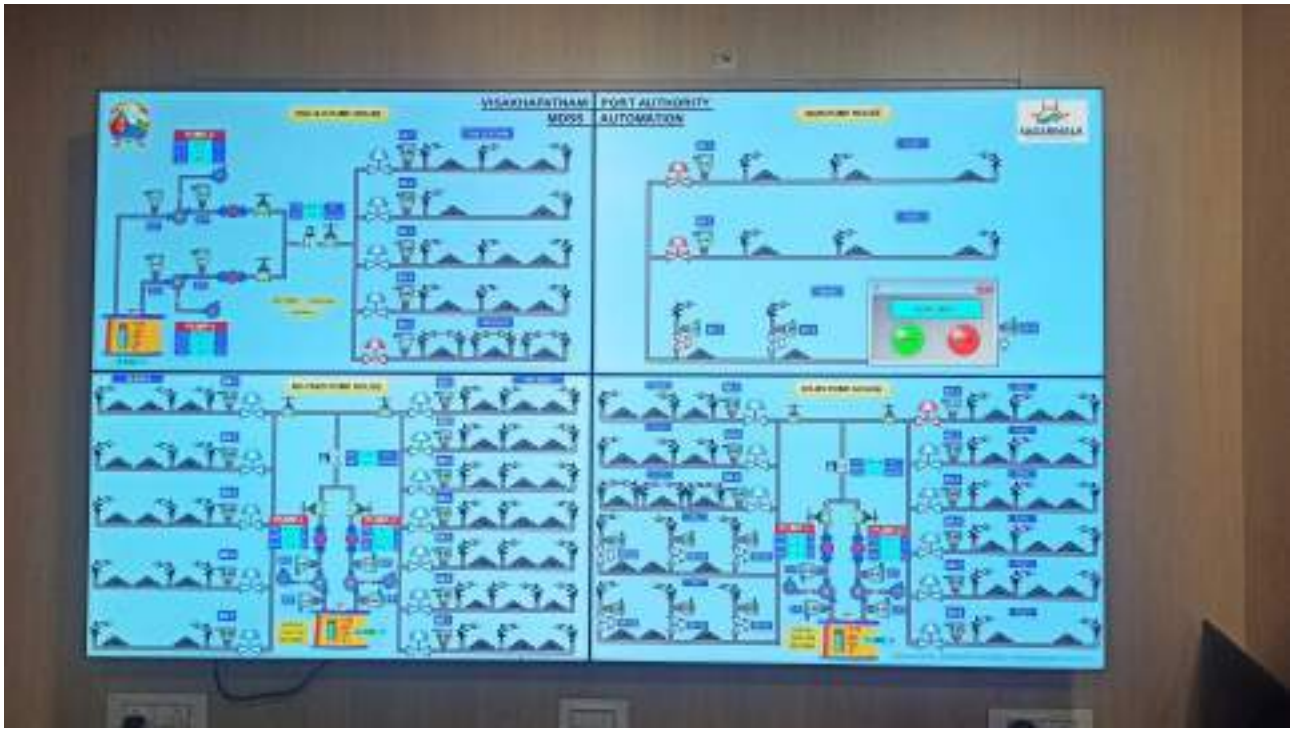
	Environment components					Action plan	Present Status
Phase	**Air**	**Noise**	**Water**	**Land**	**Socio Economic Environment**		
Construction							
Impacts due to quarrying operation	-NA-	-NA-	-NA-	-NA-	-NA-	Construction material shall be obtained only from Approved mines.	**Construction Phase of Project is Completed.**
Impacts due to effluents from labour camps	-NA-	-NA-	-NA-	-NA-	-NA-	The sewage generated from construction sites and labor camps shall be disposed into inland drainage system.	
Impacts due to Dredging	-NA-	-NA-	-NA-	-NA-	-NA-	The increase in turbidity levels of marine water at the project site due to sediments is a temporary, as there are no sensitive species located in the site there are no significant impacts.	
Impacts due to operation of construction equipment	-NA-	-NA-	-NA-	-NA-	-NA-	The mufflers shall be used and modifications in the engines as per requirement shall be carried out for minimizing the noise levels.	
Impacts due to transportation of construction materials	-NA-	-NA-	-NA-	-NA-	-NA-	Vehicles having RTA pollution levels testing certificate only shall be deployed for material movement.	
Operation							
Cargo handling operations	-ve	-ve	-ve	-ve	+ve	A standard and well-structured EMS is in place for combating environment pollution effectively.	As per EMP the Visakhapatnam Port Authority Established Environment Cell with qualified Persons under the supervision of Chief Engineer for strict compliance of Environmental Issues.
Solid waste	-	-	-	-ve	-		
Environmental impact of ship traffic	-ve	-ve	-ve	-	-		

ANNEXURE – 9

VISAKHAPATNAM PORT AUTHORITY
CIVIL ENGINEERING DEPARTMENT

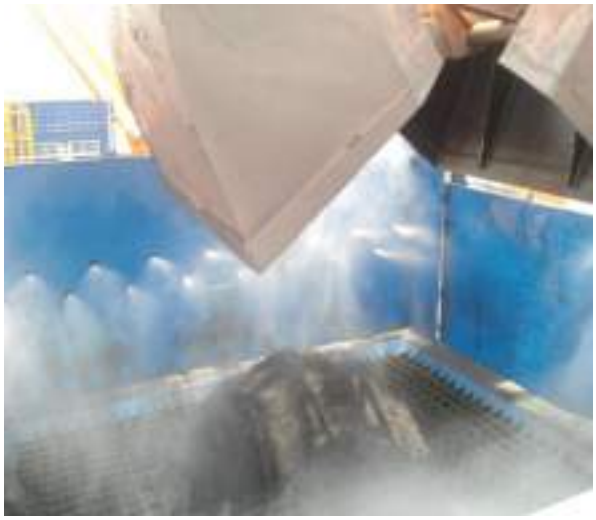
Mechanical Dust Suppression System (MDSS) Details

Mechanical Dust Suppression System		
S. No.	**Location**	**Total no. of Sprinklers**
1	WOB	31
2	S-4	29
3	R-2 to R-5	24
4	TM Road	3
5	WQ-6	6
6	WQ-7 & 8	8
7	Tinna	8
8	Tinna (Opp. Main Pump House)	3
9	NH Yard	22
10	FCI Godown	14
11	L-17	6
12	NMDC	23
13	L-9	20
14	Opp. To T.M. Office	10
15	Opp. To Old Fire Station	11
Total		**218**
PPP/BOT Operators		100
Grand Total		**318**


VISAKHAPATNAM PORT AUTHORITY
MDSS AUTOMATION


L-9
PUMP HOUSE


NH-YARD
PUMP HOUSE



ANNEXURE – 10

Monthly Report of GCB CAAQM Station for April 2024

Date & Time	PM_{10}	$PM_{2.5}$	SO_2	NO	NO_X	NO_2	NH_3	Temp	HR	WS	WD	BP	RG
	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	degree C	%	m/s	degre	mbar	mm
4/1/2024	85.43	47.00	11.69	10.33	11.32	9.25	3.91	32.36	79.89	0.92	258.06	807.24	0.00
4/2/2024	86.47	49.06	12.83	11.14	12.23	10.46	4.02	31.33	85.92	0.91	231.00	806.75	0.00
4/3/2024	88.04	52.77	13.26	11.89	12.65	10.73	4.19	30.88	83.81	1.11	199.16	807.07	0.00
4/4/2024	88.94	41.10	14.62	11.93	13.25	10.67	5.02	32.00	82.78	1.12	248.90	807.52	0.00
4/5/2024	85.93	40.02	12.71	10.93	11.81	10.06	4.02	28.87	85.92	0.91	231.00	806.75	0.00
4/6/2024	86.95	49.57	12.13	11.19	12.41	10.19	3.96	29.31	84.80	0.88	209.96	806.76	0.00
4/7/2024	87.84	45.98	12.45	11.83	12.87	11.00	4.18	29.72	82.85	1.18	245.73	862.54	0.00
4/8/2024	85.06	46.10	12.48	10.38	11.38	9.53	4.34	31.84	82.94	0.86	221.86	806.68	0.00
4/9/2024	84.82	46.17	12.95	11.41	13.08	10.40	3.52	31.69	85.85	1.15	218.69	864.87	0.00
4/10/2024	85.67	47.04	12.65	11.39	12.57	10.21	3.85	31.63	85.37	1.22	219.42	845.48	0.00
4/11/2024	89.16	51.68	12.33	11.24	12.48	10.30	3.33	32.15	83.56	0.89	226.79	807.30	0.00
4/12/2024	85.53	43.68	13.08	11.07	12.28	10.05	3.79	32.77	83.56	0.89	226.79	807.30	0.00
4/13/2024	80.78	40.58	11.10	10.56	11.53	9.27	4.57	32.81	82.55	1.08	240.94	807.01	0.00
4/14/2024	82.54	43.36	12.95	10.41	11.68	9.71	4.17	32.67	84.59	0.99	229.98	820.40	0.00
4/15/2024	84.10	44.01	13.10	11.16	12.36	9.28	4.49	32.02	87.06	0.76	227.10	850.16	0.00
4/16/2024	86.78	48.88	11.76	10.54	11.72	9.49	4.19	31.73	83.77	0.68	243.25	815.58	0.00
4/17/2024	87.42	50.74	12.13	9.87	11.11	9.03	4.20	30.49	88.57	0.51	226.37	906.84	0.00
4/18/2024	87.53	50.69	10.35	6.56	9.31	8.02	4.12	30.79	90.56	0.51	230.58	806.69	0.00
4/19/2024	85.95	43.62	13.79	7.05	12.09	7.37	5.80	31.84	85.96	1.10	205.76	747.72	0.00
4/20/2024	87.86	46.11	10.58	9.80	10.84	8.47	4.52	32.39	82.97	1.01	223.54	827.38	0.00
4/21/2024	84.21	44.15	10.99	8.99	9.95	7.91	4.27	33.59	82.85	1.18	245.73	862.54	0.00
4/22/2024	82.83	43.28	10.90	9.19	10.11	8.04	4.27	32.35	85.02	0.98	214.30	840.75	0.00
4/23/2024	83.50	45.09	11.79	8.81	9.78	7.94	4.34	32.02	88.00	0.88	234.69	828.26	0.00
4/24/2024	84.79	47.73	12.93	10.53	11.61	9.56	3.67	33.15	80.56	1.11	237.71	807.05	0.00
4/25/2024	85.76	51.85	12.42	9.34	11.15	8.36	4.21	32.15	84.52	0.98	219.26	842.92	0.00
4/26/2024	83.39	53.55	11.46	9.35	10.46	8.59	4.22	33.25	79.97	1.17	205.70	807.20	0.00
4/27/2024	82.73	51.09	11.09	9.36	10.37	8.24	4.12	30.98	81.91	1.11	210.36	807.00	0.00
4/28/2024	84.11	52.71	14.03	11.16	12.33	10.07	3.89	31.69	85.85	1.15	218.69	864.87	0.00
4/29/2024	86.10	48.28	10.38	9.47	10.72	8.86	3.78	31.45	88.65	0.51	224.83	903.68	0.00
4/30/2024	85.39	45.98	10.90	9.22	10.13	8.44	4.42	32.43	82.94	0.86	221.86	806.68	0.00

Minimum /result	**80.78**	**40.02**	**10.35**	**6.56**	**9.31**	**7.37**	**3.33**	**28.87**	**79.89**	**0.51**	**199.16**	**747.72**	**0.00**
Maximum /result	**89.16**	**53.55**	**14.62**	**11.93**	**13.25**	**11.00**	**5.80**	**33.59**	**90.56**	**1.22**	**258.06**	**906.84**	**0.00**
Average/result	**85.52**	**47.06**	**12.19**	**10.20**	**11.52**	**9.32**	**4.18**	**31.75**	**84.45**	**0.95**	**226.60**	**826.30**	**0.00**

Monthly Report of GVMC CAAQM Station for April 2024														
Date & Time	PM_{10}	$PM_{2.5}$	SO_2	NO	NO_X	NO_2	NH_3	Temp	HR	WS	WD	BP	RS	RG
	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	degreC	%	m/s	degree	mbar	W/m^2	mm
4/1/2024	83.53	49.57	11.46	8.19	9.97	1.61	4.86	31.00	67.83	3.55	238.40	807	325.83	0.00
4/2/2024	85.10	50.15	10.28	8.29	10.00	1.47	4.58	30.18	73.08	3.77	220.69	822	290.86	0.00
4/3/2024	83.37	49.47	9.83	8.14	9.68	1.57	3.35	28.03	77.82	3.09	236.13	807	277.70	0.00
4/4/2024	83.46	49.18	10.53	8.44	10.19	1.49	1.64	26.32	84.29	3.11	221.10	800	291.43	0.00
4/5/2024	86.52	53.53	10.96	8.33	9.98	1.55	4.25	30.73	78.83	3.28	228.40	885	290.12	0.00
4/6/2024	87.48	54.12	11.79	8.40	10.25	1.78	4.35	30.1	78.90	4.46	225.91	779	278.84	0.00
4/7/2024	84.32	52.17	10.31	8.52	10.39	1.81	4.57	30.7	76.38	4.10	222.79	841	287.38	0.00
4/8/2024	80.49	49.80	10.92	7.59	9.26	1.61	3.91	26.4	74.85	3.31	202.91	840	286.85	0.00
4/9/2024	86.13	53.29	10.85	8.52	10.40	1.81	4.71	30.8	78.99	4.08	215.92	820	289.66	0.00
4/10/2024	83.44	51.62	10.79	8.45	10.30	1.79	4.84	30.7	70.91	4.98	228.64	860	291.00	0.00
4/11/2024	84.82	52.48	11.04	8.89	10.84	1.88	5.84	28.56	75.70	4.41	225.73	808	325.50	0.00
4/12/2024	85.99	53.20	10.87	9.03	11.01	1.91	5.82	29.27	73.18	4.52	234.31	885	327.91	0.00
4/13/2024	84.24	49.33	10.20	8.22	9.77	1.59	5.32	29.13	67.74	4.34	217.38	1017	306.22	0.00
4/14/2024	84.78	50.76	10.44	8.55	10.29	1.59	5.33	26.99	73.89	3.27	223.41	1016	304.07	0.00
4/15/2024	83.17	51.46	9.29	6.88	8.39	1.46	5.41	27.21	72.28	3.65	225.41	1015	248.72	0.00
4/16/2024	83.16	48.70	10.29	8.74	10.43	1.69	5.65	29.13	67.74	3.67	234.04	1017	306.22	0.00
4/17/2024	88.28	52.20	9.77	8.67	10.31	1.47	3.96	27.87	72.05	3.74	255.98	1017	300.68	0.00
4/18/2024	84.42	50.54	11.06	8.69	10.46	1.62	5.33	27.0	73.89	4.52	220.08	1016	70.13	0.00
4/19/2024	84.88	52.51	11.09	8.72	10.64	1.85	4.78	30.5	76.20	3.54	218.19	827	284.29	0.00
4/20/2024	83.63	51.74	10.42	7.79	9.50	1.65	1.07	30.48	97.21	4.91	214.65	882	291.43	0.42
4/21/2024	83.07	51.40	11.12	6.94	8.47	1.47	3.91	30.40	74.85	3.31	225.41	840	286.85	0.00
4/22/2024	86.33	53.41	10.62	8.66	10.56	1.84	4.77	30.3	77.59	4.96	257.65	823	288.08	0.00
4/23/2024	84.95	52.56	10.65	7.56	9.22	1.60	4.93	30.9	76.77	4.70	214.84	802	287.50	0.00
4/24/2024	83.05	51.38	10.85	8.52	10.40	1.81	4.71	30.8	78.99	4.08	218.17	820	289.66	0.00
4/25/2024	83.97	51.95	9.72	8.32	10.14	1.76	4.48	30.46	78.69	3.93	231.52	802	290.00	0.00
4/26/2024	85.12	52.66	11.93	8.37	10.21	1.77	4.75	30.9	76.22	4.30	206.63	795	295.19	0.00
4/27/2024	85.27	52.76	11.59	8.06	9.83	1.71	5.20	30.74	73.44	4.04	167.39	843	302.85	0.00
4/28/2024	81.91	50.68	10.25	8.12	9.90	1.72	5.61	30.78	75.22	4.76	214.21	831	292.13	0.00
4/29/2024	84.37	52.20	10.33	9.09	11.09	1.93	4.84	30.66	70.91	4.98	174.05	860	291.00	0.00
4/30/2024	81.38	50.35	10.54	9.03	11.01	1.91	5.82	28.69	73.18	4.69	205.37	885	327.91	0.00

Minimum	**80.49**	**48.70**	**9.29**	**6.88**	**8.39**	**1.46**	**1.07**	**26.32**	**67.74**	**3.09**	**167.39**	**779**	**70.13**	**0.00**
Maximum	**88.28**	**54.12**	**11.93**	**9.09**	**11.09**	**1.93**	**5.84**	**31.00**	**97.21**	**4.98**	**257.65**	**1017**	**327.91**	**0.42**
Average	**84.35**	**51.51**	**10.66**	**8.32**	**10.10**	**1.69**	**4.62**	**29.52**	**75.59**	**4.07**	**220.84**	**869**	**287.53**	**0.01**

Monthly Report of R & D Yard CAAQM Station for April 2024														
Date & Time	PM_{10}	$PM_{2.5}$	SO_2	NO	NO_X	NO_2	NH_3	Temp	HR	WS	WD	BP	RS	RG
	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	degree C	%	m/s	degre	mbar	W/m^2	mm
4/1/2024	82.28	47.66	6.15	7.45	8.92	4.69	5.20	31.53	65.30	8.09	221.04	906.38	277.76	0.00
4/2/2024	85.25	49.55	6.38	7.70	9.22	5.29	5.33	31.87	63.96	8.42	80.50	854.02	290.86	0.00
4/3/2024	86.59	50.77	6.72	7.99	9.56	5.38	5.67	32.21	60.62	8.55	232.26	800.62	291.43	0.00
4/4/2024	81.27	47.07	6.40	7.62	9.34	5.27	5.45	31.94	60.40	8.33	205.40	820.23	290.12	0.00
4/5/2024	83.11	48.98	6.54	7.75	9.20	5.36	5.45	31.41	59.87	8.10	80.94	843.15	296.27	0.00
4/6/2024	85.54	49.80	6.77	7.68	9.43	5.50	5.58	31.74	60.20	8.23	123.57	802.55	289.17	0.00
4/7/2024	87.08	50.78	7.01	8.03	9.66	5.53	5.82	31.31	63.63	7.80	185.36	822.49	268.45	0.00
4/8/2024	85.73	49.99	6.76	7.68	9.42	5.31	5.57	30.06	62.39	7.75	190.50	842.20	287.38	0.00
4/9/2024	86.96	50.34	7.00	7.96	9.65	549.35	5.80	30.90	59.56	7.52	173.05	824.75	293.37	0.00
4/10/2024	81.53	47.47	6.86	7.87	9.42	5.51	5.57	30.66	59.32	7.29	220.81	853.78	293.03	0.00
4/11/2024	77.88	45.45	6.52	7.42	8.87	5.81	5.12	31.01	59.67	7.63	218.06	863.86	293.03	0.00
4/12/2024	82.62	48.16	6.75	7.42	9.10	5.60	5.46	31.34	62.00	6.10	216.00	880.54	290.87	0.00
4/13/2024	86.38	50.01	6.91	7.38	8.94	5.27	5.29	31.17	61.84	5.94	211.81	856.63	290.86	0.00
4/14/2024	80.15	46.79	6.08	6.61	8.11	4.82	4.46	31.41	61.40	6.07	212.22	769.09	293.39	0.00
4/15/2024	76.50	44.32	5.24	6.08	7.46	4.40	3.81	30.76	60.76	7.05	230.04	795.58	288.82	0.00
4/16/2024	87.84	51.50	6.57	7.43	8.99	5.26	5.35	32.27	63.30	7.79	144.11	823.09	289.61	0.00
4/17/2024	83.09	48.90	6.32	7.98	9.54	5.48	5.49	32.45	63.45	7.90	198.50	829.06	287.53	0.00
4/18/2024	86.43	50.59	6.97	7.34	8.90	5.31	4.84	33.09	62.60	7.97	194.97	883.38	293.06	0.00
4/19/2024	77.23	45.20	7.13	7.47	9.06	5.41	5.00	32.93	62.14	7.51	156.59	840.18	293.23	0.00
4/20/2024	86.19	50.45	6.86	7.86	9.53	5.69	5.16	32.46	61.67	7.04	192.75	749.62	281.98	0.42
4/21/2024	75.08	43.73	7.97	8.67	10.64	6.58	6.28	32.78	60.96	6.32	211.50	768.37	290.75	0.00
4/22/2024	72.53	42.24	8.52	9.11	11.19	6.91	6.83	33.32	60.41	6.50	215.45	879.99	291.12	0.00
4/23/2024	78.17	45.53	7.88	8.59	10.55	6.52	6.39	32.89	59.98	5.80	179.83	825.04	287.39	0.00
4/24/2024	81.81	47.40	7.54	8.02	10.21	6.06	6.05	32.54	61.32	4.46	155.24	772.96	293.58	0.00
4/25/2024	85.38	49.47	8.20	8.54	10.87	6.45	6.41	32.18	60.96	4.82	224.11	804.33	287.84	0.00
4/26/2024	87.20	50.86	7.38	8.39	10.05	6.30	5.99	31.95	62.28	5.14	169.43	856.67	287.30	0.00
4/27/2024	81.97	47.33	7.14	7.89	9.71	6.17	5.65	31.62	64.62	6.66	218.84	769.95	292.82	0.00
4/28/2024	76.83	44.51	6.91	7.83	9.48	5.94	5.89	31.38	65.05	6.64	232.26	800.62	291.43	0.00
4/29/2024	81.47	47.20	8.17	8.45	10.24	6.41	5.65	32.14	61.59	6.76	194.18	800.48	291.43	0.00
4/30/2024	77.61	44.97	7.77	8.11	10.33	6.13	4.80	32.40	64.87	5.40	237.37	779.27	278.84	0.00

Minimum /result	**72.53**	**42.24**	**5.24**	**6.08**	**7.46**	**4.40**	**3.81**	**30.06**	**59.32**	**4.46**	**80.50**	**749.62**	**268.45**	**0.00**
Maximum /result	**87.84**	**51.50**	**8.52**	**9.11**	**11.19**	**549.35**	**6.83**	**33.32**	**65.30**	**8.55**	**237.37**	**906.38**	**296.27**	**0.42**
Average/result	**82.26**	**47.90**	**6.98**	**7.81**	**9.52**	**23.79**	**5.51**	**31.86**	**61.87**	**6.99**	**190.89**	**823.96**	**289.09**	**0.01**

Monthly Report of R & D Yard CAAQM Station for May 2024

Date & Time	PM_{10}	$PM_{2.5}$	SO_2	NO	NO_X	NO_2	NH_3	Temp	HR	WS	WD	BP	RS	RG
	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	degree C	%	m/s	degre	mbar	W/m^2	mm
01-05-2024	87.44	51.18	7.92	8.54	10.48	6.24	4.95	32.55	62.72	6.17	176.35	860.19	287.54	0.00
02-05-2024	83.21	48.44	7.18	7.87	9.55	5.58	5.18	32.78	63.96	7.41	162.06	838.96	287.31	0.00
03-05-2024	79.36	46.21	6.84	7.23	9.21	5.47	4.84	32.44	65.30	7.75	205.69	889.53	295.75	0.00
04-05-2024	77.41	45.39	7.29	7.63	9.73	7.07	4.09	32.09	65.65	7.07	218.28	808.31	295.30	0.00
05-05-2024	76.65	44.33	5.51	6.93	8.29	4.72	4.86	31.00	67.83	5.55	218.51	806.93	295.41	0.00
06-05-2024	70.27	54.02	6.83	8.54	8.94	6.45	5.30	30.74	69.73	6.27	224.11	804.33	287.84	0.47
07-05-2024	39.31	22.57	3.99	3.53	4.33	3.14	2.69	27.69	75.05	8.47	193.88	814.56	272.97	0.33
08-05-2024	45.73	26.58	5.42	5.09	6.25	4.46	4.01	28.01	76.65	7.75	183.16	803.83	274.98	0.00
09-05-2024	44.24	25.36	5.08	4.62	5.67	3.88	3.43	27.43	76.07	8.55	152.62	793.29	280.58	0.04
10-05-2024	65.67	38.04	6.51	5.79	7.10	4.64	4.06	28.36	75.14	8.02	177.75	861.70	295.32	0.00
11-05-2024	84.64	49.03	6.75	6.07	7.45	4.87	4.40	28.51	74.99	7.87	239.90	911.68	295.44	0.00
12-05-2024	86.21	50.56	7.33	6.62	8.02	587.40	4.98	29.08	71.42	8.24	271.27	887.24	287.68	0.00
13-05-2024	59.35	34.38	5.28	4.76	5.83	3.81	3.56	27.33	69.67	6.50	244.63	860.59	287.04	0.46
14-05-2024	50.89	29.58	5.00	4.63	5.70	4.06	3.65	27.98	73.34	6.72	229.25	851.05	295.29	0.00
15-05-2024	56.09	32.71	5.69	5.20	6.38	4.43	4.51	28.19	70.89	6.27	211.40	838.41	287.35	0.21
16-05-2024	42.35	24.53	4.60	4.10	5.03	3.29	2.99	3.26	72.94	6.61	258.37	829.29	281.98	0.42
17-05-2024	53.21	30.82	5.73	5.23	6.42	4.19	4.38	27.74	74.62	8.97	214.65	785.57	282.56	0.00
18-05-2024	77.95	45.15	6.46	6.00	7.35	4.81	5.11	28.20	71.17	7.61	196.29	803.92	282.69	0.00
19-05-2024	83.27	48.23	7.28	6.67	8.18	5.34	5.93	29.02	71.99	8.69	240.72	903.86	295.22	0.00
20-05-2024	78.04	45.20	7.05	6.94	8.51	5.56	6.27	28.68	73.32	7.95	197.58	825.07	282.32	0.00
21-05-2024	78.73	45.92	7.09	7.05	8.56	6.12	5.65	28.74	72.88	6.05	270.06	860.15	287.77	0.29
22-05-2024	79.96	46.64	7.93	7.74	9.39	6.72	6.28	28.41	71.55	5.72	223.73	757.59	287.15	0.00
23-05-2024	64.43	37.32	7.40	7.22	8.86	5.79	5.75	27.88	73.08	5.39	228.92	803.59	282.36	0.00
24-05-2024	69.75	40.40	7.72	7.49	9.18	6.00	6.08	28.20	73.40	5.06	244.30	860.27	286.90	0.00
25-05-2024	76.09	44.08	8.06	7.76	9.52	6.22	7.40	28.54	73.75	4.72	214.30	785.23	282.21	0.00
26-05-2024	79.94	46.30	9.40	8.86	10.87	7.10	6.57	28.88	72.40	4.48	240.48	851.91	287.49	0.00
27-05-2024	77.58	44.94	9.15	8.65	10.61	6.93	6.31	29.86	72.15	4.22	240.47	829.03	294.96	0.00
28-05-2024	80.11	46.40	11.47	9.73	11.93	7.80	7.63	30.38	72.67	4.35	197.71	757.71	282.44	0.00
29-05-2024	77.25	44.74	10.62	9.04	11.09	7.24	6.79	30.04	72.32	4.00	195.95	903.51	282.35	0.00
30-05-2024	74.49	43.15	9.87	8.42	10.33	6.75	7.24	30.49	73.78	4.46	213.85	788.03	289.14	0.00
31-05-2024	71.91	41.65	10.62	9.04	11.08	7.24	8.00	30.58	73.71	7.09	207.15	894.29	276.97	0.54

Minimum /result	39.31	22.57	3.99	3.53	4.33	3.14	2.69	3.26	62.72	4.00	152.62	757.59	272.97	0.00
Maximum /result	87.44	54.02	11.47	9.73	11.93	587.40	8.00	32.78	76.65	8.97	271.27	911.68	295.75	0.54
Average/result	70.05	41.09	7.20	6.87	8.38	24.30	5.25	28.49	71.75	6.58	215.92	834.50	286.79	0.09

Monthly Report of GVMC CAAQM Station for May 2024

Date & Time	PM_{10}	$PM_{2.5}$	SO_2	NO	NO_X	NO_2	NH_3	Temp	HR	WS	WD	BP	RS	RG
	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	degreC	%	m/s	degree	mbar	W/m^2	mm
5/1/2024	86.03	51.05	10.50	7.30	8.88	1.43	4.86	31.00	67.83	2.02	164.20	807	325.83	0.00
5/2/2024	84.85	50.00	10.28	8.29	10.00	1.47	4.58	30.18	73.08	3.77	194.02	822	290.86	0.00
5/3/2024	83.12	49.32	9.83	8.14	9.68	1.57	3.35	28.03	77.82	2.80	227.79	807	277.70	0.00
5/4/2024	83.46	49.18	10.28	8.00	9.65	1.41	1.64	26.32	84.29	2.90	200.27	800	291.43	0.00
5/5/2024	84.18	52.09	10.71	8.22	9.86	1.53	4.25	30.73	78.83	2.99	195.06	885	290.12	0.00
5/6/2024	72.11	44.62	10.12	7.17	8.75	1.52	4.35	30.1	78.90	1.80	213.00	779	278.84	0.00
5/7/2024	42.94	26.57	3.60	2.85	3.48	0.60	4.57	30.7	76.38	2.05	161.96	841	287.38	0.00
5/8/2024	50.41	31.19	3.33	2.71	3.30	0.57	3.91	26.4	74.85	1.97	177.50	840	286.85	0.00
5/9/2024	46.13	28.54	3.77	2.85	3.48	0.60	4.71	30.76	78.99	2.38	149.26	820	289.66	0.00
5/10/2024	43.02	26.62	3.87	2.57	3.13	0.54	4.84	30.66	70.91	2.18	136.55	860	291.00	0.00
5/11/2024	44.82	27.73	3.75	2.84	3.47	0.60	5.84	28.56	75.70	2.36	125.73	808	325.50	0.00
5/12/2024	45.99	28.45	3.79	2.71	3.30	0.57	5.82	29.27	73.18	2.36	194.02	885	327.91	0.00
5/13/2024	55.57	32.54	4.45	2.87	3.19	0.52	5.32	29.13	67.74	2.05	201.54	1016.5	306.22	0.00
5/14/2024	51.03	30.55	4.65	2.98	3.58	0.55	5.33	26.99	73.89	3.27	223.41	1016.3	304.07	0.00
5/15/2024	53.05	32.82	4.92	2.78	3.39	0.59	5.41	27.21	72.28	3.73	208.33	1015.4	248.72	0.00
5/16/2024	53.16	31.13	3.95	2.94	3.27	0.53	5.65	29.13	67.74	2.76	184.88	1017	306.22	0.00
5/17/2024	59.40	35.12	4.18	2.89	3.43	0.49	3.96	27.87	72.05	3.74	255.98	1017	300.68	0.00
5/18/2024	84.42	50.54	9.19	6.82	8.21	1.27	5.33	27.0	73.89	4.52	220.08	1016	70.13	0.00
5/19/2024	83.21	51.48	11.09	8.72	10.64	1.85	4.78	30.5	76.20	3.54	218.19	827	284.29	0.00
5/20/2024	83.63	51.74	10.42	7.79	9.50	1.65	1.07	30.48	97.21	4.91	214.65	882	291.43	0.00
5/21/2024	83.20	51.48	9.37	6.94	8.47	1.47	3.91	30.40	74.85	2.44	125.41	840	286.85	0.00
5/22/2024	81.08	50.17	10.00	7.77	9.48	1.65	4.77	30.3	77.59	2.05	157.65	823	288.08	0.00
5/23/2024	82.20	50.86	10.65	7.56	9.22	1.60	4.93	30.9	76.77	1.16	187.26	802	287.50	0.00
5/24/2024	80.38	49.73	7.19	5.42	6.60	1.15	4.71	30.8	78.99	1.56	137.34	820	289.66	0.00
5/25/2024	82.47	51.02	8.15	5.38	6.56	1.14	4.48	30.46	78.69	1.60	177.77	802	290.00	0.00
5/26/2024	84.50	52.28	8.18	5.84	7.12	1.24	4.75	30.9	76.22	1.63	134.97	795	295.19	0.00
5/27/2024	83.56	51.70	9.25	6.29	7.67	1.33	3.28	30.74	73.44	1.71	167.39	843	302.85	0.00
5/28/2024	82.75	51.20	9.58	6.44	7.86	1.37	3.99	30.78	75.22	1.72	192.54	831	292.13	0.00
5/29/2024	82.16	50.83	9.99	7.28	8.88	1.54	3.59	30.66	70.91	1.68	174.05	860	291.00	0.00
5/30/2024	81.30	50.30	9.42	6.53	7.97	1.38	4.79	28.69	73.18	1.61	129.29	885	327.91	0.00
5/31/2024	79.32	49.08	7.33	5.13	6.26	1.09	3.72	28.56	75.70	2.36	125.73	808	325.50	0.00

Minimum	**42.94**	**26.57**	**3.33**	**2.57**	**3.13**	**0.49**	**1.07**	**26.32**	**67.74**	**1.16**	**125.41**	**779**	**70.13**	**0.00**
Maximum	**86.03**	**52.28**	**11.09**	**8.72**	**10.64**	**1.85**	**5.84**	**31.00**	**97.21**	**4.91**	**255.98**	**1017**	**327.91**	**0.00**
Average	**70.76**	**43.22**	**7.61**	**5.55**	**6.72**	**1.12**	**4.40**	**29.49**	**75.59**	**2.50**	**179.87**	**867**	**288.76**	**0.00**

Monthly Report of GCB GATE CAAQM Station for May 2024

Date & Time	PM_{10}	$PM_{2.5}$	SO_2	NO	NO_x	NO_2	NH_3	Temp	HR	WS	WD	BP	RS	RG
	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	degree C	%	m/s	degre	mbar	W/m²	mm
5/1/2024	82.76	46.55	15.38	11.88	14.47	10.42	3.83	30.93	88.65	6.17	224.83	903.68	287.54	0.00
5/2/2024	86.13	44.36	12.96	11.43	12.43	10.46	4.02	30.54	85.92	7.40	231.00	806.75	287.31	0.00
5/3/2024	83.36	42.77	12.11	11.49	12.86	11.43	3.95	29.85	79.89	7.75	258.06	807.24	295.75	0.00
5/4/2024	83.90	41.98	12.92	11.39	12.64	10.50	3.85	29.37	85.92	7.07	231.00	806.75	295.30	0.00
5/5/2024	79.50	44.68	8.46	9.22	10.68	7.30	4.46	30.43	71.73	5.55	206.25	806.98	295.41	0.00
5/6/2024	71.11	54.30	6.87	8.13	8.94	6.41	5.26	30.74	69.73	6.27	224.11	804.33	287.84	0.47
5/7/2024	45.45	24.42	4.46	3.92	4.85	3.51	3.22	28.93	70.89	9.14	176.61	801.64	272.97	0.33
5/8/2024	52.72	22.47	7.86	7.58	8.56	7.17	3.96	27.73	84.80	8.47	209.96	806.76	849.28	0.00
5/9/2024	62.36	34.93	7.35	7.69	8.72	7.62	3.59	28.41	87.97	7.09	226.16	806.60	847.51	0.00
5/10/2024	83.36	42.77	12.11	11.49	12.86	11.43	3.95	33.73	79.89	8.02	258.06	807.24	295.75	0.00
5/11/2024	83.90	41.98	12.92	11.39	12.64	10.50	3.85	33.96	85.92	7.87	231.00	806.75	295.30	0.00
5/12/2024	80.53	41.68	13.08	11.07	12.28	10.05	3.79	29.15	83.56	8.25	226.79	807.30	295.30	0.00
5/13/2024	63.64	28.86	7.79	7.51	8.46	6.61	4.18	28.31	72.23	6.50	216.90	808.56	503.72	0.00
5/14/2024	82.54	43.36	12.95	10.41	11.68	9.71	4.17	28.67	84.59	6.72	229.98	820.40	295.75	0.00
5/15/2024	75.39	39.39	10.80	9.94	11.10	9.00	3.98	28.91	87.44	6.27	213.93	850.32	557.19	0.00
5/16/2024	36.27	16.98	4.63	4.45	5.23	4.10	2.55	21.17	61.14	4.96	157.39	600.36	551.97	0.25
5/17/2024	81.44	42.78	11.63	10.98	12.36	10.74	4.00	28.68	80.16	8.97	252.17	807.29	356.35	0.00
5/18/2024	87.53	43.69	10.36	6.56	9.30	8.02	4.12	30.78	90.56	7.61	230.58	806.69	295.75	0.00
5/19/2024	87.95	43.62	13.79	7.05	12.09	7.37	5.80	28.80	85.97	8.70	205.76	747.72	287.31	0.00
5/20/2024	85.99	45.94	10.58	9.80	10.84	8.47	4.52	30.43	82.98	7.95	223.54	827.38	295.30	0.00
5/21/2024	76.07	38.76	10.26	8.74	9.71	8.00	4.10	33.73	79.80	7.94	250.64	828.58	573.86	0.00
5/22/2024	80.50	42.63	10.80	9.18	10.09	8.10	4.28	28.80	84.43	8.97	217.04	840.81	560.49	0.00
5/23/2024	83.50	45.09	10.46	8.83	11.04	7.90	4.34	29.37	88.00	6.17	234.69	828.26	295.75	0.00
5/24/2024	82.37	44.97	11.29	8.81	10.87	7.94	4.34	33.73	88.00	7.40	234.69	828.26	295.75	0.00
5/25/2024	83.06	41.40	11.87	9.42	11.16	8.36	4.21	28.68	84.52	8.96	219.26	842.92	295.75	0.00
5/26/2024	83.77	46.06	11.68	10.68	12.12	9.78	4.98	29.83	82.78	8.97	248.90	807.52	295.30	0.00
5/27/2024	82.93	42.78	12.13	12.09	13.69	10.73	5.50	30.43	90.92	7.95	174.76	858.20	245.89	0.00
5/28/2024	81.19	44.35	10.43	11.11	10.04	10.02	4.28	30.40	84.92	5.55	216.02	834.40	295.41	0.00
5/29/2024	86.21	44.72	7.33	6.62	8.02	587.40	4.98	29.08	71.42	8.24	271.27	887.24	287.68	0.00
5/30/2024	78.59	44.73	7.28	6.67	8.18	5.34	5.93	29.02	71.99	8.69	240.72	903.86	295.22	0.00
5/31/2024	65.37	34.58	9.04	8.52	10.15	8.16	3.82	29.36	74.38	7.23	243.82	800.80	543.75	0.33

Minimum /result	36.27	16.98	4.46	3.92	4.85	3.51	2.55	21.17	61.14	4.96	157.39	600.36	245.89	0.00
Maximum /resul	87.95	54.30	15.38	12.09	14.47	587.40	5.93	33.96	90.92	9.14	271.27	903.86	849.28	0.47
Average/result	76.75	40.57	10.37	9.16	10.58	27.18	4.25	29.74	81.33	7.51	225.35	816.18	378.50	0.04

Monthly Report of GCB GATE CAAQM Station for june 2024

Date & Time	PM_{10}	$PM_{2.5}$	SO_2	NO	NO_X	NO_2	NH_3	Temp	HR	WS	WD	BP	RG
	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	degree C	%	m/s	degre	mbar	mm
6/1/2024	55.96	27.13	7.03	6.99	8.02	6.82	3.27	26.23	85.52	8.95	219.89	805.21	0.00
6/2/2024	61.80	31.07	8.29	8.26	9.35	7.95	3.67	26.82	85.95	8.18	212.90	810.30	0.00
6/3/2024	69.46	34.99	8.61	6.79	8.60	7.22	3.82	26.91	85.65	7.82	236.56	806.74	0.00
6/4/2024	77.20	39.67	8.72	8.47	9.91	7.77	3.95	27.60	79.89	8.02	255.09	807.24	0.00
6/5/2024	74.92	38.49	6.52	5.99	7.37	6.13	3.56	23.98	80.23	6.30	238.57	816.77	0.33
6/6/2024	81.79	40.41	12.75	11.70	12.90	10.80	3.82	28.99	82.13	5.55	205.38	807.01	0.00
6/7/2024	82.76	46.55	15.38	11.88	14.47	10.42	3.83	30.93	88.65	6.17	224.83	903.68	0.00
6/8/2024	80.72	43.87	13.88	11.76	13.60	11.07	3.83	30.93	88.65	6.17	224.83	903.68	0.00
6/9/2024	62.36	34.93	7.35	7.69	8.72	7.62	3.59	28.41	87.97	7.09	226.16	806.60	0.00
6/10/2024	76.56	42.77	12.11	11.49	12.86	11.43	3.95	33.73	79.89	8.02	258.06	807.24	0.00
6/11/2024	77.68	43.02	12.92	11.39	12.64	10.50	3.85	33.96	85.92	7.87	231.00	806.75	0.00
6/12/2024	80.53	41.68	13.08	11.07	12.27	10.06	3.79	29.15	83.56	8.25	226.79	807.30	0.00
6/13/2024	80.56	40.35	13.78	14.69	13.52	14.21	4.33	26.90	79.89	0.92	257.76	807.24	0.00
6/14/2024	74.31	34.91	13.14	14.76	13.82	14.11	4.32	27.99	87.97	0.81	222.10	850.16	0.00
6/15/2024	78.49	38.52	12.21	14.57	14.28	14.10	3.92	27.85	83.21	0.62	256.94	762.44	0.00
6/16/2024	77.95	38.02	12.78	13.31	12.61	13.16	4.32	29.40	79.89	0.92	257.85	807.24	0.00
6/17/2024	80.56	41.35	13.78	14.69	13.52	14.21	4.33	26.90	79.89	0.92	257.76	807.24	0.17
6/18/2024	80.42	40.57	14.16	15.41	14.50	15.13	4.52	26.17	82.85	1.18	290.46	862.54	0.00
6/19/2024	78.75	39.07	13.28	12.95	12.87	13.84	4.64	25.47	82.85	1.20	245.73	860.54	0.00
6/20/2024	78.98	43.74	14.07	15.60	13.53	14.38	4.68	28.80	85.02	0.98	188.88	840.75	0.00
6/21/2024	75.38	33.52	12.90	12.70	12.62	12.67	4.47	26.88	82.85	1.18	270.73	862.54	0.27
6/22/2024	80.56	41.35	13.78	14.69	13.52	14.21	4.33	26.90	79.89	0.92	257.76	807.24	0.00
6/23/2024	80.42	40.57	14.16	15.41	14.50	15.13	4.52	26.17	82.85	1.18	290.46	862.54	0.00
6/24/2024	78.75	39.07	13.28	12.95	12.87	13.84	4.64	25.47	82.85	1.20	245.73	862.54	0.00
6/25/2024	78.56	40.74	14.07	15.60	13.53	14.38	4.68	28.80	85.02	0.98	188.88	840.75	0.00
6/26/2024	75.32	36.80	12.33	15.45	11.98	11.77	4.33	31.05	80.52	0.77	197.38	910.29	0.81
6/27/2024	78.75	39.07	13.28	12.95	12.87	13.84	4.64	25.47	82.85	1.20	245.73	862.54	0.00
6/28/2024	71.87	39.00	12.37	13.43	12.36	12.98	5.08	27.15	82.85	0.88	217.53	828.26	0.42
6/29/2024	76.38	46.59	12.91	13.74	13.22	13.15	5.08	27.68	80.52	0.84	283.56	807.05	0.00
6/30/2024	62.03	28.73	13.14	14.17	13.93	12.03	4.32	27.73	72.99	1.59	210.11	879.42	0.69

Minimum /result	55.96	27.13	6.52	5.99	7.37	6.13	3.27	23.98	72.99	0.62	188.88	762.44	0.00
Maximum /result	82.76	46.59	15.38	15.60	14.50	15.13	5.08	33.96	88.65	8.95	290.46	910.29	0.81
Average/result	75.66	38.88	12.20	12.35	12.36	11.83	4.20	28.01	82.96	3.55	238.18	833.66	0.09

Monthly Report of GVMC CAAQM Station for June 2024

Date & Time	PM_{10}	$PM_{2.5}$	SO_2	NO	NO_X	NO_2	NH_3	Temp	HR	WS	WD	BP	RS	RG
	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	degreC	%	m/s	degree	mbar	W/m^2	mm
6/1/2024	75.78	46.89	7.33	5.13	6.26	1.09	3.72	28.56	75.70	2.36	125.73	808	325.50	0.00
6/2/2024	78.51	48.57	9.42	6.53	7.97	1.38	4.79	28.69	73.18	1.61	129.29	885	327.91	0.00
6/3/2024	82.16	50.83	9.99	7.28	8.88	1.54	3.59	30.66	70.91	1.68	174.05	860	291.00	0.00
6/4/2024	82.47	51.02	8.15	5.38	6.56	1.14	4.48	30.46	78.69	1.60	177.77	802	290.00	0.00
6/5/2024	82.75	51.20	9.58	6.44	7.86	1.37	3.99	30.78	75.22	1.72	192.54	831	292.13	0.00
6/6/2024	83.56	51.70	9.25	6.29	7.67	1.33	3.28	30.74	73.44	1.71	167.39	843	302.85	0.00
6/7/2024	84.50	52.28	8.18	5.84	7.12	1.24	4.75	30.93	76.22	1.63	134.97	795	295.19	0.00
6/8/2024	80.38	49.73	7.19	5.42	6.60	1.15	4.71	30.76	78.99	1.56	137.34	820	289.66	0.00
6/9/2024	82.20	50.86	10.65	7.56	9.22	1.60	4.93	30.9	76.77	1.16	187.26	802	287.50	0.00
6/10/2024	81.08	50.17	10.00	7.77	9.48	1.65	4.77	30.3	77.59	2.05	157.65	823	288.08	0.00
6/11/2024	80.20	49.62	9.37	6.94	8.47	1.47	3.91	30.40	74.85	2.44	125.41	840	286.85	0.00
6/12/2024	78.46	48.54	10.42	7.79	9.50	1.65	1.07	30.48	75.22	4.91	214.65	882.07	291.43	0.00
6/13/2024	83.21	51.48	11.09	8.72	10.64	1.85	4.78	30.5	76.20	3.54	218.19	827	284.29	0.00
6/14/2024	78.30	48.44	10.79	9.31	11.35	1.97	3.38	27.25	69.62	2.03	174.65	1016	456.63	0.00
6/15/2024	78.28	48.43	11.12	9.09	11.09	1.93	3.91	25.6	74.85	3.31	225.41	1018	435.17	0.00
6/16/2024	75.92	46.97	10.62	8.66	10.56	1.84	4.08	26.5	71.82	2.31	204.66	1014	342.47	0.00
6/17/2024	76.12	47.09	9.11	7.53	9.18	1.60	3.66	24.2	72.12	1.11	218.78	1016	552.94	0.00
6/18/2024	76.34	47.23	9.56	8.49	10.35	1.80	4.33	25.8	74.24	1.45	219.36	1014	336.64	0.00
6/19/2024	73.22	45.30	9.72	8.32	10.14	1.76	4.39	26.29	64.10	2.12	231.00	1015	354.49	0.00
6/20/2024	75.79	46.89	11.93	8.74	10.66	1.85	3.97	26.4	75.71	2.89	193.52	1015	349.48	0.00
6/21/2024	76.44	47.29	11.59	8.06	9.83	1.71	3.81	26.42	77.11	3.62	221.10	1014	345.32	0.00
6/22/2024	77.91	48.21	11.04	8.12	9.90	1.72	3.22	25.4	74.16	3.31	218.83	1017	403.24	0.00
6/23/2024	78.28	48.43	11.12	9.09	11.09	1.93	4.39	26.17	70.89	3.31	225.41	1015	416.36	0.00
6/24/2024	76.64	45.48	10.60	8.87	10.79	1.74	4.02	30.04	65.09	2.59	184.89	1015	290.12	0.00
6/25/2024	75.28	44.51	9.77	8.67	10.31	1.47	3.96	27.87	72.05	2.78	196.14	1017	300.68	0.00
6/26/2024	71.42	36.79	15.20	8.01	10.29	1.36	3.96	27.87	72.05	1.38	170.29	1017	300.68	0.00
6/27/2024	70.25	34.24	16.05	8.59	14.06	1.69	4.02	30.04	65.09	1.87	185.81	1015	290.12	0.00
6/28/2024	74.23	40.28	15.57	9.36	15.43	1.65	4.66	27.1	74.56	0.90	211.29	1017	297.04	0.00
6/29/2024	71.84	37.55	17.35	6.37	10.49	1.35	5.41	27.2	72.28	1.16	248.34	1015	248.72	0.00
6/30/2024	72.91	43.65	10.44	8.55	10.29	1.59	5.33	26.99	73.89	1.19	223.41	1016	304.07	0.00

Minimum	**70.25**	**34.24**	**7.19**	**5.13**	**6.26**	**1.09**	**1.07**	**24.20**	**64.10**	**0.90**	**125.41**	**795**	**248.72**	**0.00**
Maximum	**84.50**	**52.28**	**17.35**	**9.36**	**15.43**	**1.97**	**5.41**	**30.93**	**78.99**	**4.91**	**248.34**	**1018**	**552.94**	**0.00**
Average	**77.81**	**46.99**	**10.74**	**7.70**	**9.73**	**1.58**	**4.11**	**28.37**	**73.42**	**2.18**	**189.84**	**936**	**329.22**	**0.00**

Monthly Report of R & D Yard CAAQM Station for JUNE 2024

Date & Time	PM_{10} $\mu g/m^3$	$PM_{2.5}$ $\mu g/m^3$	SO_2 $\mu g/m^3$	NO $\mu g/m^3$	NO_X $\mu g/m^3$	NO_2 $\mu g/m^3$	NH_3 $\mu g/m^3$	Temp degree C	HR %	WS m/s	WD degre	BP mbar	RS W/m^2	RG mm
6/1/2024	73.93	47.03	8.90	6.58	7.24	6.95	3.93	33.58	82.98	1.20	244.15	861.66	807.19	0.00
6/2/2024	71.84	34.88	10.15	5.77	8.23	5.16	3.72	32.35	85.07	1.00	214.18	860.78	642.24	0.00
6/3/2024	69.19	34.14	10.41	5.51	7.49	5.23	3.75	32.07	87.69	0.88	229.24	827.39	361.72	0.00
6/4/2024	70.81	33.95	9.92	6.03	8.45	5.73	3.59	33.08	81.00	1.15	238.08	807.05	295.75	0.00
6/5/2024	63.64	28.86	9.92	6.03	8.45	5.73	3.59	33.08	81.00	1.15	238.08	807.05	665.83	0.33
6/6/2024	79.72	39.32	8.50	7.88	9.76	7.46	3.82	27.60	82.13	5.55	205.38	807.01	415.08	0.00
6/7/2024	77.89	37.54	8.54	7.53	9.84	6.78	3.56	23.98	80.23	6.30	238.57	816.77	665.83	0.33
6/8/2024	78.68	38.46	10.23	9.29	11.19	8.14	3.82	28.99	82.13	5.55	205.38	807.01	415.08	0.00
6/9/2024	80.54	40.11	7.33	6.62	8.02	4.95	4.98	29.08	71.42	8.24	271.27	887.24	287.68	0.00
6/10/2024	80.70	40.30	7.09	7.05	8.56	6.12	5.65	28.74	72.88	6.05	270.06	860.15	287.77	0.29
6/11/2024	79.99	40.45	7.92	8.54	10.48	6.24	4.95	32.55	62.72	6.17	176.35	860.19	287.54	0.00
6/12/2024	78.03	39.59	7.29	7.63	9.73	7.07	4.09	32.09	65.65	7.07	218.28	808.31	295.30	0.00
6/13/2024	69.72	34.81	8.04	7.74	9.04	7.47	4.01	26.23	85.43	7.68	221.21	823.91	488.98	0.00
6/14/2024	79.45	40.29	7.79	7.26	9.03	6.99	3.79	27.60	79.63	5.42	210.90	807.06	443.27	0.00
6/15/2024	74.44	42.92	6.47	5.77	7.08	4.75	4.78	29.37	67.40	7.64	193.57	813.08	355.76	0.00
6/16/2024	69.02	39.60	6.82	6.09	7.48	5.10	5.10	28.87	73.11	7.25	200.18	846.17	287.40	0.00
6/17/2024	77.53	40.77	6.43	6.00	7.41	4.81	5.11	28.20	71.17	7.66	196.29	803.92	282.69	0.00
6/18/2024	77.31	44.61	6.46	6.00	7.35	4.81	5.11	28.20	71.17	7.61	200.43	803.92	282.69	0.00
6/19/2024	76.18	42.76	7.28	6.67	8.18	5.34	5.93	29.02	71.99	8.69	240.72	903.86	295.22	0.00
6/20/2024	78.48	44.65	7.05	6.94	8.51	5.56	6.27	28.68	73.32	7.95	197.58	825.07	282.32	0.00
6/21/2024	72.85	39.81	6.56	6.28	8.09	5.72	5.21	28.50	74.41	6.52	257.46	862.21	281.82	0.29
6/22/2024	57.36	34.58	7.07	7.02	8.51	6.09	5.28	28.41	71.55	5.72	223.73	757.59	287.15	0.00
6/23/2024	71.83	41.12	7.43	7.01	8.60	5.62	5.55	28.55	73.89	6.80	211.86	822.96	282.32	0.00
6/24/2024	77.63	42.15	7.96	7.63	9.23	6.50	5.63	28.37	75.77	5.12	224.50	835.23	287.13	0.00
6/25/2024	69.72	35.65	7.17	6.88	8.44	5.61	6.60	28.40	73.55	5.23	218.04	801.68	286.32	0.00
6/26/2024	76.77	40.05	6.83	6.67	8.32	5.92	5.43	28.62	73.64	6.29	263.76	861.18	284.79	0.29
6/27/2024	68.68	37.52	7.49	7.78	9.50	6.16	5.12	30.48	67.14	5.95	200.04	808.89	287.34	0.00
6/28/2024	74.59	42.58	7.87	7.07	8.52	6.55	4.52	31.40	74.17	5.03	224.76	830.97	461.60	0.00
6/29/2024	73.07	37.28	8.72	7.05	8.83	6.38	4.46	28.99	82.09	4.60	219.96	833.31	472.79	0.00
6/30/2024	72.79	36.70	8.46	6.55	8.32	5.94	4.71	29.36	80.29	3.84	219.39	812.05	363.77	0.00

Minimum /result	**57.36**	**28.86**	**6.43**	**5.51**	**7.08**	**4.75**	**3.56**	**23.98**	**62.72**	**0.88**	**176.35**	**757.59**	**281.82**	**0.00**
Maximum /result	**80.70**	**47.03**	**10.41**	**9.29**	**11.19**	**8.14**	**6.60**	**33.58**	**87.69**	**8.69**	**271.27**	**903.86**	**807.19**	**0.33**
Average/result	**74.08**	**39.08**	**7.94**	**6.89**	**8.60**	**6.03**	**4.74**	**29.48**	**75.82**	**5.51**	**222.45**	**828.12**	**381.35**	**0.05**

Monthly Report of GVMC CAAQM Station for July 2024

Date & Time	PM_{10}	$PM_{2.5}$	SO_2	NO	NO_X	NO_2	NH_3	Temp	HR	WS	WD	BP	RS	RG
	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	degreC	%	m/s	degree	mbar	W/m²	mm
7/1/2024	73.22	45.30	9.72	8.32	10.14	1.76	4.48	30.46	78.69	3.93	165.27	802	290.00	0.00
7/2/2024	75.27	46.57	11.59	8.06	9.83	1.71	5.20	30.74	73.44	4.04	168.64	843	302.85	0.00
7/3/2024	76.87	47.56	10.25	8.12	9.90	1.72	5.61	30.78	75.22	4.76	180.46	831	292.13	0.00
7/4/2024	77.91	48.21	11.04	8.12	9.90	1.72	3.22	25.4	74.16	3.31	218.83	1017	403.24	0.00
7/5/2024	78.28	48.43	11.12	9.09	11.09	1.93	4.39	26.17	70.89	3.31	225.41	1015	416.36	0.00
7/6/2024	76.44	47.29	11.59	8.06	9.83	1.71	3.81	26.42	77.11	3.62	221.10	1014	345.32	0.00
7/7/2024	75.79	46.89	11.93	8.74	10.66	1.85	3.97	26.4	75.71	2.89	193.52	1015	349.48	0.00
7/8/2024	72.93	45.12	9.81	7.87	9.60	1.67	4.27	26.17	63.85	2.37	231.00	1015	351.03	0.00
7/9/2024	75.92	46.97	10.62	8.66	10.56	1.84	4.08	26.5	71.82	2.31	204.66	1014	342.47	0.00
7/10/2024	76.12	47.09	9.11	7.53	9.18	1.60	3.66	24.2	72.12	1.11	218.78	1016	552.94	0.00
7/11/2024	76.34	47.23	9.56	8.49	10.35	1.80	4.33	25.8	74.24	1.45	219.36	1014	336.64	0.00
7/12/2024	77.99	46.28	9.83	7.93	9.43	1.53	3.35	28.03	77.82	2.71	200.29	807	277.70	0.00
7/13/2024	78.96	48.85	10.62	8.66	10.56	1.84	4.77	30.3	77.59	4.96	136.82	823	288.08	0.00
7/14/2024	78.30	48.44	10.79	9.31	11.35	1.97	3.38	27.25	69.62	2.03	174.65	1016	456.63	0.00
7/15/2024	79.09	48.93	10.50	8.72	10.64	1.85	5.16	26.6	72.32	3.59	215.25	1014	303.84	0.00
7/16/2024	76.03	47.04	10.31	8.52	10.39	1.81	6.41	27.3	72.75	4.34	184.04	1014	317.06	0.00
7/17/2024	76.38	45.01	9.78	8.44	10.19	1.49	1.64	26.32	84.29	2.15	221.10	800	291.43	0.00
7/18/2024	63.68	39.40	5.55	4.45	5.43	0.94	3.83	26.7	72.07	3.75	185.31	1015	313.21	0.00
7/19/2024	60.03	37.14	4.83	3.72	4.54	0.79	4.83	26.8	72.16	4.02	220.69	1016	285.92	0.00
7/20/2024	60.54	37.45	5.14	3.52	4.29	0.75	3.97	26.4	75.71	2.89	193.52	1015	349.48	0.00
7/21/2024	65.07	40.26	5.49	3.93	4.79	0.83	5.41	27.21	72.28	3.77	223.41	1016	248.72	0.00
7/22/2024	64.78	40.08	5.30	3.95	4.73	0.76	5.39	26.64	72.78	4.62	213.81	1015	289.50	0.00
7/23/2024	64.57	39.95	5.33	3.84	4.68	0.81	5.75	26.7	71.99	2.98	265.41	1015	287.05	0.00
7/24/2024	66.58	39.51	5.72	4.01	4.87	0.79	4.02	30.04	65.09	2.59	184.89	1015	290.12	0.00
7/25/2024	69.65	43.09	7.50	5.55	6.77	1.18	4.27	26.2	67.63	2.71	130.15	807	307.71	0.00
7/26/2024	67.99	42.07	8.08	6.55	7.98	1.39	3.91	26.4	74.85	3.31	202.91	840	286.85	0.00
7/27/2024	69.49	41.23	7.13	4.90	5.97	0.96	4.86	31.00	67.83	3.55	138.40	807	325.83	0.00
7/28/2024	71.10	41.90	6.24	4.39	5.29	0.78	4.58	30.18	73.08	3.77	220.69	822	290.86	0.00
7/29/2024	70.45	41.81	6.41	4.55	5.27	0.85	3.35	28.03	77.82	3.09	236.13	807	277.70	0.00
7/30/2024	73.38	43.24	6.20	4.37	5.27	0.77	1.64	26.32	84.29	3.11	208.60	800	291.43	0.00
7/31/2024	72.41	43.35	6.27	4.29	5.17	0.80	4.75	26.66	63.89	2.15	203.95	991	320.74	0.00

Minimum	**60.03**	**37.14**	**4.83**	**3.52**	**4.29**	**0.75**	**1.64**	**24.20**	**63.85**	**1.11**	**130.15**	**800**	**248.72**	**0.00**
Maximum	**79.09**	**48.93**	**11.93**	**9.31**	**11.35**	**1.97**	**6.41**	**31.00**	**84.29**	**4.96**	**265.41**	**1017**	**552.94**	**0.00**
Average	**72.31**	**44.25**	**8.49**	**6.60**	**8.02**	**1.36**	**4.27**	**27.42**	**73.33**	**3.20**	**200.23**	**937**	**325.24**	**0.00**

Monthly Report of GCB GATE CAAQM Station for JULY 2024													
Date & Time	PM_{10}	$PM_{2.5}$	SO_2	NO	NO_X	NO_2	NH_3	Temp	HR	WS	WD	BP	RG
	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	degree C	%	m/s	degre	mbar	mm
7/1/2024	63.64	34.19	7.79	7.51	8.46	6.61	4.18	28.31	72.23	6.50	216.90	808.56	0.00
7/2/2024	82.54	43.36	12.95	10.41	11.68	9.71	4.17	28.67	84.59	6.72	229.98	820.40	0.00
7/3/2024	83.90	41.98	12.92	11.39	12.64	10.50	3.85	33.96	85.92	7.87	231.00	806.75	0.00
7/4/2024	73.50	37.68	8.46	9.22	10.68	7.30	4.46	30.43	71.73	5.55	206.25	806.98	1.20
7/5/2024	82.54	43.36	12.95	10.41	11.68	9.71	4.17	28.67	84.59	6.72	229.98	820.40	0.00
7/6/2024	82.68	44.17	10.80	9.94	11.10	9.00	3.98	28.91	87.44	6.27	213.93	850.32	0.00
7/7/2024	83.36	42.77	12.11	11.49	12.86	11.43	3.95	33.73	79.89	8.02	258.06	807.24	0.00
7/8/2024	70.90	37.98	11.92	10.39	11.64	10.50	3.85	29.00	85.92	7.87	231.00	806.75	3.10
7/9/2024	80.53	39.68	13.08	11.07	12.28	10.05	3.79	29.15	83.56	8.25	226.79	807.30	0.00
7/10/2024	76.07	38.76	10.26	8.74	9.71	8.00	4.10	33.73	79.80	7.94	250.64	828.58	0.00
7/11/2024	82.73	51.09	11.09	9.36	10.37	8.24	4.12	30.98	81.91	1.11	210.36	807.00	0.00
7/12/2024	85.53	43.68	13.08	11.07	12.28	10.05	3.79	32.77	83.56	0.89	226.79	807.30	0.00
7/13/2024	80.78	40.58	11.10	10.56	11.53	9.27	4.57	32.81	82.55	1.08	240.94	807.01	0.00
7/14/2024	82.54	43.36	12.95	10.41	11.68	9.71	4.17	32.67	84.59	0.99	229.98	820.40	0.00
7/15/2024	84.10	44.01	13.10	11.16	12.36	9.28	4.49	32.02	87.06	0.76	227.10	850.16	0.00
7/16/2024	86.78	48.88	11.76	10.54	11.72	9.49	4.19	31.73	83.77	0.68	243.25	815.58	0.00
7/17/2024	87.42	50.74	12.13	9.87	11.11	9.03	4.20	30.49	88.57	0.51	226.37	906.84	0.00
7/18/2024	68.23	37.74	10.07	8.52	10.53	11.04	4.68	28.80	85.02	0.98	188.88	840.75	6.40
7/19/2024	69.08	38.12	9.37	9.31	9.36	10.18	5.08	27.36	82.85	0.88	221.69	828.26	5.80
7/20/2024	70.55	34.71	9.91	10.74	10.22	13.15	5.08	27.68	80.52	0.84	239.31	807.05	5.10
7/21/2024	70.44	35.80	10.96	9.44	9.75	10.33	4.62	28.06	81.91	1.11	205.36	807.00	4.80
7/22/2024	71.66	36.38	11.76	9.24	11.62	10.95	4.62	27.68	81.91	1.09	216.99	807.00	4.20
7/23/2024	69.04	34.19	10.36	10.79	10.91	9.71	4.31	30.17	82.85	1.18	245.73	862.54	3.80
7/24/2024	70.11	37.98	9.69	9.98	9.99	9.12	4.33	23.98	79.89	0.92	258.06	807.24	2.40
7/25/2024	80.53	41.68	13.08	11.07	12.28	10.05	3.79	32.52	83.56	0.89	226.79	807.30	0.00
7/26/2024	80.78	40.58	11.10	10.56	11.53	9.27	4.57	32.81	82.55	1.08	240.94	807.01	0.00
7/27/2024	82.04	42.73	12.95	10.41	11.68	9.71	4.17	31.96	84.59	0.99	229.98	820.40	0.00
7/28/2024	80.98	41.84	13.10	11.16	12.36	9.28	4.49	31.73	87.06	0.76	227.10	850.16	0.00
7/29/2024	78.44	30.84	12.75	12.03	13.04	10.81	4.17	30.65	88.38	0.61	251.98	730.83	0.00
7/30/2024	81.17	42.56	11.76	11.17	12.30	9.93	4.33	30.12	85.85	1.05	223.57	812.75	0.00
7/31/2024	84.19	44.35	10.43	11.11	10.04	10.02	4.28	30.40	84.92	0.51	216.02	834.40	0.00

Minimum /result	63.64	30.84	7.79	7.51	8.46	6.61	3.79	23.98	71.73	0.51	188.88	730.83	0.00
Maximum /result	87.42	51.09	13.10	12.03	13.04	13.15	5.08	33.96	88.57	8.25	258.06	906.84	6.40
Average/result	78.28	40.83	11.48	10.29	11.27	9.73	4.28	30.39	83.21	2.92	228.76	819.36	1.19

Monthly Report of R & D Yard CAAQM Station for JULY 2024

Date & Time	PM_{10}	$PM_{2.5}$	SO_2	NO	NO_X	NO_2	NH_3	Temp	HR	WS	WD	BP	RS	RG
	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	degree C	%	m/s	degre	mbar	W/m^2	mm
7/1/2024	68.80	38.24	6.16	5.86	7.24	4.69	4.52	27.52	78.58	7.95	216.47	884.16	222.07	0.00
7/2/2024	78.46	42.28	7.18	7.87	9.55	5.58	5.18	32.78	63.96	7.41	162.06	838.96	287.31	0.00
7/3/2024	76.24	42.21	6.84	7.23	9.21	5.47	4.84	32.44	65.30	7.75	205.69	889.53	295.75	0.00
7/4/2024	77.41	40.73	7.29	7.63	9.73	7.07	4.09	32.09	65.65	7.07	218.28	808.31	295.30	0.00
7/5/2024	76.65	44.13	5.51	6.93	8.29	4.72	4.86	31.00	67.83	5.55	218.51	806.93	295.41	0.00
7/6/2024	76.30	40.38	8.37	8.45	9.12	6.43	5.17	30.56	70.83	6.99	224.11	804.33	287.84	0.47
7/7/2024	77.89	37.54	8.54	7.53	9.84	6.78	3.56	23.98	80.23	6.30	238.57	816.77	665.83	0.33
7/8/2024	78.68	38.46	10.23	9.29	11.19	8.14	3.82	28.99	82.13	6.46	205.38	807.01	415.08	0.00
7/9/2024	80.54	40.11	7.33	6.62	8.02	4.95	4.98	29.08	71.42	8.24	271.27	887.24	287.68	0.00
7/10/2024	81.10	40.82	7.31	7.05	8.64	6.20	5.65	28.37	72.88	6.05	270.06	860.15	287.77	0.29
7/11/2024	76.88	38.35	6.75	6.07	7.45	4.87	4.40	28.51	74.99	7.87	239.90	911.68	295.44	0.00
7/12/2024	80.63	37.54	7.41	6.70	8.23	6.78	5.10	29.08	71.42	8.24	271.27	887.24	287.68	0.00
7/13/2024	77.55	38.46	5.28	4.76	5.83	3.81	3.56	27.33	69.67	6.50	244.63	860.59	287.04	0.46
7/14/2024	78.18	40.52	8.21	7.76	9.19	7.12	3.79	27.60	79.63	5.42	210.90	807.06	443.27	0.00
7/15/2024	63.31	33.54	6.35	6.09	5.40	4.40	3.47	28.30	78.80	3.91	222.78	863.77	287.16	0.21
7/16/2024	78.15	38.70	7.29	7.63	9.73	7.07	4.09	32.09	65.65	7.07	218.28	808.31	295.30	0.00
7/17/2024	66.38	32.67	10.02	7.13	9.76	7.02	4.18	29.12	83.28	4.97	218.02	823.96	397.10	0.33
7/18/2024	39.31	22.57	3.99	3.53	4.33	3.14	2.69	25.55	75.05	8.47	193.88	814.56	272.97	0.33
7/19/2024	42.35	24.53	4.60	4.10	5.03	3.29	2.99	3.26	72.94	6.61	258.37	829.29	281.98	0.42
7/20/2024	38.44	22.93	5.42	5.09	6.25	4.46	4.01	28.01	76.65	7.75	183.16	803.83	274.98	0.00
7/21/2024	46.93	27.06	5.08	4.62	5.67	3.88	3.43	27.43	76.07	8.55	152.62	793.29	280.58	0.04
7/22/2024	75.84	42.51	7.93	7.74	9.39	6.72	6.28	28.41	71.55	5.72	223.73	757.59	287.15	0.00
7/23/2024	64.43	37.32	7.40	7.22	8.86	5.79	5.75	27.88	73.08	5.39	228.92	803.59	282.36	0.00
7/24/2024	69.58	39.44	7.72	7.49	9.18	6.00	6.08	28.20	73.40	5.06	244.30	860.27	286.90	0.00
7/25/2024	76.09	44.08	8.06	7.76	9.52	6.22	7.40	28.54	73.75	4.72	214.30	785.23	282.21	0.00
7/26/2024	77.63	42.15	7.96	7.63	9.23	6.50	5.63	28.37	75.37	5.12	224.50	835.23	287.13	0.00
7/27/2024	66.87	35.70	6.25	5.95	7.89	4.70	6.40	27.18	77.07	3.64	246.41	836.17	217.91	0.00
7/28/2024	73.93	47.03	8.90	6.58	7.24	6.95	3.93	33.58	82.98	1.20	244.15	861.66	807.19	0.00
7/29/2024	79.72	39.32	8.50	7.88	9.76	7.46	3.82	28.18	82.13	5.55	205.38	807.01	415.08	0.00
7/30/2024	80.91	41.94	9.87	8.42	10.33	6.75	7.24	28.79	73.78	4.46	213.85	788.03	289.14	0.00
7/31/2024	81.36	42.34	9.87	8.42	10.33	6.75	7.24	30.49	73.78	4.46	213.85	788.03	289.14	0.00

Minimum /result	38.44	22.57	3.99	3.53	4.33	3.14	2.69	3.26	63.96	1.20	152.62	757.59	217.91	0.00
Maximum /resul	81.36	47.03	10.23	9.29	11.19	8.14	7.40	33.58	83.28	8.55	271.27	911.68	807.19	0.47
Average/result	71.18	37.86	7.34	6.87	8.37	5.80	4.78	28.15	74.20	6.14	222.70	829.99	328.64	0.09

Monthly Report of GVMC CAAQM Station for August 2024

Date & Time	PM_{10}	$PM_{2.5}$	SO_2	NO	NO_X	NO_2	NH_3	Temp	HR	WS	WD	BP	RS	RG
	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	degreC	%	m/s	degree	mbar	W/m²	mm
8/1/2024	75.03	46.89	8.50	8.74	7.88	1.85	3.97	26.4	75.71	2.02	164.20	1015	349.48	0.00
8/2/2024	74.85	45.12	8.28	7.87	8.00	1.67	4.27	26.17	63.85	3.77	194.02	1015	351.03	0.00
8/3/2024	73.12	43.32	7.83	8.32	7.68	1.76	4.39	26.29	64.10	2.80	227.79	1015	354.49	0.00
8/4/2024	73.46	43.18	8.28	8.74	6.65	1.85	3.97	26.4	75.71	2.90	200.27	1015	349.48	0.00
8/5/2024	72.18	42.09	8.71	8.06	6.86	1.71	3.81	26.42	77.11	2.99	195.06	1014	345.32	0.00
8/6/2024	70.11	40.62	6.12	7.17	5.75	1.52	4.35	30.1	78.90	1.80	213.00	779	278.84	0.00
8/7/2024	71.94	41.57	7.60	2.85	6.48	0.60	4.57	30.7	76.38	2.05	161.96	841	287.38	0.00
8/8/2024	74.91	46.35	3.33	2.71	3.30	0.57	3.91	26.4	74.85	1.97	177.50	840	286.85	0.00
8/9/2024	76.44	47.29	11.59	8.06	9.83	1.71	3.81	26.42	77.11	3.62	221.10	1014	345.32	0.00
8/10/2024	77.91	48.21	11.04	8.12	9.90	1.72	3.22	25.4	74.16	3.31	218.83	1017	403.24	0.00
8/11/2024	76.87	47.56	10.25	8.12	9.90	1.72	5.61	30.78	75.22	4.76	180.46	831	292.13	0.00
8/12/2024	75.27	46.57	11.59	8.06	9.83	1.71	5.20	30.74	73.44	4.04	168.64	843	302.85	0.00
8/13/2024	73.22	45.30	9.72	8.32	10.14	1.76	4.48	30.46	78.69	3.93	165.27	802	290.00	0.00
8/14/2024	73.16	43.80	4.65	2.98	3.58	0.55	5.33	26.99	73.89	3.27	223.41	1016.3	304.07	0.00
8/15/2024	73.05	45.19	4.92	2.78	3.39	0.59	5.41	27.21	72.28	3.73	208.33	1015.4	248.72	0.00
8/16/2024	73.08	42.79	3.95	2.94	3.27	0.53	5.65	29.13	67.74	2.76	184.88	1017	306.22	0.00
8/17/2024	76.36	45.15	4.18	2.89	3.43	0.49	3.96	27.87	72.05	3.74	255.98	1017	300.68	0.00
8/18/2024	77.34	46.30	9.19	6.82	8.21	1.27	5.33	27.0	73.89	4.52	220.08	1016	70.13	0.00
8/19/2024	79.75	49.34	11.09	8.72	10.64	1.85	4.78	30.5	76.20	3.54	218.19	827	284.29	0.00
8/20/2024	77.42	47.90	10.42	7.79	9.50	1.65	1.07	30.48	97.21	4.91	214.65	882	291.43	0.00
8/21/2024	76.78	47.51	9.37	6.94	8.47	1.47	3.91	30.40	74.85	2.44	125.41	840	286.85	0.00
8/22/2024	73.75	45.63	10.00	7.77	9.48	1.65	4.77	30.3	77.59	2.05	157.65	823	288.08	0.00
8/23/2024	75.20	46.53	10.65	7.56	9.22	1.60	4.93	30.9	76.77	1.16	187.26	802	287.50	0.00
8/24/2024	63.59	39.34	7.19	5.42	6.60	1.15	4.71	30.76	78.99	1.56	137.34	820	289.66	0.00
8/25/2024	67.55	41.79	8.15	5.38	6.56	1.14	4.48	30.46	78.69	1.60	177.77	802	290.00	0.00
8/26/2024	60.33	37.33	8.18	5.84	7.12	1.24	4.75	30.93	76.22	1.63	134.97	795	295.19	0.00
8/27/2024	53.06	32.83	5.09	4.55	5.54	0.96	3.28	30.74	73.44	1.71	167.39	843	302.85	0.00
8/28/2024	58.54	36.22	5.50	4.60	5.61	0.97	3.99	30.78	75.22	1.72	192.54	831	292.13	0.00
8/29/2024	59.91	37.07	5.15	3.66	4.47	0.78	3.59	30.66	70.91	1.68	174.05	860	291.00	0.00
8/30/2024	63.01	38.98	5.21	3.22	3.92	0.68	3.83	28.69	73.18	1.61	129.29	885	327.91	0.00
8/31/2024	54.03	33.43	4.75	4.89	5.97	1.04	3.72	27.02	75.70	2.36	125.73	808	325.50	0.00

Minimum	**53.06**	**32.83**	**3.33**	**2.71**	**3.27**	**0.49**	**1.07**	**25.37**	**63.85**	**1.16**	**125.41**	**779**	**70.13**	**0.00**
Maximum	**79.75**	**49.34**	**11.59**	**8.74**	**10.64**	**1.85**	**5.65**	**30.93**	**97.21**	**4.91**	**255.98**	**1017**	**403.24**	**0.00**
Average	**71.01**	**43.26**	**7.76**	**6.13**	**7.01**	**1.28**	**4.29**	**28.82**	**75.16**	**2.77**	**184.61**	**901**	**300.60**	**0.00**

Monthly Report of R & D Yard CAAQM Station for AUGUST 2024

Date & Time	PM_{10}	$PM_{2.5}$	SO_2	NO	NO_X	NO_2	NH_3	Temp	HR	WS	WD	BP	RS	RG
	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	degree C	%	m/s	degre	mbar	W/m²	mm
8/1/2024	80.14	42.65	12.95	10.41	11.68	9.71	4.17	28.67	84.59	6.72	229.98	820.40	222.07	0.00
8/2/2024	79.00	41.57	7.18	7.87	9.55	5.58	5.18	28.12	63.96	7.41	162.06	838.96	287.31	0.00
8/3/2024	81.76	41.98	12.92	11.39	12.64	10.50	3.85	28.12	85.92	7.87	231.00	806.75	295.75	0.00
8/4/2024	79.94	41.73	12.35	12.04	13.23	11.02	4.06	29.22	83.81	5.55	215.83	807.07	295.30	0.00
8/5/2024	78.15	44.13	5.51	6.93	8.29	4.72	4.86	31.00	67.83	5.55	224.80	806.93	295.41	0.00
8/6/2024	82.68	43.34	10.80	9.94	11.10	9.00	1.98	28.91	87.44	6.27	213.93	850.32	287.84	0.47
8/7/2024	77.89	37.54	8.54	7.53	9.84	6.78	3.56	23.98	80.23	6.30	238.57	816.77	665.83	0.33
8/8/2024	78.64	38.46	10.23	9.29	11.19	8.14	3.82	28.99	82.13	6.46	205.38	807.01	415.08	0.00
8/9/2024	78.17	40.36	7.33	6.62	8.02	4.95	4.98	29.08	71.42	8.24	271.27	887.24	287.68	0.00
8/10/2024	81.10	40.82	12.92	11.39	12.64	10.50	3.85	33.96	85.92	7.87	231.00	806.75	287.77	0.29
8/11/2024	80.34	38.35	11.09	9.36	10.37	8.24	4.12	30.98	81.91	1.11	210.36	807.00	295.44	0.00
8/12/2024	80.63	37.54	7.41	6.70	8.23	6.78	5.10	29.08	71.42	8.24	271.27	887.24	287.68	0.00
8/13/2024	77.55	40.55	11.10	10.56	11.53	9.27	4.57	32.81	82.55	1.08	240.94	807.01	287.04	0.46
8/14/2024	80.43	41.02	8.21	7.76	9.19	7.12	3.79	27.60	79.63	5.42	210.90	807.06	443.27	0.00
8/15/2024	84.10	44.01	9.93	11.16	12.36	9.28	4.49	32.02	87.06	0.76	227.10	850.16	287.16	0.23
8/16/2024	82.13	43.58	11.76	10.54	11.72	9.49	4.19	31.73	83.77	0.68	243.25	815.58	295.30	0.00
8/17/2024	72.88	38.17	10.32	7.21	9.76	7.02	4.18	29.12	83.28	4.97	218.02	823.96	397.10	0.33
8/18/2024	79.45	40.29	7.79	7.26	9.03	6.99	3.79	27.60	79.63	5.42	210.90	807.06	443.27	0.00
8/19/2024	77.31	44.61	6.46	6.00	7.35	4.81	5.11	28.20	71.17	7.61	200.43	803.92	282.69	0.00
8/20/2024	76.65	44.13	5.51	6.93	8.29	4.72	4.86	31.00	67.83	5.55	218.51	806.93	295.41	0.00
8/21/2024	76.30	40.38	8.37	8.45	9.12	6.43	5.17	30.56	70.83	6.99	224.11	804.33	287.84	0.47
8/22/2024	75.84	42.51	7.93	7.74	9.39	6.72	6.28	28.41	71.55	5.72	223.73	757.59	287.15	0.00
8/23/2024	74.51	41.43	7.52	7.22	8.86	5.79	5.75	27.88	73.08	5.39	228.92	803.59	282.36	0.00
8/24/2024	69.58	39.44	7.72	7.49	9.18	6.00	6.08	28.20	73.40	5.06	244.30	860.27	286.90	0.00
8/25/2024	71.93	40.37	8.06	7.76	9.52	6.22	7.40	28.54	73.75	4.72	214.30	785.23	282.21	0.00
8/26/2024	77.63	42.15	7.96	7.63	9.23	6.50	5.63	28.37	75.77	5.12	224.50	835.23	287.13	0.00
8/27/2024	66.87	35.70	6.25	5.95	7.89	4.70	6.40	27.18	77.07	3.64	246.41	836.17	217.91	0.00
8/28/2024	38.44	22.93	5.42	5.09	6.25	4.46	4.01	28.01	76.65	7.75	183.16	803.83	274.98	0.00
8/29/2024	42.35	24.53	4.60	4.10	5.03	3.29	2.99	3.26	72.94	6.61	258.37	829.29	281.98	0.42
8/30/2024	39.31	22.57	3.99	3.53	4.33	3.14	2.69	25.55	75.05	8.47	193.88	814.56	272.97	0.33
8/31/2024	46.93	27.06	5.08	4.62	5.67	3.88	3.43	27.43	76.07	8.55	152.62	793.29	280.58	0.04

Minimum /result	38.44	22.57	3.99	3.53	4.33	3.14	2.69	3.26	63.96	0.68	152.62	757.59	217.91	0.00
Maximum /result	84.10	44.61	12.95	12.04	13.23	11.02	7.40	33.96	87.44	8.55	271.27	887.24	665.83	0.47
Average/result	73.18	38.83	8.49	7.95	9.37	6.83	4.59	28.18	77.34	5.71	221.61	818.95	312.79	0.11

Monthly Report Of GCB Gate CAAQM Station for August. (01-08-2024 to 31-08-2024)

Date and Time	PM10	PM2.5	SO2	NO	NOX	NO2	NH3	TC	HR	WS	WD	BP	RG
	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	degreC	%	m/s	degre	mBar	mm
8/1/2024	79.84	42.64	12.52	10.77	11.82	9.92	4.69	31.06	88.46	0.90	217.07	814.07	0.00
8/2/2024	83.37	42.85	12.55	8.08	9.02	7.24	4.65	31.06	88.46	0.88	218.15	814.07	0.00
8/3/2024	83.17	45.40	11.11	9.87	10.91	8.83	4.35	33.59	82.85	1.18	245.73	862.54	0.00
8/4/2024	79.15	42.41	13.70	11.67	11.20	10.91	4.53	33.40	82.94	1.33	194.61	840.38	0.00
8/5/2024	82.30	43.79	11.83	9.84	10.92	8.87	4.38	33.34	82.02	1.33	170.18	840.41	0.00
8/6/2024	81.83	42.90	12.45	11.91	12.94	10.84	4.21	33.16	81.80	1.03	254.20	807.57	0.00
8/7/2024	81.56	43.20	11.17	11.04	12.44	9.89	4.12	24.13	71.89	1.09	141.33	823.99	0.00
8/8/2024	80.63	44.60	12.97	12.46	13.76	11.41	3.94	29.85	74.82	1.43	130.97	879.43	0.00
8/9/2024	80.14	45.13	13.97	11.42	12.69	10.74	4.28	28.41	80.79	1.11	189.29	807.07	0.00
8/10/2024	83.28	46.83	12.98	12.74	13.28	11.51	2.96	23.25	80.27	0.92	257.77	807.24	0.00
8/11/2024	82.18	38.22	12.37	11.26	13.64	10.18	3.84	27.20	84.59	1.09	240.16	807.01	0.00
8/12/2024	82.52	37.86	13.14	12.34	13.82	11.36	4.32	29.94	87.97	0.81	222.10	850.16	0.00
8/13/2024	79.82	38.40	13.40	11.52	12.91	10.07	4.78	24.72	83.78	1.11	181.66	807.07	0.00
8/14/2024	79.23	47.74	14.07	12.52	13.53	11.04	4.68	28.80	85.02	0.98	188.88	840.75	0.00
8/15/2024	78.08	45.12	12.37	11.31	12.36	10.18	5.08	27.36	82.85	0.88	221.69	828.26	0.00
8/16/2024	77.55	46.71	12.91	13.74	13.22	13.15	5.08	27.68	80.52	0.84	239.31	807.05	0.00
8/17/2024	73.44	42.80	12.96	11.44	12.75	10.33	4.62	28.06	81.91	1.11	205.36	807.00	0.00
8/18/2024	73.66	42.38	13.76	12.24	13.62	10.95	4.62	27.68	81.91	1.09	216.99	807.00	0.00
8/19/2024	71.04	40.19	10.36	10.79	11.91	9.71	4.31	30.92	82.85	1.18	245.73	862.54	1.58
8/20/2024	70.11	39.98	9.69	9.98	10.99	9.12	4.33	23.98	79.89	0.92	258.06	807.24	2.71
8/21/2024	73.93	40.03	12.14	9.83	11.18	8.98	4.15	31.32	88.57	0.51	226.38	903.67	0.00
8/22/2024	73.59	40.03	12.07	9.34	10.25	8.53	4.42	30.88	82.94	0.86	221.86	806.68	0.00
8/23/2024	84.47	47.56	12.88	10.86	11.74	10.00	4.31	31.23	88.46	0.88	217.07	814.07	0.00
8/24/2024	82.27	44.97	12.08	10.18	11.23	9.34	4.27	30.79	85.92	0.91	231.00	806.75	0.00
8/25/2024	80.76	42.24	11.32	9.94	10.90	9.10	4.36	29.76	81.05	0.89	228.94	807.19	0.00
8/26/2024	83.12	46.10	13.28	10.89	11.91	10.17	4.98	29.83	82.78	1.12	248.90	807.52	0.00
8/27/2024	83.77	46.06	12.13	12.09	13.69	10.73	5.50	30.43	90.92	1.25	174.76	858.20	0.00
8/28/2024	72.93	42.78	10.43	11.11	10.04	10.02	4.28	28.40	84.92	0.51	216.02	834.40	1.24
8/29/2024	74.19	40.35	10.43	11.11	10.04	10.02	4.28	27.40	84.92	0.51	216.02	834.40	1.82
8/30/2024	70.35	42.00	12.75	11.78	12.58	10.56	4.17	28.98	86.50	0.61	251.98	730.83	2.48
8/31/2024	72.98	41.84	13.10	11.16	12.36	9.28	4.49	27.15	87.06	0.76	227.10	850.16	1.23

Minimum /result	70.11	37.86	9.69	8.08	9.02	7.24	2.96	23.25	71.89	0.51	130.97	730.83	1.58
Maximum /result	84.47	47.74	14.07	13.74	13.82	13.15	5.50	33.59	90.92	1.43	258.06	903.67	2.71
Average/result	78.56	43.68	12.35	11.14	12.05	10.10	4.42	29.15	83.54	0.97	216.11	824.99	0.36

Monthly Report Of GCB Gate CAAQM Station for september. (01-09-2024 to 30-09-2024)													
Date and Time	PM10	PM2.5	SO2	NO	NOX	NO2	NH3	TC	HR	WS	WD	BP	RG
	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	µg/m3	degreC	%	m/s	degre	mBar	mm
9/1/2024	80.53	41.68	13.08	11.07	12.28	10.05	3.79	32.52	83.56	0.89	226.79	807.30	0.00
9/2/2024	80.78	40.58	11.10	10.56	11.53	9.27	4.57	32.81	82.55	1.08	240.94	807.01	0.00
9/3/2024	82.04	42.73	12.95	10.41	11.68	9.71	4.17	31.96	84.59	0.99	229.98	820.40	0.00
9/4/2024	80.98	41.84	13.10	11.16	12.36	9.28	4.49	31.73	87.06	0.76	227.10	850.16	0.00
9/5/2024	78.44	30.84	12.75	12.03	13.04	10.81	4.17	30.65	88.38	0.61	251.98	730.83	0.00
9/6/2024	81.17	42.56	11.76	11.17	12.30	9.93	4.33	30.12	85.85	1.05	223.57	812.75	0.00
9/7/2024	84.19	44.35	10.43	11.11	10.04	10.02	4.28	30.40	84.92	0.51	216.02	834.40	0.00
9/8/2024	82.93	42.78	12.13	12.09	13.69	10.73	5.50	30.43	90.92	1.25	174.76	858.20	0.00
9/9/2024	83.77	46.06	13.28	11.22	12.16	10.17	4.98	29.83	82.78	1.12	248.90	807.52	0.00
9/10/2024	83.16	45.97	11.32	10.07	11.02	9.15	4.36	29.76	81.05	0.89	228.94	807.19	0.00
9/11/2024	80.76	42.24	12.08	10.30	11.35	9.46	4.27	30.79	85.92	0.91	231.00	806.75	0.00
9/12/2024	82.31	42.97	12.88	11.61	12.57	10.33	4.31	31.23	88.46	0.88	217.07	814.07	0.00
9/13/2024	82.47	43.64	12.07	10.09	11.13	9.28	4.42	30.34	82.94	0.86	221.86	806.68	0.00
9/14/2024	81.99	46.61	12.15	10.71	11.95	9.73	4.13	31.32	88.64	0.51	224.83	903.68	0.00
9/15/2024	83.15	46.98	11.69	10.73	11.90	9.71	4.16	31.94	79.89	0.92	258.06	807.24	0.00
9/16/2024	84.29	46.19	12.36	10.96	11.91	10.50	4.31	30.92	82.85	1.18	245.73	862.54	0.00
9/17/2024	80.08	43.71	15.23	15.27	19.64	10.73	4.19	30.88	83.81	0.91	230.88	807.07	0.00
9/18/2024	77.11	39.27	14.62	13.29	18.10	10.67	5.02	32.00	82.78	1.90	272.10	807.52	0.40
9/19/2024	75.75	39.35	17.34	14.57	17.07	10.06	4.02	28.87	85.92	1.83	232.10	806.75	0.60
9/20/2024	72.90	37.19	12.13	11.19	12.41	10.19	3.96	29.31	84.80	0.88	209.96	806.76	0.50
9/21/2024	80.56	41.35	13.78	14.69	13.52	14.21	4.33	26.90	79.89	0.92	257.76	807.24	0.00
9/22/2024	80.42	40.57	14.16	15.41	14.50	15.13	4.52	26.17	82.85	1.18	290.46	862.54	0.00
9/23/2024	78.75	39.07	13.28	12.95	12.87	13.84	4.64	25.47	82.85	1.20	245.73	862.54	0.00
9/24/2024	78.56	40.74	14.07	15.60	13.53	14.38	4.68	28.80	85.02	0.98	188.88	840.75	0.00
9/25/2024	73.59	39.65	12.45	11.83	12.87	11.00	4.18	29.72	82.85	1.18	245.73	862.54	0.00
9/26/2024	71.46	36.27	13.28	11.00	12.04	10.32	3.93	31.69	85.85	0.94	276.58	879.40	0.40
9/27/2024	72.54	37.47	12.30	12.13	17.40	11.27	3.37	31.45	88.65	0.50	225.30	903.68	1.20
9/28/2024	75.16	39.15	17.16	14.28	17.40	13.21	3.91	32.36	79.89	0.50	225.30	788.34	1.60
9/29/2024	79.19	34.30	18.73	13.27	17.15	10.46	4.02	31.33	85.92	0.74	256.58	806.75	0.00
9/30/2024	80.53	41.68	13.08	11.07	12.27	10.06	3.79	29.15	83.56	8.25	226.79	807.30	0.00

Monthly Report of GVMC CAAQM Station for September 2024

Date & Time	PM_{10}	$PM_{2.5}$	SO_2	NO	NO_X	NO_2	NH_3	Temp	HR	WS	WD	BP	RS	RG
	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	degreC	%	m/s	degree	mbar	W/m^2	mm
9/1/2024	68.47	30.58	13.89	15.03	12.84	14.02	5.00	27.32	78.40	1.74	245.68	792	349.48	0.00
9/2/2024	70.81	33.95	13.84	13.41	13.90	13.09	4.12	24.05	71.64	1.86	148.43	824	351.03	0.00
9/3/2024	71.84	34.88	13.97	14.21	12.69	14.29	4.28	28.41	80.79	1.11	189.29	807	354.49	0.00
9/4/2024	70.21	34.69	13.17	15.87	14.85	14.81	3.95	27.17	74.36	1.82	285.41	880	349.48	0.00
9/5/2024	70.57	36.75	12.98	13.57	13.28	12.72	2.95	23.25	80.14	0.94	256.58	807	345.32	0.00
9/6/2024	73.73	37.05	12.99	12.55	13.64	12.64	3.84	27.20	84.59	1.09	240.16	807	278.84	0.00
9/7/2024	39.31	22.57	3.99	3.53	4.33	3.14	2.69	25.55	75.05	8.47	193.88	815	272.97	0.33
9/8/2024	45.73	26.58	5.42	5.09	6.25	4.46	4.01	28.01	76.65	7.75	183.16	804	274.98	0.00
9/9/2024	44.24	25.36	5.08	4.62	5.67	3.88	3.43	27.43	76.07	8.55	152.62	793	280.58	0.04
9/10/2024	65.67	38.04	6.51	5.79	7.10	4.64	4.06	28.36	75.14	8.02	177.75	862	295.32	0.00
9/11/2024	78.58	49.03	6.75	6.07	7.45	4.87	4.40	28.51	74.99	7.87	239.90	912	295.44	0.00
9/12/2024	79.96	46.64	7.93	7.74	9.39	6.72	6.28	28.41	71.55	5.72	223.73	758	287.15	0.00
9/13/2024	64.43	37.32	7.40	7.22	8.86	5.79	5.75	27.88	73.08	5.39	228.92	804	282.36	0.00
9/14/2024	69.75	40.40	7.72	7.49	9.18	6.00	6.08	28.20	73.40	5.06	244.30	860	286.90	0.00
9/15/2024	76.09	44.08	8.06	7.76	9.52	6.22	7.40	28.54	73.75	4.72	214.30	785	282.21	0.00
9/16/2024	79.94	46.30	9.40	8.86	10.87	7.10	6.57	28.88	72.40	4.48	240.48	852	287.49	0.00
9/17/2024	77.58	44.94	9.15	8.65	10.61	6.93	6.31	29.86	72.15	4.22	240.47	829	294.96	0.00
9/18/2024	80.11	46.40	11.47	9.73	11.93	7.80	7.63	30.38	72.67	4.35	197.71	758	282.44	0.00
9/19/2024	77.25	44.74	10.62	9.04	11.09	7.24	6.79	30.04	72.32	4.00	195.95	904	282.35	0.00
9/20/2024	74.49	43.15	9.87	8.42	10.33	6.75	7.24	30.49	73.78	4.46	213.85	788	289.14	0.00
9/21/2024	71.91	41.65	10.62	9.04	11.08	7.24	8.00	30.58	73.71	7.09	207.15	894	276.97	0.54
9/22/2024	70.27	54.02	6.83	8.54	8.94	6.45	5.30	30.74	69.73	6.27	224.11	804	287.84	0.47
9/23/2024	77.41	45.39	7.29	7.63	9.73	7.07	4.09	32.09	65.65	7.07	218.28	808	295.30	0.00
9/24/2024	73.16	43.80	4.65	2.98	3.58	0.55	5.33	26.99	73.89	3.27	223.41	1016.3	304.07	0.00
9/25/2024	73.08	42.79	3.95	2.94	3.27	0.53	5.65	29.13	67.74	2.76	184.88	1017	306.22	0.00
9/26/2024	77.34	46.30	9.19	6.82	8.21	1.27	5.33	27.0	73.89	4.52	220.08	1016	70.13	0.00
9/27/2024	77.42	47.90	10.42	7.79	9.50	1.65	1.07	30.48	87.04	4.91	214.65	882	291.43	0.00
9/28/2024	76.36	45.15	4.18	2.89	3.43	0.49	3.96	27.87	72.05	3.74	255.98	1017	300.68	0.00
9/29/2024	79.75	49.34	11.09	8.72	10.64	1.85	4.78	30.5	76.20	3.54	218.19	827	284.29	0.00
9/30/2024	79.36	46.21	6.84	7.23	9.21	5.47	4.84	32.44	65.30	7.75	205.69	890	295.75	0.00

Minimum	**39.31**	**22.57**	**3.95**	**2.89**	**3.27**	**0.49**	**1.07**	**23.25**	**65.30**	**0.94**	**148.43**	**758**	**70.13**	**0.00**
Maximum	**80.11**	**54.02**	**13.97**	**15.87**	**14.85**	**14.81**	**8.00**	**32.44**	**87.04**	**8.55**	**285.41**	**1017**	**354.49**	**0.54**
Average	**71.16**	**40.87**	**8.84**	**8.31**	**9.38**	**6.52**	**5.04**	**28.52**	**74.27**	**4.75**	**216.17**	**854**	**291.19**	**0.05**

Monthly Report of R & D Yard CAAQM Station for SEPTEMBER 2024

Date & Time	PM_{10}	$PM_{2.5}$	SO_2	NO	NO_x	NO_2	NH_3	Temp	HR	WS	WD	BP	RS	RG
	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	degree C	%	m/s	degre	mbar	W/m^2	mm
9/1/2024	72.33	42.65	12.95	10.41	11.68	9.71	4.17	28.67	84.59	6.72	229.98	820.40	222.07	0.00
9/2/2024	76.37	41.57	7.18	7.87	9.55	5.58	5.18	28.12	63.96	7.41	162.06	838.96	287.31	0.00
9/3/2024	75.22	45.30	9.72	8.32	10.14	1.76	4.48	30.46	78.69	3.93	165.27	802.04	290.00	0.00
9/4/2024	75.27	41.56	11.59	8.06	9.83	1.71	5.20	30.74	73.44	4.04	168.64	843.09	302.85	0.00
9/5/2024	78.15	44.13	5.51	6.93	8.29	4.72	4.86	31.00	67.83	5.55	224.80	806.93	295.41	0.00
9/6/2024	82.68	43.34	10.80	9.94	11.10	9.00	3.98	28.91	87.44	6.27	213.93	850.32	287.84	0.47
9/7/2024	76.10	36.75	8.67	7.82	9.84	6.78	3.56	23.98	80.23	6.59	228.66	816.77	665.83	0.33
9/8/2024	78.64	38.46	10.23	9.29	11.19	8.14	3.82	28.99	82.13	6.46	205.38	807.01	415.08	0.00
9/9/2024	48.83	27.11	5.58	4.87	5.67	3.88	3.43	27.43	76.07	8.55	155.58	793.29	280.58	0.04
9/10/2024	81.10	40.82	12.92	11.39	12.64	10.50	3.85	33.96	85.92	7.87	231.00	806.75	287.77	0.29
9/11/2024	82.04	42.73	12.95	10.41	11.68	9.71	4.17	31.96	84.59	0.99	229.98	820.40	295.44	0.00
9/12/2024	72.90	37.19	12.13	11.19	12.41	10.19	3.96	29.31	84.80	1.92	209.96	806.76	287.68	0.00
9/13/2024	77.55	40.55	11.10	10.56	11.53	9.27	4.57	32.81	82.55	1.08	240.94	807.01	287.04	0.46
9/14/2024	77.95	45.15	6.46	6.00	7.35	4.81	5.11	28.20	71.17	7.61	196.29	803.92	282.69	0.00
9/15/2024	84.10	44.01	9.93	11.16	12.36	9.28	4.49	32.02	87.06	0.76	227.10	850.16	287.16	0.21
9/16/2024	82.13	43.58	11.76	10.54	11.72	9.49	4.19	31.73	83.77	7.75	243.25	815.58	295.30	0.00
9/17/2024	72.88	38.17	10.32	7.21	9.76	7.02	4.18	29.12	83.28	4.97	218.02	823.96	397.10	0.33
9/18/2024	78.04	44.87	7.05	6.94	8.51	5.56	6.27	28.68	73.32	7.95	197.58	825.07	282.32	0.00
9/19/2024	77.31	44.61	6.46	6.00	7.35	4.81	5.11	28.20	71.17	7.61	200.43	803.92	282.69	0.00
9/20/2024	73.59	39.65	12.45	11.83	12.87	11.00	4.18	29.72	82.85	1.18	245.73	862.54	295.41	0.00
9/21/2024	75.76	40.38	8.37	8.45	9.12	6.43	5.17	30.56	70.83	6.99	224.11	804.33	287.84	0.47
9/22/2024	78.64	38.46	10.23	9.29	11.19	8.14	3.82	28.99	82.13	6.46	205.38	807.01	415.08	0.00
9/23/2024	74.51	41.43	7.52	7.22	8.86	5.79	5.75	27.88	73.08	5.39	228.92	803.59	282.36	0.00
9/24/2024	75.15	42.10	11.69	13.41	11.74	13.21	3.91	32.36	79.89	0.92	258.06	807.24	286.90	0.00
9/25/2024	71.93	40.37	8.06	7.76	9.52	6.22	7.40	28.54	73.75	4.72	224.39	785.23	282.21	0.00
9/26/2024	57.28	30.05	6.51	6.60	7.91	5.77	4.18	25.56	84.90	6.14	237.73	823.12	306.14	0.00
9/27/2024	45.73	26.58	5.42	5.09	6.25	4.46	4.01	28.01	76.65	7.75	183.16	803.83	274.98	0.00
9/28/2024	68.80	38.04	6.51	5.79	7.10	4.64	4.06	28.36	75.14	8.02	177.75	861.70	295.32	0.00
9/29/2024	77.63	42.15	7.96	7.63	9.23	6.50	5.63	28.37	75.77	5.12	224.50	835.23	287.13	0.00
9/30/2024	76.24	42.21	6.84	7.23	9.21	5.47	4.84	32.44	65.30	7.75	205.69	889.53	295.75	0.00

Minimum /result	**45.73**	**26.58**	**5.42**	**4.87**	**5.67**	**1.71**	**3.43**	**23.98**	**63.96**	**0.76**	**155.58**	**785.23**	**222.07**	**0.00**
Maximum /result	**84.10**	**45.30**	**12.95**	**13.41**	**12.87**	**13.21**	**7.40**	**33.96**	**87.44**	**8.55**	**258.06**	**889.53**	**665.83**	**0.47**
Average/result	**74.09**	**40.13**	**9.16**	**8.51**	**9.85**	**6.98**	**4.59**	**29.50**	**78.08**	**5.48**	**212.14**	**820.86**	**311.38**	**0.09**

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Corporate Office & Laboratory : Enviro House, B-1, Block-B, IDA, Autonagar, Visakhapatnam-530012.
Hyderabad: Flat No. 302, H.No. 7-1-396/B/12, Sai Ram Residency, Balkumpet Road, S.R.Nagar, Hyderabad-500038.
✆ +91-9440338628, +91-7207664444 ✉ svenviro_labs@yahoo.co.in, info@svenvirolabs.com 🌐 www.svenvirolabs.com
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Ref: SVELC/VPT-STP/24-04/01 2356/b Date: 25-04-2024

NAME AND ADDRESS : **M/s. VISAKHAPATNAM PORT TRUST CIVIL ENGINEERING DEPARTMENT, VISAKHAPATNAM.**

SAMPLE PARTICULARS : **EFFLUENT (SEWAGE WATER)**

SOURCE OF COLLECTION : CHANNEL INLET

DATE OF COLLECTION : 15-04-2024

TEST REPORT

S.No	PARAMETER	UNIT	RESULT	METHOD FOLLOWED
1.	pH	-	7.33	APHA, 4500-H+B,23rd Ed., 2017
2.	Total Suspended Solids	mg/l	140	APHA, 2540-D, 23rd Ed., 2017
3.	Chemical Oxygen Demand – COD	mg/l	129	APHA, 5220-B, 23rd Ed., 2017
4.	Bio-Chemical Oxygen Demand – BOD 3day 27°C	mg/l	18.0	IS 3025 P - 44
5.	Nitrate Nitrogen	mg/l	4.26	APHA, 4500-NO3-B & C, 23rd Ed., 2017
6.	Nitrite Nitrogen	mg/l	1.25	APHA, 4500-NO2-B, 23rd Ed., 2017
7.	Total Phosphate	mg/l	1.51	APHA, 4500-PD,
8.	Ammonical Nitrogen	mg/l	6.64	APHA, 4500-NH3 B-C, 23rd Ed., 2017
9.	Sulphide	mg/l	1.13	APHA, 4500-S2D, 23rd Ed., 2017
10.	Fluoride	mg/l	1.31	APHA, 4500-FD,23rd Ed., 2017
11.	Oil & Grease	mg/l	2.0	APHA, 5520-D, 23rd Ed., 2017
12.	Residual Chlorine	mg/l	<0.1	APHA, 4500-Cl B,

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Ref: SVELC/VPT-STP/24-04/05

Date: 25-04-2024

NAME AND ADDRESS : **M/s. VISAKHAPATNAM PORT TRUST CIVIL ENGINEERING DEPARTMENT, VISAKHAPATNAM.**

SAMPLE PARTICULARS : **EFFLUENT (SEWAGE WATER)**

SOURCE OF COLLECTION : TREATED OUTLET

DATE OF COLLECTION : 15-04-2024

TEST REPORT

S.No	PARAMETER	UNIT	RESULT	METHOD FOLLOWED	Standards For Disposal Of Land Irrigation
1.	pH	-	6.54	APHA, 4500-H+B,23rd Ed., 2017	5.5-9.0
2.	Total Suspended Solids	mg/l	37.0	APHA, 2540-D, 23rd Ed., 2017	200
3.	Chemical Oxygen Demand – COD	mg/l	88.9	APHA, 5220-B, 23rd Ed., 2017	250
4.	Bio-Chemical Oxygen Demand – BOD 3day 27°C	mg/l	20.0	IS 3025 P - 44	30
5.	Nitrate Nitrogen	mg/l	2.68	APHA, 4500-NO3-B & C, 23rd Ed., 2017	-
6.	Nitrite Nitrogen	mg/l	0.41	APHA, 4500-NO2-B, 23rd Ed., 2017	-
7.	Total Phosphate	mg/l	1.51	APHA, 4500-PD,	-
8.	Ammonical Nitrogen	mg/l	7.33	APHA, 4500-NH3 B-C, 23rd Ed., 2017	-
9.	Sulphide	mg/l	1.09	APHA, 4500-S2D, 23rd Ed., 2017	-
10.	Fluoride	mg/l	0.23	APHA, 4500-FD,23rd Ed., 2017	-
11.	Oil & Grease	mg/l	1.0	APHA, 5520-D, 23rd Ed., 2017	10
12.	Residual Chlorine	mg/l	<0.1	APHA, 4500-Cl B,	-

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Ref: SVELC/VPT-STP/24-04/01

Date: 11-05-2024

NAME AND ADDRESS : **M/s. VISAKHAPATNAM PORT TRUST CIVIL ENGINEERING DEPARTMENT, VISAKHAPATNAM.**

SAMPLE PARTICULARS : **EFFLUENT (SEWAGE WATER)**

SOURCE OF COLLECTION : CHANNEL INLET

DATE OF COLLECTION : 30-04-2024

TEST REPORT

S.No	PARAMETER	UNIT	RESULT	METHOD FOLLOWED
1.	pH	-	7.11	APHA, 4500-H+B,23rd Ed., 2017
2.	Total Suspended Solids	mg/l	120	APHA, 2540-D, 23rd Ed., 2017
3.	Chemical Oxygen Demand – COD	mg/l	164	APHA, 5220-B, 23rd Ed., 2017
4.	Bio-Chemical Oxygen Demand – BOD 3day 27°C	mg/l	28.0	IS 3025 P - 44
5.	Nitrate Nitrogen	mg/l	5.66	APHA, 4500-NO3-B & C, 23rd Ed., 2017
6.	Nitrite Nitrogen	mg/l	1.58	APHA, 4500-NO2-B, 23rd Ed., 2017
7.	Total Phosphate	mg/l	1.71	APHA, 4500-PD,
8.	Ammonical Nitrogen	mg/l	8.26	APHA, 4500-NH3 B-C, 23rd Ed., 2017
9.	Sulphide	mg/l	1.34	APHA, 4500-S2D, 23rd Ed., 2017
10.	Fluoride	mg/l	1.26	APHA, 4500-FD,23rd Ed., 2017
11.	Oil & Grease	mg/l	1.6	APHA, 5520-D, 23rd Ed., 2017
12.	Residual Chlorine	mg/l	<0.1	APHA, 4500-Cl B,

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Ref: SVELC/VPT-STP/24-04/05 Date: 11-05-2024

NAME AND ADDRESS : **M/s. VISAKHAPATNAM PORT TRUST CIVIL ENGINEERING DEPARTMENT, VISAKHAPATNAM.**

SAMPLE PARTICULARS : **EFFLUENT (SEWAGE WATER)**

SOURCE OF COLLECTION : TREATED OUTLET

DATE OF COLLECTION : 30-04-2024

TEST REPORT

S.No	PARAMETER	UNIT	RESULT	METHOD FOLLOWED	Standards For Disposal Of Land Irrigation
1.	pH	-	6.88	APHA, 4500-H+B,23rd Ed., 2017	5.5-9.0
2.	Total Suspended Solids	mg/l	42.0	APHA, 2540-D, 23rd Ed., 2017	200
3.	Chemical Oxygen Demand – COD	mg/l	102	APHA, 5220-B, 23rd Ed., 2017	250
4.	Bio-Chemical Oxygen Demand – BOD 3day 27°C	mg/l	24.0	IS 3025 P - 44	30
5.	Nitrate Nitrogen	mg/l	3.06	APHA, 4500-NO3-B & C, 23rd Ed., 2017	-
6.	Nitrite Nitrogen	mg/l	0.48	APHA, 4500-NO2-B, 23rd Ed., 2017	-
7.	Total Phosphate	mg/l	1.64	APHA, 4500-PD,	-
8.	Ammonical Nitrogen	mg/l	6.22	APHA, 4500-NH3 B-C, 23rd Ed., 2017	-
9.	Sulphide	mg/l	0.98	APHA, 4500-S2D, 23rd Ed., 2017	-
10.	Fluoride	mg/l	0.26	APHA, 4500-FD,23rd Ed., 2017	-
11.	Oil & Grease	mg/l	1.4	APHA, 5520-D, 23rd Ed., 2017	10
12.	Residual Chlorine	mg/l	<0.1	APHA, 4500-Cl B,	-

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Ref: SVELC/VPT-STP/24-05/01 Date: 24-05-2024

NAME AND ADDRESS 3249/15 **M/s. VISAKHAPATNAM PORT TRUST CIVIL ENGINEERING DEPARTMENT, VISAKHAPATNAM.**

SAMPLE PARTICULARS : **EFFLUENT (SEWAGE WATER)**

SOURCE OF COLLECTION : CHANNEL INLET

DATE OF COLLECTION : 15-05-2024

TEST REPORT

S.No	PARAMETER	UNIT	RESULT	METHOD FOLLOWED
1.	pH	-	7.03	APHA, 4500-H+B,23rd Ed., 2017
2.	Total Suspended Solids	mg/l	110	APHA, 2540-D, 23rd Ed., 2017
3.	Chemical Oxygen Demand – COD	mg/l	158	APHA, 5220-B, 23rd Ed., 2017
4.	Bio-Chemical Oxygen Demand – BOD 3day 27°C	mg/l	23.0	IS 3025 P - 44
5.	Nitrate Nitrogen	mg/l	4.02	APHA, 4500-NO3-B & C, 23rd Ed., 2017
6.	Nitrite Nitrogen	mg/l	1.13	APHA, 4500-NO2-B, 23rd Ed., 2017
7.	Total Phosphate	mg/l	1.09	APHA, 4500-PD,
8.	Ammonical Nitrogen	mg/l	5.16	APHA, 4500-NH3 B-C, 23rd Ed., 2017
9.	Sulphide	mg/l	1.02	APHA, 4500-S2D, 23rd Ed., 2017
10.	Fluoride	mg/l	0.86	APHA, 4500-FD,23rd Ed., 2017
11.	Oil & Grease	mg/l	1.8	APHA, 5520-D, 23rd Ed., 2017
12.	Residual Chlorine	mg/l	<0.1	APHA, 4500-Cl B,

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Date: 24-05-2024

NAME AND ADDRESS : **M/s. VISAKHAPATNAM PORT TRUST CIVIL ENGINEERING DEPARTMENT, VISAKHAPATNAM.**

SAMPLE PARTICULARS : **EFFLUENT (SEWAGE WATER)**

SOURCE OF COLLECTION : TREATED OUTLET

DATE OF COLLECTION : 15-05-2024

TEST REPORT

S.No	PARAMETER	UNIT	RESULT	METHOD FOLLOWED	Standards For Disposal Of Land Irrigation
1.	pH	-	6.38	APHA, 4500-H+B,23rd Ed., 2017	5.5-9.0
2.	Total Suspended Solids	mg/l	31.0	APHA, 2540-D, 23rd Ed., 2017	200
3.	Chemical Oxygen Demand – COD	mg/l	76.9	APHA, 5220-B, 23rd Ed., 2017	250
4.	Bio-Chemical Oxygen Demand – BOD 3day 27°C	mg/l	18.0	IS 3025 P - 44	30
5.	Nitrate Nitrogen	mg/l	1.64	APHA, 4500-NO3-B & C, 23rd Ed., 2017	-
6.	Nitrite Nitrogen	mg/l	0.34	APHA, 4500-NO2-B, 23rd Ed., 2017	-
7.	Total Phosphate	mg/l	1.28	APHA, 4500-PD,	-
8.	Ammonical Nitrogen	mg/l	7.01	APHA, 4500-NH3 B-C, 23rd Ed., 2017	-
9.	Sulphide	mg/l	1.03	APHA, 4500-S2D, 23rd Ed., 2017	-
10.	Fluoride	mg/l	0.21	APHA, 4500-FD,23rd Ed., 2017	-
11.	Oil & Grease	mg/l	1.2	APHA, 5520-D, 23rd Ed., 2017	10
12.	Residual Chlorine	mg/l	<0.1	APHA, 4500-Cl B,	-

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Ref: SVELC/VPT-STP/24-05/01 3219/1 Date: 11-06-2024

NAME AND ADDRESS **M/s. VISAKHAPATNAM PORT TRUST CIVIL ENGINEERING DEPARTMENT, VISAKHAPATNAM.**

SAMPLE PARTICULARS : **EFFLUENT (SEWAGE WATER)**

SOURCE OF COLLECTION : CHANNEL INLET

DATE OF COLLECTION : 31-05-2024

TEST REPORT

S.No	PARAMETER	UNIT	RESULT	METHOD FOLLOWED
1.	pH	-	7.63	APHA, 4500-H+B,23rd Ed., 2017
2.	Total Suspended Solids	mg/l	130	APHA, 2540-D, 23rd Ed., 2017
3.	Chemical Oxygen Demand – COD	mg/l	188	APHA, 5220-B, 23rd Ed., 2017
4.	Bio-Chemical Oxygen Demand – BOD 3day 27°C	mg/l	29.0	IS 3025 P - 44
5.	Nitrate Nitrogen	mg/l	6.64	APHA, 4500-NO3-B & C, 23rd Ed., 2017
6.	Nitrite Nitrogen	mg/l	1.82	APHA, 4500-NO2-B, 23rd Ed., 2017
7.	Total Phosphate	mg/l	1.34	APHA, 4500-PD,
8.	Ammonical Nitrogen	mg/l	3.82	APHA, 4500-NH3 B-C, 23rd Ed., 2017
9.	Sulphide	mg/l	1.28	APHA, 4500-S2D, 23rd Ed., 2017
10.	Fluoride	mg/l	0.71	APHA, 4500-FD,23rd Ed., 2017
11.	Oil & Grease	mg/l	1.4	APHA, 5520-D, 23rd Ed., 2017
12.	Residual Chlorine	mg/l	<0.1	APHA, 4500-Cl B,

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Ref: SVELC/VPT-STP/24-05/04

Date: 11-06-2024

NAME AND ADDRESS : **M/s. VISAKHAPATNAM PORT TRUST CIVIL ENGINEERING DEPARTMENT, VISAKHAPATNAM.**

SAMPLE PARTICULARS : **EFFLUENT (SEWAGE WATER)**

SOURCE OF COLLECTION : CLARIFIER OUTLET

DATE OF COLLECTION : 31-05-2024

TEST REPORT

S.No	PARAMETER	UNIT	RESULT	METHOD FOLLOWED
1.	pH	-	7.39	APHA, 4500-H+B,23rd Ed., 2017
2.	Total Suspended Solids	mg/l	49.0	APHA, 2540-D, 23rd Ed., 2017
3.	Chemical Oxygen Demand – COD	mg/l	97.8	APHA, 5220-B, 23rd Ed., 2017
4.	Bio-Chemical Oxygen Demand – BOD 3day 27°C	mg/l	21.0	IS 3025 P - 44
5.	Nitrate Nitrogen	mg/l	3.62	APHA, 4500-NO3-B & C, 23rd Ed., 2017
6.	Nitrite Nitrogen	mg/l	1.22	APHA, 4500-NO2-B, 23rd Ed., 2017
7.	Total Phosphate	mg/l	1.96	APHA, 4500-PD,
8.	Ammonical Nitrogen	mg/l	4.82	APHA, 4500-NH3 B-C, 23rd Ed., 2017
9.	Sulphide	mg/l	1.26	APHA, 4500-S2D, 23rd Ed., 2017
10.	Fluoride	mg/l	0.24	APHA, 4500-FD,23rd Ed., 2017
11.	Oil & Grease	mg/l	1.0	APHA, 5520-D, 23rd Ed., 2017
12.	Residual Chlorine	mg/l	<0.1	APHA, 4500-Cl B,

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Hyderabad: Flat No. 302, H.No. 7-1-396/B/12, Sai Ram Residency, Balkampet Road, S.R.Nagar, Hyderabad-500038.
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Ref: SVELC/VPT-STP/24-06/01

Date: 25-06-2024

NAME AND ADDRESS 3248/3 **M/s. VISAKHAPATNAM PORT TRUST CIVIL ENGINEERING DEPARTMENT, VISAKHAPATNAM.**

SAMPLE PARTICULARS : **EFFLUENT (SEWAGE WATER)**

SOURCE OF COLLECTION : CHANNEL INLET

DATE OF COLLECTION : 15-06-2024

TEST REPORT

S.No	PARAMETER	UNIT	RESULT	METHOD FOLLOWED
1.	pH	-	7.64	APHA, 4500-H+B,23rd Ed., 2017
2.	Total Suspended Solids	mg/l	89.0	APHA, 2540-D, 23rd Ed., 2017
3.	Chemical Oxygen Demand – COD	mg/l	189	APHA, 5220-B, 23rd Ed., 2017
4.	Bio-Chemical Oxygen Demand – BOD 3day 27°C	mg/l	34.0	IS 3025 P - 44
5.	Nitrate Nitrogen	mg/l	5.61	APHA, 4500-NO3-B & C, 23rd Ed., 2017
6.	Nitrite Nitrogen	mg/l	1.72	APHA, 4500-NO2-B, 23rd Ed., 2017
7.	Total Phosphate	mg/l	1.23	APHA, 4500-PD,
8.	Ammonical Nitrogen	mg/l	4.16	APHA, 4500-NH3 B-C, 23rd Ed., 2017
9.	Sulphide	mg/l	0.86	APHA, 4500-S2D, 23rd Ed., 2017
10.	Fluoride	mg/l	0.73	APHA, 4500-FD,23rd Ed., 2017
11.	Oil & Grease	mg/l	1.2	APHA, 5520-D, 23rd Ed., 2017
12.	Residual Chlorine	mg/l	<0.1	APHA, 4500-Cl B,

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Ref: SVELC/VPT-STP/24-06/05 Date: 25-06-2024

NAME AND ADDRESS : **M/s. VISAKHAPATNAM PORT TRUST CIVIL ENGINEERING DEPARTMENT, VISAKHAPATNAM.**

SAMPLE PARTICULARS : **EFFLUENT (SEWAGE WATER)**

SOURCE OF COLLECTION : TREATED OUTLET

DATE OF COLLECTION : 15-06-2024

TEST REPORT

S.No	PARAMETER	UNIT	RESULT	METHOD FOLLOWED	Standards For Disposal Of Land Irrigation
1.	pH	-	6.68	APHA, 4500-H+B,23rd Ed., 2017	5.5-9.0
2.	Total Suspended Solids	mg/l	43.0	APHA, 2540-D, 23rd Ed., 2017	200
3.	Chemical Oxygen Demand – COD	mg/l	98.6	APHA, 5220-B, 23rd Ed., 2017	250
4.	Bio-Chemical Oxygen Demand – BOD 3day 27°C	mg/l	22.0	IS 3025 P - 44	30
5.	Nitrate Nitrogen	mg/l	1.34	APHA, 4500-NO3-B & C, 23rd Ed., 2017	-
6.	Nitrite Nitrogen	mg/l	0.29	APHA, 4500-NO2-B, 23rd Ed., 2017	-
7.	Total Phosphate	mg/l	1.06	APHA, 4500-PD,	-
8.	Ammonical Nitrogen	mg/l	5.62	APHA, 4500-NH3 B-C, 23rd Ed., 2017	-
9.	Sulphide	mg/l	0.82	APHA, 4500-S2D, 23rd Ed., 2017	-
10.	Fluoride	mg/l	0.17	APHA, 4500-FD,23rd Ed., 2017	-
11.	Oil & Grease	mg/l	1.0	APHA, 5520-D, 23rd Ed., 2017	10
12.	Residual Chlorine	mg/l	<0.1	APHA, 4500-Cl B,	-

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Ref: SVELC/VPT-STP/24-06/01

Date: 08-07-2024

NAME AND ADDRESS : **M/s. VISAKHAPATNAM PORT TRUST CIVIL ENGINEERING DEPARTMENT, VISAKHAPATNAM.**

SAMPLE PARTICULARS : **EFFLUENT (SEWAGE WATER)**

SOURCE OF COLLECTION : CHANNEL INLET

DATE OF COLLECTION : 30-06-2024

TEST REPORT

S.No	PARAMETER	UNIT	RESULT	METHOD FOLLOWED
1.	pH	-	7.33	APHA, 4500-H+B,23rd Ed., 2017
2.	Total Suspended Solids	mg/l	78.0	APHA, 2540-D, 23rd Ed., 2017
3.	Chemical Oxygen Demand – COD	mg/l	169	APHA, 5220-B, 23rd Ed., 2017
4.	Bio-Chemical Oxygen Demand – BOD 3day 27°C	mg/l	31.0	IS 3025 P - 44
5.	Nitrate Nitrogen	mg/l	4.68	APHA, 4500-NO3-B & C, 23rd Ed., 2017
6.	Nitrite Nitrogen	mg/l	1.42	APHA, 4500-NO2-B, 23rd Ed., 2017
7.	Total Phosphate	mg/l	1.09	APHA, 4500-PD,
8.	Ammonical Nitrogen	mg/l	4.02	APHA, 4500-NH3 B-C, 23rd Ed., 2017
9.	Sulphide	mg/l	0.79	APHA, 4500-S2D, 23rd Ed., 2017
10.	Fluoride	mg/l	0.68	APHA, 4500-FD,23rd Ed., 2017
11.	Oil & Grease	mg/l	1 0	APHA, 5520-D, 23rd Ed., 2017
12.	Residual Chlorine	mg/l	<0.1	APHA, 4500-Cl B,

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Ref: SVELC/VPT-STP/24-06/05

Date: 08-07-2024

NAME AND ADDRESS : **M/s. VISAKHAPATNAM PORT TRUST CIVIL ENGINEERING DEPARTMENT, VISAKHAPATNAM.**

SAMPLE PARTICULARS : **EFFLUENT (SEWAGE WATER)**

SOURCE OF COLLECTION : TREATED OUTLET

DATE OF COLLECTION : 30-06-2024

TEST REPORT

S.No	PARAMETER	UNIT	RESULT	METHOD FOLLOWED	Standards For Disposal Of Land Irrigation
1.	pH	-	6.92	APHA, 4500-H+B,23rd Ed., 2017	5.5-9.0
2.	Total Suspended Solids	mg/l	40.0	APHA, 2540-D, 23rd Ed., 2017	200
3.	Chemical Oxygen Demand – COD	mg/l	91.2	APHA, 5220-B, 23rd Ed., 2017	250
4.	Bio-Chemical Oxygen Demand – BOD 3day 27°C	mg/l	26.0	IS 3025 P - 44	30
5.	Nitrate Nitrogen	mg/l	1.18	APHA, 4500-NO3-B & C, 23rd Ed., 2017	-
6.	Nitrite Nitrogen	mg/l	0.41	APHA, 4500-NO2-B, 23rd Ed., 2017	-
7.	Total Phosphate	mg/l	1.38	APHA, 4500-PD,	-
8.	Ammonical Nitrogen	mg/l	4.19	APHA, 4500-NH3 B-C, 23rd Ed., 2017	-
9.	Sulphide	mg/l	0.73	APHA, 4500-S2D, 23rd Ed., 2017	-
10.	Fluoride	mg/l	0.14	APHA, 4500-FD,23rd Ed., 2017	-
11.	Oil & Grease	mg/l	1.0	APHA, 5520-D, 23rd Ed., 2017	10
12.	Residual Chlorine	mg/l	<0.1	APHA, 4500-Cl B,	-

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Ref: SVELC/VPT-STP/24-07/01

Date: 25-07-2024

NAME AND ADDRESS : **M/s. VISAKHAPATNAM PORT TRUST CIVIL ENGINEERING DEPARTMENT, VISAKHAPATNAM.**

SAMPLE PARTICULARS : **EFFLUENT (SEWAGE WATER)**

SOURCE OF COLLECTION : CHANNEL INLET

DATE OF COLLECTION : 15-07-2024

TEST REPORT

S.No	PARAMETER	UNIT	RESULT	METHOD FOLLOWED
1.	pH	-	7.86	APHA, 4500-H+B,24th Ed., 2023
2.	Total Suspended Solids	mg/l	91.0	APHA, 2540-D, 24th Ed., 2023
3.	Chemical Oxygen Demand – COD	mg/l	198	APHA, 5220-B, 24th Ed., 2023
4.	Bio-Chemical Oxygen Demand – BOD 3day 27°C	mg/l	42.0	IS 3025 P - 44
5.	Nitrate Nitrogen	mg/l	6.15	APHA, 4500-NO3-B & C, 24th Ed., 2023
6.	Nitrite Nitrogen	mg/l	1.16	APHA, 4500-NO2-B, 24th Ed., 2023
7.	Total Phosphate	mg/l	0.89	APHA, 4500-PD,
8.	Ammonical Nitrogen	mg/l	3.16	APHA, 4500-NH3 B-C, 24th Ed., 2023
9.	Sulphide	mg/l	0.72	APHA, 4500-S2D, 24th Ed., 2023
10.	Fluoride	mg/l	0.63	APHA, 4500-FD,24th Ed., 2023
11.	Oil & Grease	mg/l	1.0	APHA, 5520-D, 24th Ed., 2023
12.	Residual Chlorine	mg/l	<0.1	APHA, 4500-Cl B,

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Ref: SVELC/VPT-STP/24-07/05

Date: 25-07-2024

NAME AND ADDRESS : **M/s. VISAKHAPATNAM PORT TRUST CIVIL ENGINEERING DEPARTMENT, VISAKHAPATNAM.**

SAMPLE PARTICULARS : **EFFLUENT (SEWAGE WATER)**

SOURCE OF COLLECTION : TREATED OUTLET

DATE OF COLLECTION : 15-07-2024

TEST REPORT

S.No	PARAMETER	UNIT	RESULT	METHOD FOLLOWED	Standards For Disposal Of Land Irrigation
1.	pH	-	7.33	APHA, 4500-H+B,24th Ed., 2023	5.5-9.0
2.	Total Suspended Solids	mg/l	49.0	APHA, 2540-D, 24th Ed., 2023	200
3.	Chemical Oxygen Demand – COD	mg/l	76.5	APHA, 5220-B, 24th Ed., 2023	250
4.	Bio-Chemical Oxygen Demand – BOD 3day 27°C	mg/l	31.0	IS 3025 P - 44	30
5.	Nitrate Nitrogen	mg/l	1.05	APHA, 4500-NO3-B & C, 24th Ed., 2023	-
6.	Nitrite Nitrogen	mg/l	0.36	APHA, 4500-NO2-B, 24th Ed., 2023	-
7.	Total Phosphate	mg/l	1.28	APHA, 4500-PD,	-
8.	Ammonical Nitrogen	mg/l	3.72	APHA, 4500-NH3 B-C, 24th Ed., 2023	-
9.	Sulphide	mg/l	0.68	APHA, 4500-S2D, 24th Ed., 2023	-
10.	Fluoride	mg/l	0.12	APHA, 4500-FD,24th Ed., 2023	-
11.	Oil & Grease	mg/l	1.0	APHA, 5520-D, 24th Ed., 2023	10
12.	Residual Chlorine	mg/l	<0.1	APHA, 4500-Cl B,	-

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Ref: SVELC/VPT-STP/24-07/01 Date: 13-08-2024

NAME AND ADDRESS : **M/s. VISAKHAPATNAM PORT TRUST CIVIL ENGINEERING DEPARTMENT, VISAKHAPATNAM.**

SAMPLE PARTICULARS : **EFFLUENT (SEWAGE WATER)**

SOURCE OF COLLECTION : CHANNEL INLET

DATE OF COLLECTION : 31-07-2024

TEST REPORT

S.No	PARAMETER	UNIT	RESULT	METHOD FOLLOWED
1.	pH	-	7.13	APHA, 4500-H+B,24th Ed., 2023
2.	Total Suspended Solids	mg/l	82.0	APHA, 2540-D, 24th Ed., 2023
3.	Chemical Oxygen Demand – COD	mg/l	162	APHA, 5220-B, 24th Ed., 2023
4.	Bio-Chemical Oxygen Demand – BOD 3day 27°C	mg/l	34.0	IS 3025 P - 44
5.	Nitrate Nitrogen	mg/l	4.62	APHA, 4500-NO3-B & C, 24th Ed., 2023
6.	Nitrite Nitrogen	mg/l	1.03	APHA, 4500-NO2-B, 24th Ed., 2023
7.	Total Phosphate	mg/l	0.81	APHA, 4500-PD,
8.	Ammonical Nitrogen	mg/l	2.62	APHA, 4500-NH3 B-C, 24th Ed., 2023
9.	Sulphide	mg/l	0.64	APHA, 4500-S2D, 24th Ed., 2023
10.	Fluoride	mg/l	0.56	APHA, 4500-FD,24th Ed., 2023
11.	Oil & Grease	mg/l	1.0	APHA, 5520-D, 24th Ed., 2023
12.	Residual Chlorine	mg/l	<0.1	APHA, 4500-Cl B,

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Ref: SVELC/VPT-STP/24-07/05 Date: 13-08-2024

NAME AND ADDRESS : **M/s. VISAKHAPATNAM PORT TRUST CIVIL ENGINEERING DEPARTMENT, VISAKHAPATNAM.**

SAMPLE PARTICULARS : **EFFLUENT (SEWAGE WATER)**

SOURCE OF COLLECTION : TREATED OUTLET

DATE OF COLLECTION : 31-07-2024

TEST REPORT

S.No	PARAMETER	UNIT	RESULT	METHOD FOLLOWED	Standards For Disposal Of Land Irrigation
1.	pH	-	7.06	APHA, 4500-H+B,24th Ed., 2023	5.5-9.0
2.	Total Suspended Solids	mg/l	41.0	APHA, 2540-D, 24th Ed., 2023	200
3.	Chemical Oxygen Demand – COD	mg/l	96.3	APHA, 5220-B, 24th Ed., 2023	250
4.	Bio-Chemical Oxygen Demand – BOD 3day 27°C	mg/l	24.0	IS 3025 P - 44	30
5.	Nitrate Nitrogen	mg/l	1.55	APHA, 4500-NO3-B & C, 24th Ed., 2023	-
6.	Nitrite Nitrogen	mg/l	0.43	APHA, 4500-NO2-B, 24th Ed., 2023	-
7.	Total Phosphate	mg/l	1.58	APHA, 4500-PD,	-
8.	Ammonical Nitrogen	mg/l	4.64	APHA, 4500-NH3 B-C, 24th Ed., 2023	-
9.	Sulphide	mg/l	0.61	APHA, 4500-S2D, 24th Ed., 2023	-
10.	Fluoride	mg/l	0.10	APHA, 4500-FD,24th Ed., 2023	-
11.	Oil & Grease	mg/l	1.8	APHA, 5520-D, 24th Ed., 2023	10
12.	Residual Chlorine	mg/l	<0.1	APHA, 4500-Cl B,	-

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Ref: SVELC/VPT-STP/24-08/01 Date: 26-08-2024

NAME AND ADDRESS : **M/s. VISAKHAPATNAM PORT TRUST CIVIL ENGINEERING DEPARTMENT, VISAKHAPATNAM.**

SAMPLE PARTICULARS : **EFFLUENT (SEWAGE WATER)**

SOURCE OF COLLECTION : CHANNEL INLET

DATE OF COLLECTION : 15-08-2024

TEST REPORT

S.No	PARAMETER	UNIT	RESULT	METHOD FOLLOWED
1.	Ph	-	6.75	APHA, 4500-H+B,24th Ed., 2023
2.	Total Suspended Solids	mg/l	71.0	APHA, 2540-D, 24th Ed., 2023
3.	Chemical Oxygen Demand – COD	mg/l	198	APHA, 5220-B, 24th Ed., 2023
4.	Bio-Chemical Oxygen Demand – BOD 3day 27°C	mg/l	43.0	IS 3025 P - 44
5.	Nitrate Nitrogen	mg/l	2.94	APHA, 4500-NO3-B & C, 24th Ed., 2023
6.	Nitrite Nitrogen	mg/l	1.32	APHA, 4500-NO2-B, 24th Ed., 2023
7.	Total Phosphate	mg/l	0.65	APHA, 4500-PD,
8.	Ammonical Nitrogen	mg/l	1.95	APHA, 4500-NH3 B-C, 24th Ed., 2023
9.	Sulphide	mg/l	0.57	APHA, 4500-S2D, 24th Ed., 2023
10.	Fluoride	mg/l	0.51	APHA, 4500-FD,24th Ed., 2023
11.	Oil & Grease	mg/l	1.0	APHA, 5520-D, 24th Ed., 2023
12.	Residual Chlorine	mg/l	<0.1	APHA, 4500-Cl B,

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Ref: SVELC/VPT-STP/24-08/05

Date: 26-08-2024

NAME AND ADDRESS : **M/s. VISAKHAPATNAM PORT TRUST CIVIL ENGINEERING DEPARTMENT, VISAKHAPATNAM.**

SAMPLE PARTICULARS : **EFFLUENT (SEWAGE WATER)**

SOURCE OF COLLECTION : TREATED OUTLET

DATE OF COLLECTION : 15-08-2024

TEST REPORT

S.No	PARAMETER	UNIT	RESULT	METHOD FOLLOWED	Standards For Disposal Of Land Irrigation
1.	pH	-	6.79	APHA, 4500-H+B,24th Ed., 2023	5.5-9.0
2.	Total Suspended Solids	mg/l	34.0	APHA, 2540-D, 24th Ed., 2023	200
3.	Chemical Oxygen Demand – COD	mg/l	81.4	APHA, 5220-B, 24th Ed., 2023	250
4.	Bio-Chemical Oxygen Demand – BOD 3day 27°C	mg/l	21.0	IS 3025 P - 44	30
5.	Nitrate Nitrogen	mg/l	2.64	APHA, 4500-NO3-B & C, 24th Ed., 2023	-
6.	Nitrite Nitrogen	mg/l	0.58	APHA, 4500-NO2-B, 24th Ed., 2023	-
7.	Total Phosphate	mg/l	1.92	APHA, 4500-PD,	-
8.	Ammonical Nitrogen	mg/l	3.72	APHA, 4500-NH3 B-C, 24th Ed., 2023	-
9.	Sulphide	mg/l	0.52	APHA, 4500-S2D, 24th Ed., 2023	-
10.	Fluoride	mg/l	0.13	APHA, 4500-FD,24th Ed., 2023	-
11.	Oil & Grease	mg/l	1.2	APHA, 5520-D, 24th Ed., 2023	10
12.	Residual Chlorine	mg/l	<0.1	APHA, 4500-Cl B,	-

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1. 8 OCT 2024
Office of the Chief Engineer
Visakhapatnam Port Authority

Ref: SVELC/VPT-STP/24-08/01 Date: 10-09-2024

NAME AND ADDRESS : **M/s. VISAKHAPATNAM PORT TRUST CIVIL ENGINEERING DEPARTMENT, VISAKHAPATNAM.**

SAMPLE PARTICULARS : **EFFLUENT (SEWAGE WATER)**

SOURCE OF COLLECTION : CHANNEL INLET

DATE OF COLLECTION : 31-08-2024

Manager
EE(EC)
7/10
4/8/2024

TEST REPORT

S.No	PARAMETER	UNIT	RESULT	METHOD FOLLOWED
1.	pH	-	7.62	APHA, 4500-H+B,24th Ed., 2023
2.	Total Suspended Solids	mg/l	64.0	APHA, 2540-D, 24th Ed., 2023
3.	Chemical Oxygen Demand – COD	mg/l	171	APHA, 5220-B, 24th Ed., 2023
4.	Bio-Chemical Oxygen Demand – BOD 3day 27°C	mg/l	39.0	IS 3025 P - 44
5.	Nitrate Nitrogen	mg/l	2.41	APHA, 4500-NO3-B & C, 24th Ed., 2023
6.	Nitrite Nitrogen	mg/l	1.06	APHA, 4500-NO2-B, 24th Ed., 2023
7.	Total Phosphate	mg/l	0.52	APHA, 4500-PD,
8.	Ammonical Nitrogen	mg/l	1.53	APHA, 4500-NH3 B-C, 24th Ed., 2023
9.	Sulphide	mg/l	0.53	APHA, 4500-S2D, 24th Ed., 2023
10.	Fluoride	mg/l	0.61	APHA, 4500-FD,24th Ed., 2023
11.	Oil & Grease	mg/l	2.0	APHA, 5520-D, 24th Ed., 2023
12.	Residual Chlorine	mg/l	<0.1	APHA, 4500-Cl B,

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Ref: SVELC/VPT-STP/24-08/02 Date: 10-09-2024

NAME AND ADDRESS : **M/s. VISAKHAPATNAM PORT TRUST CIVIL ENGINEERING DEPARTMENT, VISAKHAPATNAM.**

SAMPLE PARTICULARS : **EFFLUENT (SEWAGE WATER)**

SOURCE OF COLLECTION : AERATION TANK INLET

DATE OF COLLECTION : 31-08-2024

TEST REPORT

S.No	PARAMETER	UNIT	RESULT	METHOD FOLLOWED
1.	pH	-	7.83	APHA, 4500-H+B,24th Ed., 2023
2.	Total Suspended Solids	mg/l	70.0	APHA, 2540-D, 24th Ed., 2023
3.	Chemical Oxygen Demand – COD	mg/l	113	APHA, 5220-B, 24th Ed., 2023
4.	Bio-Chemical Oxygen Demand – BOD 3day 27°C	mg/l	49.0	IS 3025 P - 44
5.	Nitrate Nitrogen	mg/l	4.16	APHA, 4500-NO3-B & C, 24th Ed., 2023
6.	Nitrite Nitrogen	mg/l	0.61	APHA, 4500-NO2-B, 24th Ed., 2023
7.	Total Phosphate	mg/l	1.52	APHA, 4500-PD,
8.	Ammonical Nitrogen	mg/l	2.61	APHA, 4500-NH3 B-C, 24th Ed., 2023
9.	Sulphide	mg/l	1.68	APHA, 4500-S2D, 24th Ed., 2023
10.	Fluoride	mg/l	0.15	APHA, 4500-FD,24th Ed., 2023
11.	Oil & Grease	mg/l	1.6	APHA, 5520-D, 24th Ed., 2023
12.	Residual Chlorine	mg/l	<0.1	APHA, 4500-Cl B,

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Ref: SVELC/VPT-STP/24-09/01 Date: 24-09-2024

NAME AND ADDRESS : **M/s. VISAKHAPATNAM PORT TRUST CIVIL ENGINEERING DEPARTMENT, VISAKHAPATNAM.**

SAMPLE PARTICULARS : **EFFLUENT (SEWAGE WATER)**

SOURCE OF COLLECTION : CHANNEL INLET

DATE OF COLLECTION : 15-09-2024

TEST REPORT

S.No	PARAMETER	UNIT	RESULT	METHOD FOLLOWED
1.	pH	-	6.97	APHA, 4500-H+B,24th Ed., 2023
2.	Total Suspended Solids	mg/l	87.0	APHA, 2540-D, 24th Ed., 2023
3.	Chemical Oxygen Demand – COD	mg/l	234	APHA, 5220-B, 24th Ed., 2023
4.	Bio-Chemical Oxygen Demand – BOD 3day 27°C	mg/l	57.0	IS 3025 P - 44
5.	Nitrate Nitrogen	mg/l	4.26	APHA, 4500-NO3-B & C, 24th Ed., 2023
6.	Nitrite Nitrogen	mg/l	1.57	APHA, 4500-NO2-B, 24th Ed., 2023
7.	Total Phosphate	mg/l	0.73	APHA, 4500-PD,
8.	Ammonical Nitrogen	mg/l	1.64	APHA, 4500-NH3 B-C, 24th Ed., 2023
9.	Sulphide	mg/l	0.51	APHA, 4500-S2D, 24th Ed., 2023
10.	Fluoride	mg/l	0.43	APHA, 4500-FD,24th Ed., 2023
11.	Oil & Grease	mg/l	1.8	APHA, 5520-D, 24th Ed., 2023
12.	Residual Chlorine	mg/l	<0.1	APHA, 4500-Cl B,

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Ref: SVELC/VPT-STP/24-09/05 Date: 24-09-2024

NAME AND ADDRESS : **M/s. VISAKHAPATNAM PORT TRUST CIVIL ENGINEERING DEPARTMENT, VISAKHAPATNAM.**

SAMPLE PARTICULARS : **EFFLUENT (SEWAGE WATER)**

SOURCE OF COLLECTION : TREATED OUTLET

DATE OF COLLECTION : 15-09-2024

TEST REPORT

S.No	PARAMETER	UNIT	RESULT	METHOD FOLLOWED	Standards For Disposal Of Land Irrigation
1.	pH	-	6.91	APHA, 4500-H+B,24th Ed., 2023	5.5-9.0
2.	Total Suspended Solids	mg/l	31.0	APHA, 2540-D, 24th Ed., 2023	200
3.	Chemical Oxygen Demand – COD	mg/l	92.6	APHA, 5220-B, 24th Ed., 2023	250
4.	Bio-Chemical Oxygen Demand – BOD 3day 27°C	mg/l	25.0	IS 3025 P - 44	30
5.	Nitrate Nitrogen	mg/l	1.97	APHA, 4500-NO3-B & C, 24th Ed., 2023	-
6.	Nitrite Nitrogen	mg/l	0.51	APHA, 4500-NO2-B, 24th Ed., 2023	-
7.	Total Phosphate	mg/l	1.22	APHA, 4500-PD,	-
8.	Ammonical Nitrogen	mg/l	2.91	APHA, 4500-NH3 B-C, 24th Ed., 2023	-
9.	Sulphide	mg/l	0.43	APHA, 4500-S2D, 24th Ed., 2023	-
10.	Fluoride	mg/l	0.10	APHA, 4500-FD,24th Ed., 2023	-
11.	Oil & Grease	mg/l	1.0	APHA, 5520-D, 24th Ed., 2023	10
12.	Residual Chlorine	mg/l	<0.1	APHA, 4500-Cl B,	-

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Ref: SVELC/VPT-STP/24-09/01

Date: 07-10-2024

NAME AND ADDRESS : **M/s. VISAKHAPATNAM PORT TRUST CIVIL ENGINEERING DEPARTMENT, VISAKHAPATNAM.**

SAMPLE PARTICULARS : **EFFLUENT (SEWAGE WATER)**

SOURCE OF COLLECTION : CHANNEL INLET

DATE OF COLLECTION : 30-09-2024

TEST REPORT

S.No	PARAMETER	UNIT	RESULT	METHOD FOLLOWED
1.	pH	-	7.92	APHA, 4500-H+B,24th Ed., 2023
2.	Total Suspended Solids	mg/l	98.0	APHA, 2540-D, 24th Ed., 2023
3.	Chemical Oxygen Demand – COD	mg/l	286	APHA, 5220-B, 24th Ed., 2023
4.	Bio-Chemical Oxygen Demand – BOD 3day 27°C	mg/l	39.0	IS 3025 P - 44
5.	Nitrate Nitrogen	mg/l	2.67	APHA, 4500-NO3-B & C, 24th Ed., 2023
6.	Nitrite Nitrogen	mg/l	1.22	APHA, 4500-NO2-B, 24th Ed., 2023
7.	Total Phosphate	mg/l	0.67	APHA, 4500-PD.
8.	Ammonical Nitrogen	mg/l	1.46	APHA, 4500-NH3 B-C, 24th Ed., 2023
9.	Sulphide	mg/l	0.48	APHA, 4500-S2D, 24th Ed., 2023
10.	Fluoride	mg/l	0.40	APHA, 4500-FD,24th Ed., 2023
11.	Oil & Grease	mg/l	1.5	APHA, 5520-D, 24th Ed., 2023
12.	Residual Chlorine	mg/l	<0.1	APHA, 4500-Cl B.

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Ref: SVELC/VPT-STP/24-09/05

Date: 07-10-2024

NAME AND ADDRESS : **M/s. VISAKHAPATNAM PORT TRUST CIVIL ENGINEERING DEPARTMENT, VISAKHAPATNAM.**

SAMPLE PARTICULARS : **EFFLUENT (SEWAGE WATER)**

SOURCE OF COLLECTION : TREATED OUTLET

DATE OF COLLECTION : 30-09-2024

TEST REPORT

S.No	PARAMETER	UNIT	RESULT	METHOD FOLLOWED	Standards For Disposal Of Land Irrigation
1.	pH	-	7.29	APHA, 4500-H+B,24th Ed., 2023	5.5-9.0
2.	Total Suspended Solids	mg/l	24.0	APHA, 2540-D, 24th Ed., 2023	200
3.	Chemical Oxygen Demand – COD	mg/l	81.0	APHA, 5220-B, 24th Ed., 2023	250
4.	Bio-Chemical Oxygen Demand – BOD 3day 27°C	mg/l	22.0	IS 3025 P - 44	30
5.	Nitrate Nitrogen	mg/l	1.75	APHA, 4500-NO3-B & C, 24th Ed., 2023	-
6.	Nitrite Nitrogen	mg/l	0.45	APHA, 4500-NO2-B, 24th Ed., 2023	-
7.	Total Phosphate	mg/l	1.13	APHA, 4500-PD,	-
8.	Ammonical Nitrogen	mg/l	2.58	APHA, 4500-NH3 B-C, 24th Ed., 2023	-
9.	Sulphide	mg/l	0.39	APHA, 4500-S2D, 24th Ed., 2023	-
10.	Fluoride	mg/l	0.09	APHA, 4500-FD,24th Ed., 2023	-
11.	Oil & Grease	mg/l	1.6	APHA, 5520-D, 24th Ed., 2023	10
12.	Residual Chlorine	mg/l	<0.1	APHA, 4500-Cl B,	-

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Annexure – I

Table. 1: Analysis results of physico-chemical parameters of ground water leachate

S. No.	Parameters	East Yard	S4	R2-R5	19 area	B - Ramp area	Standards
1	**pH**	8.18	7.90	4.59	6.86	5.66	5.5 to 8.5
2	**Temp**	26.9	28.6	28.6	28.6	27.5	27
3	**EC**	1820	39693	13867	12391	53333	500
4	**TDS**	1277	24242	9363	8501	38357	250
5	**DO**	3.60	3.81	3.10	3.53	2.52	>3
6	**BOD_3**	7.81	7.03	10.63	12.34	13.28	<5
7	**COD**	19	39	45	31	45	10
8	**Chloride**	255	4848	1873	1700	7671	250
9	**Fluoride**	1.29	0.54	0.43	0.43	0.32	1.5
10	**Sulphate**	3.8	40.9	24.8	21.5	38.8	200
11	**Phosphate**	6.25	25.86	8.84	8.19	16.16	-
12	**Alkalinity**	311	240	204	226	210	200
13	**Nitrate**	0.09	1.23	0.31	0.41	0.82	45
14	**Calcium**	11	64	29	26	57	60
15	**TH**	30	78	38	38	74	200
16	**Sodium**	164	34	237	204	240	20
17	**Potassium**	30	92	70	67	28	-

Note: *all parameters were expressed in ppm except temperature(^oC) and EC ($\mu S/cm$)*

Table. 2: Heavy metal analysis report of ground water leachate

S. No.	Name of the Heavy metal	East Yard	S4 area	R2-R5	19 area	B-Ramp area	Standards
1	**Boron (B)**	0.449	0.523	2.332	0.373	0.577	0.5
2	**Copper (Cu)**	0.138	0.026	0.657	0.154	0.017	0.05
3	**Manganese (Mn)**	0.001	0.030	0.011	0.017	0.003	0.1
4	**Zinc (Zn)**	0.017	0.016	0.019	0.026	0.035	5
5	**Barium (Ba)**	0.277	0.109	0.296	0.056	0.118	0.7
6	**Selenium (Se)**	0.003	0.01	0.002	0.001	0.009	0.01
7	**Silver (Ag)**	0.009	0.001	0.017	0.013	0.018	0.1
8	**Cadmium (Cd)**	0.001	0.002	0.003	0.001	0.001	0.003
9	**Lead (Pb)**	0.008	0.005	0.001	0.004	0.001	0.01
10	**Molybdenum (Mo)**	BDL	BDL	BDL	BDL	BDL	0.07
11	**Nickel (Ni)**	0.007	0.006	0.002	0.006	0.006	0.02
12	**Total Arsenic (As)**	BDL	BDL	BDL	BDL	BDL	0.01
13	**Total Chromium (Cr)**	BDL	BDL	BDL	BDL	BDL	0.05
14	**Vanadium (V)**	0.002	0.015	0.003	0.010	0.001	0.2
15	**Cobalt (CO)**	0.002	0.003	0.001	0.002	0.005	-

Note: *All heavy metal parameters expressed in ppm*

RESULTS:

Physico-chemical, heavy metal and microbial analysis reports given in the table no. 2, 3, 4, 5 and 6.

DATE OF SAMPLING: 21-06-2024.

Table. 2: Heavy metal analysis report of harbour water samples for the period of April to June 2024 (Low Tide)

Sampling Points	Vanadium (as V)	Hexavalent Chromium	Total Chromium	Copper	Zinc (as Zn)	Arsenic (as As)	Cadmium (as Cd)	Lead (as Pb)	Mercury (as Hg)
Standards	**0.2**	**0.1**	**0.5**	**2.0**	**5.0**	**0.05**	**0.1**	**0.1**	**0.05**
Open Sea	0.15	BDL	0.26	0.13	0.38	BDL	BDL	BDL	BDL
Fishing Harbour	0.21	BDL	0.45	0.41	0.59	BDL	BDL	BDL	BDL
Entrance of Inner Harbour	0.18	BDL	0.26	0.30	0.60	BDL	BDL	BDL	BDL
LPG	0.20	BDL	0.28	0.49	0.56	BDL	BDL	BDL	BDL
In between OR_1 and OR_2	0.21	BDL	0.35	0.51	0.59	BDL	BDL	BDL	BDL
Iron Ore Berth	0.17	BDL	0.37	0.41	0.79	BDL	BDL	BDL	BDL
Jetty No.1	0.18	BDL	0.28	0.37	0.55	BDL	BDL	BDL	BDL
Turning Circle (Inner Harbour)	0.20	BDL	0.38	0.51	0.64	BDL	BDL	BDL	BDL
Turning Circle (Outer Harbour)	0.17	BDL	0.26	0.41	0.56	BDL	BDL	BDL	BDL

BDL – Below Detectable Limit, (all values are expressed in ppm).

Table. 3: Physico-chemical analysis report of harbour water samples for the period of April to June 2024 (Low Tide)

Sampling Point	Color	Odor	pH	DO	TSS	BOD	Oil and Grease	Sulphide	Cyanide	Ammonical Nitrogen	Free Ammonical Nitrogen	Total Kjeldal Nitrogen	Fluoride
Standards	-	-	**6.5-9.2**	**>3.0**	**600**	**5.0**	**10**	**5.0**	**0.05**	**50**	**4.0**	**100**	**1.5**
Open Sea	Colorless	U.O	7.13	7.3	469	2.7	3.5	3.4	BDL	48.4	BDL	55.0	0.8
Fishing Harbour	Colorless	U.O	9.50	5.1	792	5.6	13.4	6.4	BDL	56.5	BDL	67.4	1.2
Entrance of Inner Harbour	Colorless	U.O	8.92	6.3	719	3.0	5.8	5.5	BDL	62.9	BDL	66.9	0.2
LPG	Colorless	U.O	8.98	6.6	713	2.5	6.9	4.8	BDL	48.9	BDL	59.3	0.6
In between OR1 and OR2	Colorless	U.O	7.13	5.2	874	3.8	11.1	5.5	BDL	49.4	BDL	72.3	0.8
Iron Ore Berth	Colorless	U.O	8.08	6.2	714	3.0	8.3	5.0	BDL	54.4	BDL	68.9	0.2
Jetty No.1	Colorless	U.O	9.38	6.3	642	3.3	8.7	4.3	BDL	49.3	BDL	57.4	0.2
Turning Circle (Inner Harbour)	Colorless	U.O	7.73	5.3	846	5.2	12.2	5.2	BDL	55.5	BDL	70.6	0.2
Turning Circle (Outer Harbour)	Colorless	U.O	7.63	6.3	683	3.0	5.6	4.2	BDL	57.6	BDL	65.4	0.6

BDL - Below Detectable Limit, U.O - Un-Objectionable, OBJ - Objectionable, (all values are expressed in ppm).

Table. 4: Heavy metal Analysis report of harbour water samples for the period of April to June 2024 (High Tide)

Sampling Points	Vanadium (as V)	Hexavalent Chromium	Total Chromium	Copper	Zinc (as Zn)	Arsenic (as As)	Cadmium (as Cd)	Lead (as Pb)	Mercury (as Hg)
Standards	**0.2**	**0.1**	**0.5**	**2.0**	**5.0**	**0.05**	**0.1**	**0.1**	**0.05**
Open Sea	0.13	BDL	0.24	0.12	0.32	BDL	BDL	BDL	BDL
Fishing Harbour	0.18	BDL	0.41	0.37	0.49	BDL	BDL	BDL	BDL
Entrance of Inner Harbour	0.15	BDL	0.24	0.27	0.50	BDL	BDL	BDL	BDL
LPG	0.17	BDL	0.26	0.45	0.47	BDL	BDL	BDL	BDL
In between OR_1 and OR_2	0.18	BDL	0.32	0.46	0.49	BDL	BDL	BDL	BDL
Iron Ore Berth	0.14	BDL	0.34	0.37	0.66	BDL	BDL	BDL	BDL
Jetty No.1	0.15	BDL	0.26	0.34	0.46	BDL	BDL	BDL	BDL
Turning Circle (Inner Harbour)	0.17	BDL	0.35	0.46	0.53	BDL	BDL	BDL	BDL
Turning Circle (Outer Harbour)	0.14	BDL	0.24	0.37	0.47	BDL	BDL	BDL	BDL

BDL – Below Detectable Limit, (all values are expressed in ppm)

Table. 5: Physico-chemical analysis report of harbour water samples for the period of April to June 2024 (High Tide)

Sampling Point	Color	Odor	pH	DO	TSS	BOD	Oil and Grease	Sulphide	Cyanide	Ammonical Nitrogen	Free Ammonical Nitrogen	Total Kjeldal Nitrogen	Fluoride
Standards	-	-	6.5-9.2	>3.0	600	5.0	10	5.0	0.05	50	4.0	100	1.5
Open Sea	Colorless	U.O	6.54	8.2	345	1.7	2.7	2.7	BDL	38.1	BDL	44.0	0.7
Fishing Harbour	Colorless	U.O	8.72	5.8	582	3.5	10.5	5.0	BDL	44.5	BDL	53.9	1.0
Entrance of Inner Harbour	Colorless	U.O	8.18	7.1	529	1.9	4.5	4.3	BDL	49.5	BDL	53.5	0.2
LPG	Colorless	U.O	8.24	7.5	524	1.6	5.4	3.8	BDL	47.3	BDL	47.4	1.2
In between OR1 and OR2	Colorless	U.O	6.54	5.9	643	2.4	8.7	4.3	BDL	46.6	BDL	57.8	0.5
Iron Ore Berth	Colorless	U.O	7.41	7.0	525	1.9	6.5	3.9	BDL	44.5	BDL	55.1	0.7
Jetty No.1	Colorless	U.O	8.61	7.1	472	2.1	6.8	3.4	BDL	42.8	BDL	45.9	0.2
Turning Circle (Inner Harbour)	Colorless	U.O	7.09	6.0	622	3.3	9.5	4.1	BDL	48.3	BDL	56.5	0.2
Turning Circle (Outer Harbour)	Colorless	U.O	7.00	7.1	502	1.9	4.4	3.3	BDL	48.0	BDL	52.3	0.5

BDL - Below Detectable Limit, U.O - Un-Objectionable, OBJ - Objectionable, (all values are expressed in ppm)

Table. 6: Fecal Coliform report for the Period of April to June 2024

S. No.	Location	Low Tide No./100ml	High Tide No./100ml
Standard		500	500
1	Open Sea	13	6
2	Fishing Harbour	128	85
3	Entrance of Inner Harbour	16	15
4	LPG	15	8
5	Turning Circle (Inner Harbour)	60	53

RESULTS:

Physico-chemical, heavy metal and microbial analysis reports given in the table no. 2, 3, 4, 5 and 6.

DATE OF SAMPLING: 30-09-2024.

Table. 2: Heavy metal analysis report of harbour water samples for the period of July to September (2024 (Low Tide)

Sampling Points	Vanadium (as V)	Hexavalent Chromium	Total Chromium	Copper	Zinc (as Zn)	Arsenic (as As)	Cadmium (as Cd)	Lead (as Pb)	Mercury (as Hg)
Standards	0.2	0.1	0.5	2.0	5.0	0.05	0.1	0.1	0.05
Open Sea	0.18	BDL	0.28	0.14	0.46	BDL	BDL	BDL	BDL
Fishing Harbour	0.25	BDL	0.49	0.45	0.71	BDL	BDL	BDL	BDL
Entrance of Inner Harbour	0.21	BDL	0.28	0.33	0.72	BDL	BDL	BDL	BDL
LPG	0.24	BDL	0.30	0.54	0.67	BDL	BDL	BDL	BDL
In between OR_1 and OR_2	0.25	BDL	0.38	0.56	0.71	BDL	BDL	BDL	BDL
Iron Ore Berth	0.20	BDL	0.40	0.45	0.95	BDL	BDL	BDL	BDL
Jetty No.1	0.21	BDL	0.30	0.41	0.66	BDL	BDL	BDL	BDL
Turning Circle (Inner Harbour)	0.24	BDL	0.41	0.56	0.77	BDL	BDL	BDL	BDL
Turning Circle (Outer Harbour)	0.20	BDL	0.28	0.45	0.67	BDL	BDL	BDL	BDL

BDL – Below Detectable Limit, (all values are expressed in ppm).

Table. 3: Physico-chemical analysis report of harbour water samples for the period of July to September (Low Tide)

Sampling Point	Color	Odor	pH	DO	TSS	BOD	Oil and Grease	Sulphide	Cyanide	Ammonical Nitrogen	Free Ammonical Nitrogen	Total Kjeldal Nitrogen	Fluoride
Standards	-	-	6.5-9.2	>3.0	600	5.0	10	5.0	0.05	50	4.0	100	1.5
Open Sea	Colorless	U.O	7.77	7.4	530	3.2	3.8	4.3	BDL	51.8	BDL	55.6	1.0
Fishing Harbour	Colorless	U.O	8.60	5.2	895	6.7	14.5	8.1	BDL	60.5	BDL	68.1	1.5
Entrance of Inner Harbour	Colorless	U.O	8.22	6.4	812	3.6	6.3	7.0	BDL	67.3	BDL	67.6	0.2
LPG	Colorless	U.O	8.25	6.7	806	3.0	7.5	6.1	BDL	52.3	BDL	59.9	1.0
In between OR1 and OR2	Colorless	U.O	7.77	5.3	988	4.5	12.0	7.0	BDL	52.9	BDL	73.0	0.2
Iron Ore Berth	Colorless	U.O	8.81	6.3	807	3.6	9.0	6.4	BDL	58.2	BDL	69.6	0.2
Jetty No.1	Colorless	U.O	8.97	6.4	725	3.9	9.4	5.5	BDL	52.8	BDL	58.0	0.2
Turning Circle (Inner Harbour)	Colorless	U.O	8.43	5.4	956	6.2	13.2	6.6	BDL	59.4	BDL	71.3	0.2
Turning Circle (Outer Harbour)	Colorless	U.O	8.32	6.4	772	3.6	6.0	5.3	BDL	61.6	BDL	66.1	0.7

BDL – Below Detectable Limit, U.O – Un-Objectionable, OBJ – Objectionable, (all values are expressed in ppm).

Table. 4: Heavy metal Analysis report of harbour water samples for the period of July to September (High Tide)

Sampling Points	Vanadium (as V)	Hexavalent Chromium	Total Chromium	Copper	Zinc (as Zn)	Arsenic (as As)	Cadmium (as Cd)	Lead (as Pb)	Mercury (as Hg)
Standards	0.2	0.1	0.5	2.0	5.0	0.05	0.1	0.1	0.05
Open Sea	0.14	BDL	0.25	0.12	0.40	BDL	BDL	BDL	BDL
Fishing Harbour	0.20	BDL	0.44	0.40	0.62	BDL	BDL	BDL	BDL
Entrance of Inner Harbour	0.17	BDL	0.25	0.29	0.63	BDL	BDL	BDL	BDL
LPG	0.19	BDL	0.27	0.48	0.58	BDL	BDL	BDL	BDL
In between OR_1 and OR_2	0.20	BDL	0.34	0.49	0.62	BDL	BDL	BDL	BDL
Iron Ore Berth	0.16	BDL	0.36	0.40	0.83	BDL	BDL	BDL	BDL
Jetty No.1	0.17	BDL	0.27	0.36	0.57	BDL	BDL	BDL	BDL
Turning Circle (Inner Harbour)	0.19	BDL	0.36	0.49	0.67	BDL	BDL	BDL	BDL
Turning Circle (Outer Harbour)	0.16	BDL	0.25	0.40	0.58	BDL	BDL	BDL	BDL

BDL – Below Detectable Limit, (all values are expressed in ppm)

Table. 5: Physico-chemical analysis report of harbour water samples for the period of July to September 2024 (High Tide)

Sampling Point	Color	Odor	pH	DO	TSS	BOD	Oil and Grease	Sulphide	Cyanide	Ammonical Nitrogen	Free Ammonical Nitrogen	Total Kjeldal Nitrogen	Fluoride
Standards	-	-	6.5-9.2	>3.0	600	5.0	10	5.0	0.05	50	4.0	100	1.5
Open Sea	Colorless	U.O	7.61	7.7	350	2.2	3.3	3.7	BDL	44.0	BDL	47.3	0.9
Fishing Harbour	Colorless	U.O	8.43	5.5	591	4.6	12.8	7.0	BDL	51.4	BDL	57.9	1.4
Entrance of Inner Harbour	Colorless	U.O	8.06	6.7	536	2.5	5.5	6.1	BDL	57.2	BDL	57.5	0.2
LPG	Colorless	U.O	8.09	7.0	532	2.1	6.6	5.3	BDL	44.5	BDL	50.9	0.9
In between OR1 and OR2	Colorless	U.O	7.61	5.6	652	3.1	10.6	6.1	BDL	45.0	BDL	62.1	0.2
Iron Ore Berth	Colorless	U.O	8.63	6.6	533	2.5	7.9	5.6	BDL	49.5	BDL	59.2	0.2
Jetty No.1	Colorless	U.O	8.79	6.7	479	2.7	8.3	4.8	BDL	44.9	BDL	49.3	0.2
Turning Circle (Inner Harbour)	Colorless	U.O	8.26	5.7	631	4.3	11.6	5.7	BDL	50.5	BDL	60.6	0.2
Turning Circle (Outer Harbour)	Colorless	U.O	8.15	6.7	510	2.5	5.3	4.6	BDL	52.4	BDL	56.2	0.6

BDL – Below Detectable Limit, U.O – Un-Objectionable, OBJ – Objectionable, (all values are expressed in ppm)

Table. 6: Fecal Coliform report for the Period of July to September 2024

S. No.	Location	Low Tide No./100ml	High Tide No./100ml
Standard		500	500
1	Open Sea	16	12
2	Fishing Harbour	142	96
3	Entrance of Inner Harbour	18	16
4	LPG	14	10
5	Turning Circle (Inner Harbour)	49	45

ANNEXURE – 11

***Fax* No.0891-2565023**

Government of India
Ministry of Water Resources, River Development and Ganga Rejuvenation
Central Water & Power Research Station
Khadakwasla, Pune – 411 024

Tel : 020-24103421
Fax : 020-24381004
E-mail : kudale_md@cwprs.gov.in

No.101/13/72-PH II Dated: 10.03.2016

Chief Engineer,
Visakhapatnam Port Trust
Visakhapatnam 530 035.

(Attn: Shri. M.R. Rajanikanth, SE)

Sub: Sediment Transport Investigation at Visakhapatnam Port –Dumping Ground - Reg.
Ref: VPT fax letter. No. IENG/SE-V/AE-I/CWPRS/2016 dated 25 Feb. 2016

Sir,

With reference to your fax on the subject matter, this is to inform that based on the Radio-active studies conducted at Visakhapatnam, dumping ground is suitable for disposal of contemplated dumping activity. From the sounding chart (Fig.1 given in the Annexure) obtained from dumping ground survey conducted in the year 2015 and also in view of the fact that maintenance dredging of the port is reasonably low, it is opined that spoil ground of 2.6 Sq.km area is suitable for proposed dumping. The material to be disposed, 9.66 Lakh Cum, from the proposed capital dredging (Table.1) is not expected to come back towards the shipping channel. Radio-active Tracer studies conducted along with BARC indicated that disposed sediment predominantly moved towards South-West direction.

Maintenance dredging quantities during the period 2010 to 2015 (Table.2) indicates that annual maintenance dredging requirement would be of the order of 2.56 Lakh.cum. It is learnt that all the material being dredged from the sand trap area is being used for the beach nourishment of the down-drift northern coastline to tackle the littoral drift phenomenon and to maintain the dynamic equilibrium of the coastline and thus reducing the quantity of deep-sea dumping. Annual maintenance dredging carried out from other operational areas only, which is not that significant, is to be dumped in the deep-sea dumping ground besides the occasional capital dredging quantity.

Since the dumping ground is located in the deeper contours beyond -40m, with more offset distance of 1.45Km from the port approach channel, the chances of the dumped material finding its way back in to the port approach area are negligible with the expected dumping rates.

Radio-Active Tracer studies conducted by CWPRS along with BARC in the dumping ground area of Visakhapatnam Port during January to April 2010 indicated that the predominant spread of the dumped material is in NE-SW direction. Longitudinal distances covered by tracer towards north-east and south-west from injection point were about 300 meters and 880 meters respectively. Similarly, the spread in the north-west and south-east direction was about 170 meters on either side from injection point during the observed period (Fig.2).

Results drawn from a numerical model study, conducted to assess the spread of the disposed material in deep-sea dumping ground at a location in the vicinity of Visakhapatnam are useful to understand the bed thickness change and suspended sediment concentration for a typical disposal rate. Since the calibration of mathematical model is on the basis of radio-active tracer studies conducted at Visakhapatnam, inferences drawn are reliable if the similar disposal rates are contemplated. However, regular monitoring is suggested by conducting periodic bathymetric surveys in and around the dumping grounds.

It can be seen from figure.3 that maximum bed thickness change at the dumping location is of the order of 8.0cm at the end of two months dumping at the rate of six dumps a day by a dredge having 4500 cum hopper. With this rate of disposal, contemplated dredging of 9.66 lakh.cum would be completed in 36 days only. Bar graph showing the bed thickness change versus number of days of dumping is given in Figure.4. The dredge material has been dispersed over a large area giving a negligible increase of thickness in the surrounding areas. So it can be inferred that dumping of dredge spoil do not cause any appreciable changes on the morphology at the dumping locations and surrounding area.

A typical Suspended sediment concentration (SSC) map obtained from the numerical model on 13th day of dumping at the specified rate is given vide Fig.5. It may be noted that SSC in the central portion is 0.06 kg/cum with lesser values in the surrounding area. These insignificant SSC values spreading over a larger areal extent is desirable from environmental considerations. Above information indicate that change in the water column parameters and bed morphology as well, is expected to be less due to the impact of dumping. Alternate disposal at different sub domains within the dumping ground may be adopted to further reduce the impact of dumping. It is suggested to monitor and review the performance of the dumping ground area by conducting periodical bathymetric surveys immediately before and after the dumping.

Thanking you,

Yours faithfully,

10/3/16

(M. D. Kudale)
Additional Director

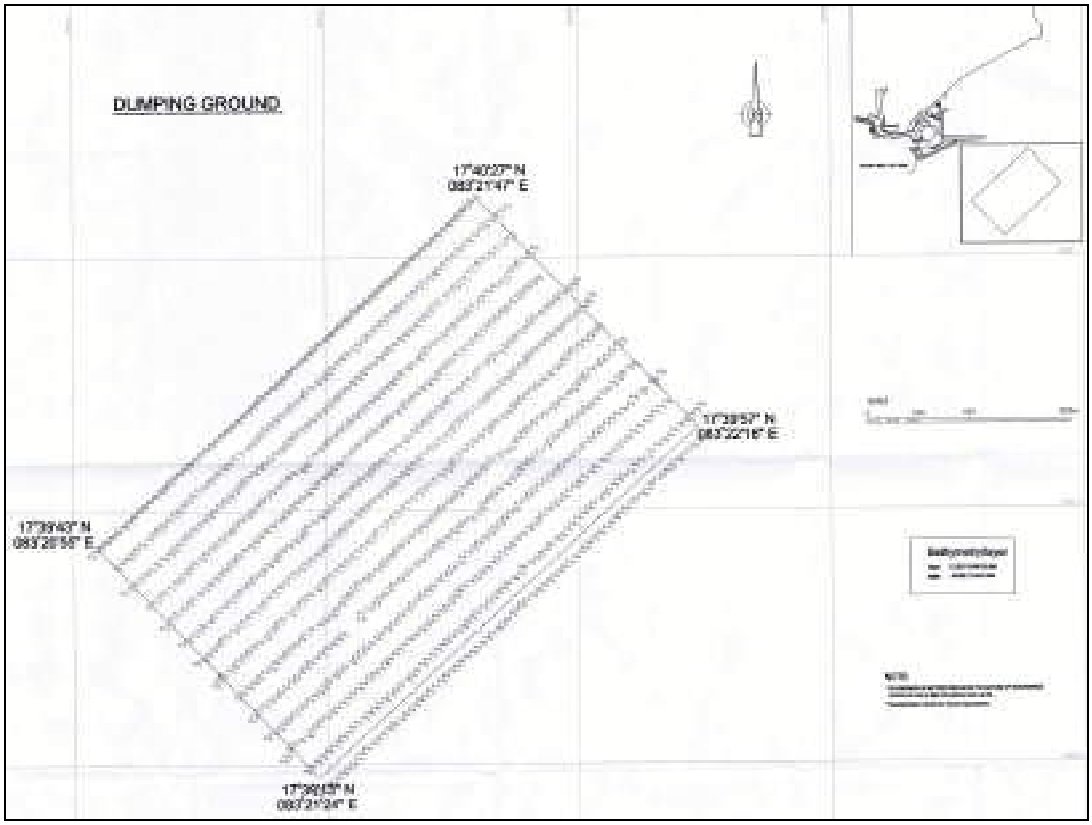


***Fig. 1**: Index map of Dumping ground at Visakhapatnam port showing the extent and Soundings*

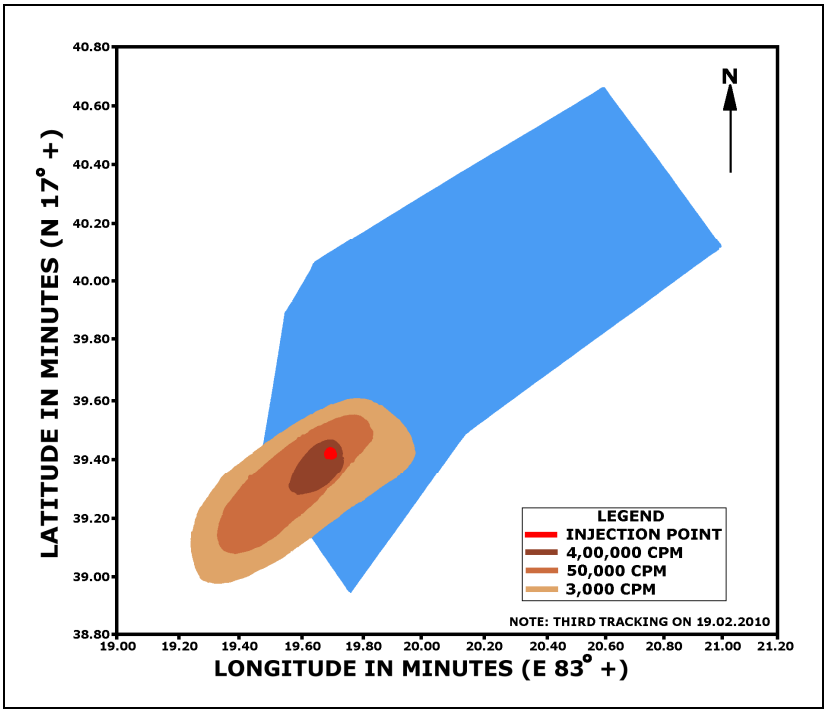


***Fig. 2**: Bed Transport / spreading pattern as per the Radio-Active Tracer study at Visakhapatnam port*

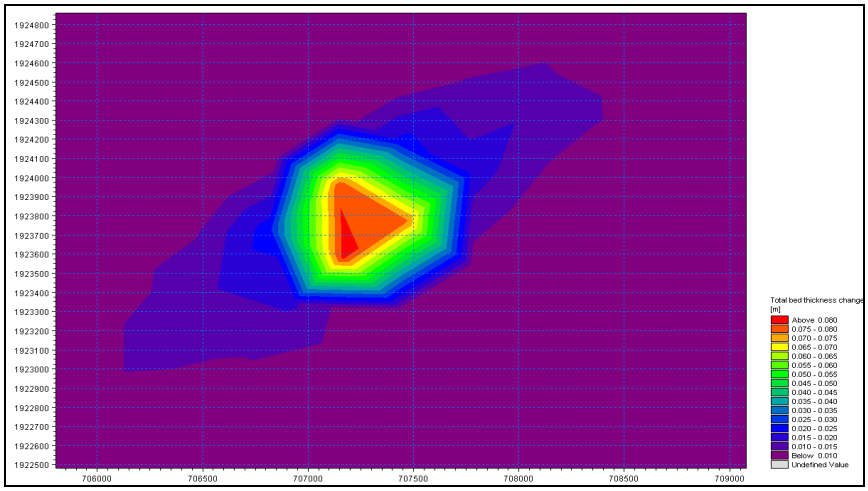


***Fig. 3**: Bed thickness change at the end of two months dumping period*

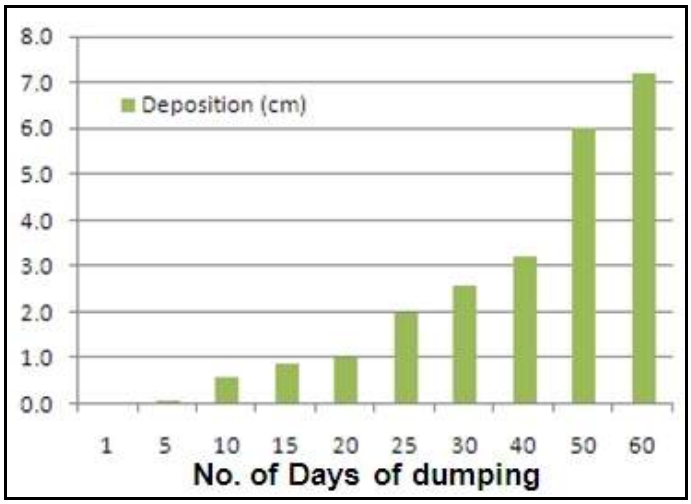


***Fig. 4**: Bed thickness change Vs No. of Dumping days*

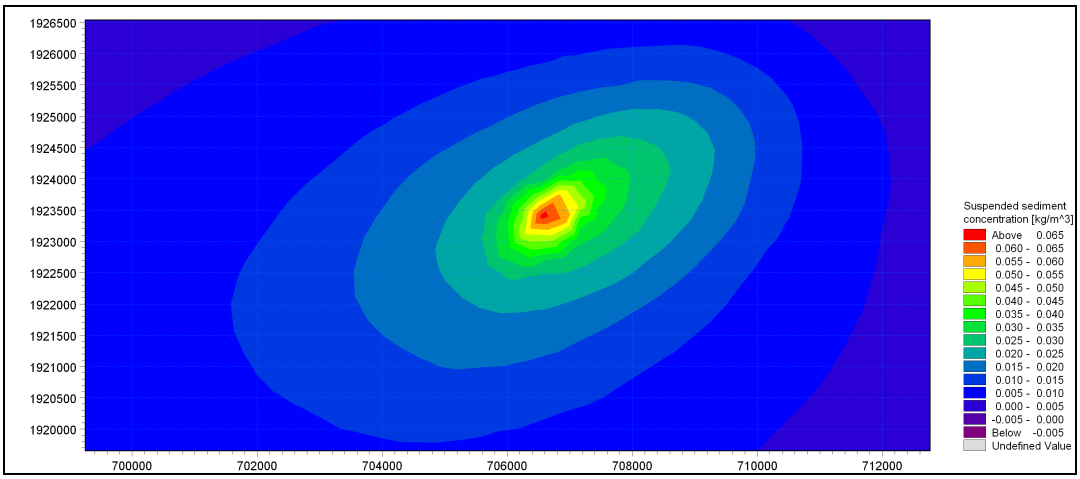


***Fig.5**: Suspended Sediment Concentration map during dumping*

ANNEXURE – 12

Sub: STATEMENT SHOWING THE DETAILS OF CER (CORPORATE ENVIRONMENT RESPONSIBILITY) IN VPA FOR YEAR OF 2024 - 2025

Sl.No.	Description of work	Expenditure incurred (Rs. in Crores)	Remarks
1.	**2.**	**3.**	**4.**
1.	Operation and Maintenance of Continuous Online Ambient Air quality monitoring Stations (CAAQMS) at 3 identified areas of VPA	0.3092	Work is in Progress.
2.	Sampling and analysis of Marine Sediments at Visakhapatnam Port	0.0138	Work is in Progress.
3.	Harbour water quality monitoring at high and low tides.	0.1170	Work is in Progress.
4.	Sampling, Analysis & Testing of raw sewage treated water of 10 MLD STP of VPA	0.0782	Work is in Progress.
5.	Operation and Maintenance Sewage Treatment Plant to handle total hospital sewage of 25 KLD at Golden Jubilee Hospital, Vishakhapatnam Port Trust for a period of 5 years.	0.0338	Operation and Maintenance is in Progress.
6.	Operation and Maintenance Sewage Treatment Plant Sullage at AOB 20 KLD for a period of 18 months.	0.3673	Treatment of Sullage water from canteen.
7.	Monitoring of Ground water samples to assess the contamination due to run off and water stagnation in cargo stacking Yards in Port area.	0.0220	Monitoring of Ground / Leachate Water is in Progress
8.	Engagement of Environment Cell Chief Manager, Manager and 3no.s of Supervisors on contract basis for Environment Cell of VPA.	0.3120	Engaged for Environmental Cell Works
9.	Marine Ecology Study	0.0412	Work in progress
10.	Providing PLC based MDSS at different areas in port area.	4.0000	Work Completed. PLC Based MDSS work is completed
11.	Construction of 4 covered storage sheds at various locations in Port area.	116.0400	3 Covered Sheds Construction work is completed. Another Shed work is in Progress.
12.	Mechanical sweeping on Port roads	1.9000	3no.s of Mechanical Sweeping Machine is deployed
13.	Three Truck Mounted and 7 Trolley Mounted Fog Canons	3.0000	Controlling of dust at operational area.
14.	Providing plantation of 10,000 Nos Avenue & Fruit Bearing plants**.**	0.0900	Work is in progress.
15.	Removal of Floating material from Drains	0.6600	Work is in progress.
16.	Green Belt Development (Maintenance)	5.0000	Work is in progress.
17.	Water Sprinkling on roads by Water Tankers	1.9200	Work is in progress.
18.	Internal roads and drains cleaning by Manpower	0.761	Work is in progress.
19	Environmental Audit and Development of Action plan for effective monitoring of Environmental Performance Indicators baseline study by NPC	0.2360	Report submitted.
20	AAQ Monitoring by Gravimetric method through M/s. MSV Analytical Laboratory	0.1275	Work in Progress.
	Total	**135.029**	

ANNEXURE – 13

Sub: STATEMENT SHOWING THE DETAILS OF CER (CORPORATE ENVIRONMENT RESPONSIBILITY) IN VPA FOR YEAR OF 2024 - 2025

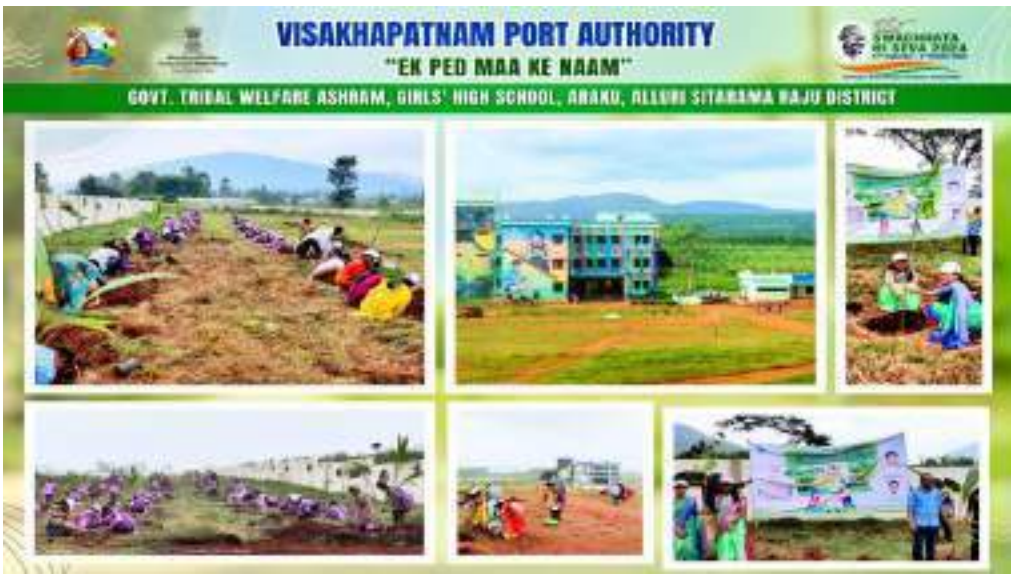
Sl.No.	Description of work	Expenditure incurred (Rs. in Crores)	Remarks
1.	**2.**	**3.**	**4.**
1.	Operation and Maintenance of Continuous Online Ambient Air quality monitoring Stations (CAAQMS) at 3 identified areas of VPA	0.3092	Work is in Progress.
2.	Sampling and analysis of Marine Sediments at Visakhapatnam Port	0.0138	Work is in Progress.
3.	Harbour water quality monitoring at high and low tides.	0.1170	Work is in Progress.
4.	Sampling, Analysis & Testing of raw sewage treated water of 10 MLD STP of VPA	0.0782	Work is in Progress.
5.	Operation and Maintenance Sewage Treatment Plant to handle total hospital sewage of 25 KLD at Golden Jubilee Hospital, Vishakhapatnam Port Trust for a period of 5 years.	0.0338	Operation and Maintenance is in Progress.
6.	Operation and Maintenance Sewage Treatment Plant Sullage at AOB 20 KLD for a period of 18 months.	0.3673	Treatment of Sullage water from canteen.
7.	Monitoring of Ground water samples to assess the contamination due to run off and water stagnation in cargo stacking Yards in Port area.	0.0220	Monitoring of Ground / Leachate Water is in Progress
8.	Engagement of Environment Cell Chief Manager, Manager and 3no.s of Supervisors on contract basis for Environment Cell of VPA.	0.3120	Engaged for Environmental Cell Works
9.	Marine Ecology Study	0.0412	Work in progress
10.	Providing PLC based MDSS at different areas in port area.	4.0000	Work Completed. PLC Based MDSS work is completed
11.	Construction of 4 covered storage sheds at various locations in Port area.	116.0400	3 Covered Sheds Construction work is completed. Another Shed work is in Progress.
12.	Mechanical sweeping on Port roads	1.9000	3no.s of Mechanical Sweeping Machine is deployed
13.	Three Truck Mounted and 7 Trolley Mounted Fog Canons	3.0000	Controlling of dust at operational area.
14.	Providing plantation of 10,000 Nos Avenue & Fruit Bearing plants**.**	0.0900	Work is in progress.
15.	Removal of Floating material from Drains	0.6600	Work is in progress.
16.	Green Belt Development (Maintenance)	5.0000	Work is in progress.
17.	Water Sprinkling on roads by Water Tankers	1.9200	Work is in progress.
18.	Internal roads and drains cleaning by Manpower	0.761	Work is in progress.
19	Environmental Audit and Development of Action plan for effective monitoring of Environmental Performance Indicators baseline study by NPC	0.2360	Report submitted.
20	AAQ Monitoring by Gravimetric method through M/s. MSV Analytical Laboratory	0.1275	Work in Progress.
	Total	**135.029**	

ANNEXURE – 14

VISAKHAPATNAM PORT AUTHORITY

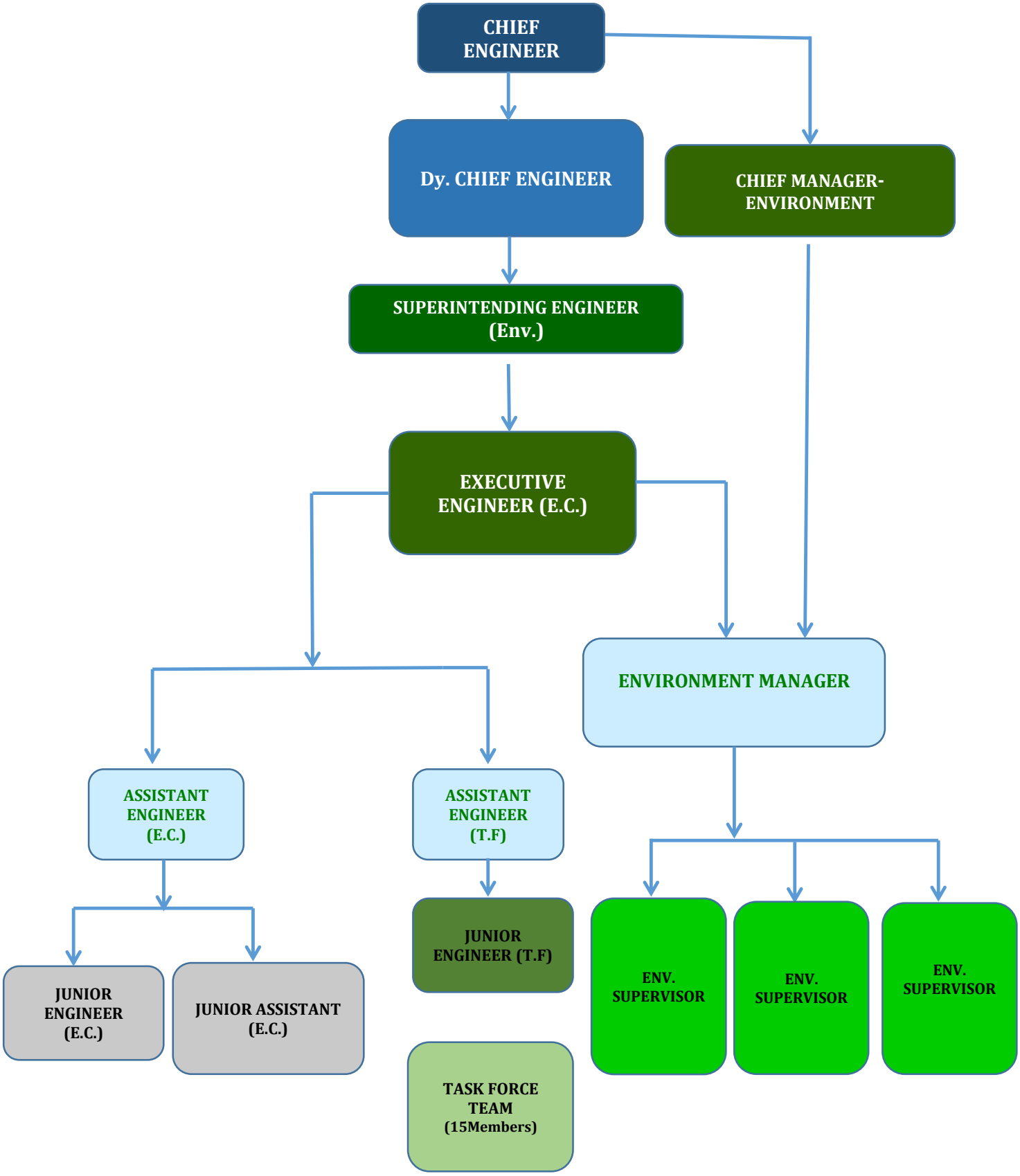
Green Belt Development in and Around the Port Area


VISAKHAPATNAM PORT AUTHORITY


VISAKHAPATNAM PORT AUTHORITY
"EK PED MAA KE NAAM"
GOVT. TRIBAL WELFARE ASHRAM, GIRLS' HIGH SCHOOL, ARAKU, ALLURI SITARAMA RAJU DISTRICT

ANNEXURE – 15

VPA Environment Cell Organogram Chart



ANNEXURE – 16

Website : http://peso.gov.in
Email : explosives@explosives.gov.in
दूरभाष / Telephone : 0712-2510248
फैक्स / FAX : 0712-2510577
कार्यालय से संबंधित सभी पत्राचार मुख्य विस्फोटक नियंत्रक के पदनाम से ही किया जाए, व्यक्तिगत नाम से नहीं।

All communications intended for this Office should be addressed to the Chief Controller of Explosives and NOT to him by name.

भारत सरकार
GOVERNMENT OF INDIA
वाणिज्य और उद्योग मंत्रालय
Ministry of Commerce & Industry
पेट्रोलियम तथा विस्फोटक सुरक्षा संगठन
Petroleum and Explosives Safety Organisation
(पूर्व नाम – विस्फोटक विभाग)
(Formerly - Department of Explosives)
ए-ब्लाक, पांचवा तल, केन्द्रीय कार्यालय परिसर,
"A" Block, 5th Floor, CGO Complex
सेमिनरी हिल्स, नागपुर - 440 006 (महा)
Seminary Hills, Nagpur-440006

क्रमांक / No. G-22(47)118/VII

दिनांक / Dated : 09/03/2022

To,

The Chief Engineer,
Engineering Department,
M/s. Visakhapatnam Port Trust,
Visakhapatnam – 530 035.

Sub: **Approval for Rehabilitation of Breasting and Mooring Dolphin at OSTT Jetty, Visakhapatnam Port Trust under Petroleum Rules, 2002 - Regarding**

Dear Sirs,

Please refer to your letter No. IM&UE/MOP/MII-8585 dated 17/02/2022 & inspection of the subject facilities by officer of O/o Dy. Chief Controller of Explosives, Visakhapatnam on 29/01/2021. Subsequently, M/s. Visakhapatnam Port Trust has submitted compliance report dated 15/02/2022 to the O/o Dy. Chief Controller of Explosives, Visakhapatnam. The inspection report along with recommendations of Dy. Chief Controller of Explosives, Visakhapatnam dated 17/02/2021 on the subject matter.

O/o Dy. Chief Controller of Explosives, Visakhapatnam has reported that M/s. Visakhapatnam Port Trust has conformed the avability of 2 Nos. of Class – III fire floats and 3 Nos.of tug boats as a Portable arrangement made for firefighting as per OISD 156, and recommended for handling the ships at the subject jetty restricted upto 1,00,000 DWT only.

In view of above the approval is accorded for the handling of vessels upto 1,00,000 DWT with following conditions :

1) A detailed clause wise compliance to OISD 156 shall be ensured.
2) SOP shall be strictly followed and regular safety audit to be carried out.
3) All activities shall be supervised by your technical competent persons.
4) Flame proof equipments with CCE approval details shall be maintained.
5) Details of hoses/unloading arms shall be regularly tested
6) HC/Fire detectors at strategic locations to be maintained
7) Automatic shutdown initiation due to HC/Fire detection to be incorporated suitably
8) No other activities to be carried out within 100 Mtrs. Radius from the unloading Arm/manifold.
9) All due safety precautions shall be taken to prevent accidents

This is issues with the concurrence of the Chief Controller of Explosives.

Yours faithfully,

[S.D. Mishra]
Controller of Explosives
for Chief Controller of Explosives

P.T.O.